FISHERY COUNTRY PROFILE	Food and Agriculture Organization of the United Nations	FID/CP/ZIM
PROFIL DE LA PÊCHE PAR PAYS	Organisation des Nations Unies pour l'alimentation et l'agriculture	April 2007
RESUMEN INFORMATIVO SOBRE LA PESCA POR PAISES	Organización de las Naciones Unidas para la Agricultura y la Alimentación	

THE REPUBLIC OF ZIMBABWE

1. GENERAL ECONOMIC DATA - April 2007

Area:	390 800 km²
Water area:	3 910 km²
Population (2005 est.):	12 900 000
GDP (current, 2005):	US$ 3.4 billion
GDP – per capita (2005):	US$ 340
Agricultural GDP (2005 est.):	22.4% of GDP

2. Fisheries Data

(2003)	Production	Imports	Exports	Total Supply	Per Caput Supply
	tonnes liveweight				kg/year
Fish for direct human consumption	15 600	1 639	1 267	16 006	1.2
Fish for animal feed and other purposes	-	-	-	-	

Estimated Employment (2004):	
(i) Primary sector (including aquaculture):	4 700
(ii) Secondary sector:	n.a.
Gross value of fisheries output (the most recent year):	$US

Trade (2005):	
Value of fisheries imports:	US$ 1 793 000
Value of fisheries exports:	US$ 2 741 000

3. Fishery Area and Main Resources

The most important commercial fish stocks exploited by fishers in Zimbabwe are within five reservoirs namely Kariba, Chivero, Manyame, Mutirikwi and Mazvikadei. The largest fishery is on Lake Kariba (16o26´ to 18o06´S and 26o40´ to 29o03´E). It contributes almost 90 per cent of the country's fish production. Lake Kariba supports an open water semi-industrial fishery that exploits *Limnothrissa miodon* locally known as Kapenta and an artisanal inshore fishery restricted to the shallow inshore water where exploitation is through gillnets. Local people who live in villages around the lakeshore exploit the artisanal fishery.

The commercial fishery on Lake Chivero (17o54´S, 30o48´E, formerly Lake McIlwaine), a hyper-eutrophic lake that lies 37 km to the southwest of Harare utilizes seine nets in marginal shallow regions of the lake and gillnets in shallow to relatively deep waters. Commercial fishing also occurs on Lake Manyame (formerly Darwendale dam) which is located downstream of Lake Chivero near Norton, 76 km west of Harare. A gillnet fishery has been established on Mazvikadei dam, which is located on Mukwadzi River in Banket, northwest of Harare. Fishing on Lake Mutirikwi (20o14´S, 31o00´E, formerly Lake Kyle), Zimbabwe's largest inland water-body, which lies southeast of the town of Masvingo, is based on gillnetting and seining. Commercial fishing commenced in 2002 on four recently constructed reservoirs namely Zhowe, Osborne, Muzhwi and Manyuchi while Manjirenji dam also supports a commercial gillnet fishery.

4. Fishery Sector Structure

4.1 Overall fishery sector

The fishery sector comprises of the capture fishery, aquaculture and recreational fishery. It exploits about 114 indigenous fish species and an additional 30 exotic species, which were introduced for aquaculture production. However only, the Nile Tilapia, *Oreochromis niloticus* has contributed significantly to fish production. Capture fisheries from Lake Kariba is the mainstay of the fishery sector, with a large aquaculture farm also on Lake Kariba contributing significantly to fish production.

4.1.1. *Catch profile*

The only fishery in Zimbabwe where systematic catch/effort data have been recorded and published annually until 2004 is Lake Kariba. Fish populations have also been monitored at Lake Chivero, Lake Mutirikwi and Manyame dam, otherwise it is difficult to obtain reliable fishery statistics and in most instances the total catch is unknown.

