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Implementing Agency	Ministry of Natural Resources and Environmental Affairs and targeted District Assemblies and Non-Governmental Organizations in the Lake Malawi Basin Address: Private Bag 350, Capital City, Lilongwe, Malawi Contact Person: Alex Bulirani Tel: 265 263-432 Fax: 265 263-151 mail: Abulirani@Globemw.Net University of Malawi and core natural resource departments in the Ministry of Water Development, Agriculture and Irrigation, and Tourism and Wildlife, with the coordination of the Department of Local Government Administration in the Ministry of Local Government
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1. Country and Sector Background

1.1 Local, national and global significance of Lake Malawi's biological resources:

Malawi’s urban and rural populations, and the national economy, depend heavily on the country’s agricultural, forest, water and lake resources for their nutritional and economic well-being. To Malawi, the Lake represents a vital source of fresh water, food and livelihoods. It is also a tourist destination, it forms the basis of a local transport network, and through its outflow into the Shire River it provides the country with its main source of hydroelectric power. The Lake and its tributaries provide an estimated 70% of the animal protein consumed in the country, thereby constituting a critical, life-sustaining input to the hronically food deficit and malnourished population. The commercial fisheries from Lake Malawi are currently estimated to contribute 1-2% to GDP and provide employment to about 40,000 people directly, and another 250,000 people in related employment activities such as fish processing and marketing. But its importance to the nation is far greater than these statistics would imply due to both the national nutritional contribution and the catalytic effect that fishing revenues have on a diversity of other economic activities at major landing sites. Nor is the latent economic value of the Lake reflected in the current forms and intensity of exploitation. Important untapped fisheries resources as well as agricultural irrigation potential await sustainable

development. The Lake possesses a number of other features that make it unique among the lakes of the world. As one of the East African Rift Valley Lakes, it is the ninth largest in the world and the third largest in Africa. The most well known feature is the species-rich assemblage of fishes whose diversity surpasses that of any other freshwater fish community in the world. Of great interest to the scientific community, this diversity, along with the fascinating breeding and feeding behavior exhibited by many of the fish, has been studied under the first GEF/SADC Project. Particularly noteworthy are the 800+ species belonging to the cichlid family, of which all but five are endemic to the Lake. Because this ichthyofauna is endemic to the Lake and because such rich speciaction among haplochromines has only occurred on such a grand scale in only two other lakes in the world, both in Africa (Victoria and Tanganyika), the global community has only one chance at effective management of this unique resource. But to the population living in the Lake catchment, it is fish's utility as a source of high quality food, rural income and employment what makes the Lake's exceptional biodiversity so valuable. Malawi is a major beneficiary, as the majority of the Lake's surface area is within Malawi, along with about 80% of the total lakeshore population. Over 95% of the Lake's fish catch in Malawi is caught by small-scale and artisanal methods within two kilometers of the shoreline. The shallow water-based artisanal fishery is however in a downward spiral of deterioration as a result of localized over-fishing and increased land degradation in the catchment, and sedimentation in sensitive habitats within the Lake. There has been a decline in fish stocks of some key species in the biodiversity-rich nearshore areas of the Lake, which are habitat for the most diverse and endemic species of cichlids. Due to their sedentary nature and low reproductive rates, the speciose cichlids are vulnerable to extinction from excessive fishing pressure, changes in water quality and localized overexploitation of the nearshore areas. The only area which currently protects the cichlid fishes is the 94 km² Lake Malawi National Park in the southern part of the Lake (Malawi), declared by UNESCO as a "World Heritage Site" in 1982, but the continuous nature of the lake environment leaves the park to large scale changes in the Lake and its basin.

1.2 State of the lake ecosystem and the economic livelihoods that depend on it:

Although the Lake overall is still in a relatively good condition and supporting its remarkable biodiversity, valuable riverine fisheries and inshore fish communities (primarily in the shallower southern portion of the Lake) are being impacted by current resource use trends. The recently completed GEF/SADC Project studied the water quality of all the major rivers flowing to the Lake. The project concluded that several rivers are substantially altered by the activities within their catchment. Riverine fisheries in these catchments have already declined through a combination of over-fishing and habitat degradation of spawning and nursery areas for young fish. It was further shown that these rivers especially in the southern part of the Lake were already changing the water quality and algal communities in local and larger areas of the Lake in ways which could reduce the habitat availability of inshore, highly diverse benthic fishes. The nutrient and sediment loading to the Lake from its rivers has likely increased by 50% within this century with a few rivers such as the Linthipe, Songwe and Dwangwa accounting for much of that increase. Even though the Lake on the whole remains in relatively good condition, with rapidly increasing populations in the riparian countries and the need to bring more marginal land into cultivation, the potential for serious degradation will only increase in the next few decades. Agricultural production in Malawi, almost 70% of which comes from smallholder farmers, accounts for more than 90% of export earnings, contributes 45% of GDP and supports more than 80% of the population. Despite the central importance of agriculture, the basis of agricultural production – the soil – is declining in fertility as a result of decades of neglect. Evidence for long-term soil degradation and soil erosion includes physical measurements of soil loss, declining yields from unfertilized crops, declining responses to fertilizer application and impaired watershed

