

**FAO SUB-REGIONAL OFFICE FOR SOUTHERN AND
EASTERN AFRICA**

**REPORT ON THE TANZANIA FISHERIES SECTOR
REVIEW**

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This report was prepared after visiting various fish production centres around Tanzania. It is based upon available statistical and biological data; on-the-spot field observations; as well as interviews and discussions with stakeholders and fisheries interested groups within government institutions and private sector.

The conclusions and recommendation given in the report are those considered appropriate at the time of its preparation. The designations employed and the presentation of material in this document do not imply the expression or opinion whatsoever on the part of the United Nations or the Food and Agriculture Organization of the United Nations, concerning legal or constitutional status of any country, territory or area, or concerning the delimitation of frontiers.

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BACKGROUND INFORMATION ON TANZANIA

Organizational Structure of National Fisheries Authority

The Fisheries Department which is placed under the Ministry of Natural Resources and Tourism is designated as the National Fisheries Competent Authority. Regional Fisheries Officers report to the Director of Fisheries, and are supported in turn by District Fisheries Officers. Extension service staff carry out both regulation enforcement and data collection duties. National fisheries research functions are vested in the Tanzania Fisheries Institute (TAFIRI). Training and education in fisheries is conducted by Kunduchi Mbogani Fisheries Development Centre and Nyegezi Fisheries Research Institutes.

The Economic Setting

From the mid-1960's to the mid-1980's (for two decades), the United Republic of Tanzania (URT) followed the central government dominated policies of economic controls and direct state investments in all sectors of the economy including fisheries. The relatively good and encourage start was short lived as the inefficiencies of the parastatals gradually crippled the economy.

To revive its stagnated economy, the Government of the United Republic of Tanzania (GOT) embarked on an Economic Recovery Programme in 1986 with the assistance of the IMF and the World Bank, aimed at lowering inflation, reviving economic growth and reaching a sustainable balance in trade. An Economic and social Action Plan followed in 1989 aimed at monopolies. The response to these programmes has generally been positive. Growth in GDP averaged 4% per annum for the period 1986-1993.

Although long-term interest rates have followed suit and fallen from a 29-38% spread in 1996 to a 21-32% spread in 1997, the cost of credit is still high and effectively constraints private sector development and the formation of domestic capital, and more particularly capital for the artisanal fishing communities.

The country's population totalled 31.3 million people in 1997 and while the population density is still low at 31 per km² population growth is rapid at 2.9% annually. About 70% of the population live in rural areas in over 8,000 villages. Tanzania has a per capital income of less than US\$200.

Investment in Fisheries

Information on other dimensions of investment in the Tanzania fisheries sector, whether private or public, such as fish landing sites support facilities and other infrastructure, processing and market buildings and plants, Government administrative and research offices, etc., has not been systematically compiled in recent years. However, for the Lake Victoria Nile perch fishery, the country's leading fishery in terms of production, ex-vessel value, and export earnings, estimates compiled in 1996 indicate that some US\$ 49.5 million has been privately invested in processing plant and associated equipment and facilities located at Mwanza.

Projection of Fish Supply and Demand

Tanzania in 1997 had a population of 31.3 million inhabitants, and has an average annual growth rate of 2.9%. Fisheries resources from all the major marine and inland capture fisheries are at or near a state of full development, though there appears to be potential for limited expansion of production from minor lakes, rivers, swamps, flood plains and reservoirs. Small-scale pond fish culture offers another possible but modest increased fish production, though significant technical obstacles will have to be overcome to increase the attractiveness of pond culture as a component of family farm enterprise. However, with population growing at its current rate, it does not appear likely that national fish production from all sources, capture fisheries and culture based fisheries will be able to maintain present *per caput* supply of fish.

TANZANIA FISHERIES SECTOR REVIEW

The Marine Fisheries Sector

Tanzania mainland has a coastline of approximately 800 km. The continental shelf has a width varying from a minimum of 6 km to maximum of 64 km and has an area of about 12 000 km² at a depth of 60 m. The remaining area is characterized by coral formations which reduce the effect of strong winds on the coast. The climate conditions and productivity of the ocean waters is influenced by the East African Coastal Current. Hydrological analysis indicates that the water is deficient in the growth of plankton which affects the fish food chain and consequently the distribution of marine living resources that can be exploited.

Small-scale fishers operate from shores of local beaches, but most fishing operations for both the artisanal and industrial marine coastal fishery are based out of Dar-Es-Salaam on the central coast, the Lindi-Mtwara area on the south coast, and the Tanga-Pangani area on the north coast. The total marine fish catch for 1996 was estimated at about 58,000 t valued at Tanzania shillings 37 million (refer to Table 1. Annex 3).

The Marine Fishery Policy

The government of Tanzania is committed to enhance fish production from the sea and the income of the artisanal and industrial fishermen operating along the coast. The national policy focuses on the following objectives:

- Increase fish production as a means of providing the much needed animal protein at a reasonable price. With deep sea fishing innovations this should result in increasing per caput fish consumption;
- Assist fishermen to raise their income and standard of living;
- Promote and consolidate fisheries training, research, statistical data collection and improve the administrative machinery and mechanisms of institutions like parastatals, cooperatives and small scale fishermen;
- Promote regional cooperation in working out a strategy for managing and exploiting fisheries resources which are shared with other adjacent states;
- Promote and consolidate national capability to exploit marine fisheries resources within the area of jurisdiction.
- Encourage earning foreign exchange from sales of surplus fish, crustacea and marine aquatic plants; and
- Consolidate the national policy of self-reliance in the field of fishing, fish processing and preservation, marketing and distribution of fish and fishery products through strengthening fishing villages, cooperatives and parastatals.

Status of Marine Fisheries and Potential

The marine fish catches contribute about 20% of the total fish landed in Tanzania. The marine fishery sector supports between 11,000 – 16,300 fulltime artisanal fishermen who produce 80% of the total marine fish landings.

The main fish species exploited are sardinella, seerfishes, sharks, various demersal fishes and seasonal quantities of migratory pelagic fishes like kingfish.

Profitable and productive marine fishing grounds are located between the Rufiji delta and the Mafia Channel. In the Rufiji delta and off Sadani (north of Bagamoyo town) prawns are caught by traditional fishermen and commercial fishing vessels belonging to Tanzania Fisheries Corporation (TAFICO), Bagamoyo Fishing Company (BAFICO) and others. Sardines are commercially exploited by light attraction with purse seines or by use of dip nets. Small scale fishermen use gillnets, shark nets, beach seines (Juya in Kiswahili), traps of different designs, and hand lines. Dynamite fishing, though prohibited, is still used and may be responsible for the damage on coral formation and the beautiful under-water gardens.

Available fishery statistics indicate that between 1984 and 1996, marine fish landing, ranged between 36,600t and 58,700t. The number of fishing vessels fluctuated between 3,200 and about 4,000. According to records of the Fisheries Department, the number of marine fishermen was about 3560 in 1984, reached a maximum of about 16,360 and thereafter dropped to about 13,800 fishers in 1996. Details of catch trends, fishing vessels and fishing gears for the period 1984-1996 are given in Table 1. (Annex 3).

Marine Fisheries Research Facilities

One of the priority areas of marine fisheries research is maximum utilization of the resource base. Presently scanty information is available on the size of the fish stocks in territorial waters. This problem is likely to increase with Tanzania with Exclusive Economic Zone (EEZ). To this regard, the attention of government should focus attention on the following:

- (a) stock assessment of crustacea (prawns and lobsters) and pelagic fishes in the EEZ *par shelf continental* with a view to understand the size of the fish stocks, their distribution, migration pattern, species composition, age structure;
- (b) investigating suitable techniques for maximizing the exploitation of the fish resources by local fishermen and commercial fishing companies;
- (c) evolution of better extension service methods commensurate with the resource base; and
- (d) determine the type of training to be undertaken in order to produce the necessary human resources to facilitate rational exploitation and utilization of fisheries.