On Lake Kariba nine species comprising of cichlids (*Oreochromis mortimeri*, *Oreochromis niloticus*, *Sargochromis codringtonii*, *Tilapia rendalli*), cyprinid (*Labeo altivelis*), characid (*Hydrocynus vitattus*), mormyrids (*Mormyrus longirostris*, *Mormyrops anguilloides*) and a Clariid (*Clarias gariepinus*) are exploited commercially within the inshore fishery. An assessment in 2003 by Phiri *et al*. (in prep) showed that *O. niloticus* is now the most important species in the total catch. Its relative importance in the total catch (expressed as index of relative importance) is 48 per cent among the cichlids while its proportion in the

total catch is 37.1 per cent (Phiri *et al*. in prep).

Lake Chivero's productivity is estimated to have reached 250 kg $h.^{-1}$ yr^{-1} (Marshall 2005). Annual production over the past ten years has varied from between 160 and 450 tonnes fresh weight. In 2000 the catch per unit effort (as number of fish/setting/net) for Clariidae, Cyprinidae, Mormyridae, Characidae and Cichlidae was estimated to be 1.28, 0.41, 0.24, 0.03 and 4.05 respectively. A total of twenty-nine species are exploited but two cichlids, *Oreochromis macrochir* and *Oreochromis niloticus* constitute more than 80 per cent of the total catch, with catch per unit effort of 1.03 and 2.76 respectively. Total annual production from gillnets and seine nets has varied between 160 and 412 tonnes. Estimates of effort (m), weight (kg), catch per unit effort (kg/100m/month) and estimated gross annual income in the gill-net catch returns were 371 844 m, 72 745 kg, 19.56 kg/100m/month and Z$3 637 250 respectively in year 2000. The assessment of commercial seine net returns in Lake Chivero in 2000 showed that the annual effort (no. of hauls), weight (kg), catch per unit effort (kg/100m/month) and estimated gross income were 4229 hauls, 113 430 kg, 30.54 kg/100m/month and Z$ 5 671 500 respectively.

Annual production on Lake Mutirikwi is low varying between 14 - 20 tonnes while on Manyame production varies between 160 - 400 tonnes. Mazvikadei yields about 4 tonnes a year. There are no catch records for Manyuchi, Zhowe and Osborne. Species harvested in these reservoirs include *Oreochromis macrochir*, *Oreochromis mossambicus*, *Tilapia rendalli*, *Clarias gariepinus*, *Barbus marequensis*, *Labeo altivelis*, *Labeo congoro* and *Micropterus salmoides*, an exotic species.

4.1.2 *Means of fishing/production*

The inshore fishery on Lake Kariba is exploited by approximately 1 272 fishers whose fishing gear comprises of 3 198 nets and 663 boats. The 663 boats are mostly dugout canoes. Only 0.8 per cent of the boats are motorised and these are used for speedy transportation of fish to markets. Currently there are 98 registered operators in the kapenta fishery on Lake Kariba who are fishing with 295 boats. In 2000 four commercial fishing companies were operating on Lake Chivero.

5. Post Harvest Use

5.1 Fish utilization

Post-harvesting processing for fish is limited and the infrastructure in place is minimal. Kapenta from Lake Kariba is either salted and sun-dried on drying racks or frozen. Most commercial artisanal fish catches are sold fresh/frozen, sun-dried or smoked. The only elaborate fish-processing infrastructure that comprises a state-of-the-art fish factory has been developed at the aquaculture farm in Kariba.

5.2 Fish markets

The artisanal fishers supply the local market. They sell their fish at landing sites to small-scale traders who after sun drying transport the fish to farms, towns and rural areas for marketing. Commercial operators supply fresh fish to retail shops in urban centres. Dried kapenta is sold locally in jute bags weighing 30 kg to traders and retail supermarkets where it is re-packaged into smaller units. *Oreochromis niloticus* produced from an aquaculture farm in Kariba is sold either locally or exported as frozen whole fish or fillets to the European market mainly supermarket chains across northern Europe and Spain and in the southern Africa region. Factory by-products are sold from a factory gate shop. Trout is exported or sold locally as frozen trout, trout fillets, smoked trout and trout pates.

