

INTEGRATED MANAGEMENT OF ZAMBEZI / CHOBE RIVER SYSTEM - TRANSBOUNDARY FISHERIES RESOURCE NAMIBIA / ZAMBIA / BOTSWANA

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Summary Report of main findings of the Zambezi/ Chobe fisheries project, July 2006 to July 2009

August 2009



Women fishing in Zambezi with traditional baskets



Exploiting a valuable food resource during floods



Dried fish ready for market



Fishing community meeting

by: Clinton J. Hay & Ben C.W. van der Waal

Field Document no. MFMR/NNF/WWF/Phase I/3



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1 OBJECTIVE OF THIS REPORT

This report was requested by the Permanent Secretary and aims to consolidate the reports that were produced during the project period July 2006 – June 2009. The main findings and recommendations are summarised. The original proposal for this project was designed by MFMR staff and was signed off by the previous Permanent Secretary. This report should assist the Ministry of Fisheries and Marine Resources and their partners to plan and implement the necessary action. For convenience each project output is dealt with separately.

It is important to note that detailed conclusions and recommendations made during the project period are available in the separate reports listed.

2 INTRODUCTION AND PROJECT BACKGROUND

2.1 Development of the Project

The fish resource in the shared Upper Zambezi River system is limited and it is the policy of the Namibia Ministry of Fisheries and Marine Resources (MFMR) to protect the interests of the most vulnerable fish users, the subsistence households. There is a long-term need to ensure the availability of fish from the rivers, as fish provide critical supplements to the diets of a large number of floodplain residents. Consequently, there is a need to control the commercialisation and potential attendant over-exploitation of this important subsistence and rich biodiversity resource.

Fishing pressure on the Zambezi River fishery resource is on the increase. This will have negative impacts on communities and other stakeholders, especially poor rural communities. The MFMR have conducted biological surveys of fish populations in the Zambezi since 1997 to study the state of the resource. The Ministry developed a database on the biological aspects of the fish over the last ten years but very little data were available on the fisheries in the area. This lack of important information led to the development of a project “*Shared Resource Management On The Zambezi / Chobe Systems In Northeast Namibia – Current Practices And Future Opportunities*” funded by WWF Living in a Finite Environment (LIFE), that made significant contributions towards the collection of valuable data on the fishery resource and resource users in this system. The Project was then able to establish a good foundation for further work in the management of shared resources, with a number of recommendations being made for continued future work. The following objectives were developed for the previous project (October, 2001 – August, 2004):

- Collection of quantitative and replicable data regarding the nature and characteristics of the small-scale subsistence fishery on the Zambezi and Chobe Rivers in the northeast, and development of a consistent approach to data collection (biological and social) between the adjacent countries.
- The nature of the fishery management systems are identified, investigated and documented and their appropriateness for future management is assessed, whilst various alternatives for the future management of the freshwater fisheries in the region are explored.
- Working relationships (including biological, ecological and social disciplines), understanding and awareness regarding fisheries and resource management are established between relevant agencies both within the Caprivi Region, in Namibia and internationally, supported by the official recognition of the role of the Standing Committee on Fisheries, currently known as the Aquatic Resources Working Group which includes Botswana, Namibia, Zambia, and Zimbabwe.

The baseline data collected during the previous project, especially on the fisheries aspects, such as effort input and species composition of the subsistence fishery as well as for the recreational fishery and market interactions, supported the development of the Namibia Inland Fisheries Resources Act in 2003. With the Act in place, the implementation of this Act became the focus of the MFMR which again lead to more challenges and opportunities. These new challenges identified areas where WWF support could help the MFMR by providing support for the implementation of the Inland Fisheries Resources Act and further contribute to capacity building in the Ministry. The shared nature of the Zambezi / Chobe River System further contributed to the challenges of managing such a river system. The cross border nature of the fishery was also an area where WWF could contribute to the facilitation of joint management of the resource.

Contact with the stakeholders in neighbouring countries was made through the previous project, but continued maintenance of these contacts will be difficult until proper, effective coordination and management structures are put in place.

Despite this solid start by the previous project, the actual management and co-operation between stakeholders and neighbouring countries was still lacking. Fisheries Inspectors, employed by MFMR, were appointed to carry out patrols on the rivers. However, it remained essential to actively engage the involved communities in the management of the resource, and that pilot projects be initiated to assist the Ministry with the acquisition of experience in the development of appropriate management structures, including at community and regional levels. It is therefore necessary that structures be put in place that will facilitate the joint management (local and regional, as well as international) of the fish resource in the Zambezi and Chobe Rivers.