Tanzania Inland Fish Production

Tanzania is extremely well endowed with freshwater fisheries resources and inland production in recent years accounts for between 80% to 90% of annual national total production for capture fisheries. Some 86% of Tanzania's inland waters are contained in the Great Lakes of Victoria, Tanganyika and Nyassa (Malawi). All three lakes host remarkably diverse assemblies of fish and other aquatic life. Their waters, with the particularly heavy contribution of Lake Victoria, provide the bulk of Tanzania's inland (and thus indeed total national) fisheries production. Numerous rivers are found within the country's four main drainage basins (Indian Ocean, Lake Tanganyika, Lake Victoria and the interior drainage including Lake Rukwa, the Rift Valley and Maasai Steppe). Lake Rukwa (2,300 km²) is a comparatively large lake situated between the southern highlands and Lake Tanganyika. Rukwa and the major rivers, together with many smaller lakes, swamps, floodplains and conservation and flood control reservoirs, all host modest commercial and subsistence fisheries which are nevertheless of great importance to local inhabitants.

Tanzania has the major inland fisheries resources in Africa, equivalent to about 20% of the continent's current production. According to government statistics, inland catches provide about 90% of Tanzania's landings and 85% of the value of total production. The bulk of the catch now comes from Lakes Victoria and Tanganyika, together yielding 84% of inland production, although the data pertaining to these lakes are believed to be largely overestimated. Other potentially important waterbodies are Lake Rukwa, the Kilombero River and floodplains, and in the long term Malagarasi River and floodplain. The Mtera dam and the Nyumba ya Mungu reservoir are both at a level nearing overfishing.

The main freshwater species harvested in Tanzania are Lakes (Nile perch); Dagaa (Rastrineobola) in Lake Victoria; and Limnothrissa and Stolothrissa in Lake Tanganyika; the tilapias; Bagrus; Clarias and Protopterus (Lungfish).

Lake Victoria

The most important of the inland waters is Lake Victoria, 51% or 33,700 km² (51) of which lies within Tanzania territory. Most fishing villages and camps are concentrated along the southern and eastern reaches of the lake in Mwanza and Mara Districts. Landings and encampments along the Bukoba District shoreline, skirting the more remote southwestern quadrant of the lake are more sparsely distributed. Mwanza Town is the fish marketing and processing capital for the entire lake region. Dramatic changes have occurred since the mid-1980s, when the introduced predator Nile perch (Lates niloticus) began to dominate the fisheries. Reports indicate that Tanzania landings of 1997 (FAO/FISHSTAT estimates). The contemporary fisheries regime is much simplified in species composition from the 'pre- Nile perch' days. Harvests are now based largely on L. niloticus (≈60%), the Nile tilapia Oreochromis niloticus (≈10%) and the endemic small pelagic cyprinid Rastrineobola argentea or 'dagaa' (≈20%). There has been extensive development of industrial processing for the lucrative export trade in Nile perch fillets, raw material for which is mostly supplied by artisanal gillnet and longline fishers. Seven processing plants had been established at Mwanza Town (south-central shore of Lake Victoria) by 1996, producing frozen fillets as well as some chilled fillet.

Total Nile perch fillet exports for that year ran to an estimated 15,000 mt, representing a value of about US\$49.5 million.

Lake Victoria is relatively shallow (maximum depth 79m, mean depth 40m). This lake has higher fish yields per unit area than Lakes Nyasa and Tanganyika. The original endemic haplochromine and cichlids have changed. Its fisheries now depend on the introduced Nile perch and the Nile tilapia (*Oreochromis niloticus*) as well as on the indigenous pelagic cyprinid – *Rastrineobola argentea* (dagaa). Lake Victoria, has now a very much disrupted food web system. Many haplochromine zooplankton feeders and mollusc eaters have declined. Hence, there are abundant lake flies and possibly (*Rastrineobola*) and the exotic Nile perch are very sensitive to pollutants and low oxygen levels caused by eutrophication and possibly water hyacinth cover. There is increasing discharge of animal agricultural and industrial waste into Lake Victoria. This has already led to excessive nutrients in the lake, stimulating the spread of water hyacinth and depletion of oxygen. Additionally there is also more pesticides from agricultural land reaching the lakes and also siltation due to soil erosion. All these events adversely affect the breeding and spawning pattern of the various fishes, and more so for the tilapias and other fishes. The estimated annual production potential is about 200 000 – 400 000 tons for the whole lake. Current trends in Tanzania catches of Lake Victoria are shown in Table 2. (Annex 3)

Lake Tanganyika

Lakes Tanganyika borders on Burundi (8%); DRC (45%); Tanzania (41%); and Zambia (6 %). Lake Tanganyika is a very deep lake with de-oxygenated bottoms and with much of its endemic fauna somewhat still intact. The two lakes are still dominated by the cichlids, most of which are endemic. The fisheries of Lake Tanganyika are dominated by pelagic species which are sensitive to pollution, low oxygen and rising thermoclines.

The lake has large quantities of pelagic fish which are located in the shallow surface waters. The deep waters do not have oxygen. In fact only 25% of the volume of Lake Tanganyika is oxygenated.

During dry periods, upwelling occurs and the deep water without oxygen come to the surface and this obviously affects the survival of fish species during drought and their abundance in subsequent normal years with adequate rainfall.

Fishing operations along the 669 km of Tanzania's Lake Tanganyika coastline primarily exploit the two schooling clupeid 'dagaa', *Limnothrissa miodon* and *Stolethrissa tanganyicae*, together with their major predator, *Lates stappersii*. The dagaa make up about 65% of the catch and *L. stappersii* about 30% (by weight). Lakewide annual harvest levels in recent years have been estimated to vary in the range of 165,000-200,00 tons which is worth tens of millions of US dollars. Tanzania's share of the total lakewide catch in 1995 was around 31% or about 55,000 tons. The Tanzanian shore extends for about 670 km along the western side of the lake. According to results of the 1995 Frame Survey organized by the FAO/FINNIDA Lake Tanganyika Research (LTR) project, a total of 208 landing sites are located along this shore, of which are found in Kigoma Region to the north and in the more sparsely settle Rukwa Region to the south. Much of the catch from the Tanzania portion of the lake is marketed as undocumented

exports to Burundi, DRC and beyond. Catch trends for the Tanzania sector of the lake are shown in Table 3. (Annex 3).

Lake Nyassa (elsewhere known as Malawi and Niassa)

Located at an altitude of 471 m, Lake Nyassa has a total surface area of 30,800 km², of which 24,400 km² lie in Malawi and 6,400 km² in Mozambique. Tanzania has a sector of about 5,569 km² of the lake. The total shoreline is 1,500 km of which 300 km lie in Tanzania; 300 km in Mozambique; and 900 km in Malawi.

Although Tanzania has some 300 km of shoreline on the lake, the Nyassa area is remote from major centres of population, development activity has been minimal over the years, and the evolution of the fisheries has not been well documented. It does not appear at this stage that the development of the Lake Nyassa fisheries is complicated by the question of territorial jurisdiction.