6. Fishery Sector Performance

Zimbabwe has limited fisheries output despite the fact that the country has approximately 10 700 large to medium sized dams. Efforts have to be made to increase fish production in order to increase the country's per capita fish consumption.

6.1 Economic role of fisheries in the national economy

Fish production does not rank among the most important contributors to GDP in the country. It is only important for food security as a protein source and for local employment and has a significant economic role at a local level. The output estimates in 2005 was 15 452 tonnes.

6.2 Demand

Fish demand exceeds supply in Zimbabwe. Due to increasing costs of other protein sources demand for Kapenta in urban and rural areas has increased. In 2004 an estimated 12 000 tonnes of fish was harvested from Lake Kariba. Annual fish production from all other capture fisheries is estimated to be about 870 tonnes. An estimated 20 tonnes of other fish was also harvested from fish farms throughout the country and approximately 2 400 tonnes from aquaculture in Lake Kariba. The estimated population in the country is 12.9 million thus the annual per capita fish consumption level is 1.2 kg, well below the SADC average of 6.7 kg.

6.3 Trade

Production from a fish farm on Lake Kariba and trout in the Eastern Highlands provide for the export market. Exports of fish in 2005 amounted to US$ 2.7 million.

6.4 Food security

Tilapia purchases are made only by the relatively wealthy minority, being out of reach for the sector of the population with the greatest need. Most of the fish is sold in urban areas whereas 70 per cent of the population reside in rural areas. Its impact on household food security for the majority of the population is minimal. On Lake Kariba, significant impact is only on communities that live along the shoreline who have fish as an important part of their daily diet thereby curbing protein deficiencies. Otherwise high costs of fish production continually push the price of fish beyond the reach of many.

6.5 Employment

There are no consolidated national statistics on fisheries related employment, although generally both capture fishery and aquaculture are not significant employers at the national level. The estimated labour force in Zimbabwe is 3.94 million (2005 estimate) of which 66 per cent, 10 per cent and 24 per cent are employed in agriculture, industry and services respectively. At national level fisheries is not significantly contributing to employment. In Kariba approximately 3 000 people are employed in the kapenta fishery for catching, processing and packaging of fish. The artisanal fishery on Lake Kariba is exploited by 1 272 fishers. Lake Harvest Aquaculture farm employs about 320 workers while other water bodies have probably less than 100 people involved in fishing. An estimate of people involved in fisheries is approximately 4 700 for the whole country.

6.6 Rural development

Fisheries development has not contributed much in the development of infrastructure or provision of services in rural areas or in fishing villages. The typical case is the Lake Kariba shoreline where there is a significant lack of development and service provision such that most of the shoreline area is inaccessible. Within the communities along Lake Kariba, infrastructure development and social service provision are poor, inadequate and sometimes non-existent. The other major reservoirs are located within parks estates (protected areas), and hence there are no rural communities surrounding them. Subsistence fishers from

nearby urban and rural settlements commute daily to fish while commercial fishing companies operate from landing sites located along the shores. These basically house their fishing gear and a few employees on a temporary basis. Thus direct contribution of fishery to rural development is minimal.

7. Fishery Sector Development

7.1 Development prospects/strategies

7.1.1 *Main areas for opportunities*

The potential to boost fisheries production in Zimbabwe lies in utilizing the 10 000 dams that have been constructed for water storage. These reservoirs can be used for fish farming. Local communities capture existing fish stocks in these dams.

7.1.2 *Main constraints to development*

The capture fishery is threatened by increasing illegal fishing activities. Poachers encroach in areas set aside as breeding grounds for fish. Poaching introduces error margins in yield estimates, as the bulk of fish being caught is unaccounted for, thereby affecting management decisions.

The increase in occurrence of *O. niloticus* in the reservoirs can cause serious threats to indigenous cichlids through competition and crossbreeding. This species is known to crossbreed with two indigenous breams *O. mortimeri* and *O. mossambicus*. Inter-breeding will result in a reduction of the abundance of pure stocks resulting in loss of biodiversity.

