

# THE STATUS OF FISH POPULATION IN ZAMBIA'S WATER BODIES

By ACF/FSRP (09 April, 2009)

**Overview:** Fish makes up 40% of animal protein in the diet of Zambians. Natural fisheries contribute 90% fish production of the average 70,000 to 85,000mts in recent past with the other 10% coming from fish farming. Zambia has 9 major fisheries in Kariba, Tanganyika, Itezhi-tezhi, Bangweulu, Mweru Luapula, Mweru wantipa, Kafue River, Zambezi River and Lukanga Swamps. Other minor fisheries include Lusiwashi dam, Lower Zambezi and Chambeshi River. These fisheries cumulatively have more than 400 fish species. However, only about 17 species can be considered commercial.

From 1970s to 1980s, the per capita consumption of fish in Zambia was 12.0 kg/person/annum. Recent estimates have put the per capita consumption at 7.0 kg/person/annum. The drop in the per capita consumption is attributed to the decline in fish stocks in some of the fisheries as a result of excessive fishing and use of bad fishing methods, as well as an increase in demand due to the increase in the human population. This increase in demand has resulted in increase in fishing pressure to the extent of using environmentally unsound methods of capturing fish and emergence of non-traditional fishes on the market.

**Background:** Detailed information about the Department of Fisheries is provided in Supplement 1. The Fisheries development Programme has two major sub-programmes namely capture fisheries and aquaculture. The overall objective of the Fisheries development Programme is to promote sustainable utilization of fisheries resources thereby contributing to the economy through the generation of employment, income and improved availability of fish; contribute towards poverty reduction through making fish readily available as a reliable and sustainable source of protein especially for the rural communities. The expected outcome is an increase annual fish production from capture and Aquaculture from the current 70,000 tones to 120,000 tones by 2015.

While agriculture is the most important source of livelihood, Zambia has 15 million hectares of water in the form of rivers, lakes and swamps, which provide the basis for extensive freshwater fisheries. Everyone in Zambia, irrespective of socio-economic status, enjoys fish. However, demand for domestic fish for consumption still outstrips production. Government is aware of the direct benefits of fish as a source of food of high nutritional value, especially for vulnerable groups, so the sector is not underrated. The sector, because of its mostly rural setting, continues to contribute significantly to rural development in terms of employment and income generation and reducing poverty. It is estimated that the sector supports more than 300 000 people deriving their livelihood directly as fishers and fish farmers, or indirectly as traders, processors and other service providers.

The precariousness of the food security situation in many parts of Zambia requires action to improve animal protein supply. Government efforts to increase fish production and enhance nutrition have targeted popularizing aquaculture and collective management of capture fisheries for sustainable resource utilization. Government assistance has helped to popularize pond culture techniques and has contributed significantly to the creation of an institutional and technological infrastructure in support of the growth of the industry. Liberal government policies have seen the private sector lead in the introduction of new production technologies and systems such as freshwater floating cages and production of ornamental fish in tanks.

However, the future of the sector now depends on raising the scale of operations. This will require attracting corporate investments in the sector to help realize the country's fisheries and aquaculture potential, by transforming the agricultural output mix, thus supporting the country's food needs and contributing significantly to growth of exports by removing socio-economic and institutional constraints facing the industry.

**Fishery Areas and Fishers:** Fishing in Zambia is carried out by two distinct groups: industrial operators and traditional or artisanal fishers. The industrial operators are found mainly on lakes Kariba and Tanganyika, where they operate large fishing vessels exploiting the pelagics. The artisanal fisheries, with more than 25 000 fishers, still dominate in terms of production output and in terms of labour. The bulk of fish is distributed by private and individual traders, of which a large number are women.

