

# INTEGRATED MANAGEMENT OF ZAMBEZI / CHOBE RIVER SYSTEM - TRANSBOUNDARY FISHERY RESOURCE, NAMIBIA / ZAMBIA / BOTSWANA

Norad project no.: GLO-05/312-11

WWF Norway project no.:5012

WWF project no.: 9F0792

## Final Technical Report December 2009



Preparing to fish through the night



Zambezi River and flooded plain, April 2009



Abundant small fish species on floodplain



Exploiting a valuable food resource during floods

by: **Denis Tweddle, Clinton J. Hay & Ben C.W. van der Waal**

Technical Report no. MFMR/NNF/WWF/Phase I/3



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# **1. INTRODUCTION**

The fish resources of the Zambezi and Chobe rivers and associated Caprivi floodplains are both a vital component of the livelihoods of the floodplain inhabitants and a major angling tourist attraction. Fish is thus a major contributor to food security and the local economy. Improved communications in the area and consequent increased commercialisation of the fishery was identified as a major threat to rural livelihoods and to aquatic biodiversity through over-exploitation of the larger fish species that are most valuable for both food and for angling tourism. Concerns were expressed by the local fishing communities and by the tourist organisations that the fishery was in serious decline as a result of widespread use of illegal and destructive fishing methods, and the results of monitoring programmes carried out since 1997 by the Ministry of Fisheries and Marine Resources confirmed over-exploitation of the large tilapia cichlid species.

The Zambezi/Chobe fisheries project was thus conceived as a way of empowering the local communities to manage the resources in a sustainable way through the formation of local management committees and devolution of responsibility for management, as envisaged in the Namibian constitution and the Inland Fisheries White Paper. The project set out to facilitate management of the fisheries by developing a system of integrated co-management and, because the Zambezi fishery is a shared resource with Zambia, harmonisation of activities and cooperation in surveys and monitoring.

The project officially started in July 2006. An interim consultant, Dr N. Nyambe, was appointed in September 2006 until the appointed Project Executant, Dr BCW van der Waal was able to take up the post in February 2007. The project was scheduled to end June 2009, but following the Final Evaluation (Tweddle, 2009) was extended until December 2009. Dr C. Hay and Mr D. Tweddle were contracted to complete the project and prepare for a new project phase.

## **1.1. Project background**

## **1.2. Project location**

The Caprivi Region in Namibia borders on Botswana in the south, Angola and Zambia in the north and Zimbabwe to the east. The Chobe River and the Kwando/Linyanti River System border on Botswana and the Zambezi River on Zambia. The Chobe National Park in Botswana borders a large section of the Chobe River (both sides of Kabula-Bula), where no subsistence fishing is allowed on the Botswana side, but with a fishery operating on the Namibian side. The Zambezi River borders Namibia and Zambia for approximately 120 km between Katima Mulilo and Impalila Island, where it connects with the Chobe River. The water level of the Chobe River is influenced by the Zambezi River and changes direction depending on the flood level of the Zambezi. Both the Zambezi and Chobe Rivers are slow flowing with large floodplains and small, vegetated islands, with the only rapids being at Katima Mulilo and Impalila Island. The largest sections of the floodplains fall within Namibia with smaller sections in Zambia. Both the Chobe and the more westerly Kwando/Linyanti Rivers flow into Lake Liambezi, depending on the magnitude and duration of the annual flood. This lake played an important role in the subsistence fishery in the 1970s and early 1980s, but dried up in 1985. Prior to the start of the present project, some inflow was recorded during the 2000 and 2003 floods, but during the course of this project the lake has received more floodwater, culminating in April 2009 in a major flood that has filled the lake.

Consequently, fishery activities are again taking place in Lake Liambezi. Three major tributaries enter the Zambezi River on the Zambian side with several lagoons present between Sesheke and Mambova.

At 600-700 mm, East Caprivi has the highest rainfall in Namibia -- although it is considered low globally. The rainfall in the catchment area of the Zambezi River in Angola and Zambia is, however, much higher and is the main factor determining the flood level, timing and duration in the Caprivi. In comparison, the local rain in the Caprivi has very little impact on the flood cycle of the Caprivi floodplains. The floodplains cover large areas (>300,000 hectares) of the eastern Caprivi and in times of a major flood, the Kwando/Linyanti System connects with the Chobe River. More than 30 per cent of the eastern Caprivi can then be flooded. The fishery and overgrazing of the floodplains in the eastern Caprivi are possibly the activities with the highest impact on the environment and the fish community and there now is evidence of overexploitation of the fish stocks (Hay and van der Waal, 2009). The absence of large-scale industries and cities in the region ensure very little pollution on the floodplains. The physical characteristics and water quality of each river system does not change drastically between the different regions. No dams or weirs are present or planned for the proposed project area, as the floodplains' flat topography is not conducive to such structures.

Figure 1 highlights the study area and the stations that are monitored each year during the biological survey (by MFMR, Namibia) and also the stations surveyed during the previous project (Kalimbeza, Impalila and Kabula-Bula/Ihaha areas).

### **1.3. 3.3 Project context**

#### **1.4. 3.3.1 Biodiversity importance of project area**

The project area is largely comprised of a rich system of floodplains and permanent backwaters to the Zambezi River. These floodplains are part of a wider ecosystem that has historically been part of a seasonal migration complex for a mix of charismatic large African megafauna (i.e., elephant, buffalo, plains zebra, waterbuck, etc.) that also includes the Kalahari Woodlands found on the southern side of the Chobe River. Until the late 1960s, the floodplains were occupied by large numbers of wildlife such as red lechwe, puku, and hippopotamus. However, the occupation of the area by the South African Defence Force, and attendant proliferation of firearms in the area, resulted in extensive over-use of the floodplains' valuable wildlife stocks for the next three decades.

Since passage of the Namibia Conservancy legislation in 1996, a number of conservancies have begun to form and remnant populations of these animals have begun to recover. Presently, the area is of significant biodiversity value to Namibia and the region, and is under consideration as a potential Ramsar Wetland Site of International Importance. Additionally, the area provides critical habitat to a number of endangered and/or rare species on the CITES appendixes (Nile crocodile, African elephant, etc.) and national and IUCN Red Data books.