A very good working relationship was developed between the Ministry and WWF (LIFE) during the previous project which formed the basis for the outputs documented. The excellent relationship which existed and the challenges faced by the Ministry in implementing the Inland Fisheries Resources Act formed the foundation from which this current project was developed and initiated.

2.1.1 Project justification

The current project is a strategic and logical continuation to previous efforts aimed at promoting effective and sustainable management of Namibia's shared north-eastern fishery resources. The transboundary nature of the Zambezi / Chobe fishery, a serious absence of developed and functional institutional mechanisms to facilitate transboundary collaboration (and community-based fisheries management), unprecedented levels of fish exploitation (and associated risks such as a reduction to the fishery resources contribution to local livelihoods, the regional economy and conflict) and other factors combine to make the Project timely and useful. Not only is the fishery a shared resource, but if current trends of illegal, unreported and unregulated fishing continue unabated, they are likely to disrupt the fishery's contribution to local diets (fish is a major and relatively affordable source of protein for the poor floodplain communities), livelihoods and the economy.

Three key problem areas are currently associated with the Zambezi / Chobe fishery and they formed the premise for the conceptualization of the Project:

- Potential over-exploitation of the fish resource arising from:

- increase in human population manifesting itself in terms of unprecedented levels in demand for fish, numbers of people trading in fish and numbers of new fishing camps and fishermen;
 - poor management arising from inadequate regulation by a skeleton staff, lack of involvement of local communities in resource management;
 - potential commercialization facilitated by unregulated net sales, easy cash conversion and the economic value of the resource bolstered by current high market demands.
- Conflict between different stakeholders over the resource as well as cross border conflict as a result of:
 - unregulated nature of the shared fishery;
 - unharmonised or different objectives between stakeholders in the neighbouring riparian countries (Botswana, Namibia and Zambia);
 - potential resource competition between emerging aquaculture and the long-established subsistence fishery sector.
 - Lack of understanding of different management approaches/ systems partly due to:
 - inefficient management structures in place;
 - inadequate flow of information between different stakeholders and between countries;
 - lack of communication between stakeholders (traditional leaders, fishermen, etc).

The overall approach of the Project was to facilitate transboundary collaboration with a view to work towards a fully integrated fishery management system. One of the listed objectives in the Inland Fisheries Policy of Namibia is to ensure co-ordination and co-operation between countries in the region, sharing inland water bodies and rivers with Namibia. A further objective in the Policy is to ensure that local subsistence fishers through local community leaders are consulted about the extent the communal resource can be used for competitive and recreational angling by tourists. The Ministry further strives towards a holistic approach in the management of the fish, rivers and floodplain environments. Areas of collaboration include policy and legislation review and development, research, monitoring and surveys as well as the implementation of specific interventions (e.g. closed fishing season or closing river sections) deemed appropriate for ensuring the sustainable management of the fishery.

Against this background, the current Project sought to address several interrelated issues as outlined below:

- The need to address the challenges presented by the transboundary nature of the Zambezi / Chobe fishery;
- Promote institutional collaboration amongst the respective government agencies, namely Botswana's Department of National Parks and Wildlife (DNPW) – the fisheries Directorate; Namibia's Ministry of Fisheries and Marine Resources (MFMR) and Zambia's Department of Fisheries (DoF) as well as other stakeholders like NGOs, traditional authorities, conservancies and the private sector (particularly lodge owners and tour operators);
- To elevate the status of fish monitoring as an integral component of the conservancy committees through their Event Book System. Without this intervention, fish monitoring risks being misconstrued as an additional task compared to other long-established monitoring activities, especially in terms of wildlife.
- Explore the possibilities of proactively avoiding potential tensions or conflict that may arise from the establishment of fish farms through facilitating dialogue between fish farm cooperatives and the subsistence fishery sector.

The implementation of this project was associated with several opportunities and strengths on the one hand and weaknesses and threats on the other hand. The opportunities included the development of a low technology fish farming sector; and improved transboundary cooperation in research and policy thereby paving the way to the much needed transboundary harmonization in these areas. Other opportunities included the involvement of conservancy committees in fish monitoring, fishery management, and benefiting from fish-related enterprises.