The other constraint is inadequate extension and fishery information delivery services. Aquaculture production under natural conditions is restricted to the rainy season. It cannot be carried out in drought-prone areas and areas with temperature below 22ºC. Other constraints to aquaculture development include (i) inadequate fingerling supply due to the lack of well-managed hatcheries, (ii) limited extension infrastructures, (iii) lack of credit facilities for new fish farmers or fish farmers wanting to expand their facilities, (iv) marketing problems and (v) lack of quality feed.

7.2 Research

The research institutions involved in fish related research and an indication of the activities they have been actively involved in are listed below.

Research institution	Main research projects
University Lake Kariba Research Station (University of Zimbabwe)	• Ecology of fish eating birds and their impact on the inshore fishery of Lake Kariba[P] • The ecology of *Sargochromis condringtonii*[P] • *The inshore fish communities of Lake Kariba and aspects of their ecology*[O]

Lake Kariba Fisheries Research Institute (Zimbabwe Parks and Wildlife Management Authority)	• Some management aspects of pre-recruitment ecology of the freshwater sardine *Limnothrissa miodon* in Lake Kariba[P] • The inshore fish population of Lake Kariba with reference to the biology of *Synodontis zambezensis* Peters, • Hydroacoustic assessment of the Kapenta (*Limnothrissa miodon)* stock[P] • Bio-economic assessment of the Kapenta fishery on Lake Kariba
University of Zimbabwe, Department of Biological Sciences	• Trophic interrelationships amongst cichlid fish species in a tropical African reservoir (Lake Chivero, Zimbabwe)[P] • The levels and bio concentration of heavy metals (Cu, Zn and Pb) in the African catfish *Clarias gariepinus* in streams around the City of Harare, Zimbabwe[P]
Lake Chivero Fisheries Research Station (Zimbabwe Parks and Wildlife Management Authority)	• Fisheries Management Research[P]
Sebakwe Fisheries Research Station (Zimbabwe Parks and Wildlife Management Authority)	• Fisheries Management Research[P]
Lake Mutirikwi Fisheries Research Station (Zimbabwe Parks and Wildlife Management Authority)	• Fisheries Management Research[P]
Nyanga Trout Research Centre (Zimbabwe Parks and Wildlife Management Authority)	• Trout Research, nutrition, diseases and trout propagation[P]
Matobo Fisheries Research Station (Zimbabwe Parks and Wildlife Management Authority)	• Fisheries Management Research[P]

Henderson Research Station (Agricultural Research and Extension Services, Ministry of Lands, Agriculture and Rural Resettlement)	• Aquaculture Research[P]

P = past O = on-going

7.3 Education

The Department of Biological Sciences at the University of Zimbabwe offers a Bachelor of Science Honours degree in Biological Sciences. The course covers aspects of fisheries science. The Master of Science in Tropical Hydrobiology and Fisheries degree also offered at the University of Zimbabwe covers more detailed aspects on fish biology.

7.4 Foreign aid

An externally funded project that was involved in assisting in the development of capture fisheries on Lake Kariba was the Zambia/Zimbabwe SADC Fisheries Project. The project was funded by NORAD (Norwegian Agency for Development) and DANIDA (Danish International Development Agency). An FAO/ALCOM Aquaculture Project has also been involved in promoting aquaculture among smallholder rural communities and equipping fish farmers with knowledge on fish stocking.

Currently there is limited foreign assistance in the fisheries sector. There are initiatives by the University Lake Kariba Research Station and the Lake Kariba Fisheries Research Institute to institute collaborative projects. A project entitled "An ecological and socio-economic assessment of biodiversity in a large tropical reservoir (Lake Kariba): towards the development of monitoring tools for conservation and sustainable utilization of freshwater resources in southern Africa" has been submitted to the Global Environmental Facility for consideration.