### **1.5. Figure 1: Map of project area**

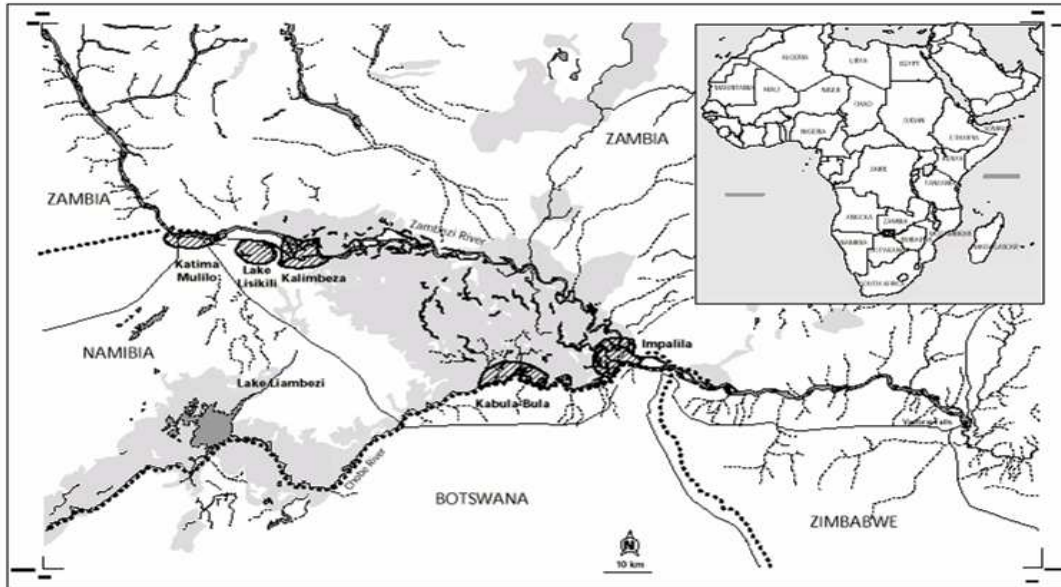


Figure 1. Map of the study area with the stations surveyed during the annual monitoring programmes of the Ministry of Fisheries and Marine Resources, Namibia (Hay et al., 2002).

A locally threatened fish species, the Caprivi Killifish (*Nothobranchius* sp.) (taxonomy under investigation but considered by B. Watters [pers. comm.] to be a colour form of *Nothobranchius kafuensis*), is found in a small number of rain pools in the Caprivi. It has a specialised life cycle where eggs are laid on the bottom and development is suspended when the pool dries out. During the next rainy season, these eggs hatch, the fish mature and breed before the pool dries up again. These pools are not connected to the river or floodplains and the distribution is linked to the movement of terrestrial animals. Any development projects, such as roads, may further threaten this species.

The Zambezi and Chobe Rivers are rich in fish species diversity with more than 80 species identified from the Namibian section of the system. The entire Zambezi River has close to 160 species. Several species have been identified as having specialised life cycles and habitat niches. There are species that are not commonly sampled due to habitat preferences, but others are rare with no known reason for this. The annual flood cycle is the main stimulant for fish production and any changes to the hydrology will seriously influence the fish stocks. Similarly, any artificial changes to the habitats may negatively impact on the fish population. It was found that species diversity and species composition differ between stations as well as during the different flood periods. This is probably linked to habitat differences, and breeding and migration behaviour of the different species. Another important aspect of the fish resource is that the Namibia Ministry of Fisheries and Marine Resources has initiated an index where fish can be used as indicators for aquatic ecosystem health. Fish are part of the top structure of the system and will show signs of any impacts at lower levels. Species diversity plays a very important role in this index. The Ministry started a monitoring programme in 1997 (working on all fish species) to follow the trend in the fish population over years.

#### **Policy and legal context**

The Namibia Inland Fisheries Resources Act (Act No. 1 of 2003) and Regulations came into operation on 6th June 2003. The Regulations make provision for differences between different river systems due to the nature of these systems and also due to the importance of

the fishery to the communities. Seasonal systems such as the Cuvelai System (seasonal river system in north central Namibia flowing from Angola) will be managed differently from perennial systems such as the Zambezi River. Also, the Orange River (bordering South Africa in the south), where the fish resource play a minor role towards community welfare, will also differ in the management approach compared to e.g. the Okavango River, where the fishery resource is extremely important to resident households.

The subsistence nature of Caprivi's multi-species fishery, combined with the shared nature of the fishery resource, makes fishery management impossible through a quota system. Hence, the regulations are written in such a way as to restrict the input effort by the fishery. These restrictions are linked to the number of nets, mesh sizes, and net lengths. Furthermore, no dragging or drifting of nets is allowed in the Caprivi, but all traditional gear types are allowed. The rationale is that no restrictions will be put on the poor communities who can still use the traditional ways of fishing. The making of these gear types, in itself, is restricting the catch effort.

Illegal fishing has been reported by fishermen both from Zambia, as well as from Namibia, with Zambians often being the offenders, and limitations in enforcement is often cited as a reason. The shared nature of the transboundary fish resource is complex, having multiple users who are responsible to different authorities with different rules, having different capabilities and means of enforcement. Conflict also originates from different causes on both sides of the river, as during the Zambian closed fishing season many Zambian fishermen simply fish in the Namibia backwaters or side of the Zambezi River. In Namibia, conflict arises because of access and the method of fishing, whereas in Zambia it also includes the high number of nets.

The Act also makes provision for an Inland Fisheries Council that will advise the Minister in relation to any matter on which the Minister is required to consult the Council. This council will also include traditional leaders leading the way for inputs from the fishing communities. The council may also establish committees to investigate issues as determined by the council. According to the Act, closed seasons and fish sanctuaries can be established with collaboration with the stakeholders with the aim to preserve the environment, protect the fish resource and habitats necessary for successful breeding, and to promote the regeneration of the fish stocks. Fishery Inspectors are employed by the Ministry, but the Minister can also appoint a person nominated by the traditional authority as an inspector.

The Fisheries Act in Zambia is under review with the following considerations:

- The need to regulate and mandate fish farming;
- The need to decentralise fisheries management through community involvement;
- The increasing need for co-operation with neighbouring states in the management and development of shared fisheries; and
- The need to increase protection of aquatic fauna and flora, biodiversity from environmental degradation.

Different policy and legislative frameworks exist between Namibia, Botswana and Zambia. In the Botswana Okavango Delta, the commercial fishery plays a much larger role than in Namibia, where subsistence fishery is favoured over the commercial fishery. The Namibia subsistence emphasis is based upon the collection of biological data from the Namibian rivers that shows the fish resource is limited and will not sustain commercial ventures. Also in Zambia, different regulations exist for the same resource utilized by Namibians. Botswana and Zambia are in the process of reviewing their legislation and continued communication will be needed to ensure a harmonised policy between stakeholder countries.