Zambia has 15 million hectares of water in form of rivers, lakes and swamps. The fisheries of Zambia are classified into major and minor fisheries (which include fisheries of small water bodies). There are 11 main fisheries; four belong to the Congo River basin and seven to the Zambezi River basin. The fisheries in the Congo basin include Bangweulu, Mweru-Luapula, Mweru Wantipa and Tanganyika. Kafue, Kariba, Lukanga, Upper Zambezi, Lower Zambezi, Itezhi-tezhi and Lusiwashi belong to the Zambezi basin. In 2000, the Congo basin fisheries accounted for 43 percent of annual production.

**Fishing Production Means:** Industrial fishing activities are limited to Lake Tanganyika and Kariba, and are associated with production of kapenta. In the years 1999 - 2004, the annual commercial fish production was about 70000 t. About 30 000 artisanal fishers account for 85 percent of catches, while the less than 100 industrial producers on Lakes Tanganyika and Kariba account for 15 percent of production.

The long distance between catching and consumption areas and limited cold storage and transport facilities means that 65 percent of production is dried, most of which is kapenta, smoked or simply sun-dried, and rarely salted breams.

**Management applied to Main Fisheries:** The Department of Fisheries in the Ministry of Agriculture and Cooperatives is mandated through the Fisheries Act, Cap 200 of the Laws of Zambia, to manage the fisheries resources of the country. In order to ensure the sustainable utilization of the fisheries resources in line with the provisions of the Act, the following control measures are employed:

- Annual Fishing Closure, from 1 December to 28 February the following year. This coincides with the rainy season and was introduced to protect the breeding of the commercially preferred species (mostly Tilapia species) whose breeding peaks in this period. The flooded plains provide ideal breeding grounds and nurseries for the juveniles;
- Mesh size restriction of not less than 50 mm for all stationary gillnets. This restriction allows for new recruits to attain a minimum size before being exploited;
- Introduction of permanently closed areas as sanctuaries and breeding grounds for commercially important species;
- A complete ban on use of some destructive fishing methods such as forcefully driving of fish into set nets, using explosives, use of weirs targeting migratory fish, and beach seine nets operated in shallow waters, which incidentally destroy fish nests and foul the water by stirring up silt.

Zambian fisheries are dominated by artisanal fishers whose fishing operations are predominantly gillnetting using craft made of planks or fibreglass. Dugout canoes still feature in fishing operations on almost all water bodies.

No restrictions are imposed on the number of craft or nets that an artisanal fisher can own. Despite being in a ministry where farmers enjoy a number of incentives, such as tax relief on inputs and equipment for production, the same does not apply to the fisheries sector.

**Aquaculture Sub-Sector:** Zambia is a country richly endowed with natural resources ideally suited to aquaculture production. Aquaculture promotion in Zambia has a long history, dating back over forty years. Considerable work by the Department of Fisheries in cooperation with international assistance agencies and NGOs in promoting aquaculture practices in the country has resulted in some 6 000 small-scale farmers now operating over 13 000 fish ponds throughout the country. At the same time, 16 large commercial fish farmers have taken up the activity in the Copper belt, Lusaka and Southern Provinces, where ideal conditions for such business exist. The sub-sector produces about 5 000 t/yr of fish. Of this, 75 percent comes from small-scale aquaculture, while commercial fish farmers produce the other 25 percent. Aquaculture is expanding in all nine provinces of the country, and as a result, Zambia is now one of the largest aquaculture producers in sub-Saharan Africa.

Aquaculture systems range from extensive to intensive systems, and include both multi-species culture and monoculture. There are three levels of fish farmers: small-scale, emergent (smallholder), and commercial. Small-scale fish farmers rely on family labour and practise extensive culture. Emergent fish farmers have income generation from the element of food security for their households. They purchase some inputs and practise integration, i.e. combine fish farming, crops and livestock, and they may use family or hired labour for various tasks. Commercial fish farming is usually very large, intensive and involves large investments. It is market oriented and may include processing for export.