The African Wildlife Foundation and the Southern African Trust are involved in a project called "Piloting Community involvement in defining and applying SADC protocols for natural fisheries resources". The project aims to promote community involvement in the development and implementation of SADC protocols for shared natural resources, with a particular focus on shared fisheries resources. The main objectives of the project are to do a participatory analysis of existing community resource-monitoring systems (CRMS) and legal frameworks for shared fisheries resources, to develop, discuss and adopt a CRMS protocol for shared fisheries resources along the Zambezi River basin and to disseminate information on the CRMS protocol and participatory process.

The University Lake Kariba Research Station is involved in a research project aimed at assessing the inshore fish communities on Lake Kariba and aspects of their ecology. The project is funded by the UZ-Flemish Universities Link & The British Ecological Society Overseas Bursary Award. The main objectives of the study are to (i) assess the changes that have occurred in the inshore fish community since 1958, (ii) determine differences between the inshore fish communities in fished and non fished areas (iii) determine relationships between habitat heterogeneity and the inshore fish community and (iv) determine structure and the trophic relationships among the major ecotrophic groups in the lake. It is anticipated that the proposed study will contribute to better understanding of the interactive processes in the biology and ecology of inshore fish communities.

The VLIR UZ-FLEMISH UNIVERSITIES FUND in collaboration with the University of Zimbabwe

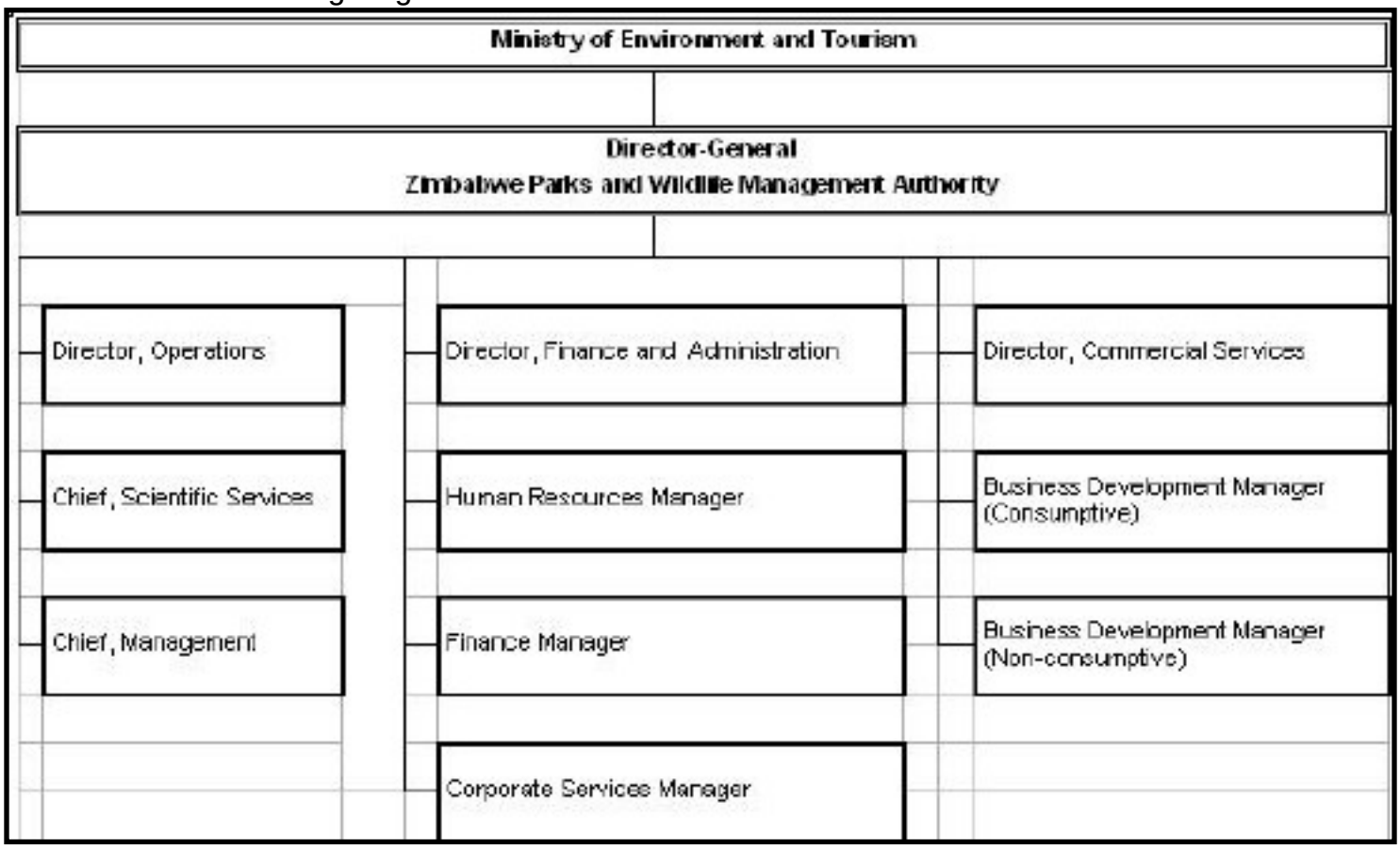
is assisting in the training of fisheries biologists in Master of Science in Tropical Hydrobiology and Fisheries at the Department of Biological Sciences, University of Zimbabwe. The fund is also assisting with training of doctorate students who are undertaking research in ecology and evolution biology of fauna in temporary aquatic systems and in fish parasitology.