### **1.6. 3.3.3 Social, and economic context**

A study conducted on the eastern floodplains of the Caprivi, Namibia states that a third of the households depend primarily on the fishery for subsistence and income purposes and that there is a clear reliance on the fishery for survival. The income generated by fisheries covers the basic needs of the people such as food, clothing and school fees. Fish are important in the diet, especially in years of drought and stress. These households on the floodplains usually have a subsistence livelihood, further emphasising the importance of the fishery. The fishermen in the Caprivi are mainly males, using modern gill nets. In contrast, the vendors at the markets are mainly females (frequently the head of a household), who rely on fish sales as the main source of income for their families.

Although the area has a relatively high level of literacy, a high rate of unemployment is present, stressing the importance of the fishery. The study further revealed that the households in the area earn on average N\$ 868 (US\$108) per month and experience difficult times during November/ December to April/May when incomes are low.

Fish are very important in Zambia with approximately 55% of all animal protein coming from fish. More than 300 000 households in Zambia are directly and indirectly employed by this sector.

### **3.3.4 Major stakeholders and their roles, interests and concerns**

#### **Households dependent on subsistence use of the fishery resource**

In the Kabbe constituency (the majority of the project area), Namibia, about 30 per cent of the households depend mainly on fishing for subsistence and income purposes. A large percentage of these households indicate that fishing is critical to the family for survival. The income generated from fishing goes to basic needs such as food, clothing and school fees. No real commercial fishing is taking place on the Zambezi River, although there may be increasing numbers of people hiring fishermen to fish for them.

#### **Vendors**

The majority of the vendors are women, with many indicating they are the head of the households. For some, fishery is the most important income activity to sustain the family.

#### **Potential local fishery management structures (i.e., fish associations, conservancies, etc.)**

The fisheries management system is only one component of the broader resource management system, based on the traditional structure at various levels. Access to the fishery under traditional systems is still in place but weakened. Regulations on who can fish where and when are generally followed, although they are difficult to enforce. The traditional authority (the Khuta) has confiscated and condemned illegal fishing gears but not consistently in line with the national legislation. A system of management is present on the Zambian side between the Government and the Traditional Authority, where the traditional system is respected by the DoF and not interfered with, but enforcement is problematic. Conservancies are now managing natural resources in their areas through a system of committees with NGO support and have the potential to take over local fishery management, while outside the conservancies, village fishery committees are in place to fill the same role.

#### **Traditional Authority**

The Traditional Authority is the facilitator in relation to the handling of conflicts or disputes. This is particularly meaningful in Caprivi and Zambia where government enforcement of fishery regulations is weak. This Traditional system is transparent and it allows everybody to have a say in the discussion. There is also the right of appeal and the discussion can be taken to the next level in the Traditional Authority. The Traditional Authority is seen as a key role

player in future joint management of the fish resource when considering the transboundary aspects.

### **Sport fisherman and tourism industry**

Tourism and recreational ventures are important activities, bringing new income opportunities and economic benefits to the rural communities. This is also the situation in the Caprivi where several lodges specialise in the recreational fishing industry. The Zambezi and the Chobe Rivers have several excellent large fish species for sport fishing, and tourists come from far to catch tigerfish and large cichlids such as nembwe and threespot tilapia. A study done during a fishing competition (2008) held in the Caprivi indicated the value generated for local business per fish caught was N\$ 52.

### **Namibia Ministry of Fisheries and Marine Resources**

The Namibia Ministry of Fisheries and Marine Resources is the responsible Ministry for the freshwater fish resources in the country. The line functions of the Ministry are further based on the Namibian Constitution (Article 95) that states “The state shall actively promote and maintain the welfare of the people by adopting “policies aimed at maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future”.

### **Department of Fisheries, Zambia**

The Department of Fisheries in Zambia has its head office in Chilanga and falls under the Ministry of Agriculture, Food and Fisheries and has the responsibility to implement fisheries and aquaculture development programmes in the country.

### **WWF in Namibia**

The WWF in Namibia has a mandate to assist with the development of capacity in Namibian partner organisations to develop and implement innovative community-based natural resource management (CBNRM) and monitoring systems. As part of this process, WWF staff and partner organizations assist the MFMR and relevant Caprivi stakeholders (conservancy committees, traditional authorities, private sector partners, etc.) to develop, implement, and test pilot fishery management and monitoring systems as part of a broader approach to integrated resource management in Caprivi that also involves wildlife, forestry, and tourism resources.

### **Namibia Nature Foundation (NNF)**

The NNF is a national, not-for-profit NGO whose mission is to support sustainable development, to protect biodiversity and ecosystems, and to promote the welfare of people, both present and future. The NNF plans, implements and manages projects and programmes in support of this mission, including CBNRM, transboundary, river basin, biodiversity and livelihoods initiatives. It promotes partnership with community-based organisations, other NGOs, the private sector, government ministries and donor organisations. In this project the NNF employs the project executant, administers and runs the funds, provides technical and administrative support and endeavours to maintain an open and constructive partnership and dialogue with the MFMR on project activities and developments.

### **Lodge Operators and Guides In Botswana**

Presently, the Zambezi/Chobe River system is routinely exploited by Botswana lodges and

guides who ferry sport fishermen into the Namibian portions of the system to undertake sport fishing for tigerfish, large cichlids, and barbel. This is a lucrative undertaking. While the sport fishery presently does not directly benefit the conservancies or fisherfolk of any country, it does employ a considerable number of people from the local fishing communities in the lodges and as fishing guides and thus contributes to the local economy. The introduction of a fishery management plan for the Impalila and Kasika Conservancies will entail the establishment of a daily use fee for Botswana lodge operators and guides who bring sport fisherman into the Namibian waters.

#### **1.7. 3.3.5 Other related conservation initiatives in the project area**

The Project is liaising closely with the Namibian NGO, Integrated Rural Development and Nature Conservation (IRDNC), which is supporting the formation of conservancies in Caprivi. In addition, and where applicable, the Project coordinates with the Namibia Ministry of Environment and Tourism, which is playing a key facilitator role in the establishment of the Kavango/Zambezi Transfrontier Conservation Area.

## **2. Project Objectives**

### **2.1. Project Goal**

The shared Zambezi/Chobe River fisheries resources managed sustainably through transboundary coordination and collaboration after the introduction of fully integrated fishery management systems.