Technical skills are still lacking among most small-scale fish farmers in terms of fish husbandry practices and pond construction. They also lack capital to improve and increase their investment in aquaculture, while the Department of Fisheries is constrained by limited funding and capacity (training and staff shortages) from providing effective extension support.

Long standing constraints in aquaculture include: inadequate extension services, lack of comprehensive training packages and materials, chronic shortages of quality fish seed and fingerlings, high cost of fish feed, and poor marketing support.

There are continuing government efforts to promote aquaculture as it believes that exploitation of opportunities in aquaculture will reduce pressure on capture fisheries and provide opportunities for increased incomes for the rural poor. Further, the development of commercial-scale aquaculture will contribute positively to economic growth.

**Fishery Sector Performance:** Annual capture fisheries output per person has declined from 11.4 kg in the 1970s to 8 kg in the 1990s, and to 6.4 kg in 2003. Overall increases in total fish production are less than increases in population. Even though annual fish production increased from 40 000 t/yr in the late 1960s to over 62 000 t in 2000, it has consistently failed to exceed 70 000 t/yr, even in favourable years. At the same time, per capita fish production has dropped 50 percent. Drastic declines in fish catches per unit effort indicate that the fish stocks either are fully- or overexploited. In order to increase annual per capita fish production from the current <6 kg to the target of 12 kg, technology and management of capture fisheries must change to support such an increase. In the absence of such improvement, and with little likelihood of such a change in the near future, significant gains in fish production can only come from fish farming. Expansion of fish farming will supplement production of natural fisheries, reduce pressure on natural stocks and contribute to improved food production and nutrition.

**Demand and Supply:** Population density, supplies and income determine the demand for marketed fish. The current estimates for annual fish production from capture fisheries ranges between 60 000 and 70 000 t, with an estimated 5 000 produced through aquaculture. The national demand for fish is conservatively estimated at 120 000 t/yr, and this gap between

supply and demand is foreseen to increase further with population growth. The country has the potential to produce more fish on a sustainable basis with the development of aquaculture and rational management of capture fisheries.

**Fishery Sector Development Constraints:** The problems in the sector fall under five categories: those faced by small-scale fishers, problems faced by small-scale fish farmers, those encountered by commercial or large-scale fishers, those faced by large-scale fish farmers, and constraints faced by the government in rational management of capture fisheries and promotion of aquaculture.

Across the sector, problems include:

- There is inadequate funding for, and re-investment in, the sector despite the sector's ability to generate its own resources. This is due to poor and uncoordinated systems of collection and utilization of revenue from fishing levies and licences;
- There has been unlimited entry into fisheries. While fishing in a particular fishery is regulated by way of licensing, the number of licences issued is not limited. This has led to reduction in catch per unit effort for preferred fish species, which in turn has led to a decline in efficiency in capture fisheries, which is a major cause of declining incomes among small-scale fishers;
- Dissemination of information on production techniques and processing technologies to small-scale fish farmers and fishers has been of limited effectiveness. This has been due to poor evaluation of target groups and inadequate extension coverage;
- There is limited development in aquaculture owing to inadequate investment. With declining incomes in capture fisheries resulting from the depletion of stocks of preferred fish species and sizes, opportunities for growth in the sector will come from increased and coordinated investment in aquaculture;
- Non-availability of reliable sector information (statistics) severely limits the scope of interventions in the regulation and development of the sector. Information is insufficient on parameters such as statistics on fish production levels, number of stocked and un-stocked ponds, pond yield, fish stocks, levels of exploitation and market data.