A major strength for the Project was that it was building on earlier initiatives whereby transboundary collaboration and cooperation could be enhanced. Strengths arising from operating in the project area include the presence of a healthy fishery with natural and socio-economic constraints, a rich history of resource management, e.g. traditionally, through CBNRM and more recently, conservancy movement. A further strength was that local communities and traditional authorities previously demonstrated a desire to participate in management of natural resources, fish not being an exception.

But these strengths and opportunities may be diluted by weaknesses which include a lack of biological and social information, lack of related institutions and capacity, as well as limited and outdated legislation in some cases. Furthermore, threats include potential commercialization of fisheries and growing demand, unpredictable flood and rain patterns, highly extractive and damaging fishing methods, growing conflict over shared fishery resources and potential conflict arising from different or competing demands among stakeholders.

2.1.2 Project goal and purpose

The project goal is: *“The shared Zambezi/Chobe River fisheries resources managed sustainably through transboundary coordination and collaboration after the introduction of fully integrated fishery management systems”*.

The project purpose is: *“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 resource”*.

2.1.3 Project outputs

- Output 1: A better understanding of the impact the new Inland Fisheries Resource Act (Namibia) has on the fisherfolk (both Namibians as well as Zambians) and the fish resources acquired and documented.
- Output 2. 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.
- Output 3. Support the emergence of local level community fishery groups that assume management responsibility for fisheries in their areas.
- Output 4 - Facilitation of the development of appropriate fish farming projects in conjunction with MFMR and projects utilising existing water bodies and local fish species
- Output 5 Monitoring programs 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.

2.1.4 Project implementation arrangements

The Norwegian Agency for Development Cooperation (Norad) and WWF-Norway provided 90 and 10 per cent respectively of the Norwegian funding to the Project. The WWF LIFE Project was the field-based manager of the Project, being responsible for overall adherence to the project proposal, budget, planned outputs, and provision of technical assistance. Grant funds were administered by the Namibia Nature Foundation (NNF), who was the appointed grant management partner. Field-based implementation of project activities was done with assistance of the MFMR. The MFMR also co-funded the Project.

Other organisations and institutions without whom this Project was not possible included the Integrated Rural Development and Nature Conservation (IRDNC) who provide support to conservancies in Caprivi. Sport fishermen and private sector agencies, such as fishing lodges and guides, in the project area were also stakeholders in this Project. Traditional Authorities and fishing communities provided considerable guidance and information. With the outbreak of the EUS disease in the fish in the area, the Department of Veterinary Services also became an important partner.

The main target groups included fisher folk and floodplain dwellers in the Caprivi region (both in Namibia and Zambia) who benefited from sustainable community-based management of the aquatic resource and the accompanying empowerment and expected improvement in livelihood security. Fish vendors – mainly females heading their respective households or key income earners, traditional authorities who not only were playing their customary roles of mediation and leadership, but could potentially be drawn upon for support of any future management approaches, were included in this target group. Fish farmers involved in aquaculture activities, and marketed their products locally or regionally, were also included.

3 SUMMARY OF CONCLUSIONS MADE AS PER PROJECT OUTPUT

3.1 Project output 1:

A better understanding of the impact the new Inland Fisheries Resource Act (Namibia) has on the fisherfolk (both Namibians as well as Zambians) and the fish resources acquired and documented.

- The impact of the new Legislation on the fisher folk and the fish resource could not be adequately assessed. This was due to the weaknesses in implementing the legislation. The legislation has to be amended before its implementation can be effective. The present implementation of the Act has very limited effect on fishing behaviour of fishers.
- Unforeseen difficulties include the issuing of licences by the Regional Council only, resulting in large-scale fishing without licences.
- The entire Act was translated into Silozi. This was done to make sure that the local communities understand the Act.
- Some weaknesses were identified in the Inland Fisheries Resources Act and Regulations. The following were highlighted:
 - The Ministry of Fisheries and Marine Resources (MFMR) has limited enforcement capacity and there is considerable hostility towards local fisheries inspectors tasked with enforcing the law. The system of issuing fishing

licenses through one official in the Regional Council is impractical for both local fishermen and for sport anglers.

