

Research Article

A Study on the Assessment of Fisheries Resources in Pakistan and its Potential to Support Marine Economy

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In this study an effort has been made to assess fisheries resources of Pakistan and determine its economic value. The survival of the fisheries industry of Pakistan lies between the modification and thinking of the people associated with this industry. With adequate production and maximum utilization of fishery resources, Pakistan could be able to achieve a remarkable position in the national and international seafood market which in turns stimulates the nation's economy.

[**Keywords:** Intertidal fauna, Marine resources, Seafood exports, demersal fish, Fish stock, estuarine delta]

Introduction

Pakistan is rich in fishery resources which comprised of coastal and offshore fisheries and has potential for industrial fisheries as well. Pakistan off shore waters of EEZ (exclusive economic zone) has rich fauna of commercially important tuna species.¹ Intertidal fauna of Pakistan's coast is composed of diverse group of species namely gastropod, mollusk, decapods and crustaceans.^{2,3}

On the west bay of Gwadar 16 species of commercially important bivalve mollusks have been identified⁴. There was a record of 400 marine fishes and rich fauna of shrimp identified in the coastal waters of Pakistan.⁵

In Pakistan very limited research has been conducted on Marine Resources in order to improve and develop fisheries management awareness of the fish stocks and biology of species is very important.⁶

There are many fish fleets engaged in fishing along coast of Pakistan. Some fishermen hired a rent boat for a day or more in Karachi and other

private boats, jetties and piers are also very famous.

Pakistan's fishery is supported by coastal and marine areas with rich resources of large pelagic species, tuna, mackerel, sharks etc. In the creek area of Indus river commercially important species such as *Mugil cephalus* (mullet), *Sillago bassensis* (silver whiting) and other small sized demersal fishes, especially juveniles of estuarine fishes are harvested.⁷

Mangrove forest support fishery resources and it is considered as nursery of marine fauna. One hectare of mangrove harvest could increase national economy of developing countries by foreign earnings of USD 33-57 thousand per year.⁸

In 1997 estimated 83000 million tons of fish and fishery products valued 7.27 US billion were exported from Pakistan. Main export products were fish; shrimps and fish products earned 6% of total foreign exchange. In the year 2003-2004 Pakistan GDP of fishing industry was 0.9%.⁹ About 400 000 fishermen are

engaged in fishing and their families are dependent on fishery resources.^{9,10}

Fish catches in coastal areas and EEZ increased in 1993-2003 (Sindh and Baluchistan) due to entrance of foreign trawlers. These foreign trawlers have changed zoning policy and improved fish catch. Fish catches were declined again in 2010 by 29% as a result of more vessels into Pakistani coastal zones.¹¹

In 2008 shell fish production have decreased from 47,500- 28,166 tons due to improper fishery management in Pakistan and because of population load. Modern gears also effected fishery sector and have demolished aquatic ecosystem. The main reason of unsustainable fishery production is lack of advance technology and sea food insecurity.¹²

In Pakistan more than 500 species of fish belongs to *Clupea harengus* (Sardine), *Carcharhinus amblyrhynchos* (Shark), *Tenualosa ilisha* (hilsa), *Thunnus albacores* (mackerel), *Peprilus paru* (butter fish), *Brama brama* (pomfret), *Pegusa lascaris* (sole), *Calamus bajonado* (seabream), *Thunnus thynnus* (tuna), *Epinephelus itajara* (jew fish), *Siluriformes* (cat fish), *Anguilla rostrata* (eel fish), shrimps, crabs and lobsters are recorded. If Government applied good polices to utilize these naturals gifts Pakistan could earn high margin in international Trade market. Only 100 species are exported to foreign countries which in turn gives total trade of foreign exchange to Pakistan.