The lake lies in the far south-western corner of Tanzania, remote from major centres of population. Development activity has been minimal and the evolution of Tanzania-based fisheries is not well known and is further complicated by questions of territorial jurisdiction. During the late 1980s and early 1990s nominal Tanzania landings were in the 20,000 to 40,000 mt range. However, lack of adequate gear and craft are known to be severely limiting factors for the fishery along the Tanzania shore. Main reported catches from Lake Nyassa/Malawi consist of Haplochromis spp for the inshore areas and Engraulicypris sardella for the open waters. Available figures (late 1980s) indicate that the gear kit of the Tanzanian-based fishery was principally comprised of gillnets and that some 2400 planked canoes and dugouts and about 5,500 artisanal and subsistence operator in 1989. The total fish catch rose to a peak of about 45,000 t in 1992 before declining to about 18,700 t in 1996. Details of trends are given in Table 4. (Annex 3).

On-the-spot Observations at Kyela as well as at Kiwira and Matema Fishing Villages on the Shores of Lake Nyassa.

Informative and fruitful discussions were held with the staff of TAFIRI Centre concerning research programmes, activities and outputs. It emerged that although the Kyela station is relatively new, research work is constrained severely by lack adequate human resources, financial support and equipment. The Kyela District Fishers is also handicapped by the number of staff.

The Fishers Sector Review Mission was informed that prior to a mandatory staff retrenchment exercise, Kyela had 10 fisheries officers compared to only 4 officers in 1999. It is therefore impossible for the four officers to provide meaningful administrative support to entire coastline of Lake Nyassa within Mbeya Region. The mission discussed fisheries issues with fishers at Kiwira and Matema.

It was evident from the discussions that the Ministry of Natural Resource and Tourism (based in Dar-es-Salaam) and the Mbeya Region Administration (in Mbeya) should collaborate in providing the capacity to Kyela District to fulfill the following :

- Collect, compile and analyze fishery statistic and other data necessary for fisheries planning;
- Monitor and control fishing activities; and
- Surveille fishing grounds and fish landing beaches.

It is the view of the FAO mission that the same consideration and facilities should be accorded to Liwuli and Mbamba location of Songea District, Ruvuma Regional sector of lake Nyasa, as well as to the Iringa Region sector of lake Nyasa (Ludewa District).

TAFIRI Centre Kyela (Lake Nyassa)

The mission noted a serious shortage of human and financial resources needed by TAFIRI to fulfill research on Lake Nyassa in the following disciplines:

- Fishers biology;
- Limnology;
- Aquaculture;
- Fish technology;
- Fishing technology;
- Socio- economics; and
- Marine engineering in case of fishing deep waters and exploratory surveys of lake Nyassa.

The Mission recommends that the stations be provided with a minimum of modern research. Equipments and chemicals for biological and limnological studies. The TAFIRI Board of Directors and also the Ministry of Natural Resources and Tourism should ensure that Kyela has similar and comparable facilities that are available to other TAFIRI centres.

The mission is aware that most of the facilities available to TAFIRI centres in Kigoma and Nyegezi / Sota have been provided by FINNIDA (for Kigoma), and by lake Victoria Fishers Research project (supported by European Union) and the World Bank funded lake Victoria Environment management programme. Nevertheless, for long term fisheries research planning, Government should find the means to support research in future. It is a fact that donor support is not permanent and Government should take note of this when formulating the next fisheries management and development plan.

Small Water Bodies, Dams, Rivers and Swamps

Tanzania has many small water bodies, dams, reservoirs and swamps whose fish production is significant. The most important are Lake Rukwa, Nyumba ya Mungu, Mindu and Mtera Reservoirs, and the Ruvuma, Rufigi and Malagarasi rivers and floodplains. The total production of these small water bodies was estimated at 28,000 t in 1989. Trends in fish production of small water bodies are given in Table 5. (Annex 3).

Aquaculture Production and Development Strategy

Development of aquaculture, if integrated with agriculture and animal husbandry, can significantly increase protein supply in rural areas and enhance farmer incomes as stipulated in the national fisheries policy. However, it is not quite certain that aquaculture will contribute significantly in the national economy in the immediate future and the development of aquaculture should be considered as a long term objective. It is therefore, useful for the Fisheries Department to carry out the following activities:

- (a) Make an inventory of existing fish ponds using internal financial and human resources. The mission notes that TAFIRI has conducted this exercise in Lake Victoria region ;
- (b) Formulate national extension plans which will also motivate stakeholders to start pilot project;
- (c) Develop Hatchery Centres in the Indian Ocean area for the development, multiplication and distribution of improved seeds. Encourage private entrepreneurs to establish own hatcheries. Strengthen the Nyengezi Hatchery to cater for the Lake Victoria region ;
- (d) Encourage private sector to develop mariculture along the coast.
- (e) Ensure that the livelihood of the local communities and their access to fishing grounds are not affected by aquaculture development ;
- (f) Promotion of extension of viable aquaculture technologies appropriate for small-scale and semi-intensive levels ;
- (g) Establish, maintain and develop an appropriate legal and administrative framework which facilitates the development of sustainable aquaculture ;
- (h) Ensure safe, effective and minimal use of therapeutants, hormones and drugs antibiotic and other control chemical ; and
- (i) Promote the utilization of small water bodies, dams and reservoirs for aquaculture.

Constraints in Aquaculture and Small Water Bodies Development

The Mission noted the following constraints :

- Lack of quality fingerlings ;
- Poverty among fish farming communities ;
- Insufficient extension services to fish farmers ;
- Insufficient baseline data and information on small water bodies fisheries ;
- Insufficient linkage between the Fisheries Division and the Regional and District Fisheries Offices ;
- Physical factors such as droughts and unsuitable land.

General Constrains to Fish Production

Based on field visits to various distant fish production areas and through discussions with stakeholders and fishery interested groups, the FAO Mission took note of the following constraints limiting fish production in the country:

- Open access problems, licensing system and regulations;
- Limited diversification of fishing methods;
- Limited support and supply services;
- Inadequate access to fish production inputs;
- Lack of fishing technologies for fish stocks in the deep lakes and the sea;
- Fish quality assurance problems;
- Post-harvest losses, particularly during the rain season.
- Limited application and adherence by fish farmers to recommended fish farming technological practices;
- Poor and effective extension services particularly around the Lake Tanganyika and Lake Nyassa, small water bodies and along the coast;
- Low producer prices;
- Inadequate fisheries management; and also lack of monitoring, control and surveillance;
- Lack of community based resource management; and

General Fishery Research Needs and Immediate Management Measures

The Tanzania Fisheries Research Institute (TAFIRI) is responsible for fisheries research in marine and freshwater. It is worth noting that cumulative consistent research data on the size of the fish stocks is necessary as a guide for proper planning and subsequent rational exploitation. Management measures to be taken will rely heavily on how much information which is available on the fishery resource base.

The Mission noted lack of adequate human resource funds and equipment at TAFIRI stations of Kigoma and Kycia. The situation at Nyegezi is better due to funding through EU Research Project and LVEMP activities funded by the World Bank. The Institutes Headquarters in Dar-es-Salaam needs a proper building and modern laboratory. The research staff at the Headquarters is adequate and are deployed in Lakes Victoria and Tanganyika whenever needed. The mission noted that TAFIRI Headquarters has a research boat R.V. Kiboko which is to be used in research. It is highly recommended to finance the researches planned for this boat.

The research information to be gathered by TAFIRI should include:

- (a) fishing methods and types of gears suitable for various types of fisheries;
- (b) optimum fishing effort of fishermen, vessels and gear;
- (c) magnitude of investment;
- (d) location of fishing grounds;
- (e) joint venture agreements;
- (f) socio-economic constraints of artisanal and commercial fishermen/fisherfolk.
- (g) development of appropriate aquaculture technology
- (h) fish stock assessment

- (i) liminological work
- (j) fish statistics

Sustainable fisheries development and management for the economic benefit of the industry could be realized if fishery data and statistics were easily made available. The development plans for exploiting fish stocks on a sustainable basis require:

- Plans for setting up shore-based facilities to service the fleet;
- Investigation on how to utilize abundant fish resources which are under-utilized but could form a major source of protein food;
- Establishing fish receiving, processing, preservation, marketing and distribution facilities;
- Introducing management measures which will control over fishing and sustain the resource;
- Study of socio-cultural aspects of fishers;
- Monitoring, control and surveillance mechanisms.