**Fishery Sector Development Prospects and Strategies:** The overall objective of the fisheries and aquaculture sector is to contribute to poverty reduction and economic growth through sustainable utilization of fisheries resources and development of aquaculture. In order to achieve this objective, and in view of sectoral problems and strengths identified, possible interventions are:

- Establishing an efficient and effective system of collection and utilization of revenue from fish and fishing gear levies, fishing licences and other related fees;
- Developing stakeholder partnerships towards sustainable and efficiently managed exploitation of fish and other valuable aquatic resources in natural water bodies. This would ensure efficient and effective regulation of fishing activities in proportion or relation to existing stocks of fish resources in all fishery areas;
- Identification and implementation of fishery development strategies through enhancements (stocking and re-stocking) of both indigenous and suitable exotic species;
- Development of aquaculture through intensified promotion of available aquaculture opportunities. While aquaculture offers opportunities for increased incomes and food among low-income earners, its exploitation has remained minimal. This is largely attributed to inadequate sensitization. Further, as a result of inadequate promotion of

the country's aquaculture opportunities, there has been little commercial investment in the subsector;

- Regular generation and provision of demand-driven information in both capture and culture fisheries. In effect, research to generate information should be demand driven as opposed to the current open-ended approach to information generation. Experience has shown that information usually required by stakeholders includes but is not limited to fish production, number of fishers and fishing boats in particular fisheries, number and type of fishing gear, number of stocked and unstocked fish ponds, average pond yield, fish stocks, and levels of exploitation.

In order to be more focused and achieve maximum benefits from the interventions identified, these could functionally be divided into three components:

1. Fisheries Management component focusing on the management and regulation of exploitation of fish and aquatic resources in natural water bodies;
2. Aquaculture development component emphasizing the development of both commercial and small-scale aquaculture; and
3. Research, management and coordination component to support and facilitate the implementation of the other two components.

**Fishery Sector Institutions:** The fisheries and aquaculture sector consists of two branches: the Fisheries Extension and Management Branch, and the Fisheries Research Branch. The two branches are mandated to implement fisheries and aquaculture development programmes. There are also a number of private sector participants – commercial or large-scale fish farmers, fishers and traders, and a number of small-scale fishers, fish farmers and traders.

Community-based fisheries management programmes are being assisted through organized fisher groups that participate in conservation and education programmes among community members.

The National Aquaculture Association of Zambia (NAAZ), an affiliate of the Zambia National Farmers Union (ZNFU), intends to take advantage of agricultural programmes such as the government's national irrigation projects aimed at increasing the efficient use of water bodies through fish farming.

**General Legal Framework:** Fisheries legislation has had a comparatively slow evolution as it does not conform to current changes in policy and traditions of the local communities. Legislation is old and inappropriate to current thinking for the management and development of fisheries, as it has not changed from the colonial era.

1. Fisheries Conservation Ordinance of 1962, Chapter 263 of the Laws of Northern Rhodesia, an Act designed to facilitate administration of a territory by a Governor, highly centralized, no stakeholder participation in formulation and implementation of fishery management regulations with little or no flexibility for the devolution of fishery management authority to riparian communities in fishery areas.
2. Fisheries Act of 1974, Chapter 314 of the Laws of Zambia, now Chapter 200, designed to repeal the Fisheries Ordinance has no fundamental differences from both the legal and fishery management viewpoints. The Fisheries Act places fishery management responsibilities in the national government, with no provisions for community involvement.
3. The Current Fisheries Bill is a revision of the Zambian Fishery legislation, whose main features include:

- devolution of fishery management responsibilities to local communities in fishery areas;
- participation of stakeholders in the formulation and enforcement of fishery management regulations;
- aquaculture development in fisheries legislation;
- conservation of aquatic habitat and fauna;
- facilitation of improved management and conservation of fisheries in accordance with the Code of Conduct for Responsible Fisheries;
- cooperation on shared and transboundary fisheries; and
- fish definition broadened to include both shell- and finfish.

## **SUPPLEMENT 1.**

### **BACKGROUND ON THE DEPARTMENT OF FISHERIES**

#### **1.0 Brief History**

The Department of Fisheries was established in 1974 through the enactment of the Fisheries Act. Prior to this, functions of the department were operationalised by the fisheries ordinances in the colonial government in the 1950s, followed by the Game and Fisheries Act of 1969.

