

**ECOLOGY AND BY-CATCHES OF TUNA WITH RESPECT TO THE  
CONSERVATION AND MANAGEMENT MEASURES TAKEN BY  
GOVERNMENT OF PAKISTAN**

By

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**INTRODUCION**

**The Importance of Fisheries at National Level**

The importance of fisheries to an individual economy can be considered from many points of view, for example its contribution to Gross Domestic Product (GDP), to foreign exchange earnings, to domestic nutrition needs, to domestic employment and their contribution to employment and output in other industries, all are known as the linkage effect. In Pakistan Marine Fisheries sector is the main component of the fisheries economy contributing about 70 % in terms of landing and more than 90 % in export.

**Role of Fisheries in Pakistan**

In Pakistan the knowledge of the art of fishing is transmitted from father to son generation after generation. Despite a lack of formal fisheries education Pakistani fishermen are skilful and know their trade well. They are good fishermen, as apparent from the fact that their catch rates, using small boats have been at par with fishermen of other countries who use similar boats (FAO, 1977).

**Fishing Sector of Pakistan**

Fisheries sector of the country has developed substantially since creation of Pakistan when almost entire fleet was sail driven and major mode of processing was production of low quality salted dried products for peninsular Indian market. Now the situation seems to have been completely changed as almost entire fleet has been either motorized or mechanized and freezing became the main mode for processing. After the introduction of trawlers a tendency developed in Pakistan to build boats which could be used for trawling and gill-netting (Burney, 1961; FAO, 1977). For instance the Pakistani 'Bedi' boats, which were redesigned, have been considered as excellent modern fishing boats by FAO (1977) and Guckian *et al* (1971).

## **PAKISTAN'S COAST:**

*The Pakistan waters are located at the Northern-most part of the Arabian Sea.* The Pakistan coast line and the extent of the Exclusive Economic Zone are estimated about 1120 km and 250,000 sq. km respectively. The continental shelf area (shallower than 200 m depth) and territorial zones are estimated to about 50,270 sq. km and 20,830 sq. km respectively. The total maritime zone of Pakistan is over 30% of the land area. The western end of the region's boundary is the Gulf of Oman in the south, while the east end is connected to coastal waters along the west coast of India.

For the management of offshore fishing, the EEZ from the coastline has been divided in following zones:

- a) Zone-1 (i.e. from coast line up to 12 nautical miles) reserved for Small-scale Fishing.
- b) Buffer Zone Area between 12 and 20 n. miles is left as buffer zone and reserve for fishing through medium sized vessels.
- b) Zone-III (i.e. beyond 20 nautical miles to 200 nautical miles) for Industrial Fishing.

## **TUNA STOCK ASSESSMENT:**

*Tuna is migratory in behavior and their migration associated to intrinsic and extrinsic factors. Among the several factors influencing tuna distribution, temperature is considered to be primary determinants.*

All species of tuna and billfishes are migratory and their migration can probably be simplified into a strategy for placing the adults during the reproductive periods in water masses most favorable for larval growth and survival and for placing the juveniles and non-reproductive adults in water masses containing a high availability of suitable prey. Food items are usually nekton, in case of tuna, while adult billfishes takes both nekton and medium sized pelagic fishes.

Tunas have very distinct behavior patterns and are known to congregate in areas where favorable ecological and environmental conditions prevail. These complex and dynamic forces of environment have a profound influence on the movement of tuna shoals, in vertical and horizontal planes, and their seasonal fluctuations and catchability. Within the general area of distribution, each of these species is specialized:

- Yellowfin is the tropical tuna and its pole ward distribution is bounded by 18-21°C isotherms. It inhabits the tropical mixed layer above the thermocline, but is capable of penetrating down into the cooler waters.

- Skipjack have a very similar distribution but have greater temperature tolerance. Occurring in water as cool as 16°C and not seeming to avoid the warmest pools of surface water.
- Bigeye tuna have a very similar geographic distribution to yellowfin.
- Albacore (*Thunus alalunga*) are sub-tropical fish with a temperature tolerance of 14-23°C. They occur at approximately the same depth as big eye. Apparently they preferred temperature occurs in the eastern parts of tropical oceans over too narrow a depth range for them to occupy it successfully.
- Longtail tuna (*Thunus tonggol*) and Kawakawa (*Euthynus affinis*) are abundant in the western Indo-Pacific.
- Swordfish (*Xiphias gladius*), sailfish (*Istiophorus platypterus*) and blue marlin (*Makaira nigrican*) are, like yellowfin and skipjack, cosmopolitan tropical surface water species.