- It was concluded that a community-based fisheries management (CBFM) approach would benefit the fisheries resource by leading to more sustainable use through local management suited to local conditions carried out by people living close to the resource. Better management should lead to more fish being available which will benefit local communities who will also increase their benefits from the resource through conservancies linking tourism income from sport anglers to fisheries management. The MFMR would benefit through reduced hostility towards fisheries inspectors, better cooperation with local communities and more efficient use of its own resources.
- Local community structures as Fisheries Committees and conservancies are not recognised in the present legislation. These bodies should ultimately be empowered to manage fisheries resources in their areas of jurisdiction.
- Licence fees are not used to support the management and control over fisheries resources. Local communities would be strengthened if they receive income from licensing in their areas for fisheries management actions.

3.2 Project output 2:

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.

- Transboundary committees have not yet been established but officials now have contact and cross-border communications and visits are taking place. MFMR confirmed that further high level meetings are planned in the near future.
- Initially DoF from Zambia did not buy into the project and perceived it as a Namibian initiative with Namibian objectives. Weak participation from Zambia led to a breakdown in communication between the two stakeholder groups.
- A starter document was prepared for the MFMR as a memorandum of trilateral agreement on joint harmonized management of the Zambezi/Chobe fisheries. The Code of Conduct for responsible fisheries of FAO and the SADC Protocol on Fisheries principles were used as basis.

3.3 Project output 3:

Support the emergence of local level community fishery groups that assume management responsibility for fisheries in their areas.

- Fisheries Committees were formed at Lisikili and Kalimbeza, but the institutional structures are not yet in place for them to operate efficiently. Responsibilities for fisheries management have not yet been devolved.
- Conservancy members were trained in the use of the Event Book system. This was done to record natural resource activities in their areas. Such an event book recording was developed for the fishery. Despite the initial teething problems that require attention, it still has the potential to provide valuable information on fisheries trends.

3.4 Project output 4:

Facilitation of the development of appropriate fish farming projects in conjunction with MFMR and projects utilising existing water bodies and local fish species

- As an alternative to the conventional fish farming approach followed on the Ministerial fish farms, the Project introduced a concept harnessing natural productivity potential by stocking natural water bodies with tilapia [the preferred fish species] that are selectively netted out by the present fishery.
- Proposals were prepared for the MFMR, Caprivi Regional Council, Traditional Authorities and Salambala Conservancy proposing the large scale stocking of Lake Liambezi with tilapia [three species] fingerlings and developing a well-managed commercial fishery on the lake. The MFMR accepted this challenge, but stocking and organization of fishing activities is awaited for.
- Technical advice and physical support in the form of design and construction of fishing gear and fish transport facilities, was given to the Lead Fish Farmer Programme.
- The main results of the Lead Fish Farmer Programme are:
 - Overall objectives:
 - Develop a suitable design and management regime for viable Low Input fish pond production
 - Develop appropriate technical fish and poultry production manuals in Silozi
 - Establish a training/extension system for preparing other households to produce fish/poultry
 - More than 20 natural pools and filled gravel pits were stocked by the Lead project and four harvested in 2008.
 - Fish stocked at the end of 2007 and beginning of 2008 had grown to acceptable size [more than 200g] in pools where no fish were originally present.
 - Some of the problems encountered included the inability to obtain fingerlings from fish farms. This problem was partly solved when an agreement was reached on the fingerling fish price in 2008.
 - It was then realized that the fish farms have a serious problem to breed sufficient fish fingerlings for their own requirements. This aspect needs urgent attention as the development of alternative fish farming activities rely on the provision of suitable fish fingerlings.
 - Considerable interest in the Kwando area could not be satisfied as there is a risk that if fingerlings from the Zambezi, where EUS occurs, are used in the Kwando area, the disease may inadvertently be spread by this extension programme. As an alternative, a start was made to identify suitable pools and stock them with local fish for breeding purposes. The local Nwanyi angling club and Ministry of Environment and Tourism were asked to help collect breeders in the Kwando in the Bwabwata National Park.
 - Problems were encountered harvesting the fish. Owners have to learn to take initiative and cooperate with other people and sharing of fishing nets.
 - This project comes to an end in 2009 and a follow up is required to establish this approach in the rural areas.

3.5 Project output 5:

Monitoring programs 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.