Current Fisheries Legislation Laws and By- Laws of Mainland Tanzania

The basic current legislation on fisheries is the Fisheries Act, No. 6 of 1970. It applies to both marine and freshwater fishing. It provides for the protection, conservation, development, regulation and control of fish, fish products and aquatic flora. It specifies that a Chief Fisheries Officer (now the Director of Fisheries) shall be appointed by the President and that a license is required to engage in fishing, gathering, manufacturing, selling, marketing, importing or exporting of fish, fish products, aquatic flora or aquatic flora products.

The Fisheries Act (1970) is the major legal instrument facilitating implementation of the current fisheries policy and management measures. Other instruments include the Territorial Sea and Exclusive Economic Zone Act (1989). The Tanzania Fisheries Research Institute Act (1980) and the Marine Parks and Reserves Act (1994). Most of these laws would need to be revised and subsidiary legislation updated from time to time in order to meet the requirement of changing policies.

The main fisheries regulations in force in mainland Tanzania are the following:

- (a) The Fisheries Act No. 6 of 1970 (currently under review)
 - Under Part IV of the Act, the Minister is empowered to regulate the fishing industry through a licensing mechanism and may impose fishing restrictions.
 - General powers of the Minister to make regulations are provided for under section 7.
 - The Minister can fill any lacunae that are found in the Act, by making regulations, which cater for specific demand of the industry.

- (b) Fisheries (Marine Reserves) Regulations, 1975;
- (c) Fisheries (Inland Waters) Regulations, 1981;
- (d) Fisheries (General Amendment) Regulations, 1991;
- (e) The Fisheries Principal Regulations of 1989 as amended
 - G.N. 369 of 9/10/94 – The Fisheries (General Amendment Regulations, 1994 fishery products from aquaculture activities are exempted from export royalty.
 - G.N. 370 of 1994 prohibits the use of specified vessels or tools.
 - G.N. 189 of 6/6/97 among other matters, prohibits the use of beach seines in fresh water fisheries ;
 - G.N. 624 of 9/10/98. Among other matters certain coastal reefs were closed for a period of one year in order to save them from further degradation due to human activities.
- (f) The Mafia Island Marine Parks and Reserves Act, 1994
 - G.N. 200 of 6/9/96 declares portion of Mafia Island to be a marine park.
 - G.N. 83 declares certain islands along the Indian Ocean coastline as marine reserves. These are the same area declared in 1975.
- (g) On the defining EEZ limits, some progress has been made.
 - The boundary between Tanzania and Kenya has been defined. Likewise the one between Tanzania and Mozambique.
 - Currently preparations are underway to convene a meeting that will bring together Tanzania, Comoro and Seychelles in order to deliberate on the delimitation of the EEZ zones where they overlap. Hopefully an equitable solution will be achieved before end of this year.
- (h) Fisheries (General Amendment) Regulations, 1996; and
- (i) Fisheries (Amendment) Regulations, 1997.

The Minister is granted wide general powers to make regulations for the purpose of protecting, conserving, developing, regulating or controlling the capture, collection, gathering, manufacture, storage or marketing of fish, fish products and aquatic flora. S/he is also empowered to make regulations on a wide range of specific issues, inter alia, in respect of fishing gears and seasons, the introduction of non-indigenous fish species, the use of explosives, poisonous or toxic substances, the protection of spawning grounds, and access to fishing grounds (number and size of fishing vessels). S/he is given the power to exempt any person or organization from all or any provisions of the Act or of any subsidiary legislation made under it, if in his/her opinion, it is in the public interest to do so. The Act also sets out the circumstances and the procedures under which a search and a seizure of a vessel can be properly conducted.

The Fisheries Principal Regulations, 1989, require every fishing vessels operating within Tanzanian waters to be registered and recorded on the central registry of fishing vessels. It sets out different classes of fishing vessels for licensing purposes and

stipulates that all fishing vessels to which a license has been issued be kept in a seaworthy condition. It gives the Director of Fisheries power to attach conditions to licenses. Fishermen and fish dealers must hold a license in order to engage in fishing, collecting or export of fish or fish products. Reporting pertaining to fish killed, processed, preserved, packed, bought, sold, imported, exported or otherwise acquired or disposed of, is required from every licensee. Schedule 4 of the Act sets out fishing methods exempted from taking out a license. It includes fishing for prawns using cloth and fishing by means of a rod or line from the beach without using a fishing vessel whether for sport fishing or domestic consumption. Import of any non-indigenous live fish products into Tanzania Mainland is subject to prior authorization from the Director of Fisheries. Tanzania Mainland, or their transfer from one water body to another within Tanzania, as well as export of any live fish or fish products from Tanzania Mainland is subject to prior authorization from the Director of Fisheries.

The law prohibits the use of explosives, poisons, and electric devices for fishing purposes throughout Tanzanian waters. In line with the "polluter pays principle" the Fisheries Act states that any person who causes water pollution is required to clean polluted waters at his own expense. To that effect, the Director of Fisheries is empowered to establish "a system of consultation and co-operation with appropriate officials".

Access of foreign fishing vessels to Tanzanian territorial waters for any purpose is generally prohibited, unless such entry is authorized under the Act, any other law or in compliance with any Treaty or any International Agreement. In respect of access to fishing grounds within Tanzanian territorial waters, the Director of Fisheries has indicated that conditions of access would be negotiated on a bilateral basis. It is specified that foreign fishing vessels would be required to apply for a license and be compelled to land their catch in a Tanzanian port or pay royalties based on the quantity of fish caught.

The Fisheries (General Amendment) Regulations, 1994, adjust the rates for fishing vessels registration and transfer fee. They also modify the classes of fishing vessels for licensing purposes and sets out 4 categories: prawn trawlers, vessels for ordinary fish up to 11m, trawlers or vessels for ordinary fish, and sport fishing vessels. Sub-categories are established according to Gross Registered Tonnage (GRT) or length of the fishing vessel. Typically, fees vary in accordance with the vessel or the owner being a citizen or a foreigner. Fees for collecting aquarium fish are also set out.

The Need for Fisheries Legislation on International Shared Fisheries

In view of fisheries legislation, Tanzania Government should take into account provisions of the Third United Nations Convention of Law of the Sea (UNCLOS III) as well as the legislation to the neighbouring States sharing to same fishery resources.

It is important that Tanzania takes the necessary action on its Legal Continental shelf (LCS), considering that the convention came into force in 1994 and that the following deadlines have to be observed accordingly:

- Year 2000, the deadline for defining the limits of the EEZ; and

- Year 2004, the deadline for defining the limits of the Legal Continental Shelf (LCS).

Concerning the application of the FAO Code of Conduct for Responsible Fisheries, Tanzania should endeavour to implement the following management measures:

- Conserve biodiversity of aquatic habitats and ecosystems, particularly Lakes Victoria, Tanganyika and Nyasa (Elsewhere known as Niassa and Malawi). The issue of O.M which is known to replace other indigenous tilapiines in a number of water bodies ;
- Protect endangered species like haplochromines and tilapias as well as Labeo in Lakes Victoria, Tanganyika and Nyassa;
- Control pollution of inland water bodies and the sea;
- Control waste dumps from urban centers;
- Assess adverse environmental inputs affecting fisheries around the country; and
- Monitor and control the introduction of exotic fish species and plants

In the case of marine fisheries, Tanzania should implement the Agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas.