Under the 1997 organisation restructuring in the Agricultural Sector Investment programme (ASIP), the fisheries functions were placed under two separate departments within the ministry. The fisheries extension and management was under the Field Services Department while the fisheries research was placed under the Research and Specialist Services Department. This fragmentation of the Department of Fisheries overshadowed the prominence and importance that should be accorded to the fisheries industry in socio-economic development of the country.

The arrangement had impaired effective coordination and utilization of the inadequate human, material and financial resources as each head of the two branches scumbled for resources and reported to a different authority. Consequently, the fisheries sub-programme had not been able to provide fully the various services it was supposed to render to the community or to the intended clients. Furthermore, the Fisheries Act was placed in abeyance as it placed emphasis on the Director of Fisheries who during this period did not exist. Thus in 2005, the Department of Fisheries was re constituted

#### **1.1 The Functions Of The Department Of Fisheries**

The key role of the Department of Fisheries is to promote the development of fisheries and aquaculture in the country in order to increase fish production.

The above role is to be realized through the following strategies:

- Strengthening and facilitating the provision of sectoral services in order to increase productivity;
- Reviewing and realigning institutional and legislative arrangements;
- Development and promotion of appropriate technology for fishing, fish farming and fish processing;
- Promotion of gender equity in resource allocation and access to sectoral services focusing more on women and youth;
- Promoting conservation of fisheries resources;
- Promoting and strengthening Cooperatives and Fish Farmer Organizations as a vehicle for agricultural development;
- Facilitating provision of incentives for local and foreign agricultural investment;
- Strengthening information collection and dissemination;
- Re-enforcing the sector's regulatory functions. This will also include liaison or coordination with appropriate institutions or bodies responsible for the regulation of related resources;
- Maintaining biodiversity and promoting conservation of aquatic eco-systems and sustainable utilization of natural resources.

These strategies are realized by the following activities:

- Monitoring, control and surveillance of the fisheries so as to ensure sustainable exploitation;
- Licensing of fishers and fish farmers;
- Promotion and regulation of fish farming activities;
- Conduct research in natural fisheries so as to provide information needed for the management of the fisheries;
- Conduct research in aquaculture so as to improve methods of fish production;
- Conduct training for fishers and fish farmers in order to transfer new technologies and instill knowledge of conservation to the grassroots;
- Quality assurance for fish and fish products;
- Collection and processing of fisheries and aquaculture statistical data.

## **1.2 Department of Fisheries Structure**

The Department of Fisheries is headed by a director with two deputy directors. The functionalities of the department are driven by two main branches, namely, Capture Fisheries and Aquaculture. Appendix 1 shows the structure and distribution of the technical and support staff in the Department of Fisheries.

The Department is faced with three main challenges. The first one is that the current establishment is only filled to about 72% of its capacity. However, considering the task at hand, even if the structure was filled to 100% capacity it would still be inadequate to effectively fulfill the mandate.

The second challenge is with respect to the administration of the fisheries. These are administered on the basis of political boundaries (districts) and as a result some fisheries are managed by many districts (e.g. Bangweulu fishery is surrounded by 8 districts). This has resulted in the spreading of resources (material and human) meant to manage one fishery.

The third challenge is with respect to the dual functions of the extension officers, who are also expected to enforce the law during Closed Fishing Season (Fish ban). This has tended to create conflicting reaction from the communities. The ideal situation would be to create an inspectorate unit or separate the two functions.

## **2.0 Measures In Place To Ensure Sustainability of Fish Species In Zambia's Water Bodies**

- Control of fishing gear by type and mesh size;
- Protection of fish breeding grounds;
- Control of fishing practices;
- Establishment of collaborative management systems (co-management);
- Control of introduction and translocation of alien fish species;
- Enforcement of the annual fishing ban;
- Regular monitoring and inventory of the fisheries;
- Observe protocols and international agreements on management of shared fisheries such as Lake Mweru, Lake Tanganyika, Lake Kariba and The Zambezi fisheries;
- Domesticated the Code of Conduct for Responsible Fisheries;
- Developed the National Plan Of Action to look at Illegal, Unregulated and Unrecorded fishing (NPOA-IUU).