### **2.2. Project Purpose**

By mid 2009 alternative community fishery management practices have been piloted and tested and these contribute to a fully integrated management system for subsistence, semi-commercial, and sport fisheries that will provide optimal benefits to all stakeholders who are reliant on this valuable resource

### **2.3. Project Outputs**

- A better understanding of the impact of the new Inland Fisheries Resource Act (Namibia) on the fisherfolk (on Namibians and Zambians and the resource) is acquired and documented.
- Collaboration on fisheries management achieved between the transboundary communities through the establishment of a cross border committee (between Namibia and Zambia) that will have input on the joint management of the shared fishery resource and oversight of the closed fishing season.
- Support the emergence of local level community fishery groups that assume management responsibility for fisheries in their areas.¶

- Facilitation of the development of appropriate fish farming projects in conjunction with MFMR and projects utilising existing water bodies and local fish species
- Monitoring programmes are introduced and/or maintained (i.e. for the river fisheries survey at Kalimbeza (Namibia) and Ngweshi (Zambia) area), the fish market survey at Katima Mulilo, EUS monitoring and the biological surveys on the rivers and the lakes.

#### **2.4. Amendments to outputs**

### **3. Project achievements**

#### **3.1. Project goal and purpose**

The project goal is a long-term target that could not possibly be fully achieved through a 3-year project with limited scope, technical input, and funding. Successful projects to manage fisheries in African freshwaters are rare. Increasing human populations and inability to enforce regulations have resulted in serious declines in fisheries health and sustainability. There is an unfortunate tendency to disregard impacts of excessive exploitation on fish stocks until it is too late. This project is an exception in that the governments recognised the need for management before stocks were seriously depleted, and thus there is an opportunity to develop effective management.

An issue that has yet to be properly addressed is the tendency in MFMR (and other fisheries departments in Africa) and among fishermen to disregard the value of tourist angling to the local communities. It is often overlooked that fishing lodges create employment for local communities in the fishing areas, and people employed in lodges are as dependent on the health of the fishery as any active fisherman. The economics of the recreational fishery must be taken into account when planning management interventions with the government authorities, conservancies, and fishing communities.

To counteract the present tendency to overexploit the resources will take much longer than the present project. The groundwork has effectively been laid for progress towards achieving the project goal and purpose, but it will take a longer-term commitment to develop effective management systems that will lead to the goal being achieved.

#### **3.2. Contributions to local, national, regional and global (WWF) biodiversity and ecosystem conservation goals, and to natural resource management governance and management**

The project has a long-term potential to contribute to conservation goals at all levels from local to global. Effective and sustainable management of the fisheries in this area through devolution of decision-making and control to the communities as a result of this project will act as a model for fisheries management in the region, while helping to maintain a relatively stable fish population structure, which is a long-term conservation target.

The protection of the *Nothobranchius kafuensis* “Caprivi” population in Salambala Pan and the recognition of the importance of its presence in a conservancy area and the need to conserve it is a valuable contribution to biodiversity conservation.

### **3.3. Contributions to socio-economic situation in the project area**

If the trend to increased exploitation continues, the fishery-dependent households in the project area will become much poorer due to diminishing shares of diminishing resources, while the loss of angling tourism will impact severely on the households dependent on incomes from employment in lodges and guiding. The contribution of the project to local livelihoods will only become apparent in the longer-term. If the initiatives implemented during the project succeed, incomes will be sustained and fish will continue to provide a major source of animal protein to the local population.

### **3.4. Fish farming activities in the region**

MFMR has for the last number of years invested huge capital in establishing three fish farms in the area that are run by community co-operatives. These ventures have been unsuccessful due to flooding, high feed costs and ineffective management approaches. The project has supported the LEAD fish farmer programme (CEE project) which greatly contributed to the success of fish ranching in the area. Although this is unlikely to have any impact on the resources in the river, a contribution is made to local livelihoods.

### **3.5. Facilitation on the disease Epizootic Ulcerative Syndrome (EUS)**

The project was the first to bring the attention of the disease to MFMR and greatly facilitated the process in identifying the disease and set up collaboration with neighbouring countries. The project further played a major role during the visits made by FAO to set up a monitoring protocol for the region.

### **3.6. Sensitising the communities on management of the resources, including the establishment of Fish Protection Areas (FPAs) as a way of ensuring future fishery sustainability**

Communities were sensitised on the issues relating to excessive exploitation of the fish resources in the Zambezi and Chobe Rivers and were consulted and advised on possible ways of managing the resources. Communities identified several areas as having potential as pilot sites for FPAs. These were proposed not only as sanctuaries in which the large fish species could breed and thereby populate surrounding areas, thus boosting fish yields, but also as areas in which tourists could practise catch-and-release angling on payment of fees to the communities in which the FPAs are established. The role of the Project and MFMR will be to facilitate the drawing up of agreements for management of the reserves between communities, traditional authorities and tourism interests (primarily lodges). A management plan has been drawn up for establishment of specific pilot FPAs, as part of an overall management plan for the fishery of the eastern floodplains.






A total of eight fish guards were appointed in conservancies and Fisheries Management Committees were established in these conservancies and other areas controlled by villages and sub-khutas.

### **3.7. Data collecting on the fisheries**

Monitoring programmes were initiated where fish guards collect data from the fishermen on the catches and gear used at the four sites. Fish entering the Katima Mulilo fish market are also recorded to give a picture of the amount of fish passing through the market. The disease EUS were also monitored at the fish market.

## **4. CONSTRAINTS AND OBSTACLES ENCOUNTERED**

Given the limitations in project financing and staffing, and the lack of support from MFMR in facilitating the transfer of fishery management to the communities by enacting enabling legislation, the project has made satisfactory progress. The project has not achieved all proposed outputs for the following reasons:

-  Non-enactment of enabling legislation for devolution of management to the fishing communities.
-  Lack of capacity (financial and human resources) in both the MFMR in Namibia and the Department of Fisheries in Zambia to enable effective surveys and extension work to take place.
-  Over-dependence on one project executant for a complex project requiring a range of complementary skills, i.e. fish ecology; fisheries stock assessment; knowledge and experience of the Zambezi fauna and environment; understanding of legal aspects and implementation of fisheries regulations; ability to interact with, educate and learn from fishermen; CBNRM principles and practice; ability to communicate with different levels of government departments and ministries, etc. The skills of Dr van der Waal and Dr Nyambe complemented each other and it is unfortunate that lack of funding prevented them from working together for the duration of the project.
-  Communities not given sufficient support by MFMR and the project to develop management proposals and explore the possibility of establishing their own fishing rules or setting up pilot closed fishing areas.
-  Enforcement of existing legislation by MFMR has been virtually non-existent. It is considered a major weakness in MFMR that the same officers tasked with educating the fishing communities and spreading extension messages are also the ones responsible for enforcement of regulations. Combining these tasks is impossible. The result is a marked lack of enthusiasm for enforcement of regulations against the rampant use of illegal fishing gears, while tourist anglers are considered an easy target for harassment.