8. Fishery Sector Institutions

The Minister of Environment and Tourism has the final authority over the fishery resource, which he exercises through the Director General of the Zimbabwe Parks and Wildlife Management Authority. A Director General under which are three directors heading three main divisions namely Operations, Finance and Administration and Commercial services heads Parks and Wildlife Management Authority. The management structure is depicted in the organogram below. The Chief for Scientific Services under the Director of Operations is responsible for fisheries management.

The Zimbabwe Parks and Wildlife Management Authority is empowered, through its Director to regulate, control, restrict or prohibit fishing in controlled waters. The Parks and Wildlife Management Authority has overall responsibility for fisheries development throughout the country. Its responsibility within the Parks Estates includes research and management. It has sole authority for the management of the fishery resources in Kariba, Chivero, Mutirikwi, Manyame and Sebakwe. Management, control and fisheries research is effected through personnel stationed at research stations located at these dams.

Organigram of fisheries administration in Zimbabwe



9. General Legal Frameworks

Fisheries management regulations are enacted within the National Parks Act of 1975 (Parks and Wildlife Act–Chapter 20:14 of 1996, as amended). This is the principal legislation and

management Act governing the development, control and management of fisheries in Zimbabwe. Part XIV of the Act deals with fish conservation. The regulations focus on licence limitation, gear and area restriction and controlling mesh size and number of nets allowed per fisher in order to regulate effort.

10. Management Applied to the Main Fisheries

The overall management strategy for fisheries resources in Zimbabwe is sustainable utilization and maintenance of biological diversity. The overall aim is to increase production in order to strengthen the rural economy, create employment and enhance household food security.

10.1 Main goals/objectives

The main goal of fisheries management is sustainable utilization. This is realised through the institution of various management measures. Fishing is controlled and only allowed in specified waters. Fishing is carried out after issuance of a permit by the appropriate authority. Catching and selling fish requires a permit. Possession of fishing nets is only allowed for fishing-net manufacturers or holders of valid fishing permits. On private land (waters), the appropriate authority may possess a fishing permit. The registration as a dealer or manufacturer of fishing-nets is only granted and authorized by the Minister of Environment and Tourism through the provisions of the Parks and Wildlife Act while the fishing gear for each controlled fish water body is specified in the Parks and Wildlife Act.