3.5.1 Biological data

- The data collected by MFMR between 1997 and 2007 assisted in identifying trends in the fish stock. These data were analysed and a report produced titled “Analysis of Historic Fisheries Research Data for the Caprivi Region.”
- The following conclusions resulted from an analysis of the available data:
 - The fished areas have a lower fish density and fewer larger fish than protected / conservation areas. This is attributed to the effects of selective overfishing of larger species.
 - The smaller faster growing species are replacing the larger, slower growing species.
 - The fish biomass in conserved areas is higher than in fished areas.
 - This study indicated that the fishery has not, as yet, impacted on the fish species diversity.
 - The net fishery in Caprivi negatively impacted, especially *Oreochromis andersonii* and *Oreochromis macrochir* populations.
 - Some other larger fish species such as catfish and tigerfish seem not to be as much affected by the fishery as expected, possibly because of their migratory habits and the high reproductive potential of these species.
 - The magnitude and peak level of a flood affects the fish catches and production positively and is recognizable two years after such floods.
 - Ways in which the fish community of Caprivi can be utilized sustainably include the removal of present restrictions on smaller mesh gillnets. This will result in a more balanced harvesting and relieve the present fishing pressure on larger fish species.
 - Fish life should be effectively protected against overfishing. Closed seasons are not recommended, but rather the creation of community supported fisheries reserves where fish are not disturbed by any netting.
 - The fish species composition in Lake Liambezi changed since the early 1970's. It was then dominated by cichlids, particularly greenhead tilapia (*Oreochromis macrochir*) and medium sized fish.
 - After drying out and refilling, the catch per unit effort in weight in Lake Liambezi had declined.
 - Lake Liambezi requires restocking with cichlids to more rapidly revive the previous fish production potential.
 - The large economically important species in the Zambezi and Chobe Rivers will decline further in future if the fishery is left unmanaged.
 - A decline in large fish occurrence may impact on the recreational angling tourist industry in the region with the possibility of cuts in employment and income to communities.
 - A non-management strategy of the fishery may impact especially on the poor rural communities (in particular women and children), increase poverty and place further pressure on government for aid.
 - The final conclusion is that if the fishery is not properly managed, the fish resource will continue to decline in biomass and fish size to where fishermen adapt their fishing methods to enable them to have enough protein for the family. This decline may further continue and cause a total collapse of the fishery.

3.5.2 *EUS disease*

- The project played a major role in the identification of the fish disease Epizootic Ulcerative Syndrome (EUS) in the Zambezi/Chobe System which was discovered in the Zambezi in 2006 but only identified as EUS in May 2007.
- EUS is a serious fish disease which has spread in many countries (e.g. Australia, Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Lao PDR, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam) since the first outbreaks were reported in the early 1970's, causing significant loss of income to fishers and fish farmers and negative biodiversity and social impacts.
- Regular surveys were undertaken and reports submitted to the MFMR and FAO on the status of the disease in the Zambezi/Chobe region.
- With the EUS pathogen now found in the upper portion of the Chobe-Zambezi river system, downstream spread can be anticipated, especially during the rainy season. Salinity and water temperature strongly influence the production of zoospore, the infective stage of the fungus *Aphanomyces*. Within the Chobe-Zambezi river system, this disease condition could become pandemic with the potential to impact aquaculture, capture fisheries and aquatic biodiversity.

3.5.3 *Fish market surveys*

- Surveys of the fish market were undertaken by the Project since November 2007.
- The Katima Mulilo Open fish market has a daily turnover of 1.1 ton of fresh fish and 160kg of dried fish, calculated at 400kg fresh fish per day. The total daily turnover of fish sold at the market is then 1.5 tons of fish. The annual turnover is estimated at 450 tons.
- The Katima Open Market is estimated to handle about 30% of the total surplus catch of the Zambezi/Chobe floodplain, the rest is exported directly to Zambia and Botswana.
- The main fish species sold fresh at the market are threespot tilapia, redbreast tilapia, greenhead tilapia, representing 84% of numbers and 78% of weight. Of the non-cichlid species, tigerfish and catfish make up a further 16% of the weight. Smaller fish species represent only 6% of fish offered for sale.
- The dried fish sales are also dominated by cichlids, but dried catfish represent about 30%.
- Seasonal changes in the market volume show intensification in fishing activities in spring, coinciding with low water levels, the spawning time of cichlids and increase in illegal netting such as drift netting, bashing and drag netting.
- An analysis of the lengths of fish offered for sale reveals that more than half the tilapia [representing 64% by weight] sold are less than 22 cm and represent immature, still growing fish.
- The fish price of the species drops from the highest price of a mean value of N\$20 for tilapia species to N\$13 for tigerfish to only N\$6 for catfish.
- The market survey thus explains why tilapia is targeted: It fetches the highest price.
- There is also sensitivity to fish size: small and very large tilapia are sold at a much lower price (N\$10/kg) than premium middle sized fish of 30cm (N\$27/kg).
- Serious exploitation of undersized tilapia is already occurring in the region, fish caught do not obtain the best price and the use of the legal mesh size of three inch nets are partly responsible.