## 1. LESSONS LEARNED

Radical changes in fisheries management methods in a rural environment cannot be achieved overnight. Government ministries and departments in Africa have for decades operated through legislation and attempted enforcement of regulations, despite lacking the financial and staff capacity to be effective. Attitudes are changing with a recognition in many quarters (though not universally) that CBNRM has considerable advantages over a top-down enforcement approach. There have been notable failures in CBNRM, usually where the resources are so degraded and people so impoverished and in need of food, however little, that control is impossible. The Caprivi fishery is fortunately not yet in such a state, although the fishery is noted to be in decline.



The project has not been sufficiently involved in providing training for the relatively junior fisheries staff in Namibia and particularly in Zambia, where the staff's qualifications consist of fisheries certificate training courses. Fisheries personnel need to be exposed to modern methods, e.g. by attending specialised training courses and by attachments to other, successful CBNRM projects.

The project, because of financial limits, was limited to a single technical adviser. It was unrealistic to expect a single adviser to possess all the skills necessary for such a complex project. During the new phase, technical support should, at the very minimum, consist of a fish and fisheries expert (to provide advice on optimum and sustainable methods of exploiting the stocks) and an expert in CBNRM to work closely with IRDNC and the communities to implement the recommendations of the fisheries adviser.


The project was supported through the NNF and WWF, with a mid-term review and frequent email contact but the Final Evaluation endorses the recommendation of the mid-term review that a "Technical Advisory Committee" should be set up to oversee the project, including MFMR, DoF, IRDNC, NNF and WWF. During the next phase, regular meetings of such a committee must be held to review progress, keep the project on track, and provide support where necessary, e.g. where government decision or approvals are required for necessary actions.


During the project's 6-month extension, discussions were held between the project, MFMR and DoF to ensure closer collaboration during the next phase. Effective communication between the two countries and continual participation from the Zambian fisheries officials and local communities are imperative for the success of the next phase.


## 2. RECOMMENDATIONS FOR THE WAY FORWARD


-  The management plan developed during phase 1 should be translated into Silozi and discussed with the fishing communities.
-  The proposed fisheries regulations should be greatly simplified. The majority of proposed regulations are aimed specifically at fishing in the main river channels and do not take into account the widespread floodplain fisheries for very different fish species assemblages. Gazetting regulations including lengthy lists of banned fishing gears for the whole area will be counter-productive as fishermen will not respect regulations that

they know are unnecessary and that prevent them efficiently harvesting resources. Regulations must therefore be agreed at local community level. For example, regulations aimed at protecting large species in the major river channels will be pointless in floodplain scenarios where small, pioneering, highly prolific species are the target. It is therefore suggested that only the most destructive fishing gears are prohibited through the Fisheries Act regulations. These are: seine nets, including gillnets modified to allow them to be dragged through the water; drifting gillnets; beating the water or marginal vegetation to drive fish into gillnets; poisons and explosives. The use of monofilament gillnets should also be prohibited as they are much more effective than multifilament nets, thus creating an enormous increase in effective effort in an already heavily-exploited fishery. A comprehensive ban should be placed on possession of this gear. A curfew, prohibiting fishing at night should be considered after consultation with the fishing communities.

 Following development of the new comprehensive management plan, and with agreements on the way forward for community management and on local regulations, a new version of revisions of the Act and regulations should be drafted with legal advice, and enactment of these revisions should be given high priority by MFMR.

 The system for issuing fishing permits must be reviewed. The present system, where it is operated through the Regional Council and fishermen have to travel to the office to obtain licences, is unworkable. The system is a major cause of the current tendency for the majority of fishermen to use unlicensed gears. The ill-will generated by inability of tourists to obtain licences directly from the lodge at which they stay, and the perception that anglers are a 'soft' target for law enforcement, creates negative impressions of Namibia abroad. Issuing of licences should be the responsibility of the fishing communities and conservancies, and tourist lodges for anglers, with a percentage of fees earmarked for the Regional Council. Revenues realised would be greater and the system would be more effective in enabling control of illegal fishing. Until this issue is resolved the project faces enormous difficulties in achieving its goals.

 Issues identified during the assessment of the recreational fishery must be followed up. The *modus operandi* of angling tourism is not generally understood by Government. A large number of local people are employed in the fishing lodges and as tour guides, who directly benefit from the fishery. The contribution of the angling tourism sector to the local economy must be highlighted to illustrate the value of the fishery and provide an enabling environment for cooperation between local fishing committees/conservancies and lodges.

 Catch and release angling, which does not impact on fish stocks, is promoted by the tourist lodges. The needs of the recreational fishery and the local fishermen exploiting the main river channels and peripheral lagoons are the same, i.e. a healthy stock of large fish species. It is, therefore, important that project (and post-project) activities in the






tourist areas address issues raised by both sectors. Conservancies have accepted the concept of non-fishing reserves and in fact this is reportedly a part of old traditional systems of control. The project should expand on the non-fishing reserves proposed during phase 1 to other parts of the region as well as to the Zambian section of the river after consultation with all Zambian stakeholders.




- 🐟 The next phase to this project should be a joint project between Namibia and Zambia, operating with the full confidence and participation of senior officers in the Zambian Department of Fisheries. MFMR and the Zambian DoF must be active partners and it is suggested that there is a permanent (or at least more frequent) project presence on the Zambian side of the river. Botswana should also be much more closely involved in the project as the Chobe floodplain is a shared resource and Botswana has a set of fishing regulations that needs to be harmonised with agreed regulations on the Namibian side of the Chobe River.
  
- 🐟 The project should be guided by a steering committee incorporating senior officers from the three countries. This should meet frequently (at least twice yearly and preferably quarterly) to review progress and make recommendations for modification to the workplans if necessary.
  