performance. Similarly, with more than 90% of Malawi's energy requirements met from biomass supplies and national wood consumption standing at double the sustainable production, the country faces a looming fuelwood crisis as energy needs are met through the liquidation of forest capital. The increased soil load moving off of degraded watersheds and eroded fields finds its way to the Lake through the country's river systems, where it poses a threat to the Lake ecology and to the condition of the nation's watercourses. Although only 28% of the Lake's total drainage basin area is within Tanzanian borders, the country provides for 53% of the total inflow into the Lake. Major rivers are Songwe (shared with Malawi), Kiwira, Lufirio, Ruhuru and Rumakali and annual mean runoff exceeds 10 million l/km² in many areas. As a result, land management within the Tanzanian catchment area has a significant impact upon the level of nutrients, sediments and other land-based pollution entering the Lake. Although the northern shoreline currently is significantly less exposed to agricultural practices and development pressures than the southwestern areas (Malawi side) of the Lake, it is clear that further land clearance in the more mountainous northern areas will have relatively greater negative impact on the Lake due to steeper slopes and higher rainfall. (Mozambique has very little influence on the Lake's chemistry, as its catchments on the steep eastern lakeshore are very small, sparsely populated and mostly forested). As a result of the above processes, resource degradation in the watersheds and in the Lake is worsening, jeopardizing both the fragile level of nutritional sufficiency of rural families and the very resources on which their livelihoods depend. While the specific causes of land degradation vary from locale to locale and even from landholding to landholding, the causal linkages between land-based resource degradation and Lake resource productivity and ecological health do not stop with the deposition of soil and nutrients into the Lake. As agricultural livelihoods are threatened by declining soil fertility and the resulting drop in the ability to meet subsistence economic and nutritional requirements, pressure on Lake resources increases. Lake Malawi has historically served as a safety net for the rural population in times of need and the low capital and technological requirements of artisanal fishing methods combined with the prevailing lack of social or governmental regulation of access provide significant incentives to indiscriminate exploitation of the Lake's fisheries resources. The consequence has been increased pressure on the biodiversity-rich nearshore fisheries, declining catch, a heightened risk of depletion of local stocks, and possible endangerment and loss of valuable endemic species. The Government of Malawi has recognized this dual threat to livelihood sustainability and economic development and is seeking to develop strategies to improve both resource conservation and productivity. The major consequences of not confronting present trends would be a decline in the overall artisanal fishery, loss of biodiversity and a continued deterioration of Lake water quality and potential uses, including unsustainability of the Lake water for domestic supply, livestock or hydroelectric generation, loss of potential tourist revenue and related recreational opportunities, higher prevalence of water-borne diseases and related human and economic costs, and degradation of wetlands and their associated environmental and economic services. The urgency of the challenge has been dramatically reinforced by a lake wide fish kill which began in late September 1999 and extended into November. This protracted die off of a wide spectrum of fish species with quite different ecological niches and oxygen tolerances is unprecedented in the Lake's known history and is deeply troubling to the people dependent on the lake's resources, as well as those concerned about the exceptional biodiversity. Other costs will arise from the destruction of the existing biological diversity for its scientific interest and its role in providing a resilient ecosystem for the Lake.

2. Objectives

The Lake Malawi Ecosystem Management Project (LMEMP) is one of three nationally-based ecosystem management programs, currently under preparation with the Governments of the other two countries adjoining Lake Malawi/Niassa/Nyasa

(Mozambique and Tanzania). The project will be the first of its kind in this Lake that is both of great economic value to the riparian countries and of great scientific and cultural significance to the global community. LMEMP's development objective is to contribute to the country's efforts to improve the economic livelihood of stakeholder communities living along the lakeshore and in the catchment of the Lake. The project will identify and demonstrate practical, self-sustaining environmental management interventions in critical pilot zones, while simultaneously building the constituencies and capacity of national and local-level institutions for ecosystem management. It will have as its central aim maximizing the benefits to riparian communities from improved fisheries management and the sustainable use of soils, forests, wetlands and other resources within the basin to generate food, employment and income, while sustaining the ecosystem from which these benefits arise. The Global objective of the project is to bring about joint management and monitoring of the shared drainage basin for conservation and sustainable use of the Lake's globally significant biodiversity for the benefit of the people who live in the catchment, the national economies of which they are a part, and the global community.

The fundamental concept put forward for the Lake Malawi Ecosystem Management Project is that the project will enable a more programmatic linkage between the Lake and its watershed in the thinking and planning of resource users, sector agencies, local governments and ministries concerned. This is a significant challenge considering that at the moment natural resource management in the Lake watershed is not the explicit mandate of any particular government agency or institution. In this regard, LMEMP will help create a more informed constituency within sectoral ministries and agencies, district assemblies, local level institutions and communities for an integrated ecosystem approach for sustainable resource management of the Lake resources. All interventions considered for support under LMEMP will be consistent with existing government programs and policies and will be implemented through existing structures at national, district and local levels, while supporting the district development framework in the three countries. The formulation of LMEMP is based on a good understanding of priority transboundary environmental concerns, the sectoral policy causes of such problems, and riparian recognition of the strategic actions required to address the identified threats to the Lake ecosystem. Transboundary diagnostic analysis is the basis for the formulation of the Strategic Action Program (SAP) by the three riparian countries. Between 1996 and 2000, the GEF, CIDA and DFID supported the implementation of the GEF/SADC Lake Malawi/Nyasa Biodiversity Conservation Project, an intensive regional research program on the Lake. The project concept centred on filling the gaps in knowledge and understanding of (a) the distribution and current status of biodiversity, and (b) catchment and limnological processes which provide the basis of the Lake's biological productivity. This was achieved through a strong international scientific input over four years that led to comprehensive assessments of the state of the Lake ecosystem, the sources and severity of threats to the ecosystem, and the geographic and temporal parameters of those threats. The knowledge base generated by the GEF/SADC Project thus provides important information on baseline conditions in 1996-2000, against which future improvements can be evaluated.