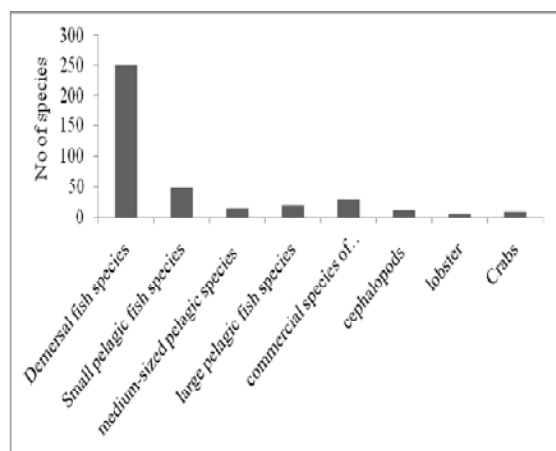


Figure---- 1 Source: FAO Commercial important fishery resources in Pakistan. Pakistan is enriched with variety of fish species. Demersal fish species are found in greater proportion. This survey has been conducted by FAO in 2010.

Baluchistan has established fishing industry extensively; most of the fish catch either exports or supplies to Karachi. Out of total catch 80% exported annually and only 20% consumes within Pakistan. In Punjab, Khyber Pakhtunkhwa and in northern areas fish catch is limited to inland water and from fish farms, but fish farms lack advance technology which is a main problem in order to sustain fish production. Karachi fish Harbour serves as main port to handle fish catches and Sea food exports in Pakistan. Approximately 95% of fish and Sea food exports from Korangi fish Harbour.¹³

New culture techniques are being introduced in some regions of Pakistan to increase production of economical valued species. NWFP, AJK (Azad Jammu Kashmir and Northern areas mostly engage in culturing *Salmo trutta* and Rainbow trout (*Oncorhynchus mykiss*). In older times fish farms were stocked only with local species such as Catla (*Catla catla*) but now a day's commercially important species i.e, Grass carp (*Ctenopharyngodon idellus*) and Silver carp (*Hypophthalmichthys molitrix*) have been culturing under advance techniques.¹⁴

Total marine fish production was slightly higher in 2004-2005 approximately 403,500 metric tons than marine fish production in 2003-2004 i.e, 400500 metric tons.¹⁵ Economic performance of Pakistan was accelerating in terms of quantity and value in 2008-2009. China and Pakistan have made wide ranging of economic pathways which will open doors of connectivity between South Asia and East Asia.¹⁶

Neritic tuna catch was visibly increased during past 10 years mainly due to amendment of new fisheries policies. In coastal areas contribution of neritic tuna during 2005-2012 was more than 90%. This major increase in fish catch was due to restriction of tuna gill nets to the coastal areas of Pakistan. Other species productions can me increased by applying same strategies.¹⁷

In 2013-2014 Pakistan has earned valuable foreign exchange which build job market of 1% GDP with exports of 367 million USD in value. The average annual catch is almost 600,000 metric tons of more than 200 commercially important fish and shellfish

species, found in and around the Karachi Harbour. More than 200 commercially important species of fish and shellfish are found along Karachi coast (Karachi Harbour) which yield 600,000 fish catch annually. Primary exporters of Pakistan are China, the United Arab Emirates (UAE), Thailand, Saudi Arabia, Malaysia, Indonesia and Korea.¹⁸

Food chain is highly contaminated by environmental toxins and parasites. Fish has great importance in the large part of the world in some regions fishery sector is responsible for expanding, establishing and promoting nation economy. Karachi and Baluchistan are major source of nation earning and employment by supplying fish catch in larger portion of total catch percentage. Karachi Coast (Sindh) is the main port for fish supply but the cost is far above the ground for common people therefore it is considered as protein deficient country of the world.

The objective of this paper was to introduce main fishery resources of Pakistan, ways to stabilize fishery sector by applying sustainable management through increased local capacity to enforce rules, and to advocate for change in national policy, practice and service provision.