Regarding Agenda 21 adopted by the United National Conference on Environment and Development, as well as the Declaration of Cancun adopted by the International Conference on Responsible Fisheries, Tanzania should take action in these respects.

Education and Training in Fisheries

Fisheries in Tanzania have been undertaken by utilizing the Government owned Kunduchi and Nyegezi Fisheries Institutes as well as the Mbegani Fisheries Development Centre, which provide training at diploma and Certificate levels respectively. Graduates from these institutions form the bulk of staff in national and regional fisheries establishments. These graduates are responsible for:

- (a) management and administration of fisheries at regional and district levels;
- (b) extension service support; and
- (c) technical support in fisheries research, training and commercial Establishments.

Training of professionals has been undertaken by utilizing places available at the University of Dar-Es-Salaam and training institutions overseas. Training abroad covered

the following areas: marine biology, oceanography, limnology, aquaculture, fisheries management and administration as well as fish processing technology.

NORAD has provided technical and financial assistance for improving on and expanding training facilities at Mbegani Fisheries Development Centre. The Center is providing skilled technical personnel in the fields of nautical science and fishing gear technology, boat building, marine engineering and refrigeration and fish processing and marketing. The skills gained at Mbegani are considered a backbone for large-scale fisheries operations.

It should be noted that well planned programs in fishery education and training could facilitate the fishing industry in the following:

- (i) Assist in proper forecasting of the manpower needs of the different fisheries fields with the purpose of optimizing resource exploitation;
- (ii) Stimulate planning for maximum utilization of locally available training facilities for short and long term training programs;
- (iii) Facilitate identification of areas requiring specialized training and the actual number of such personnel required;
- (iv) Ensure funds available for training are channeled to areas where maximum benefit can be obtained; and
- (v) Create a pool of skilled personnel who can be consulted by investors.

The development of human resources in fisheries ideally depends on the level and intensity of formal, non-formal and informal training and education. The national policy and strategy on training and education in fisheries focuses on the following activities:

- Develop a national training programme and implement it according to assessed needs to meet the human resources requirements of the fisheries sector;
- Develop a curricula in national fisheries training and educational institutions on the basis of assessed fisheries training needs.
- Assess regularly the fisheries sector training needs according to specific requirements for human resources with specific reference to fisheries development programmes;
- Strengthen the human resource capacity and infrastructure in the national fisheries training and research institutions;
- Collaborate with the private sector and donors in the development of a sustainable funding mechanisms;

- Develop relevant vocational training programmes for artisanal fisherfolks; and
- Facilitate the development of a viable and sustainable schemes in order to improve access to national fisheries training institutions.

The FAO mission visited Kunduchi Fisheries Training Institute near Dar-es-Salaam, Nyegezi Fisheries Training Institute near Mwanza on Lake Victoria and Mbegani Fisheries Development Centre near Bagamoyo north of Dar-es-Salaam. Consultation were made on subject matter, institution capacity, financial assistance for students, carrier development and job opportunities for graduates from the training institutes as well as availability of training courses in food technological, marine biology, marine engineering, nautical science and fishing technology at the University of Dar-es-Salaam.

Emerging Issues in Education and Training in Fisheries

In the last two decades, Tanzania has made tangible achievements in the area of education and training in fisheries through the establishment of Kundushi, Mbegani and Nyegezi Fisheries Institutes. However two significant issues have emerged that will require consideration when formulating the next fisheries development plan. The issues to be addressed relate to the relevance of fisheries training and education to the changing needs of the economy and the high cost of training.

It is the view of the FAO Mission that Government needs to consider the following constraints and issues:

- Assist the undergraduates in every cycle to find gainful employment in the modern wage sector, small-scale enterprises and other forms of self-employment in the fisheries;
- Make the individual more easily trainable at higher levels of education and training after leaving Kunduchi and Nyegezi;
- Instill realistic attitudes and aspirations regarding employment in fisheries, both in the public and private sectors;
- Provide financial assistance and allow for both public and private participation in meeting the costs of achieving this objective.

The problem of financing education and training in the Fisheries Training Institute from the private sector is proving to be the most critical strategic issue facing the fisheries sector. It is noted that many parents cannot afford the sum of Tanzania shs. 500,000 per student per year in the available institutes. This is apparent from the data available at Kunduchi and Mbegani. The student intake capacity for Kunduchi and Mbegani for a two year course is 60 and 120 respectively. But the students enrolled at Kunduchi and Mbegani are 27 and 25 respectively.

GENERAL RECOMMENDATIONS

Recommendations on Research Programme and Activities

The importance of collecting information necessary for fishery management (stock assessment), commercial and economic data of available fish resources, and the need to set correctly research priorities in accordance with national needs and available human and material resources, were noted during the visit. It is further recognized that stock assessment is essentially a long term and expensive undertaking, and that a solution to short term needs lies in effective monitoring schemes based on keeping correct statistical data and continuously evaluating them and transmitting results to stakeholders.

TAFIRI is mandated to conduct research, acquire, analyze scientific information on inland and marine fisheries; and also disseminate scientific information for use in sustainable management of fisheries. The available human resources, research facilities and funds do not permit TAFIRI to fulfil its mandate. The following activities are recommended:

- Re-structure and strengthen TAFIRI by providing more human resources research facilities and funding;
- Strengthen TAFIRI Centre at Kyela (Lake Nyassa), Kigoma (Lake Tanganyika, Nyegezi (Lake Victoria) and Kunduchi near Dar-es-Salaam (for the Marine Fisheries Sector);
- Promote research aimed at providing immediate information on efficient fishing and processing methods;
- Analyze and package existing information in the institute and establish a national fishery database;
- Carry out survey of exploited marine and freshwater fish stocks;
- Conduct limnological surveys;
- Make an inventory of wild fish species, fish species cultured in ponds and fishes stocked in reservoirs;
- Enhance socio-economic studies to enable better fish distribution and marketing;
- Collect more data on productivity of small water bodies, dams and reservoirs;
- Hold periodic workshops to review all research findings;
- Develop fish quality assurance standards and codes of practice for fish handling processing and marketing; and
- Disseminate scientific information to stakeholders and fisheries interest groups.

In order to immediately improve the state of knowledge of the coastal fish stocks, it is recommended that a coastal fish stock assessment be initiated by Government, even with a small TCP Project.

General Recommendations on Fisheries and Aquaculture Development and Management

It is noted that the Fisheries Department, which is placed under the Ministry of Natural Resources and Tourism, is designated as the National Fisheries Competent Authority. Regional Fisheries Officers report to the Director of Fisheries, and are supported in turn by District Fisheries Officers. Extension service staff carry out both regulation enforcement and data collection duties. National fisheries research functions are vested in the Tanzania Fisheries Institute (TAFIRI). Kunduchi and Nyegezi Fisheries Training Institutes and also the Mbegani Fisheries Development Center conduct training and education in fisheries.

The linkages between the Fisheries Department and the Regional and District Fisheries Offices are poor. There is a break down in fisheries extension services. In order to facilitate the collection compilation and dissemination of information for management, it would be necessary to re-centralize collection of fishery data and statistics.

There is no adequate human resources deployed around the Lakes Nyasa, Tanganyika, Victoria and around other small water bodies and also along the coastline. In these circumstances, the mandatory fisheries field staff retrenchment exercise should be placed on hold and deployment of new staff to be considered.

The FAO Mission recognizes that the present fisheries administrative and extension service of structures, where responsibilities are not clearly shared between regions and local councils. This makes implementation of fisheries planning, administration and extension support by the Fisheries Department difficult and ineffective. To rectify this situation, it is recommended that the existing administrative structure should be adjusted to ensure detailed accountability by the Fisheries Department and clear responsibilities for local governments. It is further recommended that the fisheries administration and extension service should be supported with equipment, transport and motivation.