The use of destructive fishing methods such as explosives, chemicals, poison, intoxicating substances and jigging are prohibited and only allowed under a special permit. The injury or intentional disturbance of any fish or spawning bed, bank or shallows whereon or wherein such spawn is deposited is prohibited. Introduction to waters of fish and aquatic plants and importation of live fish and fish ova is controlled. It is prohibited to introduce exotic fish and aquatic plants into any waters. Importation of live fish or ova of any fish is prohibited except under licence. Introductions and importations are expected to comply with agreed protocols such as the Convention on International Trade in Endangered Species of wild fauna and flora and the Convention of Biological Diversity. The Precautionary Approach to Capture Fisheries and Species Introduction within the FAO Technical Guidelines for Responsible Fisheries is also used when dealing with fisheries issues. When fish populations are threatened either by excessive aquatic plant growth or other fish, only the minister has powers to control or eradicate the threat in such waters. It is a punishable offence to possess fish caught in contravention of the Act and the relevant fines are stipulated in various statutes.

10.2 Institutional arrangements

10.2.1 *Co-management activities*

An initiative to introduce fishery co-management within the inshore fishery has been implemented on Lake Kariba. The objective is to reduce conflicts between fishers and resource managers by bringing in fishers' participatory management. Provisions of co-management are in (a) a legal framework − section 95(1) of the National Parks Act of 1991 and 1994 (SI 12/91 and SI 40/94 respectively) which allow for devolution of appropriate authority to district councils who then sublease exclusive fishing zones to local fishing communities. Through the provision of a Kariba Lakeshore Combination Master Plan the fishing grounds were zoned and assigned to specific fisher groups. Fishers were assisted to establish fisheries management institutions, to formulate constitutions and were trained in necessary skills. The success of the co-management initiative on Lake Kariba has not yet been evaluated. It is anticipated that if the system is effective it may be introduced on other

reservoirs.

10.2.2 *Participatory approaches*

Fishery management in Zimbabwe is guided through the provisions of the Parks and Wildlife Act. A fisheries policy that embodies participatory approaches has not yet been formulated. As such there is limited involvement and participation by communities and stakeholders in fisheries management. It is the sole responsibility of the Parks and Wildlife Management Authority to manage the fishery resources. This causes conflicts of interests among fishers and resource managers. Enabling policies and legislation that involve fishers in a participatory management process are still to be instituted.

10.3 Management measures

Appropriate management measures have been instituted on each fishery as provided for by the Act. Fishing within the Kapenta fishery on Lake Kariba occurs year-round. The fishery is managed through enforcement of regulations. The fishing effort is controlled through provision of licences. Recruitment and growth over-fishing is reduced by restricting the minimum mesh size to 8 mm. Pre-recruits occur in water less than 20 m deep so fishing is confined to areas more than 20 m deep. Fishing is prohibited within a 2-km radius of all river mouths in order to protect species on spawning runs up the rivers.

The regulations used for management of the inshore fishery in Lake Kariba are intended to ensure the conservation of biodiversity while allowing for sustainable utilization of the fishery resource. Since the lake is a recreation park it is also intended that the amenity value of the lake be maintained. This is effected through licensing, gear restrictions and closed areas. Fishers have to obtain an annual licence and are allowed to fish in designated fishing grounds within the lake that have been delimited for specific villages. Fishing is not allowed in closed and protected reserves, which include rivers, river mouths and the shoreline adjacent to national parks and wildlife land. On Lake Kariba approximately 600 km of shoreline is closed to fishing. Closed and protected reserves have been left aside in order to enhance recruitment, protect potamodromous species, protect breeding areas, conserve fish stocks that become reservoirs for replenishing neighbouring fished areas and to maintain biodiversity for the long term.

On Lake Kariba, the minimum gillnet mesh size (stretched) allowed in commercial inshore fishing areas is approximately 102 mm (4 inches). Each fisher is allowed five gillnets of 90 m length each (unmounted). The use of explosives, chemicals, poisons, intoxicating substances, scoop nets, jigging and fish-driving are prohibited. Commercial fishing using spear guns, basket traps and rod-and-lines with 3 hooks or more is prohibited. There is a bag limit for recreational fishing (e.g. rod and line and spear fishing).