3. Rationale for Bank's Involvement

Research carried out under the former SADC/GEF Biodiversity Conservation Project indicates that a highly targeted approach to land use improvements in the catchments is required in order to reduce or reverse the trend towards eutrophication and harmful sediment impacts in Lake Malawi. Current government-supported interventions in the watersheds do not take this requirement into account, and will not therefore address the problems of the Lake ecosystem in a systematic manner. Given existing financial constraints and the intensification of problems in land and natural resources management, it is likely that

activities on the ground will remain limited and progress correspondingly slow. Indeed, in some sectors such as forestry and fisheries net progress is actually negative overall. The Bank would therefore support the only intervention that seeks to build government and community capacity to address resource degradation in a comprehensive and strategic manner that is directly related to maintenance of the economic and biologic productivity of the Lake and its catchments.

Currently the only donor active within the fisheries sector on Lake Malawi is GTZ, and this agency's support to policy, research and management will end in October 2002. Malawi is in the unusual position of having a well-developed fisheries sector policy, well-researched problems in fishery management and resource allocation, and proven fishery development opportunities in the form of under-exploited fish stocks. The Bank is thus uniquely placed to assist the Government to convert theory into practice by supporting policy implementation and financing the design and pilot testing of a management and sector development framework for Lake Malawi.

GEF support for LMEMP has had an enormous leveraging with national funding, development financing, bilateral funding, and private sector action for operationalizing an ecosystem approach for Lake Malawi, not only in Malawi but also in Tanzania and Mozambique where national Lake programs are being prepared. Undoubtedly there will be substantial additional funds from other donors. These planned and future initiatives still forthcoming are expected to "take their signals" from the framework to be streamlined under this project. GEF funding will also make possible the development of permanent institutional arrangements for implementation of an integrated ecosystem approach to managing the lake ecosystem.

4. Description

The project will consist of two broad sets of investments. The first set of investments, which will be designed to identify, test and demonstrate practical, self-sustaining management interventions to address specific environmental threats (studied under the first GEF/SADC Project), will take place in a series of selected pilot zones. The second set of investments, which will improve information on the Lake, build a more informed stakeholder constituency for ecosystem management, and enhance local and national capacity for more effective ecosystem monitoring and management, will be of necessity lake-wide in scope. All components will contain a mixture of information gathering, monitoring, capacity building and support for community-based interventions to address the prioritized issues in the project's pilot zones. All components will receive funding from the GEF and other bilateral agencies. LMEMP will support the following specific activities under four project components:

(1) Integrated Watershed Management component
A key objective of LMEMP is to protect fisheries productivity and species biodiversity in Lake Malawi by reducing soil and nutrient loss from the lake catchments and the loading of these materials into the Lake. Under the Integrated Watershed Management (IWM) component, this objective will be accomplished through a combination of improved ecosystem planning and monitoring capacity at national level, strengthened integrated action planning and implementation at district and area level, and community driven investments in priority watershed management activities in sensitive catchments. The activities to be carried out on the ground will contribute to the environmental objectives while at the same time contributing to the national goal of poverty reduction through enhanced resource productivity.

Specific sub-components include:

A. Develop National Capacity for Integrated Watershed Management Planning and Monitoring. The objective of this sub-component is to develop a national capacity for ecosystem-based planning and more specifically for a watershed focus in the sectoral planning of the principal natural resource departments. This will require the development and maintenance of relevant databases for ecosystem management, the development of a national monitoring program, and training in integrated watershed management planning methods for technical staff in the natural resource departments. This sub-component will also include support for the harmonization of policy and legal frameworks to facilitate implementation of an ecosystem approach to planning and support to sectors to orient sector planning and resource allocation systems in accordance to the priorities developed from an ecosystem-based approach.

B. Decentralized Capacity-building for IWM.
In keeping with Government's commitment to decentralize planning and implementation functions to the districts, this sub-component will provide support for IWM planning at District and Area levels. Since technical capacity at this level is generally weak, LMEMP will support the reallocation of technical resources from central to district level in targeted districts, while providing specialized medium- and long-term training for officers assigned at district and area levels. Logistical support will also be strengthened for district, area and field-level technical specialists directly involved in supporting LMEMP-funded IWM initiatives in priority watersheds and micro-catchments. NGO and CBO involvement in supporting field-level initiatives is to be encouraged, with special attention to training and other capacity-building needs.

C. Community-Driven Investments in IWM.
There is substantial demand from resource users and communities for investment in improved natural resource management practices and infrastructure as revealed in the process of developing District Environmental Action Plans and District State of the Environment Reports. There is growing awareness of the linkage between conservation practices and productivity; what is often missing is the application of information, organization, and funding. LMEMP will assist in providing these key ingredients by promoting the communication of indigenous and other technical knowledge, supporting community institutions in mobilizing people and resources for locally-defined projects in critical micro-catchments, and providing funding through local administrative channels for projects that have passed through district planning processes.