The Fisheries Department under the Ministry of Natural Resources and Tourism should be strengthened and facilitated to fulfil the following functions:

- Collect, analyze and disseminate fisheries data and statistics to stakeholders and fisheries interested groups; (this activity requires a fisheries project).
- Review from time to time existing legislation;
- Organize stakeholders workshops on legislation to facilitate compliance;
- Arrange for a quality control managers to formulate guidelines;

- Review international market requirements and set up codes of practice and standards;
- Set up a monitoring, control and surveillance mechanisms;
- Evaluate extent to which agreed on management decisions are adhered to;
- Study on existing funding and utilization of revenue from the fisheries sector;
- Collaborate with TAFIRI in standardizing data collection and analysis in order to establish a viable fishery data base;
- Assist the private sector to expand fish farming across the country;
- Make an inventory of existing fish ponds using internal financial and human resources;
- Formulate a fishery national extension plan which will also motivate stakeholders to start pilot project;
- Develop Hatchery Centres for development, multiplication and distribution of improved seeds;
- Encourage private sector to develop mariculture along the coast; and
- Establish legislation for all shared international fisheries along the sea and for Lakes Victoria, Tanganyika and Nyassa.

After discussing the role of Government in assisting fishers on Lakes Tanganyika, Nyassa and Victoria as well as along the sea coast, it is the view of the FAO Mission that Government should also treat fishing gear and other fishery inputs as agricultural inputs for which sales tax and custom duties are exempted. This will enhance the reduction of prices of fishing gear and motivate fishermen to supply more fish for internal and external markets.

Additionally, there is a need for Government to review the current local government system of many levies and taxes on fish and fishery products to enhance fish production and marketing, resulting in better nutritional standards.

Specific Recommendations on Aquaculture

Aquaculture in Tanzania is still poorly developed and requires more inputs in terms of human resources, funding and appropriate technologies. It is recommended that the Fisheries Division, Ministry of Natural Resources and Tourism focuses attention on the following :

- Strengthen the extension services in collaboration with District fisheries offices, NGOs etc. In order to reach more farmers especially in areas with high aquaculture development potential ;

- Place emphasis on the establishment of fingerling production centre in order to combat the problem of the lack of quality fingerlings ;
- Train more aquaculture extensionists to equip them with the necessary knowledge on appropriate aquaculture technology and extension skills.

Marine in Tanzania is not yet developed to any extent and that few project proposals on prawn farming have been formulated by the Fisheries Division for consideration and funding. Government should fulfil the following in mariculture :

- Establish a legal framework for mariculture to safeguard coastal environmental degradation ; and
- Ensure that coastal fisheries interests including the need for conservation are taken into account in the multiple use of the coastal zone and that there is integrated coastal area planning management and development

Specific Recommendation on Fisheries Statistics

The Mission notes with concern that the current statistical system was introduced in 1992 under UNDP/FAO Project, Strengthening Fishery Statistics and started operating in 1993. The system involved data collection at selected landing sites in the Districts by random sampling. At the end of the month data collected at various landing sites was forwarded to the Regional Office where it was semi-processed by the Regional Statistics Supervisors before sending it to Headquarters for final processing. About 10 Regions were provided with Lap tops for data entry and processing.

After the Government embarked on the restructuring exercise in 1996 most of the enumerators in the field were retrenched, seriously affecting data collection. The abolition of the Regional Offices which acted as contact points in 1998 further disrupted the system because there is now no co-ordination between Districts in the Regional and also between Districts and Fisheries Head Office. Some of the equipment supplied for data collection and processing have been left without proper care.

Currently fisheries data collection has ceased in most Districts. The last statistical report was the 1996 report. This failure is due to several factors including :

- Lack of sufficient and trained staff;
- Lack of supervision and co-ordination in the Districts and Regions;
- Lack of equipment e.g. transport and computers and weighing scales.

It is recommended that in order to revive the function system prior to 1996, the Government should carry out the following :

- Re-establish Regional Statistics Supervisors who will be responsible to supervise data collection in the Districts, compile Regional data and act as contact point between Districts and the Head Office;
- Recruit and train more staff at District level.
- Initiate the use of local communities in the collection of information;
- Strengthen the collection of data on socio-economics; and cooperatives and associations;
- Provide working equipment.

It is also recommended that the following statistical regions and zones be recognized and utilized :

- (a) Mwanza, Mara and Kagera regions for the Lake Victoria zone;
- (b) Mbeya, Iringa and Ruvuma regions for the Lake Nyassa zone;
- (c) Tanga, Coastal, Dar-es-Salaam, Lindi and Mtwara regions for the Indian Ocean Coastal zone; as well as
- (d) Kilimanjaro, Arusha, Singda and Dodoma regions for the inland sector or zone with small water bodies.

Specific Recommendation on Fisheries Legislation of International Shared Fisheries

In view of international fisheries legislation, Tanzania Government should take into account provisions of the Third United Nations Convention of Law of the Sea (UNCLOS III) as well as the legislation to the neighbouring States sharing to same fishery resources.

It is important that Tanzania takes the necessary action on its Legal Continental shelf (LCS), considering that the convention came into force in 1994 and that the following deadlines have to be observed accordingly:

- Year 2000, the deadline for defining the limits of the EEZ; and
- Year 2004, the deadline for defining the limits of the Legal Continental Shelf (LCS).

Concerning the application of the FAO Code of Conduct for Responsible Fisheries, Tanzania should endeavour to implement the following management measures:

- Conserve biodiversity of aquatic habitats and ecosystems, particularly Lakes Victoria, Tanganyika and Nyasa (Elsewhere known as Niassa and Malawi). The issue of O.M which is known to replace other indigenous tilapiines in a number of water bodies ;
- Protect endangered species like haplochromines and tilapias as well as Labeo) in Lakes Victoria, Tanganyika and Nyassa;
- Control pollution of inland water bodies and the sea;
- Control waste dumps from urban centers;
- Assess adverse environmental inputs affecting fisheries around the country; and
- Control the Nile tilapia (*O. niloticus*) which out competes other tilapias whenever it is introduced ;

- Monitor and control the introduction of exotic fish species and plants.

In the case of marine fisheries, Tanzania should implement the Agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas.

Regarding Agenda 21 adopted by the United National Conference on Environment and Development, as well as the Declaration of Cancun adopted by the International Conference on Responsible Fisheries, Tanzania should take appropriate action in these respects.

Specific Recommendation on Funding Activities in the Fisheries Sector

Among the national food production sectors, it is the fisheries sector and particularly the Fisheries Department which is least funded from external sources. For the fiscal year 1999/2000, the Fisheries Department obtained about 1 million US dollars from the World Bank for the Lake Victoria Environmental Management Programme on Lake Victoria. Additional, NORAD provided about 375 000 US dollars for Mafia Island Marine Park. This magnitude of funding is not commensurate to the contribution for fisheries to the national economy.

It is recommended that the funding of the Fisheries Sector be encouraged and strengthened.

Recommendations on Education and Training in Fisheries

Training in fisheries in Tanzania have been undertaken by utilizing the Government owned Kunduchi and Nyegezi Fisheries Institutes which provide training at diploma and Certificate levels respectively. Graduates from these institutions form the bulk of field staff in national and regional fisheries establishment. These graduates are responsible for:

- (a) Management and administration of fisheries at regional and district levels;
- (b) Extension service support at district, regional and national levels; and
- (c) Technical support in fisheries research, training as well as artisanal commercial fishing.