On the other reservoirs fishers are issued licences, which are renewable annually. The licence specifies the dimensions of the nets, their mesh size and the reservoir where they can be used. On Lake Mutirikwi and Nyanga reservoirs, bag limits are used to control angling for bass and trout. Use of gillnets is not allowed in the rivers and their use in reservoirs is subject to a number of restrictions.

11. Recreational Sub-Sector

Recreational fishery is carried-out in most of the reservoirs. Anglers are not regulated closely except for the issuance of licences for fishing in reservoirs within park estates or for trout fishing in the Eastern Highlands. There are no statistics on the number of angler-days in reservoirs and catch data. Lake Chivero where recreational fishery is most productive has an estimated production of 120 kg/ha of which 49 per cent is from the commercial fishery,

27 per cent from recreational anglers and 24 per cent from subsistence anglers.

Sport fishing for trout is carried out in reservoirs and rivers in Nyanga National Park in the Eastern Highlands while that for Large Mouth Bass (*Micropterus salmoides*) is carried out on Mutirikwi, Manyuchi, Manjirenji, Matopos, Ncema and Mayfair dams. Sport fishing for tiger fish (*Hydrocynus vittatus*) is also done in the Zambezi River and its tributaries. Subsistence angling is a common activity in all reservoirs near urban centres mainly Lake Chivero, Lake Manyame and Lake Kariba. Generally the intensity of the fishery is influenced by the size of the local urban population, demand from tourism and accessibility of the water body. The fishing gear used is rod-and-line.

Major events of the recreational fishery include the Annual International Tigerfish Tournament held on Kariba and the Bass Masters Tournament that is held on Lake Manyame. The International Tigerfish Tournament is the biggest sport-fishing event in Zimbabwe. Recreational fishing is presently not included in the general management programmes making it difficult to estimate its contributory role to fish production.

12. Aquaculture Sub-Sector

Aquaculture production is carried out for subsistence and commercial purposes. Subsistence aquaculture is carried out at household level. It is limited to a few pond-based enterprises where it provides a cheap source of protein for domestic consumption. Indigenous species such as Mozambique Tilapia (*Oreochromis mossambicus*), the Red-Breasted Tilapia (*Tilapia rendalii*), the Green-Headed Tilapia (*Oreochromis macrochir*), the Kariba Bream (*Oreochromis mortimeri*) and Sharptooth Catfish (*Clarias gariepinus*) are utilized. Annual production from subsistence aquaculture is estimated to be 900 tonnes.

Commercial aquaculture production is based on the Nile tilapia, (*Oreochromis niloticus*) and the rainbow trout (*Onycorhynchus mykiss*). Commercial aquaculture production is estimated to produce approximately 1 600 tons per annum mainly from a farm on Lake Kariba. The farm was established by Lake Harvest Aquaculture (Pvt) Ltd in 1997. It grows Nile Tilapia, which contributes more than 80 per cent of the annual production from aquaculture. The production system uses small-dammed reservoirs (about 1.5 m deep) for breeding fish until they weigh about 20 - 25 grams, after which they are transferred to floating net cages suspended in Lake Kariba where they grow-out to a market size of about 900 g. The cages produce 50 kg of tilapia per m^3.

Trout production is confined to the high-altitude Eastern Highlands where temperatures are cooler and the water quality is good. The species cultured are Rainbow Trout (*Oncorhynchus mykiss*) and Brown Trout (*Salmo trutta*).

The Parks and Wildlife Act provides the regulations for aquaculture management in Zimbabwe while the Parks and Wildlife Management Authority grants authority for development of aquaculture on state dams and in water designated as Recreational Parks.

13. Fishing Communities

Four formalised institutions have been formed through the initiatives of the co-management approach in the gill-net fishery on Lake Kariba. District Fishing Associations (DIFA) are responsible for coordination of fishing activities at district level while Sub-Area Fishers Associations (SAFAs) comprising of 4-6 adjacent fishing villages are responsible for effecting dialogue among members and between fishers and the state. Within each SAFA is a Fisheries Management Committee and 3 resource monitors. The Kapenta operators on Lake Kariba have representation through two Kapenta fishing associations.