Tuna schools are believed to associate themselves with dolphins for protection against sharks, which are tuna predators. Tuna by-catch includes sharks, turtle and other oceanic fish.

### **MANAGEMENT PROCEDURES:**

*The purpose of management is to control the fishery in a good manner resultant to yield net benefits for the community, which is in harmony with national goals.*

### **Monitoring, Control and Surveillance (MCS) Arrangments**

Under the Exclusive Fishing Zone (Regulation of Fishing) Act, 1975, fishing in the Exclusive Economic Zone is managed. For the implementation of these regulations the Governments have taken adequate measures. A full-fledged organization, Maritime Security Agency (MSA), under the Ministry of Defense has been established to ensure that no infringement is made in Exclusive Economic Zone. Such as control on operation of licensed vessels, poaching by licensed vessels in restricted zone and other provisions of federal fisheries laws.

## **Outside EEZ and High Seas Area**

There is a need for an agreement for conservation and management programme of these fish stock because of migratory behavior, between the regional countries such as Yemen, Oman, Iran, Pakistan, India and the Maldives.

## **Stock Management**

Presently limited work on the aspects related to management of stocks is being taken in Pakistan. Marine Fisheries Department has established a tuna landings monitoring programme initially with the assistance of Indo-Pacific Tuna Programme (IPTP) and later on carried out with own resources. Government of Pakistan is considering to modifying local gill-netters to tuna long liners to fetch better markets.

## **Inspection and control Scheme**

A system of inspection of catch upon arrival of vessels from fishing ground to Karachi port has been in place whereby catch composition and quality reported are verified before vessels is allowed to offload the catch.

## **Identical Catch**

Observers programme in place in Pakistan is specially directed to collect information about incidental catches. Data of non-target species is collected and analyzed by Marine Fisheries Department on regular basis. Pakistan considers that IOTC is a nascent organization and need support of other international agencies and RFMO as well as member states to proper organize and play effect role in management of tuna resources in its jurisdiction.

## **TO BE ENVIRONMENTAL FRIENDLY:**

*Impacts of fisheries on ecosystems are sometimes difficult to separate from environmental effects.* They are widespread and include direct impacts of over-fishing, modifying community species composition and genetic diversity through selective targeting on species and particular size classes; impacts on non-target species through low selectivity of certain gears; incidental mortality from lost or abandoned gear, direct impact on the sea bed through e.g. trawls and dredges; and destructive illegal "fishing gear" such as dynamite and poisoning. Discarding of unwanted fish represents wastage of potentially valuable resources.

Progress has been made in addressing some of these, for example through development of more selective gear and more effective zoning practices including the use of marine protected areas. However, the net effect is still frequently inadequate, and upset by problems such as open access and excess fishing capacity.

## **STEPS TAKEN BY GOVERNMENT FOR MANAGEMENT AND CONSERVATION OF TUNA FISHERIES**

### **Improvement of Fishing Boats.**

- For quick transfer of fish, the modern fish-handling and preservation technology on-board the fishing boats and to reduce post harvest losses, marine fisheries department (MFD) M/o L&DD has up-graded 04 local fishing boats, under boats modification scheme, for presentation to the fishermen as modular boats.
- Accordingly, Government of Sindh, has approved a project through which two hundred (200) local fishing boats are being modified on the basis of 75% by them and 25% of the total cost by the boat owners. Under the scheme, one hundred and nine (109) boats have already been modified.
- The Government of Sindh, under their above approved project, will also provide twenty seven (27) flake ice plants, free of cost, to the boat owners for onboard operation to preserve their catchess.
- In order to assist small-scale coastal fishermen having small fishing boats without fish holds, approximately, two hundred (200) insulated plastic containers (IPCs) and one hundred & fifty (150) plastic crates / baskets have been distributed to them by Government of Sindh on recommendation of Federal Government.

## A FEW YEARS BEFORE SITUATION OF HARBOUR



### Improvements of Fish Landing / Auction Sites.

- -I and K-II auction halls have been renovated at Karachi Fisheries Harbour and equipped with electronic weighing machines, stainless steel trolleys, stainless steel auction tables and pallets.