Concerning the vital role of extension services and the required human resources, government should strengthen Kunduchi and Nyegezi institutes and also the Mbecani Centre. It is noted that the student intake is low and reduce duplication of cost and courses, it might be useful to re-structure the institutes by combining some of them. There are three options to reduce the cost of training and education in fisheries :

- (i) Combine Nyegezi with Kunduchi into one institute which should be sufficiently equipped to deliver the services;

- (ii) The alternative would be to attach the Kunduchi Institute to the University of Dar-es-Salaam and leave Nyegezi and Mbegani as separate institutes; and
- (iii) The third option is to combine Mbegani and Kunduchi and leave the Nyegezi Institute to stand on its own.

The team noted that there was a report on the possibility of combining Kunduchi and Mbegani and this was awaiting funding. It is therefore recommended to opt for third option 'combine Mbegani and Kunduchi'.

Concerning education and training, it is recommended that government focuses attention on the following activities:

- Develop national training programme and implement it based on assessed needs to meet the human resources requirements of the fisheries sector;
- Develop curricula in national fisheries training and educational institutions on the basis of assessed fisheries training needs.
- Assess regularly the fisheries sector training needs according to specific requirements for human resources with specific reference to fisheries development programmes;
- Strengthen the human resources capacity and infrastructure in the national fisheries training and research institutions;
- Collaborate with the private sector and donors in the development of a sustainable funding mechanisms for the institutes and enrolled students; and
- Develop relevant vocational training programmes for artisanal fishers and traders.

ANNEX 1: LIST OF PERSONS MET

Hon. Zakia M. Meghji	Minister	Ministry of Natural Resources & Tourism, Dar-es-Salaam
Mr. P.L. Luhanjo	Permanent Secretary	Ministry of Natural Resources & Tourism, Tanzania
Mr. T.W. Maomboc	Director	Fisheries Division, Dar-es-Salaam
Mr. R.R. Mepunda	Assistant Director	Fisheries Development & Planning, Dar-es-Salaam
Mr. W.V. Haulc	Assistant Director	Research, Training & Statistics, Dar-es-Salaam
Mr. S.P.N. Kimaro	Assistant Director	Surveillance Control, Dar-es-Salaam
Mr. G.F. Nanyara	Assistant Director	Quality Assurance, Dar-es-Salaam
Ms. P. Lyimo	Senior Fisheries Officer	Statistics, Dar-es-Salaam
Mr. K. Shindika	Assistant Fisheries Officer	Statistics, Dar-es-Salaam
Ms. V.E. Mushi	Senior Fisheries Officer	Aquaculture, Dar-es-Salaam
Mr. N.J. Jihulya	Fisheries Officer	Planning, Dar-es-Salaam
Mr. E. Katunzi	Centre Director	TAFIRI, Mwanza
Mr. G.C. Mahika	Aquaculture Unit	TAFIRI, Mwanza
Mr. C.N. Ezekiel	LVFRP (Limnology)	TAFIRI, Mwanza
Mr. U. Wabeya	Fisheries Technician	TAFIRI, Mwanza
Ms. Elizabeth Mchagwa	Socio-Economist	LVFRP, TAFIRI, Mwanza
Mr. E. Mlaponi	LVEMP Aquaculture	TAFIRI, Mwanza
Mr. Y.L. Budeba	LVEMP (Limnology/Ecosystem)	TAFIRI, Mwanza
Mr. M.J. Musiba	LVEMP (Fish Biology)	TAFIRI, Mwanza
Mr. M. Medani	Socio-Economist	TAFIRI, Mwanza
Mr. M.B.K. Kajelelo	Administrative Officer	TAFIRI, Dar-es-Salaam
Professor P.J. Dwachondi	Director-General	TAFIRI, Dar-es-Salaam
Mr. J.S. Uronu	Senior Assistant Fisheries Officer	Legislation, Dar-es-Salaam
Mr. Deonatus Chitamwebwa	Agriculture Centre Director	Kigoma
Mr. J. Obeto	Musoma Fish Processors	(MFP) Musoma
Ms. A.R. Kitima	Fish Processing	(AFSO IV), Musoma
Mr. A.M. Said	Fish Processing	(AFSO IV), Musoma
Mr. E.S. Kijoga	Regional Fisheries Officer	Musoma
Mr. Z.G. Kazulu	AFSO II	Musoma
Mr. J.G. Kizimba	AFSO III	Musoma
Mr. A. Makaja	District Fisheries Officer	Musoma
Mr. M.V.L. Mlay	Centre Director Kyela	Kyela
Mr. H. Bhagat	Vlefish Ltd	Dar-es-Salaam
Mr. Alex Jose	Tanganyika Fish Processor Ltd	Mwanza
Mr. C. Kondonessons	Tanperch Ltd	Mwanza
Mr. Jacob Matseli	Vlefish Ltd	Mwanza
Mr. Grewal Dceah	Omega Fish	Mwanza
Mr. Amin Hassanali	Omega Fish Ltd	Mwanza

ANNEX 2

Table 1. SUMMARY OF FISHERY STATISTICS FOR MARINE WATERS OF TANZANIA 1984 - 1996

Years	No. of Vessels	No. of Fishers	GEARS							
			Sh'nets	Traps	Fixed Traps	Beach Seine	Hooks	Ignet	C/nets	S
1984	3556	13,783	2,342	6,418	482	371	6,757	0	408	
1985	3045	11,392	3,083	159	6,418	1,288	12,357	0	622	
1986	3690	12,619	3,590	9,159	3,159	1,003	13,478	0	216	
1987	3595	12,739	3,193	7,888	3,052	1,087	10,708	0	516	
1988	4390	13,855	3,751	6,351	178	832	7,088	56	683	
1989	4399	15,491	3,649	2,058	233	688	5,786	50	646	
1990	4354	18,178	2,856	5,813	167	1,189	7,063	96	374	
1991	4402	16,361	2,530	4,736	234	665	6,721	104	398	
1992	3514	15,027	3,427	5,183	34	537	5,672	92	124	
1993	3232	15,027	3,427	5,593	34	537	5,672	92	124	
1994	3232	15,027	3,427	5,593	34	537	5,672	92	124	
1995	3768	13,822	3,367	3,390	25	350	7,839	221	49	
1996	3768	13,822	3,357	3,390	25	350	7,839	221	49	

Table 2. SUMMARY OF FISHERY STATISTICS FOR TANZANIAN WATERS OF L

Items	1988	1987	1986	1989	1990	1991	1992
No. Of Fisherman	24,241	22,207	22,928	29,816	26,086	25,900	20,084
No of Fishing Vessels	7,404	6,667	6,546	7,797	5,948	6,041	4,187
Catch in Metric tons	217,162.4	158,815.2	218,442.8	205,475.7	231,547.3	146,310.9	132,171.3
Value in 000's TSHS	3,628,165.2	3,117,913.8	5,000,693.2	6,468,255.6	8,101,582.0	8,221,807.3	12,443,988.7
GEARS BY TYPE AND SIZE:							
GILLNET 7/8"			481	105	105	105	
GILLNET 1"			6	19	19	19	
GILLNET 1 1/2"	516	683	4	231	231	231	
GILLNET 1 7/8"	2,696	10	533	1,782	1,693	1,683	
GILLNET 2"	13,961	2,887	1,008	1,295	1,447	1,447	1,447
GILLNET 2 1/4"		4,182	1,886	392	392	392	392
GILLNET 2 1/2"	7,209	4,991	1,270	1,563	1,553	1,553	1,553
GILLNET 3"	31,056	3,870	1,315	1,949	1,949	1,949	1,949
GILLNET 3 1/2"	11,218	3,587	1,800	2,071	1,718	1,718	
GILLNET 4"	14,482	6,599	4,059	5,021	6,021	5,021	6,021
GILLNET 4 1/2"	15,215	8,028	5,577	7,353	7,353	7,353	7,353
GILLNET 5"	11,030	6,023	4,059	12,915	12,915	12,915	12,915
GILLNET 5 1/2"	245	208	769	335	335	335	335
GILLNET 6"	10,867	8,290	8,683	8,978	8,978	8,978	8,978
GILLNET 6 1/2"							
GILLNET 7"	9,285	10,639	22,261	33,791	33,791	33,791	33,791
GILLNET 8"	16,014	9,919	5,326	10,278	10,278	10,278	10,278
GILLNET 9"	2,612	3,863	3,000	5,180	5,180	5,180	5,180
GILLNET 10"	6,873	4,586	404	2,776	2,776	2,776	2,776
GILLNET 11"							
GILLNET 12"	139	2	76	2	2	2	2
TOTAL GILLNETS	153,218	78,323	62,676	98,004	98,004	98,004	98,004
TOTAL BEACH SEINES	1,484	523	558	658	573	573	573
TOTAL DAGAA SEINES		923	837	1,052	1,140	1,140	1,140
TOTAL LIFT NETS				24	27	27	27
TOTAL HOOKS	350,850	492,128	390,938	621,950	369,444	369,444	369,444
TOTAL MOSQUITO NETS							
TOTAL SCOOP NETS	1,858	1,558	1,420	1,928	1,408	1,408	1,408
TOTAL TRAPS							
TRAWLERS	18	22	17	17	12	12	13
ENGINES:							
INBOARD ENGINES	148	146	130	154	111	111	111
CUTBOARD ENGINES	45	28	28	32	33	33	33