- 🐟 Technical assistance should include a fish and fisheries specialist and in addition a specialist in CBNRM. These two officers should work very closely together. It is essential that extension messages conform to current knowledge of fishery dynamics and do not conflict with indigenous knowledge on the state of the fish stocks and how best to conserve them. A case in point is the timing of the closed season in Zambia, which does not protect the larger, more valuable species in their breeding season as claimed. Its only benefit is that it causes a reduction in overall annual effort, and is in force at a time when many fishermen do not fish much anyway as they are tending their gardens at that time.
  
- 🐟 The project emphasis must be on empowering the fishing communities/conservancies to manage the fisheries on a localised basis, including responsibility for licensing of fishermen and/or fishing gears. MFMR must provide an enabling environment (Zambia's regulations already permit community-based management) for devolution of management responsibilities by gazetting modifications to the Fisheries Act and its regulations. Modifications have already been proposed by the project but these need to be reviewed to remove the excessive and biologically unnecessary restrictions contained therein. Agreement of local regulations should be decided on a localised basis dependent on the fishery priorities in the immediate area controlled by a committee or conservancy. The project's role should be to provide guidance to the communities based on sound scientific principles.
  
- 🐟 IRDNC, a local NGO, is experienced and successful in guiding conservancies in CBNRM. The current project has initiated close links with IRDNC and appointed two officers trained through the project to assist IRDNC in fisheries matters. The new phase of the project should continue to provide close support to IRDNC to develop CBNRM in the fisheries.


## ANNEX 6: PROGRESS AGAINST INDICATORS


This table lists the projected outputs and rating of the progress made towards the outputs, together with a brief assessment of the activities.






Project Targets	Indicators	Baseline (value and time of measurement)	Current status (Value and Date) with discussion of any variance	Success rating (green, amber or red)
<b>Project Goal</b>				
The shared Zambezi/Chobe River fisheries resources managed sustainably through transboundary coordination and collaboration after the introduction of fully integrated fishery management systems.	<ul style="list-style-type: none"> <li>• A fully integrated management plan in place.</li> <li>• Full co-operation between Namibia, Botswana, and Zambia on the management of fishery resources of the Upper Zambezi River.</li> </ul>	<p>No formal or personal contact between Zambian and Namibian fisheries departments.</p> <p>No integration or harmonization of fishery regulations</p>	<p>Concept of coordinated management discussed with partners in Zambia and Botswana.</p> <p>Contact between DoF and MFMR established on a local as well as managerial level. Initiative now required by MFMR, which has proposed monthly meetings at local level.</p> <p>Integrated regulations not yet in place but this should not delay implementation of CBNRM through traditional management structures.</p>	
<b>Project purpose</b>				
By mid 2009 alternative community fishery management practices piloted and tested and these contribute to a fully integrated management system for subsistence, semi-commercial, and sport fisheries that will provide optimal benefits to all stakeholders who are reliant on this valuable	<ul style="list-style-type: none"> <li>• New local fishery management structures tested (i.e., conservancy committee, Fisheries Committee, traditional authority, etc.)</li> <li>• New fishery management practices introduced (i.e., closed season, closed sections of river (now called Fish Protection</li> </ul>	<p>No fisheries committees in Caprivi, fishery committees initiated in Zambia.</p> <p>Closed fisheries season called in Namibia in 2006 for EUS health reasons.</p>	<p>Four Fisheries Committees have been formed and supported by Project, while other committees are being formed throughout the area on the initiative of the communities themselves. Conservancies have also been sensitised to the aims of CBNRM in the fisheries. Formal recognition of committees by MFMR is still awaited.</p> <p>Closed season was motivated to Minister for</p>	






resource	<p>Areas - FPAs), sport fishery agreement with conservancies etc.)</p> <ul style="list-style-type: none"> <li>• A closed fishery season on the Namibia side of the river is enacted in tandem with the closed season on the Zambia side of the river [if acceptable].</li> </ul>		<p>2007 but not declared. A closed season is currently under discussion for 2009/10. The concept of closed seasons is now questioned by MFMR and Project following analysis of monitoring data and observation of the fishery, but any decrease in current effort will be beneficial, with an added benefit of harmonisation of regulations with Zambia. Communities accept the concept of FPAs and several areas have been identified and demarcated. Progress towards implementation now has high priority.</p>	
<b>Output 1</b>				
<p>A better understanding of the impact of the new Inland Fisheries Resource Act (Namibia) on the fisherfolk (on Namibians and Zambians and the resource) is acquired and documented.</p>	<ul style="list-style-type: none"> <li>▪ Study that documents the positive and negative impacts of implementing the Fishery Act on the livelihoods of participating fisherfolk.</li> </ul>	<p>Effect of the fisheries act on fisherfolk not investigated or understood.</p>	<p>Study has not been undertaken as present act has to be amended before it can be effectively implemented.</p> <p>Present implementation of the act has very limited effect on fishing behaviour of fishers.</p> <p>Unforeseen difficulties include the issuing of licences by the Regional Council only resulting in large scale fishing without licences.</p>	
<b>Output 2</b>				







<p>Collaboration on fisheries management achieved between the transboundary communities through the establishment of a cross border committee (between Namibia and Zambia) that will have input on the joint management of the shared fishery resource and oversight of the closed fishing season.</p>	<ul style="list-style-type: none"> <li>▪ A cross-border fishery committee, composed of key stakeholders from Namibia and Zambia is established and the terms of reference documented</li> </ul>	<p>No communication between Fishery departments or community structures across the border</p>	<p>Transboundary committee not yet established but officials now have contact and cross-border visits take place. MFMR confirmed that further high level meetings are planned in the near future. Initial contacts also made during contract extension with NGOs and other organisations active in natural resource management in the project area in Zambia</p>	
<p><b>Output 3</b></p>				
<p>Support the emergence of local level community fishery groups that assume management responsibility for fisheries in their areas.</p>	<ul style="list-style-type: none"> <li>▪ Conservancies and Fishery Committees initiate fishery management systems and practices, and monitor fishery use practices.</li> <li>▪ Fishery activities are included in the Event Book system</li> </ul>	<p>Some contact between Project and conservancies. Fisheries Committees non-existent</p>	<p>Dr van der Waal attended quarterly meetings, and visited conservancies. Event book includes fisheries activities.</p> <p>Fisheries Committees formed at Lisikili, Kalimbeza, Impalila and Kasika. Fish guards appointed in these four areas. Other communities, e.g. Muyako on Lake Liambezi, have also formed committees and need to be nurtured by the project/MFMR.</p> <p>Responsibility for fisheries management not yet devolved.</p>	
<p><b>Output 4</b></p>				
<p>Facilitation of the development of appropriate fish farming projects in conjunction with MFMR and projects utilising existing water bodies and local fish species</p>	<ul style="list-style-type: none"> <li>▪ MFMR/ NGOs developing alternative fish farm activities as recommended.</li> </ul>	<p>Fish farming limited to the three formal fish farms and one private enterprise</p>	<p>Project [correctly] did not support non-viable formal fish farms.</p> <p>LEAD fish farmers' project initiated and actively supported by advice and technical support. 34 private and community natural ponds stocked with cichlids and later harvested, and growth of fish monitored.</p>	