## IMPROVED HARBOUR AFTER THE EFFORTS OF GOVT.



### **Capacity Building and Training.**

- Fifteen hundred (1500) fishermen have been trained by the MFD under United Nation Development Organization (UNIDO) on fish handling and preservation of fish catch. Besides eight hundred (800) Officers / Officials of Korangi fisheries Harbour authority (KFHA), Fishermen's Cooperative Society Ltd (FCS) and responsible staff from fish processing plants have been trained on traceability and Hazard Analysis Critical Control Point (HACCP) by MFD in collaboration with UNIDO.

### **Modernization of Laboratories Infrastructure.**

- Two (02) state-of-the-art laboratories namely Microbiology and Chemical of MFD had achieved International accreditation by Norwegian accreditation (NA) body in January, 2007 and April 2008 respectively under ISO/IEC-17025. However, the same could not be continued due to non payment of accreditation fee / charges by UNIDO. The steps are being undertaken to invite accreditation body for assessment.
- Two (02) other Laboratories namely Hydrology and Biochemical are under initial process of preparation for international Accreditation.

## **Stock Assessment Survey in Exclusive Economic Zone (EEZ) of Pakistan**

The last stock assessment survey in Pakistan was carried out in 1986. Fisheries management in Pakistan needs significant renovation and support. Essential is up-to-date knowledge of the fishery sector, the state of the stock at sea (from the coastal area to offshore deep waters), and the fisheries' social and economic dynamics. To address the information gaps, the Marine Fisheries Department (MFD), GoP is conducting a major project titled "Stock Assessment Survey Programme in EEZ OF Pakistan through Chartering of Fisheries Research Vessel and Capacity Building of Marine Fisheries Department". The aims of the survey are as under:

- Obtain acoustic biomass estimates for the major small pelagic and meso-pelagic fisheries resource species.
- Obtain swept-area biomass estimates for continental shelf demersal fisheries resource species
- Obtain oceanographic observations of the marine environment as related to the fisheries resources
- Obtain exploratory fishing information on the demersal fisheries resources in deep sea areas such as the Murray Ridge and deep continental slope

## **GOVERNMENT POLICY FOR FURTHER ENHANCEMENT OF THE CONSERVATION AND MANAGMENT OF TUNA FISHERIES RESOURCES**

The Government of Pakistan has keen interest in the conservation and management of Tuna Fisheries Resources and has launched a very comprehensive Deep Sea Fishing policy. The Government activities related to tuna fishing are guided by the "Deep Sea Fishing Policy 1995 as Amended in 2001 and 2009". The policy is aimed to develop a fleet of vessels to exploit the fishery resources of the under-exploited area between 20 to 200 nautical miles. The salient features of the Deep Sea Fishing Policy of Pakistan are as under;

- At the time of issuance of fishing license an undertaking will be obtained from the firm that no discard of fish bi-catch will be done under any circumstances, failing which the license will be immediately cancelled and renewal put on hold for three years.



- All Deep Sea Vessels will install Vessels Monitoring System (VMS) and installation of vessel-based VMS unit onboard will be monitored by Maritime Security Agency (MSA), Ministry of Defence, Government of Pakistan.
- The performance and conduct of Licensees / Vessels will be monitored on a quarterly basis by Maritime Security Agency (MSA), Ministry of Defence and Marine Fisheries Department (MFD) Ministry of Livestock and Dairy Development, Government of Pakistan. A comprehensive review will be held after one year.
- Scientists / observers / officers of Govt. will be posted by Marine Fisheries Department (MFD) Ministry of Livestock and Dairy Development, Government of Pakistan on selected vessels as and when required for collection of fisheries data.
- The Licensee will ensure compliance with the all national and international / treaties / obligations regarding the responsible fishing which are rectified by the Government of Pakistan.

## **CONCLUSION:**

*Offshore fishing is a source of ponder since its beginning in Pakistan. Contract/ foreign vessels fishing have created troubles for local inshore fishermen. The utilization of untapped fish stocks would require research and assessment, as well as the introduction of suitable fishing technology. There is a need for Pakistan to improve its strategy and policy concerning fishery management and development.*

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