- Traditional authorities and fishery committees agree that three inch nets should not be allowed as young, immature tilapia are targeted.

3.5.4 *Fisherman frame survey*

- The Project undertook a frame survey of the whole Zambezi/Chobe region with the support of the MFMR and the DoF of Zambia in the areas in Zambia from September to November 2008.
- Later the DNPW (Fisheries Directorate) of Botswana also conducted a survey in the Chobe Enclave and Kazungula areas in Botswana.
- Data were collected for all fishing villages and fishing camps along the Zambezi and Chobe rivers as well as the floodplain between.
- All data were submitted to the MFMR, who undertook the entering of data in database format.
- Analysis will be undertaken by the Project and a report will be submitted to the MFMR before the end of 2009.
- Results are expected to confirm previous concerns about an increase in fishing activities along the Zambezi, with concurrent over-harvesting of the tilapia resource.

4 SUMMARY OF RECOMMENDATIONS MADE AS PER PROJECT OUTPUT

4.1 **Project output 1:**

A better understanding of the impact the new Inland Fisheries Resource Act (Namibia) has on the fisherfolk (both Namibians as well as Zambians) and the fish resources acquired and documented.

- The Inland Fisheries Resources Act should first be amended and the institutional structures put in place before efficient implementation can commence. Then only can this output be evaluated.
- The most important proposed amendments include the following:
 - The recognition of fisheries committees and conservancies as institutions to whom management of fisheries are delegated
 - Devolution of fishing regulations and licensing from the MFMR to local institutions. This will include number of fishers allowed, gear restrictions and closed areas or seasons.
 - Channelling of all income generated from licences and forfeiture to the local institutions that have taken over the management functions.
- The proposed new project phase should focus on the development of a comprehensive management plan for the fisheries in the Zambezi/Chobe System.

4.2 **Project output 2:**

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.

- High level discussions should be held between MFMR from Namibia and DoF from Zambia and Botswana to guarantee committed stakeholder participation with common goals and objectives for the project and for future joint management of the fisheries.
- An official agreement and Memorandum of Understanding between the party States involved should be duly signed and its recommendations applied.
- Regular transboundary communication and meetings as scheduled in the Memorandum of understanding should be held.
- Cross border committees should be established as soon as possible to ensure assistance from the project during the next proposed phase.

4.3 Project output 3:

Support the emergence of local level community fishery groups that assume management responsibility for fisheries in their areas.

- The following are recommendations for implementing CBFM under the existing legislation: As provided for in the Act regulations should be drafted that enable the establishment of inland fisheries committees and which define their powers and functions:
 - The powers and functions of the committees should include prevention of illegal fishing and fishing methods, powers to confiscate illegal nets, resource monitoring, management of fisheries reserves and reporting to MFMR.
 - The regulations should be framed in such a way as to enable communities to form their own committees and apply to the MFMR for registration and should be flexible enough to allow a community to use an existing institution such as a conservancy to be established as an inland fisheries committee.
 - The regulations should address issues of whom the committees should represent and how they are accountable to local resource users/communities, as well as financing, financial management, role of traditional leaders, and the need for a constitution.
- In addition, MFMR should revise the legislation such that Regional Councils should be able to use local bodies such as conservancies or sub-khutas to issue licenses and collect license fees.
- The following implementation steps need to be taken to ensure that the current legislation can be appropriately applied to promote community-based fish management:
 - Conservancies should be recognized as inland fisheries management committees and should be actively promoted by the MFMR.
 - The conservancies should be encouraged to establish local fisheries management sub-committees at appropriate levels (such as sub-khuta) which are responsible for local management.
 - The conservancy, as the inland fisheries management committee should request the declaration of a fisheries reserve to the traditional authority which should make the request to the MFMR.
 - MFMR should ensure that regulations for the establishment of the inland fisheries committee include provision for management of the fisheries reserve.
 - Before the regulations are prepared for establishment of the committee the conservancy as the inland fisheries committee and acting on the advice of its fishing sub-committee(s) should provide nominations of persons who should

be local fish guards to the traditional authority which should nominate these persons for appointment by MFMR as fisheries inspectors.