Material and Methods

An extensive literature review related with Fishery resources and their effects on Pakistan's economy was used to achieve the aim of this paper. Although Pakistani fishery sector have poor record of fish catch and fish production but authors tried to describe natural resource potential of Pakistan due to fisheries. Some survey references have given in this research article to explain how Pakistan fishery department is managing landing of commercially important species shrimp and tuna. Most of the data needed for this research paper was obtained from the Marine centre (National institute of Oceanography NIO) located at Karachi and some various linked publications. Figures, graphs and material about fishery resources of Pakistan and their economical value originated from Government department (Sindh Bureau of statistics planning and development) located in Sindh, research institute, published articles and daily news

papers. Sources used for this study were FAO Fishery and Aquaculture statistics. Marine Fisheries Department (MFD) Government of Pakistan, WWF (World wide Fund for nature), UN ESCAP (The United Nations Economic and Social Commission for Asia and the Pacific), IUCN (International Union for Conservation of Nature).

Results

For sustainable development of any country fishery sector plays very important role. Pakistan has considerable exports earnings due to fishery resources. In 2003-2004 total Marine fish production was 400702. Total export of fishery products in value 2003-2004 was 156254 million USD. A number of substantial workers from India, Pakistan and Bangladeshi engaged in fish and fish products exports to Middle Eastern Countries.

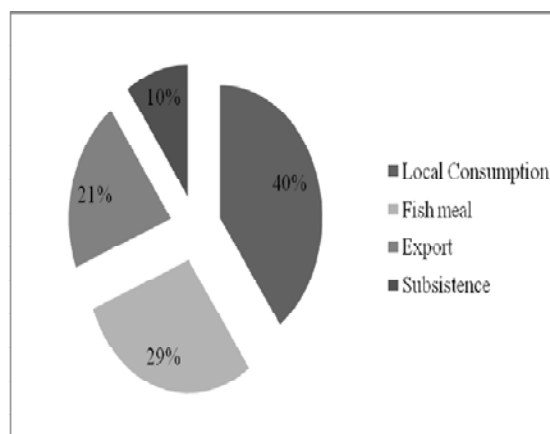


Figure--- 2 Disposition of fish production in Pakistan as local consumption 40%, fish meal 29%, fish exports 21% and subsistence 10%. Source: www.infish.org 2012

Marine Resources

Pakistan is full of fishery resources and has potential to generate 1 million tones/year Marine fish production. More than 250 commercially important demersal fish species, 50 small pelagic fish species, 15 medium sized pelagic species 20 large pelagic fish species, 15 species of shrimp, 12 species of cephalopods and 5 species of lobster found along the coast of Pakistan. Marine fisheries account 59% of total fish catch in Pakistan. Fish catch is being carried out at two main destinations i.e. Sindh coast and Baluchistan coast.¹⁹

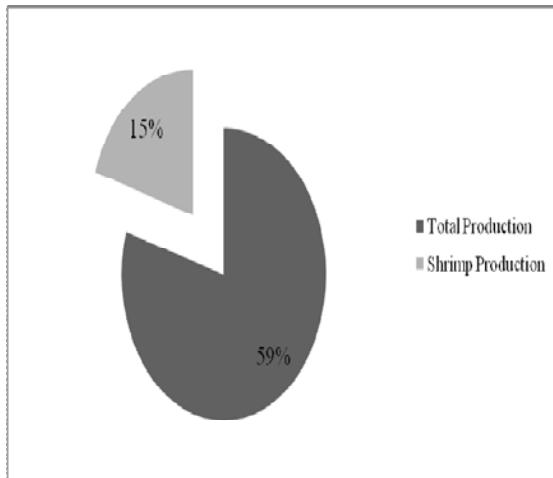


Figure--- 3 Marine fishery production in Pakistan expressed in percentage (Source: WWF Pakistan)

Estuarine delta of the river Indus in Pakistan is rich with fin-fish, shrimp and other marine life. Catla, Rohu, Mrigal, grass carp and silver carp are main species of warm waters. Pakistan is an agricultural country and fisheries plays significant role in the economy by earning foreign exchange. Fishery industry supports and secures food of the country by reducing demand of other form of meat. But fishery sector needs more advancement and improvement.