Approach and Justification
The first GEF/SADC Project (completed in 2000) defined fluxes of sediments and nutrients to Lake Malawi at the river basin scale and confirmed that poor agricultural practices, deforestation and seasonal burning are already having a measurable impact on riverine and near shore fisheries and biodiversity, and threaten to bring about a major shift in the Lake's ecology through eutrophication of its surface waters. A catchment modeling study undertaken in 2000 indicated that the principal source of river-borne sediment and nutrients is the steep escarpment zone, mostly lying within 40km of the lakeshore. These steep areas in close proximity to the shoreline of the Lake have high slopes, fragile soils and high rainfall which give them high erosion potential. The strongest effects of this process are felt in the shallow water aquatic communities that are located near the biodiversity-rich deltas. Shoreline and water quality changes in the vicinity of impacted rivers together with intensive exploitation of the highly diverse near shore fisheries resources reduce fish production, lower local lakeshore incomes and nutritional conditions as well as eliminate their potential to supply fish to inland areas within the riparian countries. The Integrated Watershed Management component will select priority river basins and will work with communities at the micro-catchment and catchment

levels to reduce excessive loss of water and soils from watersheds, increase soil fertility, increase rates of afforestation, protect and increase potable water supplies, empower resident communities to maintain and monitor their watersheds, and introduce new approaches for integrated delivery of watershed management services. Specifically, the component will support (a) integrated watershed management planning and coordination, including the progressive refinement of existing catchment models to improve the targeting of field interventions and the strengthening of a multisectoral ecosystem-level approach to natural resources management within the Lake basin; (b) an integrated program of community-based soil conservation, wetland maintenance, and forest management interventions in targeted micro-catchments, based on existing government policies for land resources, forestry, water, wildlife and fisheries; and (c) the monitoring of watershed function, with particular emphasis on strengthening the hydrological monitoring network but also including the monitoring of land use change, forest cover and in some cases river fisheries. The monitoring activities supported under the IWM component will also contribute directly to the tripartite Lake Malawi/Niassa/Nyasa International Monitoring program (component 4) by providing input information for the principal Malawi catchments. Critical basins from this perspective are the Linthipe, with the largest urban population in the Lake catchment and the Songwe, Bua and Dwangwa where increasing pressures for agriculture may be affecting water yields and quality significantly. These larger basins differ markedly in their impacts on the Lake's coastal areas, but the causes are still poorly defined in terms of land uses. The project will strengthen the relevant departments' ability to conduct assessments of larger river basin issues and tie together sectoral information and databases into a common GIS-based watershed database and modeling approach so that services and interventions can be targeted into critical areas undergoing rapid loss of natural capital. Such an approach will also assist stakeholders to generate credible predictions about the future status of the Lake, confirm causes of past changes in loss of watershed natural capital, target critical areas for interventions, and evaluate their anticipated impacts on the water quality and fish resources of coastal areas of the Lake.

The IWM component will be multi-disciplinary and will cut across traditional sectoral and ministerial boundaries within national administrative structures. It will be implemented by staff from several natural resource departments, including Water Development, Forestry, Parks and Wildlife, Land Resources, and Fisheries, and by the University of Malawi, District Governments, NGOs, and most critically the communities in the targeted micro-catchments. There is a large number of possible sites on the escarpment, and the micro-catchments finally chosen for action will vary in their size and the time required to bring about a monitorable change. But the entry point for the implementation of these objectives will be existing policies and programmatic approaches of the implementing agencies. LMEMP will build upon the current knowledge and capacity of the implementing departments and will focus on strengthening those departments and mobilizing their technical capacity at the community, district, and national level.

(2) Fisheries Resource Management

The fisheries component seeks to improve the livelihoods of fishing communities along the Lake and contribute to nutritional availability and economic productivity at both the local and national levels by improving ecosystem-based fisheries management strategies and policies and ensuring that fish resources are utilized sustainably while conserving globally significant biodiversity. The component will examine the feasibility of community-based management of fishing areas to determine sustainable levels of exploitation which reduce overexploitation of fish stocks and minimize risks of species extinctions in the highly diverse fish communities of the Lake. It is anticipated that trials of combinations of fishing technology, methods and intensity will determine the type and scale of artisanal fishing which brings the greatest return on achievable investment to the artisanal fishermen and their fishing community

while minimizing risks of species extinctions. From these trials at the community level, a coherent strategy and policy development framework for the sector will be formulated with the support of the project.

Specific sub-components include:

A. Fisheries Management
Strategy. The sub-component will consist of a lake-wide planning framework for biodiversity conservation and enhanced sustainable exploitation of fisheries resources. Using data generated from the predecessor GEF/SADC Project and other scientific studies on lake biodiversity and fish stocks, a comprehensive strategy for protecting fragile lake habitat and species diversity while enhancing the economic and nutritional contribution of lake resources to families, communities and the national economy will be developed. The development of technically sound and financially viable production strategies will be a key sub-component of the component. This sub-component will also support the regulatory and research (monitoring) functions of central departments.

B. Pilot Technology and Production
Methods Innovations. Scientific studies referred to above confirm that there is a large, relatively untapped fisheries resource in the deeper areas of the Lake. These studies also reveal the fragility of some fish stocks, the existence of over-exploitation in some nearshore areas, and the generalized threat of unregulated exploitation to the quality of lake resources and biodiversity. While a number of technologies and fishing methods innovations have been advanced to address issues such as overfishing of nearshore stocks, there has been little systematic assessment of the appropriate mix of innovations to provide financially viable and technically accessible options for fisher communities and entrepreneurs. This sub-component will provide for rigorous study and development of approaches of technologies and fishing methods as well as careful monitoring of the impact of each production package on lake biodiversity while also assessing the equity and social impacts of different packages. While particular attention will be accorded to packages adapted for small-scale and artisanal fisher populations, the constraints and opportunities for medium-scale commercial exploitation will also be addressed.