### **3.0 Deliberate Measures In Place To Increase Fish Population So As To Meet The Country's Demand**

- Aquaculture development;
- Stocking small water bodies (fish ponds, dams and reservoirs);
- Where scientific investigations indicate the need for enhancement of fish stocks, restocking is recommended;
- Monitoring, control and surveillance of fishing activities.

### **4.0 Measures Used To Ensure That Correct Methods Of Fishing Are Used And That There Is No Overfishing**

Monitoring, control and surveillance patrols; conducted in all fishery areas throughout the year but normally intensified during the fishing ban period.

Extension education; the new approach to fisheries management encourages the participation of stakeholders at all levels from central government to the grassroots. In order to facilitate this programme, amendments were made to the Fisheries Act so as to legalise the community structures.

### **5.0 Sanctions That Are Imposed On Those Who Do Not Follow The Correct Practices**

Penalties for breach of the Fisheries Regulations are found in Section 5, sub-section 13 of the Fisheries Act. These range from fines to imprisonment or both fine and imprisonment, depending on the gravity of the offence. For details, see appendix 2 (attached).

### **6.0 Requirements To Qualify To Be Registered As A Fishing Entity**

#### **6.1 Industrial Fishing**

- Must have registration certificate from registrar of companies
- Must have tax registration from ZRA
- Compliance to Fisheries ACT
- Must fill in an application to DOF to be considered for a fishing license

#### **6.2 Small-scale Fishing**

- Compliance to Fisheries ACT
- Application to DOF at fishery level to be considered for a fishing license

### **7.0 Number Of Fishing Organisations In The Country**

- Industrial fishing: 86 Fishing entities on lakes Kariba and Tanganyika approved for 2008
- Small scale fishing: 42,420 countrywide as at end of 2007

### **8.0 Benefits To Government From These Organisations**

- Direct and indirect taxes for Central Government
- Fish levy for Local Government Authorities
- Food security

- Employment opportunities
- Local and Foreign Trade
- Eco-tourism

#### **9.0 What Fishing Organizations Do During The Period Of Fishing Bans**

- Some go into crop farming
- Go on Industrial break used for equipment maintenance
- Some artisanals migrate to open fisheries

#### **10.0 What Government Is Doing/Should Do To The Country Wide Water Bodies Which No Longer Have Fish**

- Where research findings justify fish stock enhancement, government has stocked or restocked, e.g. Kapenta into Lakes Kariba and Itzhi-tezhi, and breams in Lake Mweru wantipa and Upper Kafue (on the Copperbelt).
- Strong and up to-date Management measures have been instituted.

## SUPPLEMENT 2. IMPORTANT BACKGROUND RESOURCES- DOWNLOADABLE

WorldFish Center. **Proceedings of the international workshop on the fisheries of the Zambezi Basin.** Penang: WorldFish Center, 2007. 82 p. (*WorldFish Center contribution no. 1841 WorldFish Center conference proceedings no. 75.*) ISBN 978-983-2346-60-9.

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[http://www.worldfishcenter.org/resource\\_centre/CP75\\_301007.pdf](http://www.worldfishcenter.org/resource_centre/CP75_301007.pdf)

This report from WorldFish is divided into two sections, with annexes. Section One contains the workshop report, including the workshop results and outputs. Section Two contains summary papers of the workshop presentations with a record of relevant points of discussion. The annexes contain additional information such as the participant list, detailed findings and speeches.

Subject Descriptors: [Fisheries](#); [Fishery development](#); [Research](#); [Water management](#)