During the months of July-February 2012-2013 total fish and fish products were 199.949 million USD which is higher than year 2011-2012 195.119 million USD. In the year 2012-2013 total Marine production was estimated 467,000 tonnes. To improve fisheries sector and its production Government is enforcing polices and a number of initiatives are being considered by federal and provincial fisheries departments. Pakistan's fishery sector required potential of extension services, launching of new technologies, maintenance of value added fish products, increase demand of fish consumption and upgrade socio-economic condition of fishermen.²⁰

The WWF-Pakistan in partnership with SFI (Smart Fishing Initiatives) has processed one more project for protection of fisheries resources and their main aim was to reduced fish by catch. WWF-Pakistan has conducted and observed data regarding by-catch of tuna in offshore areas of Pakistan which are very rich in

marine turtle species.²¹ A system of inspection of catch upon arrival of vessels from fishing ground to Karachi port has been enforced whereby fish catch composition and quality are verified before vessels is allowed to offload the whole catch. Government has released incentives for fishery sector maintenance and improvement of socio-economic condition of fishermen.²²

Demersal Fish

Pakistan has good stock of demersal fish is around 380,700 tonnes with in the EEZ (Exclusive economic Zone) up to depth of 200 meters. The recent year 2013-2014 yield is about 94,000 tonnes.

Shrimp

Shrimp is supposed to be the backbone of Marine fishery of Pakistan which earns about 80% of foreign exchange by exports. According to general trawl surveys estimated Shrimp biomass is 88,000 tonnes. Annual maximum yield of shrimp in Pakistan comprised of 37,000 tonnes which does not consider sustainable.

Small Pelagic Fish

In Pakistan stock data information related with small pelagic fish is limited due to poor fishing potential. But according to past surveys of research vessel it was estimated that annual small pelagic yield was 250,000 tonnes. But this record was not reliable. More information and surveys need to collect data from entire fishing zone.

Large Pelagic Fish

Data required for large pelagic fish is also minimal in Pakistan. But by different authentic sources it is considered that 20,000 tonnes large pelagic fish stock collected annually.

Cephalopods and Other Marine Resources

Pakistan conducted first production record in 1982-83 that was approximately 343,000 tonnes which had increased 419,000 tons in 1986-87 due to improved fishing techniques and adopting of advance storage facilities in fishing boats. On the continental shelf of Pakistan estimated biomass 10,000

Table---1 Marine Fish Production in Pakistan (000 tonnes), Source: Trade Development Authority Pakistan 2012

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
438.4	451	480	400.9	400.5	386.6	349.4	342.6	344.7	338.7	339.9	339.4

tonnes with annual yield of 2,000 tonnes of Squid and cuttlefish are found. Besides these commercial important species significant stocks of crabs, crayfish, lobster, clams and sea urchins were also recorded.

Development of Marine Fishery in Pakistan

Pakistan is facing uncountable problems in fishing industry because of poor management and lack of technical, operational advancement. Along the coast of Pakistan there are many commercial important species of shrimps, crabs, lobster and about 70 species of fish namely Sardina, Hilsa, Shark, Mackerel, Butterfish, Pomfret, Sole, Tuna, Sea Bream, Jew Fish, Cat fish and Eel which could be great source of foreign earning and national economy. In 1999-2002 SMEDA (Small and Medium Enterprises development Authority) worked to upgrade fishing industry of Pakistan through different laws and policies.

SMEDA is providing the necessary services to overcome the weaknesses of the marine fishery industry and contributes the growth and development of marine fishery sector in Pakistan through:²³

- (i) Creation of a favorable and facilitating regulatory framework of marine fisheries
- (ii) By development of advance fish industries
- (iii) and the provision of economical development services in all areas of fishery management.