C. Strengthen Producer and Community-based
Management of Fisheries Resources. While sector-wide regulations are an important aspect of fisheries management, effective management of the fisheries ultimately depends on the actions of local producers and fisher communities. This sub-component will support Fisheries Department initiatives in the establishment and strengthening of Village Beach Committees. Support will also be given to assessing the demand for producer-based organizations for artisanal and semi-commercial fishers. Such groupings may be of particular value in information generation and sharing regarding best practices, production technologies, and the incentives surrounding regulatory compliance. It may be anticipated that these groups will also play a critical role in the development and implementation of agreements regarding managing access to fisheries. Innovations developed under this sub-component will also require careful monitoring for the impact on vulnerable populations.

Approach and Justification
Lake Malawi possesses a number of features that make it unique among the lakes of the world. The most well known feature is the species-rich assemblage of fishes whose diversity surpasses that of any other freshwater fish community in the world. Of great interest to the scientific community, this diversity, along with the fascinating breeding and feeding behavior exhibited by many of the fish, has been studied under the first GEF/SADC Project. But for the population living in the Lake catchment, it is fish's utility as an inexpensive source of high quality food what makes the Lake’s exceptional biodiversity so valuable.

The shallow water artisanal fishery is however in a downward spiral of deterioration as a result of localized over-fishing and increased land degradation, sedimentation and siltation in the catchment. There has been a decline in fish stocks of some key species in the biodiversity-rich near shore areas of the Lake, which are habitat for the most diverse and endemic species of cichlids. Due to their sedentary nature and low reproductive rate, cichlids are vulnerable to extinction from excessive fishing pressure, changes in water quality and localized overexploitation of the near shore areas. The principal challenge for sustainable management of the Lake's fisheries is to reduce pressure on the fragile and highly diverse near shore stocks. To date there has been very little management of the artisanal fisheries. Malawi and Tanzania have enacted laws to regulate the fisheries by conventional means – through mesh size restrictions, gear prohibitions, closed seasons and minimum landed sizes – but in practice these are not well enforced nor complied with. There has never been any attempt to limit total fishing effort and fishing pressure is contained only by the opportunity cost of labor (which is very low) and the industry's technical backwardness. In 1997 Malawi enacted a fisheries law that provides, for the first time, for the sharing of management between the government and the fishing communities. This policy shift shows some signs of promise, but it cannot yet be said to have been successful. Both Mozambique and Tanzania have expressed interest in developing similar co-management regimes in their artisanal fisheries. Tanzania has successfully adopted this approach on Lake Victoria.

The fisheries component of LMEMP will provide a planning framework for development of an ecosystem-based socially and environmentally sustainable fisheries management strategy. Such strategy will enable to manage fisheries resources in ways that are consistent with sustaining the biological viability of fish stocks and the financial viability of the fishing industry. Currently, the Lake's near shore stocks are under heavy pressure from artisanal fisheries, while offshore demersal stocks are only moderately exploited and the large offshore pelagic stocks are very lightly exploited. There exists a real possibility of complementing attempts to improve the management of the biodiversity-rich inshore fisheries by promoting the diversification of the fishing sector into offshore waters. This could involve investigating options for sustainably increasing yields and generating economic opportunities by determining appropriate technologies and fishing methods which could allow the artisanal fishery sector to sustainably develop into a locally-based small-scale fishery based on demersal and offshore stocks. Such efforts will need to be community based and will reduce pressure on the biodiversity-rich near shore stocks. It is the intention of the Government to do this within the context of a well-defined management strategy for the Lake fisheries and under a regime of close supervision and monitoring. Over the past decade a great deal of fishery research has been undertaken in the Lake, the results and recommendations of which are neither easily accessible to fishery managers nor in all cases in agreement with each other. It is necessary to develop a synthesis of current understanding on the various fish stocks and the relationships between them in order to design a coherent ecosystem-based strategy for fisheries management. In cases where the fishery scientists are in disagreement, the scope and implications of such disagreement must be made clear and suitable tests embodied in the resulting adaptive management/development strategy. Monitoring is also a vital component in any management structure, and the future fisheries resource component will be tied to monitoring systems operating at national and local levels. Local-level monitoring will include elements of intensive research as well as the tracking of key indicators, e.g. catch per effort and size distribution of the catch, by members of the fishing communities.

The Fisheries component will therefore support initiatives to develop an ecosystem-based fisheries management strategy for the national fishing industry; radically improve the management of near shore artisanal fisheries by supporting implementation of the government's participatory fisheries management policy;

propose financially viable and biologically sustainable approaches for possible community-based offshore fishery development in selected pilot areas, including a rigorous assessment of the environmental and social impacts of full-scale development; investigate the feasibility of aquaculture in the lake shore zone, now favored by market conditions, as a complementary source of fish protein, and define a sector investment strategy to support the development of environmentally and socially proven opportunities in offshore fishing and aquaculture to reduce pressure and improve management on the biodiversity-rich near shore areas.

It is evident that without improved management of the resource there will be serious impacts on the valuable near shore fisheries resources, with negative socio-economic consequences for fisherfolk communities and the local economy. The most dramatic and direct effect of not taking action would be the onset of increased instability in the fisheries sector and a risk of at least localized collapses of shallow water fish stocks, with negative impacts on biodiversity. The example provided by the chambo fisheries in the upper Shire and nearby Lake Malombe, located south of Lake Malawi, illustrates the potential crisis that could arise if measures are not taken to manage the Lake's fisheries in a sustainable manner.