Output 5				
Monitoring programmes are introduced and/or maintained (i.e. for the river fisheries survey at Kalimbeza (Namibia) and Ngweshi (Zambia) area), the fish market survey at Katima Mulilo, EUS monitoring and the biological surveys on the rivers and the lakes.	<ul style="list-style-type: none"> <li>The Zambian Department forms part of the monitoring programmes (seasonal biological assessments, household surveys, monthly river transects, etc.) run by MFMR</li> </ul>	Annual biological surveys are undertaken by the Fisheries MFMR staff at Katima Mulilo. No data capture or interpretation takes place locally – data are faxed to Hardap. No participation by Zambian DoF No market survey	Annual biological surveys expanded to two-monthly surveys in four selected sites. Detailed report on analysis of data prepared and recommendations made for management based on results. Project needs extra scientific staff (promised imminently by MFMR). One fisheries scientist now appointed at Katima Mulilo office. Without more qualified staff, ongoing programme will not be sustained. Long-term monitoring needs to be at least 3 times per year, preferably quarterly, essential to quantify impacts of flood cycles and fishing. Regular EUS monitoring takes place together with the biological sampling. Data are entered and verified and a report written. Participation by Zambia is still limited Fish market survey increased to twice weekly . Eight fish guards recording data from local fishermen at four sites twice weekly.	







Activity	Success Rating
<b>Activity 1.1</b> – A platform from which feedback from the communities can be obtained regarding the Inland Fisheries Resources Act and regulations will be established. Meetings will be scheduled by the MFMR and Project to bring the Inland Fisheries Resources Act into line with the original community based approach as spelled out in the White Paper. All stakeholders will be involved in these discussions. The Kalimbeza area as well as the Kasika and Impalila Conservancies will be used as a pilot study areas.	

<p>Limited progress was made. The low level of enforcement of the Inland Fisheries Resources Act and regulations contributed to the present state of uncontrolled fishing on the Zambezi and Chobe Rivers. Some progress was made with the establishment of Fisheries Management Committees at four areas, Impalila, Kasika, Kalimbeza and Lisikili. Three of these, Impalila, Kasika and Kalimbeza fall within established conservancies facilitating the communication process. Other committees have been formed independently of the project, a highly encouraging development.</p>	
<p><b>Activity 1.2</b> – The biological monitoring of fish life in the region (in collaboration with Zambia) will continue to determine whether there are any significant differences in the fish population and whether these differences can be ascribed to the introduction of legislation.</p> <p>The data of the previous 11 years were analysed to determine changes and effects of the intensive gillnetting. Limited collaboration with Zambia took place. An initial meeting was held between MFMR, DoF (Zambia) and the project to discuss future collaboration between the two countries. A proposal has been developed by MFMR to increase the sampling frequency, pending the appointment of more qualified staff.</p>	
<p><b>Activity 1.3</b> – Translation of the Inland Fishery Resources Act into SiLozi. This is distributed to traditional authorities, local Councils and conservancies for use by affected communities.</p> <p>The act has been translated and SiLozi copies submitted to conservancies, khutas and fisheries committees in order to facilitate better understanding of the law. Modifications to the Act and Regulations are considered essential to facilitate CBNRM.</p>	
<p><b>Activity 2.1</b> - A closed season will be requested by the MFMR to coincide with the closed season in Zambia, from 1st December to 28/29th February. The principles of the closed season will also be similar to that in Zambia. After the Legislation has been changed by the MFMR, communities will be helped to become directly involved in the management and control of the process, as well as with monitoring its effectiveness and impacts.</p> <p>A closed season was declared at the end of 2006 for the outbreak of the disease EUS. No closed season was declared since then, but is proposed for 2009 and the request is, at the time of reporting, under consideration by the Minister.</p>	
<p><b>Activity 2.2</b> – The effect of the closed season or fish sanctuaries on the stakeholders will be documented as well as the effect on the fish population. This will be done in conjunction with activity 1.2.</p> <p>No monitoring can take place presently as no closed season or fisheries reserve has been established. A closed season was established during 2006/2007 but only due to the outbreak of EUS. No data on the beneficial effect of a closed season is available in Zambia either.</p>	
<p><b>Activity 2.3</b> – A motivation will be drawn up in collaboration with one or more interested conservancies or fisheries committee to declare fish sanctuaries in the respective conservancies in terms of the Inland Fisheries Resource Act.</p> <p>Consultation meetings were held with Impalila, Kasika, Kalimbeza and Liskili communities to discuss FPAs. Fish guards and Fisheries Management Committees (FMC) were appointed and several sites were proposed by the communities that could be declared as FPAs. A draft management plan for each proposed FPA has been developed.</p>	

<p><b>Activity 2.4</b> - A workshop will be held with stakeholders both from Namibia and Zambia to establish a cross-border committee that will be responsible for all fishing related activities in the Kalimbeza area. The Kalimbeza area again will be used as a pilot site for this activity. The terms of reference will be developed.</p> <p>Although initial discussions were held with fisheries committees on both sides of the river and idea of joint committee was accepted, nothing materialised. MFMR has indicated that cross-border cooperation will be given priority. This must be expedited in the next phase.</p>	
<p><b>Activity 2.5</b> – Linkages with the MFMR, Namibia and the DoF, Zambia will be set up to facilitate the flow of information between the fishermen and the two Government departments. Additionally, steps will be taken to incorporate representatives from the Botswana Fishery Department and Department of Wildlife and National Parks to coordinate fishery management issues along the river frontage of the Chobe National Park.</p> <p>Initial contact was made with the relevant departments. No formal communication linkages exist but the MFMR and other countries are giving priority to improved communications.</p>	
<p><b>Activity 2.6</b> - Link up with the proposed FAO project on the EUS outbreak and include this in the mandate of the cross-border committee (joint management).</p> <p>The Project has participated actively by participation in joint surveys, own regular regional surveys, reports and participation in FAO initiated workshops. A presentation was made and samples of affected fish submitted to the University of Zambia for analysis. MFMR now has a scientist dedicated to the monitoring of EUS stationed at the KIFI research station at Kamutjonga.</p>	
<p><b>Activity 3.1</b> – Continue training courses for game guards to include all fish and fisheries activities in conservancies in the already present Event Book system.</p> <p>Visits were made to Kasika, Salambala and Impalila Conservancies. Further training is needed. Event book well-designed but should be reviewed after reviewing early data. Book is in partial use but more training is needed and agreement on consistent implementation across all conservancies.</p>	
<p><b>Activity 3.2</b> – A pilot fish management system will be piloted in the Impalila, Kasika or other Conservancy in Namibia to explore the optimal integration of subsistence fisheries, with semi-commercial fisheries, with premium sport fisheries. As part of this process, assistance will be provided to the relevant Conservancy to initiate contractual arrangements with sport fishing guides (from Namibia and Botswana) for the right to fish within the waters of the concerned Conservancy[ies]. The income from the venture shall be applied towards the institutionalisation of a sustainable fishery management plan for the waters of the Conservancy.</p> <p>Meetings were held with Impalila, Kasika and Sikunga (Kalimbeza) Conservancies to discuss local management of demarcated areas. See activity 2.3.</p>	