- Unless there are good grounds for objecting, the MFMR should accept these nominations. Wherever possible, means should be found for the conservancy/inland fishing committee to finance the payment of the fish guards/inspectors.

The following recommendations are made for **amending** the existing legislation in order to provide a more solid foundation for CBFM through the granting of stronger rights to local communities:

- The legislation should be revised so that provision is made for inland fisheries committees to be formed and provided with strong and secure management rights over fisheries.
- The legislation should adopt the approach of the Nature Conservation Amendment Act of 1996 and the Forest Act of 2001 which provides rights over resources to communities that meet certain conditions.
- Cabinet has fully endorsed the devolution of management to communities and the integration of community-based management across sectors. (Recommendations, Strategic Options and Action Plan on Land Reform in Namibia 2006).
- The legislation should spell out these conditions which should include the formation of an association of defined community members represented by an elected committee, governed by a constitution, and operating within a defined geographical boundary.
- The legislation should enable any existing institution, such as a conservancy, that meets these conditions to be recognised as an inland fisheries committee.
- The legislation should clearly spell out the management rights of the inland fisheries committee which should include the following:
 - The right to appoint fish guards who will be appointed as fisheries inspectors.
 - Through the community fish guards/inspectors to enforce the legal provisions regarding methods of fishing and fishing without the required license.
 - The right to set harvest limits and declare closed seasons.
 - The right to establish fish breeding areas (local fish sanctuaries / reserves) that may be closed to certain types of fishing.
 - The right to request the declaration of fish reserves and manage these reserves.
 - The right to issue all fishing licenses including recreational licenses, to collect license fees and to retain 75% of the income from these fees.
 - The right to carry out inspections and confiscate of illegal fishing gear and undersize fish.

All stakeholders in the region [and neighbouring states] should be consulted and given the opportunity to contribute to the process of amending the Act before it is finalised and promulgated.

It is possible that revision of the fisheries enactment cannot be undertaken on a national level. Consideration to have regionally based fisheries legislation is thus proposed.

4.4 Project output 4:

Facilitation of the development of appropriate fish farming projects in conjunction with MFMR and projects utilising existing water bodies and local fish species

4.4.1 *Lake Liambezi*

- The present filling of Lake Liambezi offers a unique opportunity for enhanced fishing for the local communities by simple addition of fish fingerlings of those species that are mainly targeted by fishers.
- It is proposed that the lake be stocked with a target number of one million *Oreochromis* (Tilapia) fingerlings bred in the existing fish farms.
- Present levels of gill netting with larger mesh size gillnets [four and five inch] can be allowed as it will allow the stocked fish to grow and breed before they become vulnerable to capture.
- Long lining for catfish should also be promoted.
- There is additionally a possibility to harvest the present large population of barbs in the lake, if small mesh nets [one and two inch] can be made available by the MFMR or agent and the necessary fishing permits issued to bonafide fishermen.
- Job opportunities for 200 fulltime fishers, generating a potential income of N\$50mill can be realised per year whilst the lake is full.

4.4.2 *LEAD fish farmer programme*

- The LEAD fish farmers programme should continue and new donors be found.
- All potential suitable natural smaller water bodies should be identified from satellite imagery and mapped and georeferenced for ground inspection and follow up.
- Successful units can act as resource for fingerlings for further distribution.
- A separate fish breeding unit should be developed for the Kwando River
- Data on stocking, harvesting, feeding and growth and income should be entered into a database for analysis

4.5 **Project output 5:**

Monitoring programs 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.

4.5.1 *Biological monitoring*

- It is vitally important that the biological monitoring programme continues and that the Zambian colleagues are also brought onboard.
- The outlay of the programme is set out in the report “Analysis of Historic Fisheries Research Data for the Caprivi Region.”