Table 3. SUMMARY OF FISHERY STATISTICS FOR LAKE TANGAN

Years	No. of Vessels	No. of Fishers	GEARS							
			L/Nets	Apollo L/net	Dagaa Seine	Beach Seine	Hooks	S/nets	P/Seine	G
1984	7,721	13,886	360	0	0	534	15,006	3,851	3	4
1985	5,979	13,626	451	0	0	493	6,919	2,974	6	10
1986	4,537	13,837	1,203	0	0	627	3,297	2,312	7	1
1987	3,820	13,528	640	0	0	550	16,156	1,655	7	1
1988	4,301	16,666	634	0	0	552	9,184	2,519	5	1
1989	3,747	15,400	612	0	0	391	30,022	1,183	3	1
1990	4,495	15,799	673	0	0	407	23,889	1,267	4	1
1991	3,292	13,651	993	0	0	259	25,652	1,019	3	1
1992	2,176	8,784	691	0	0	618	605	257	1	1
1993	2,937	9,190	916	0	39	363	2,178	307	1	1
1994	2,937	9,190	918	0	39	303	2,178	307	1	1
1995	3,494	12,510	1,088	0	39	496	6,747	271	1	1
1996	3,494	12,510	1,088	0	39	496	6,747	271	1	1

Table 4. SUMMARY OF FISHERIES STATISTICS FOR THE TANZANIAN WATERS

Items	1986	1987	1988	1989	1990	1991	1992
No. Of Fishermen	5,226	6,341	5,393	5,455	7,4235	6,255	7,818
No of Fishing Vessels	2,445	2,648	2,463	2,418	2,641	2,052	2,889
Catch in Metric tons	35,937.00	30,008.60	39,282.90	34,525.80	20,741.50	28,078.50	44,907.90
Value in 000's TSHS	578,718.40	34,154.90	115,044.70	1,628,328.00	1,439,344.80	1,011,888.00	3,211,569.80
GEARS BY TYPE AND SIZE:							
GILLNET 1"					11	11	571
GILLNET 1 1/2"	358	449	659	659	188	168	1,362
GILLNET 1 7/8"		305	157	157	172	172	
GILLNET 2"	619		620	1,275	18,088	18,398	1,001
GILLNET 2 1/4"	3,868	81	631	1,591	581	581	879
GILLNET 2 1/2"	3,585	1,446	2,063	2,663	26,470	26,470	3,439
GILLNET 3"	2,374	1,553	1,290	1,343	18,001	18,001	1,388
GILLNET 3 1/2"	392	500	455	517	13,150	13,150	318
GILLNET 4"	582	451	560	680	12,055	12,055	549
GILLNET 4 1/2"	439	340	472	368	5,305	5,305	309
GILLNET 5"	231	275	414	345	889	889	570
GILLNET 5 1/2"		96	39	39	8	8	3
GILLNET 6"	74	106	208	225	29	29	612
GILLNET 6 1/2"		23					
GILLNET 7"	32	7	8		23	23	107
TOTAL GILLNETS	12,414	5,641	7,680	9,865	94,940	94,940	11,108
TOTAL BEACH SEINES	284	102	179	159	162	162	10
TOTAL DAGAA SEINES	889	76	282	561	491	491	
PURSE SEINES	300	484	665	427	481	481	428
TOTAL HOOKS	39,824	51,189	44,281	44,382	79,535	79,535	51,095
TOTAL SCOOP NETS	89	398	228	229	1,822	1,822	
TOTAL TRAPS	189	58					9
ENGINES							
INBOARD ENGINES	12		15	9	9	16	11
OUTBOARD ENGINES	4		2	1	1	2	1

Table 5. CATCH STATISTICS FROM MINOR FRESH WATER BODIES FISHERIES OF TA

WATER BODY	YEARS						
	1985	1986	1987	1988	1989	1990	1991
Rubewa Dam	4036.8	5989.7	8119.9	5838.8	8940.0	10390	9358.3
Daya Menga Dam	2396.0	3253.4	3361.3	3793.5	4605.9	3761.4	5024.8
River	1765.1	-	-	6093.5	3424.0	4376.5	3667.5
Mboko Dam	2016.0	905.1	112.0	1737.0	516.2	783.7	1941.5
Swamp	282.6	450.3	380.7	654.9	531.1	434.5	440.8
Saki dam	381.4	154.2	886.8	132.8	821.8	1362.2	2683.0
Indwa Dam	11.1	27.0	25.3	63.7	47.6	298.1	79.9
Lee Manyara	7.3	23.1	24.5	24.6	116.2	-	-
Babat	-	1.8	25.1	-	5.4	40.0	-
Besuto Flow	93.4	83.5	920.6	4237.3	1050	1243.0	1.6
K'itangiri	92.3	19.1	84.3	45.6	45.0	81.0	10.4
Singida	5.7	1.1	7.8	12.2	14.4	21.5	-
Kindal	1581.7	1765.1	1762.2	800.2	901.0	-	-
Goni Dam	31.0	12.6	-	7.2	-	-	132.1
Kanyl Dam	11.4	-	14.1	57.0	32.6	32.6	-
Liloumagwa	22.3	8.4	1.3	1.7	3.8	1.6	4.9
Tamboloko dam	87.5	68.4	9.7	83.3	29.6	26.5	29.5
Dam	-	331.3	348.3	348.3	857.3	458.3	458.3
Gomhe	-	-	-	-	64.0	69.6	43.1
Igala River	32.8	41.6	41.6	41.6	93.6	20.2	20.2
Maboha	0.1	71.4	71.4	71.4	16.5	16.8	16.5
Shella	715.2	155.2	155.2	84.4	19.3	19.3	19.3
Mwamapuli	60.6	155.2	155.2	155.2	62.8	62.8	62.8
Nhumbu Dam	27.9	1.68	1.9	1.9	-	-	-
Ningwa Dam	22.0	4.7	13.5	1.4	1.4	1.4	1.4
New Dam	0.7	0.2	0.6	0.4	0.4	1.3	1.3
Ustulize Dam	0.9	4.8	0.7	8.5	-	24.7	24.7
Morogoroglan	-	2.2	6.8	3.3	3.3	-	-
	21.7	550.2	684.7	2724.8	2164	2726.3	2683