<p><b>Activity 3.3</b> – Develop a data collection system for all fishing lodges in the region to return all information of catch and released fish. Additionally, released fish will be tagged where possible to add value to data. This data will be used for evaluating the conservation measures in fisheries reserves.</p> <p>Forms with a request were personally delivered at all lodges involved in angling. Only one set of forms were returned. More follow-up is required. The MFMR can put some pressure on lodges to return angling records [condition of chartered boats].</p>	
<p><b>Activity 3.4</b> – Develop fish sanctuaries [reserve] in one or more conservancies.</p> <p>The following sites were identified within conservancies: Sikunga conservancy (Kalimbeza) - the Kalimbeza channel to Kalizo Lodge, Simasiku lagoon and Katoya channel. Part of the Kalimbeza channel falls within the boundary of Lisikili. Lisikili community has also identified Maningimanzi lagoon as a possible PFS. In Impalila Conservancy, the Kasaya channel has been identified for an FPA. Discussions continue to identify sites within the Kasika Conservancy.</p>	
<p><b>Activity 4.1</b>– Assist the MFMR to develop different appropriate fish farming and fish ranching approaches and communicate that to local and traditional authorities, conservancies and Central Government.</p> <p>Powerpoint presentations presented to MFMR and proposals were submitted. At khuta meetings at Bukalo and Chinchimane as well as to conservancies at Quarterly meetings and Regional Council the principles and examples were explained. The Lead Fish Farmers Project is actively setting an example of alternative low input fish farming.</p>	
<p><b>Activity 4.2</b> – Assist the MFMR and NGOs in the development of projects on low input appropriate fish ranching and fish farming projects in conservancies</p> <p>The Lead Fish Farmers Project has been actively supported. Strong links exist between the Lead fish farmer programme and MFMR.</p>	
<p><b>Activity 4.3</b> – Data collection on the yield from the existing and planned fish farms, the prices and processing of the fish</p> <p>Relevant data was not available from MFMR staff. A meeting with MFMR staff is needed to collect data for the future. Conventional fish farming is no longer considered an appropriate intervention target for the project.</p>	
<p><b>Activity 4.4</b> – An assessment of the production potential from the new fish farms to determine the ability of these fish farms to alleviate fishing pressure on the Zambezi River or to supplement livelihood needs of fisherfolk during the proposed closed fishing season.</p> <p>New and existing fish farm fish production is still small in comparison with the fisheries and no effect could be assessed. Conventional fish farming is no longer considered an appropriate intervention target for the project.</p>	



<p><b>Activity 5.1</b> - The monitoring programs already in place in Namibia will continue, but will be adjusted where necessary to supplement the data collected by the Project.</p> <p>Planned biological, EUS, market surveys are all taking place in Namibia. Difficulties are however experienced to undertake joint activities with Zambia. Regular biological surveys and EUS monitoring are combined in order to increase efficiency. A meeting was held with DoF (Zambia) and the departments have proposed monthly meetings to discuss matters of mutual interest.</p>	
<p><b>Activity 5.2</b> - The Department of Fisheries in Zambia will be incorporated into these monitoring programmes.</p> <p>The DoF is involved in a joint frame survey and this will be extended once financial responsibilities are resolved.</p>	
<p><b>Activity 5.3</b> – Monitoring of the health of fish in the region [particularly monitoring the occurrence of EUS in fish communities in the Zambezi and Chobe rivers] in collaboration with scientists in Botswana and Zambia, This is very important and can be a motivation to convince Zambia to join the surveys.</p> <p>FAO has taken responsibility for EUS monitoring and has organised standardised monitoring in the affected countries.</p>	
<p><b>Activity 5.4</b> – Monitoring system developed in conjunction with MFMR for monitoring the quantity and composition of fish sold at the Katima Mulilo Open Market.</p> <p>Continued monitoring of the fish market is taking place. The sampling frequency has increased to twice a week. A report on results so far is at an advanced stage of preparation.</p>	
<p><b>Activity 5.5</b> - Organizing and executing a fisheries Frame survey of the Zambezi/Chobe region with the full participation of the Department of Fisheries, Zambia and Department of National Parks and Wildlife, Botswana.</p> <p>The frame survey was held from September 2008. Delays in analysis by MFMR have resulted in the project taking over responsibility and the report will be completed by end-December, the end of this project phase. The evaluation report commented that this analysis must be expedited to justify the green progress rating by the end of the project phase.</p>	
<p><b>Activity 5.6</b> - Training of young fisheries biologists and technicians of the MFMR in the identification of prominent fish diseases, particularly EUS, and the collection and preparation of samples for laboratory analysis.</p> <p>Regional workshop was held by FAO at KIFI in October 2009. A fisheries scientist dedicated to EUS was appointed at KIFI (MFMR)</p>	

**Activity 5.7** - Training and preparation of young fisheries biologists and technicians in the use and maintenance of fisheries data bases to continue the use and updating databases and to enable the writing of reports.

A workshop was held at KIFI in September 2009 where fisheries scientists and technicians received training in data collection, database management and basic data analysis. Detailed research programmes have now been developed by the researchers at KIFI.



Red – limited progress (<1/3 of indicators achieved);

Amber – good progress (1/3 – 2/3 of indicator achieved);

Green – very good progress (>2/3 of indicator achieved).