4.5.2 *EUS*

- While control of EUS in wild populations is almost impossible, there are some measures which can be applied to eradicate or exclude the fungal pathogen in aquaculture situation.
- Early warning and sharing of information to neighboring countries such as Namibia, Zimbabwe, Angola, Malawi, Zambia; and also to seek information from neighboring countries of any similar occurrence or any on-going active outbreak of a similar disease.
- Active surveillance of further disease outbreaks, collection of samples for histopathology (taking special emphasis on other susceptible species), and submission of such fixed samples to specialized institutions, and collection of other

epidemiological data (temperature, species affected, mortality rates, data on spread to neighboring countries).

- Creating an initial dialogue in the form of a workshop, among the countries sharing the Chobe-Zambezi river system, to establish a sub-regional disease surveillance, monitoring, preparedness and response programme and a practical action plan as early as possible.
- Further recommends a medium- to long-term programme to strengthen capacity for fish disease diagnosis and control, quarantine, safe movement of aquatic animals, development of appropriate policy and regulatory frameworks, and implementation of better aquatic animal health management programmes in the region.

4.5.3 *Fish Market*

- Two-weekly surveys of the market should be maintained. The number of staff involved should be brought down to two.
- Data should be entered into a database and analysed on an annual basis.
- Similar data should be collected from the markets at Mambova, Mwandu and Shesheke in Zambia as well as Kasane/Kazungula in Botswana.

4.5.4 *Frame survey*

- A regional frame surveys should be undertaken every three years.
- Fishing camps along the Zambezi and on the floodplain should be monitored annually in terms of locality, occupancy and gear.

5 RECOMMENDATIONS ON THE WAY FORWARD

- With the documentation now available on the status of the fish stocks and the guidelines for community based management, a comprehensive management plan for the fisheries can be developed. The emphasis should be on implementing the findings from the studies through CBNRM methodology. The management plan outline should be translated into Silozi and discussed and fine-tuned with the fishing communities.
- The management plan should incorporate fisheries monitoring and research. This is vital to develop understanding of the fisheries dynamics, particularly in periods of high floods that are of great benefit to the fish stocks. The project, while not directly conducting research, should explore with MFMR ways of facilitating collaborative research involving Namibian university students and external universities and institutes.
- The proposed fisheries regulations should be greatly simplified. 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 the possession or sale of this gear.
- 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.

- Recommendations on how to assist the communities in establishing fish reserves and how to run fishery enterprises are stipulated in the report “Developing community-based fish management in the Zambezi-Chobe river systems in Caprivi, Namibia.” The steps to be taken for the establishment of the fish reserves are clearly specified in the document.
- 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.
- The recreational fishery must be more thoroughly assessed. The contribution of the angling tourism sector to the local economy should be quantified 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. Conservancies have accepted the concept of non-fishing reserves and in fact this is reportedly a part of old traditional systems of control, therefore pilot programmes should be initiated as soon as possible. The project should explore the possibility of incorporating contributions from tourist lodges to conservancies that promote sound conservation measures such as non-fishing reserves where catch and release angling can be promoted. This can be funded through a revised angling permit scheme where a percentage of the fee is given to the conservancy for administrative services.

6 LIST OF IMPORTANT REPORTS PRODUCED DURING THE PROJECT PERIOD

- Developing community-based fish management in the Zambezi-Chobe river systems in Caprivi, Namibia. Report 1: Findings and Recommendations for devolving management authority to local communities.
- Developing community-based fish management in the Zambezi-Chobe river systems in Caprivi, Namibia Report 2: Findings and Recommendations for implementing a local fisheries Community-based Natural Resource Management (CBNRM) initiative.
- Analysis of Historic Fisheries Research Data for the Caprivi Region.
- Integrated Management of the Zambezi / Chobe River System Transboundary Fishery Resource. WWF-Norway Project Evaluation Report.
- Optimizing the fish production potential of Lake Liambezi.

- Integrated Management of the Zambezi / Chobe River System Transboundary Fishery Resource. Annual Report 2008.
- Mini-survey of experiences and perceptions of fish traders operating at the Katima Mulilo open market.
- NNF - CEE LEAD Fish Farmer Programme Progress Report.
- Proposed amendments to the Inland Fisheries resources Act and Regulations.
- The Katima Mulilo fish market in 2008 (Not finalised yet).
- Zambezi/Chobe fish frame survey report (Not finalised yet)