(3) Mobilization of Social and Institutional Capital
The objective of this component is to increase the awareness of and contribution to effective resource management of key social institutions at community, district and national level involved in the management of Lake Malawi resources. This will be accomplished in part by supporting existing Government initiatives to build local capacity to manage the natural resources upon which local livelihoods depend, such as the Village Natural Resource Management Committee and the Village Beach Committee. In addition to these organizational innovations, existing social capital in the form of indigenous knowledge and social institutions governing and informing community organization and mobilization, resource management practices, and collective decision-making will be acknowledged and integrated into project identification, development, implementation and monitoring procedures. Horizontal and vertical networking within and among stakeholder communities will be supported as a primary factor in establishing and voicing local demands for ecosystem management and planning.

Specific sub-components include:

A. Indigenous knowledge and Improved Resource Management.
This sub-component will actively address the integration of indigenous knowledge and practices into technical decision-making processes for integrated watershed and fisheries management. It will also identify constraints which limit the adoption of alternative technologies and approaches or negotiate alternatives which may be more socially acceptable and equally effective.

B. Support for Government CBNRM and Decentralization Policy.
Existing programs to establish and strengthen community-based organizations such as Village NRM Committees and Village Beach Committees will be assessed to determine best practices. Support will be provided to expand these organizations into pilot areas and to strengthen the capacity of relevant technical departments to support these CBOs.

C. Capitalizing on Community Expertise.
Study tours, local “best practices” competitions, and other mechanisms for information exchange among community natural resource managers will be assessed for effectiveness and promoted as a means of fostering horizontal networking and information capital accumulation.

D. Vertical Networks:
Working up the Watershed. As part of the social capital strengthening process, vertical networks linking resource users, community organizations, Traditional Authorities, district technical and administrative officers and national policy-makers and technical specialists will be facilitated. Watershed forums will be organized allowing for discussion across jurisdictional boundaries as well as social and technical hierarchies. Such fora will provide a mechanism for sharing knowledge and experiences, establishing priorities, and evaluating the results of initiatives sponsored by this and related projects over time.

Approach and Justification
A key objective of LMEMP is to build a more informed stakeholder constituency for sustainable resource management of the Lake resources. Through the Social and Institutional Capital mobilization component, the project seeks to foster a strong linkage among knowledge (including indigenous knowledge), stakeholder participation, and co-management initiatives, which all LMEMP components will support. A major consideration for the project is how to institutionalize such efforts so it continues beyond the life of LMEMP. LMEMP success will rely to a considerable extent on an informed exchange among the stakeholders at all levels. This informed exchange includes not only the dissemination of information generated at the center (government policies, research findings, extension recommendations etc.) but also the contribution of (indigenous) community-based knowledge to decision making in the co-management of the Lake resources to be supported under LMEMP. The preparation of this component builds on earlier indigenous knowledge (IK) related activities in Malawi dating back to 1995, and a National Science and Technology Policy approved in May 2001 which stresses the relevance of IK. This cross-cutting component will develop multi-stakeholder information networks for Lake Malawi ecosystem management; support vertical communication linkages that ensure a regular two-way flow of information between resource users, local authorities and central technical specialists and policy makers; and facilitate mechanisms for horizontal information exchange, such as fisher-to-fisher, farmer-to-farmer, community-to-community, local government-to-local government and department-to-department. Strengthened social and institutional capital that builds on indigenous means of communication and organization will be instrumental in facilitating horizontal networks among stakeholders whose exchanges in the past have been either very limited or restricted to formal or hierarchical channels. Such conditions of open dialogue for collective analysis are essential in order for all stakeholders to collaboratively identify achievable priority actions, but most importantly, create spaces for consultation and dialogue among themselves and with the implementing agencies and districts on ways to achieve and monitor progress towards meeting the project's objectives. It will enable stakeholders to advocate their interests, provide feedback to government, and monitor progress towards achieving LMEMP objectives. In addition, this component will support the integration of indigenous knowledge into project planning and practice. This will be achieved through the establishment of an IK technical team charged with the identification of indigenous knowledge, practices and resource management systems that can be extended or replicated through the project’s field components.

(4) Regional Programs component
The objective of this component is to support the development of an ecosystem policy and institutional framework to assist the riparian governments to eventually operationalize joint management and monitoring of land and water resources in the Lake basin.

Specific sub-components include:

A. African Centre for Aquatic Research and Education.
This sub-component will facilitate transformation of the Senga Bay research station, home of the predecessor GEF/SADC Project, into a regional center of

excellence for aquatic ecosystem research, training and education to serve the needs of Malawi and the riparian countries of Tanzania and Mozambique for improved management of Lake Malawi.

B. Ecosystem Monitoring Program.
LMEMP will establish a lake-wide water quality/physical processes model and regional ecosystem monitoring system, which would form the core transboundary program for the regional center (above).

C. Ecosystem Policy and Institutional Framework.
This sub-component will assist in the design of common strategies and compatible policies and programs for joint management of the transboundary resources in the basin based on lessons learned from pilot projects and field experience, including support to special studies related to transboundary issues, and support to a Malawi Secretariat to a (future) Lake Malawi/Nyasa/Niassa management institution.