Some of the important fishery development projects launched by SMEDA are:

- i. Engine modification and boat lending. Gwadar District
- ii. Shrimp farms establishment in Pakistan.
- iii. Establishment of fish processing plant in Gwadar.
- iv. Establishment of export warehouse in (NWFP Azakhel).

v. Opening of model quarry and marble training Institute.

vi. Joint fishery technology transfer arrangements (NWFP)

After this project another plan has been launched by KFHA (Karachi fish Harbour Authority) and FCS (Fishermen Cooperative Society) to maintain seafood hygienic conditions on boats and in fish processing plants. Pakistan can take many advantages by its fishing industry if modern techniques and advancement applied.²⁴

United Nations Development Program, FAO and various mutual sources are paying attention to improve marine fishery sector in Pakistan. In this regard ADB (Asian Development Bank), EC (European Community) have provided 98 million USD loan for rehabilitation of the Karachi fish harbour and improvement of marine and aquaculture sectors. ADB has funded 27 million USD for another project to construct Pasni port at Gwadar. By the mutual collaboration of ADB, EC and government of Pakistan it is somehow possible to utilize marine resources into valuable source of earnings. Overall strategies of these funded projects will help to expand fish catches and fish landings.

Discussions

The first step towards fisheries management of Pakistan has been initiated at Sonmiani by creation of local fisher folk organization named as Mahigeer Ittehad. The main objective of this study was to promote sustainable fisheries in the Miani Hor (Fishing channel). Most of the coastal communities' livelihoods depend on fisheries resources but these worthy resources are now in dreadful conditions by using harmful fishing techniques such as destructive nets which are degrading immature fish catch. Long term use of these illegal over fishing is responsible to decline fish productivity and causing pressure to disturb natural ecosystem.²⁵

Pakistan's fishery sector is being degraded by overfishing, pollution and environmental hazardous (Air pollution, water pollution and radiation). There is a mandatory requirement to rebuild fishing industry and to introduce new techniques. Fisheries plays a significant role in nation economy but by mismanagement of associated fishery department Pakistan is helpless to add value in this sector. Now a day's aquaculture, fishery sub sector has been introduced in Pakistan to fill the gap between supply and demand of fish which might be subsidized field to overcome loss of fishing industry.²⁶

Feb 20, 2014, Fisheries Development Board (FDB) launched a project to improve fisheries and aquaculture which is funded by European Union. In this event experts, government representatives, fish farmers, fishermen, and representative of international development organizations have addressed and discussed major fishery sector problems. On this occasion Seerat Asghar federal secretary, Ministry of Food Security and Research was chief guest of the ceremony appreciated hard work of FDB in development of fishery industry. He was confident that Pakistan's Government is trying to improve fisheries and aquaculture potential and engaged to advance fishery sector through many policies.²⁷

Conclusions

Pakistan's fishery industry is regulated by federal and provincial institutes and by private stakeholders. Fisheries Departments of the Punjab, Sindh, Baluchistan and the NWFP are in charge for licensing and rental public waters. The fisheries department of Punjab also conducts some training programme for fisher folk to extend fish industry services.

Besides these duties Punjab Government initiates fisheries research based on fish stock data collection. Pakistan Government has divided Arabian Sea fishery under the authority of three agencies the Sindh and Baluchistan fisheries departments' maintain the 12-mile territorial water zone; while the federal Marine Fisheries Department is in charge for administering activities beyond the territorial zone and for collecting statistics on nationwide fisheries.

Pakistan's fishery industry has faced issues related with development and management. Fish degradation and fisheries management problems are influence of low marine fish catch and fish yield across the nation over past years. United Nations Development Programme FAO is assisting Pakistan's fisheries department through countless development projects and other mutual sources. Many other funding organizations like EC (European Community) have funded US 12 million loans for development of Karachi Fish Harbour.²⁸

Development of fishery is linkage between catch and supply. The main factor of stable fishery sector is to raise funds for introducing new infrastructure, boat, gear and to aware fisher folk about modern operation of fish catch. This paper describes the condition of the fishery sector in Pakistan and discusses those serious problems that are main reason for destroying its importance on systematic lines. The policy and programme explained here is intended to provide as a channel to help in the foundation of a National Conservation Strategy.

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