Approach and Justification
As indicated earlier, LMEMP succeeds the GEF/SADC Lake Malawi/Nyasa Biodiversity Conservation Project which was completed in 2000. An important lesson learned from the SADC/GEF project was that the three riparian countries have different priorities and impacts on the Lake ecosystem, and also face different constraints in their capacities to manage the Lake resources. Although each has voiced a commitment to the actions called for under the first project, they felt that a single large project covering a wide range of disciplines and institutions in the three countries under a single regional management would be less manageable than a series of nationally based projects with strong mechanisms for regional networking and the treatment of transboundary issues. The transboundary issues of the Lake ecosystem require that in the long-term the three riparian countries find common strategies and institute compatible policies and programs for joint management of the resources in the basin. The Regional Programs component is the first contribution to such networking and collaboration. The component is coordinated with a number of other relevant initiatives related to the larger Lake Malawi/Niassa/Nyasa eco-region which are under consideration or in the early stages of development, including the Lake Malawi Eco-region initiative supported by WWF, the Tri-partite Legal Framework facilitated by FAO, the Regional Water Resources Development initiative supported by SIDA, and a similar regional water program sponsored by Danida. Each of these efforts is a clear expression of the strong international interest in this vital eco-region. With the support of the Bank and the GEF, the emerging programs in Malawi, Mozambique and Tanzania represent the countries' national efforts to develop multi-sectoral approaches to improve resource utilization and management of the Lake and its catchments within a regional framework of cooperation. In this sense, LMEMP rightly focuses on building local and national capacity to address the management priorities for the Lake fisheries and key catchments feeding into the Lake, while establishing the knowledge base and expertise required for effective regional management of the larger Lake basin.

5. Financing

	Total (US$m)
BORROWER	$2.00
IBRD	
IDA	$18.00
GLOBAL ENVIRONMENT FACILITY	$10.00
Total Project Cost	$30.00

6. Implementation

The Lake Malawi Ecosystem Management Project will be implemented over a period of eight years. This somewhat longer than typical project time horizon is recommended due to the long-term capacity building objectives and scale of the project, involving as it does a wide range of implementing agencies and a significant reorientation in the conceptual underpinnings of traditional sectoral planning and implementation to include a basin-wide conceptual frame and development of a corresponding multi-sectoral decision-support information system. In addition to the targeted district assemblies in the Lake basin, the project will involve four ministries and six government departments in the coordination of project activities. The ministries include: Ministry of Natural Resources and Environmental Affairs, Ministry of Water Development, Ministry of Agriculture and Irrigation, and Ministry of Tourism and Wildlife. The departments include: Department of Fisheries, Department of Forestry, Department of National Parks, Department of Water Resources, the Environmental Affairs Department, and the Land Resources Conservation Department. The Department of Local Government Administration in the Ministry of Local Government will also play a key support role in guiding and facilitating the operations of the district administrations through which much of the field level activities will be planned and executed. Field level implementation will also involve NGOs, government programs with expertise in watershed related rehabilitation such as the EU-funded Promotion of Soil Conservation and Rural Productivity Project (PROSCARP) and the USAID-sponsored Agroforestry Extension Program (MAFE), and implementing partners such as MASAF.

Oversight:
The Government of Malawi has expressed interest in establishing a central entry point for Lake initiatives and a mechanism for ensuring that information and relevant analysis is shared among key state agencies. To assist with the accomplishment of these responsibilities, a National Lake Malawi Policy Coordination Committee (NLMPCC) will be constituted, comprised of the Principal Secretaries of the Ministries of Natural Resources and Environmental Affairs, Water Development, Agriculture and Irrigation, Tourism and Wildlife, Transport, and others to be determined by Government. This body will provide effective oversight to the project while also addressing the broader policy considerations that may arise involving Lake Malawi, the watersheds that drain into the Lake, and the regional management of the Lake basin. The NLMPCC may also serve as the national foundation and possible Malawi Secretariat for the eventual establishment of a Joint Commission for Lake Malawi/Nyasa/Niassa at regional level.

Project Management:
Given the coordination requirements of the project through the mentioned technical departments and the uneven rate of advancement of the country's decentralization program, Government has decided to establish a central Project Management Office (PMO) with a substantial degree of administrative authority and an experienced professional staff. The PMO will be established by the Ministry of Natural Resources and Environmental Affairs to undertake the general management of the project, the coordination of implementation by the responsible implementing agencies, financial management, central procurement, and the preparation of progress, procurement and financial reports. An experienced Project Manager, Financial Controller, Procurement Specialist, Monitoring and Evaluation specialist, and support staff will make up the Project Management Office. The provision of targeted technical assistance in specific areas such as integrated watershed management, fishery exploitation technologies, and communication strategies is also planned. The form and scale that such technical support will take will be determined during appraisal.

Technical Coordination:
Coordination of the technical aspects of project development and implementation will be ensured through the establishment of a Technical Coordination Committee (TCC) composed of Directors of implementing technical departments, the senior executive officer of the successor organization to the Senga Bay inland fisheries research center, and a representative appointed by the University of Malawi. The Principal Secretary, MNREA, will chair the TCC. The TCC would collaborate closely with the Project Management Office, but would have no formal reporting relationship to the National Lake Malawi Policy Coordination Committee. Rather, each Department Director would report to his superior through regular ministerial channels. At District level, the counterpart to the TCC will be the District Environmental Sub-Committee (DESC), composed of the heads of the technical departments responsible for natural resource management at district level, notably Agriculture, Forestry, Fisheries, Water Resources, Parks and Wildlife and Environmental Affairs. Other technical services such as health, education, roads and public works are also involved in the work of the DESC when relevant. NGOs and private sector interests actively engaged in the district are typically invited to attend and participate in DESC meetings. LMEMP will provide support to the DESC for project identification and development, project supervision and technical support, logistics, and implementation of approved activities. Provision will also be made for structured meetings of DESC representatives from the participating districts to share experiences and expertise, to develop and exchange lessons learned from implementation, and to provide a project-wide forum for qualitative assessment of project progress and accomplishments.

Regional Linkages:
While LMEMP is a national project, it has been designed with full recognition of the regional dimension of effective management of the Lake as an international water body and of the Lake Malawi basin as an ecosystem that physically transcends national boundaries and demands coordinated action for its sustainable maintenance. The Government of Malawi has undertaken the establishment of a regional center of excellence in aquatic research in partnership with the United Nations University's specialized branch for water and environment, the International Network for Water, Environment and Health (INWEH) which will provide administrative oversight and technical support. The foundation for the establishment of the African Center for Aquatic Research and Education (ACARE), to be located at the site of the Senga Bay inland fisheries research facility, has been laid with the drafting and initial review of a host country agreement and Memorandum of Understanding between the Government of Malawi and the UNU. ACARE will be central importance to the development of regional capacity in ecosystem analysis and management. Core research themes for ACARE were reviewed and agreed by key stakeholders in a workshop organized by the Ministry of Natural Resources and Environmental Affairs. While ACARE will operate as an autonomous institution, its research program, education and training activities, and staffing will reflect regional priorities and management needs of the Lake Malawi/Nyasa/Niassa basin.

The project will also support the regional integration and sharing of findings from national ecosystem monitoring programs through the establishment of a regional ecosystem monitoring network. The network is to be facilitated by ACARE.

7. Sustainability

The key elements for sustainability of project benefits are: (i) stakeholder community empowerment; (ii) adequate commitment to strengthen management agencies, local government and community capacities to implement project activities; and (iii) political willingness to sustain regional cooperation for joint environmental management of the Lake and its watershed. Respectively, these are addressed in the project by the proposed stakeholder participation

process to be mainstreamed in LMEMP through the Social Capital Mobilization component, the project's approach to work through the operationalization of existing government policies within a strategic ecosystem management framework, and support for the regional programs component to develop common strategies and compatible policies and programs for joint management of the resources in the Lake and the basin.

8. Lessons learned from past operations in the country/sector

The highly participatory project preparation process allowed for a comprehensive analysis of best practices, and of design features to avoid or overcome, from relevant completed and ongoing projects. As an example, in the area of integrated watershed management LMEMP design reflects the conclusion drawn from the field experience of both PROSCARP and MAFE. Initially, both of these better land husbandry / soil and water conservation (SWC) programs focused at the community and on-farm level. Implementation tended to be dispersed, with technology adopters spread across a large area. Both programs have since adopted a catchment approach to organizing SWC interventions. LMEMP also takes a clear landscape approach to the maximization of impact from watershed restoration or rehabilitation by focusing field activities on priority areas in a given watershed. Similarly, the approach taken to working with rural communities and producers as the primary resource managers owes much to the experience of projects such as COMPASS and NARMAP, focusing on collaborative management and CBNRM practices in the watersheds and along the lakeshore, respectively, as well as to regional best practices from a broad range of environmental and natural resources management projects.

Lessons learned from the IDA Fisheries Development Project and the GEF/SADC Lake Malawi Biodiversity Conservation Project are described in the Intensive Learning ICRs, Beneficiary Assessment and OED performance audits that were carried to derive lessons for the design of LMEMP. Preparation of these ICRs encouraged an open and supportive dialogue with the Government and the Bank team about lessons learned from these projects and other relevant experiences which could inform the formulation of LMEMP. Combining these leads to the following list of conclusions that are of direct relevance to the current project design. GEF projects need to be strongly linked to all relevant national environmental and natural resource agencies to mainstream the development effort and leverage outputs.

Failure to undertake realistic appraisal of institutional capability risks overloading projects with unachievable objectives and components. Establishing regional institutions for international waters projects requires very careful planning, extensive consultation, clear and unambiguous agreements, protocols on communication, and an effective umbrella organization to coordinate and synergize riparians' efforts. All this requires a high level of Bank effort and facilitation to avoid GEF projects becoming enclave activities of questionable operational value.

Achievement of multi-country objectives is put at risk if only one partner receives and manages GEF project financing. It is probably better to support cross-boundary resource conservation through free-standing projects to individual countries and deal with the inter-regional coordination as a separate activity. GEF biodiversity and environmental projects require objective management and technical review to ensure continued focus on their development and operational goals—and thus avoid becoming hostage to increasingly demanding scientific agendas. These observations have been considered carefully in the formulation of this project, as follows: The project's ecosystem approach to planning and implementation requires strong intersectoral coordination, especially at field level. The development of a national ecosystem monitoring program, and its integration at regional level, provides further opportunity for linkage among sectors and institutions. This lesson learned from the IDA

Fisheries Development Project relates to weaknesses in central project administration that constrain or limit field implementation capacity. This problem has been addressed in the current project design by separating core functions for central departments from field implementation, with the latter organized and funded at district and sub-district levels.

The establishment of ACARE as a regional center of excellence is a key contribution to building indigenous regional commonality in perspective, understanding, and the effective capacity to undertake joint management of the Lake Malawi basin. This important lesson resulted in the current program design, comprising three national projects with transboundary issues dealt with through a regional programs component.

Unlike the GEF/SADC Project referred to above, LMEMP is not primarily a scientific research project but instead focuses on improved ecosystem management for enhanced economic productivity and livelihood sustainability. The core research functions of key natural resource sectors will be supported under the project as part of the effort to improve resource management practices.

9. Program of Targeted Intervention (PTI) N

10. Environment Aspects (including any public consultation)

Issues : The Executive Summary of the Integrated Social and Environmental Analysis of the project is being disclosed separately.

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Note: This is information on an evolving project. Certain components may not be necessarily included in the final project.

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