

A status overview of fisheries and aquaculture development in Pakistan with context to other Asian countries

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acres were recorded as compared to 1436 previously recorded in District Fisheries Office. The difference is plotted in Figure 3.

Keeping in view the above, up to 40% of fish ponds seem to be missing from the record. This situation demands extensive surveys to be carried out in the country, especially in far flung inland areas, to bring out the actual figures. The matter is similarly true for the data pertaining to the fish production in the country specifically of the inland areas because the fish catches that culminate at small inland markets and subsistence fish catches also need to be accounted for a complete picture of fish production in the country.

Pakistan's commercially important marine fish fauna comprise of some 250 demersal fish, 50 small pelagic, 15 medium-sized pelagic and 20 large pelagic fish. In addition, there are 15 commercial species of shrimp, 12 of squid/cuttlefish/octopus, and five of lobster. The freshwater fauna comprises more than 200 fish species and 35 of shellfish including prawns and crabs. Around 20 fish species are commercially important.

According to various partial surveys carried out in the continental shelf area to explore fisheries resources, Pakistani waters provide a fishing potential of up to 1.0 million tonnes per annum from marine sources alone (Table 3) which can be increased through sea ranching and conservation measures such

The fisheries sector plays an important role in the alleviation of poverty and the achievement of food security in many parts of the world. In many economies, fisheries exports generate more foreign exchange than the revenues earned from any other traded food commodity such as rice, cocoa, coffee or tea (FAO 2004). According to the Economic Survey of Pakistan 2006-2007 (ESP 2006-2007), fisheries are the principal source of livelihoods for many rural communities inhabiting the long coastline of Sindh and Balochistan, as well as inland along the major rivers, and in the vicinity of lakes and dams. In 2006 the total fish production was 604,900 metric tons (Table 1). The fisheries sector is estimated to provide direct employment to about 379,000 fishermen and 400,000 people in ancillary industries (State Bank of Pakistan).

In Pakistan the domestic consumption of fish at 1.9 kg per capita is amongst the lowest in the world. However, fish are also an important source of nutrition for many people, particularly in rural areas, containing 15-20% protein with high levels of vitamin A, phosphorus and many other useful dietary supplements, in addition to low cholesterol content (Mazid 2002).

During 2006-2007 the fisheries sector witnessed a growth of 4.2 percent (ESP 2006-2007). Although the fisheries sector represents only a small amount of Pakistan's total GDP it contributes substantially to the national income through export earnings. Figures from the Trade Development Authority of Pakistan (TDAP) 2007 indicate that fish and fish preparations are among the top 16 export items and second among primary commodity category exports after rice (Figure 1). During 2006-07, a total of 123,615 metric tons of fish and fisheries products were exported, earning US\$ 188 million (TDAP 2007). The top 10 countries to which fish were exported fish include China, U.A.E, Thailand, Belgium, Malaysia, Korea, Hong Kong, Saudi Arabia, Japan and Sri Lanka (TDAP 2007). The bulk of

the captured fisheries from the marine areas go into low value usages (ESP 2006-07).

Pakistan has a considerable extent of resources i.e. 0.29 million sq km of marine (National Institute of Oceanography, 2007) with 1120 km long coastline and approximately 8.6 million ha of inland waters with details as mentioned in table 2 below.

Although aquaculture has been growing at a good pace in Pakistan, an in-depth analysis clearly indicates that it utilises only around 1% of the available water resources while others such as waterlogged areas (56%) and flood water areas (18%) return a haphazard fisheries production (Figure 2). Of the millions of hectares of waterlogged areas created due to massive irrigation systems, practically no attempt has been made to use these water bodies for fish culture (FAO 2003a). Careful planning is needed for judicious use of these underutilized areas for productive fish farming.

The situation is further aggravated by the fact that the average growth of aquaculture area and production are divergent to each other as far as the Sindh province (which hosts around two thirds of fisheries resources) is concerned (Figure 3).

Another impediment to the sector is its data deficiency. Either the data is lacking or its reliability is questionable. This can be gauged from the fact that the data of fish farms and the fish production both seem on lower side because there may be hundreds of fish farms which are not reported or could not be surveyed by the fisheries departments due to their meager manpower resources, non availability of sufficient operational funds, vehicles and other difficulties including the law and order situation. This can be supported by the fact that only in one district i.e. Shikarpur a difference of more than 500% was found in data available (1994) and the survey conducted in 1996. According to the survey 8008

Table 1: Total fisheries production in Pakistan 2006

Fish Production (2006)	Quantity ('000' tons)
Marine	425.0
Inland	179.9
Total	604.9

Source: MINFAL

Table 2: Pakistan's water resources

Resources	Area
Marine (sq km)	
Continental Shelf	50,270
Exclusive Economic Zone	240,000
Total Marine	290,270
Freshwater (ha)	
Rivers/ streams	3,102,408
Canals, Drains & Abandoned canals	346,803
Lakes	127,109
Dams/ reservoirs	195,670
Waterlogged areas	3,031,600
Deltaic Area	700,000
Flood Water Area	1,000,000
Fish farms	60,230
Total Freshwater	8,563,820

Source: DOF Sindh Province 2004, * WWF Pakistan.

Table 3: Fisheries resources potential

	Makran Coast	Sonmiani Bay/ Sindh Coast	Total ('000 tonnes)
Small pelagic	140-240	320-520	450-750
Demersal	120-200	170-290	300-500
Total	260-440	490-810	750-1250

Source: Surveys of Pakistan Fishery Resources, September 1983 to June 1984 - Summary of Findings Dr. Fridtjof Nansen (UNDP/FAO Programme GLO/82/001).

as declaring marine protected areas and alternate fishing zones to sustain yields. Whereas the Extensive Riverine Irrigation System which is one of the world's largest contiguous irrigation systems, covering around 63,000+km (FAO 2003a) provide a wide network of canals, lakes, ponds, marshes, waterlogged areas, natural depressions, dams etc; covering more than 8 million hectares; has an immense potential to produce high stocks of fish.

FAO's "State of World Fisheries and Aquaculture 2004" (FAO 2004) states that in 12 of the 16 FAO statistical regions at least 70 percent of stocks are already fully exploited or overexploited, suggesting that the maximum fishing potential has been reached and that more cautious and restrictive management measures are needed. The report further indicates that "...world marine fish production from capture was 87 million tonnes in 2000, which decreased to about 84 million tonnes in 2001 and was constant in 2002". The next issue of the same publication, SOFIA 2006 (FAO 2007), concludes that the "marine capture fisheries – when summed together worldwide – seem to have reached a ceiling". The same situation seems to be prevailing in Pakistan too, the fish production from marine as well as inland capture fishery has been decreasing or is stagnant except for a little rise during 1999 (Figure 4).

Table 4: Fisheries and aquaculture production of selected Asian countries

Country	Freshwater area (ha)	Aquaculture production (tonnes)	Aquaculture growth rate	Per capita fish consumption (kg)	Total (culture+capture) production (tonnes)	Exports (value in '000' US\$)
India	5700000	2 837 751	6.3	5.0	6 318 887	1591851
Bangladesh	4,560,900	882 091	7.8	15.0	2 215 957	359472
Sri Lanka	n.a.	1 724	n.a.	25.0	163 684	3137
Indonesia	1165000	1 197 109	6.9	23.6	5 578 369	1802961
Malaysia	n.a.	175 834	7.8	60.0	1 390 017	634370
Philippine	n.a.	557 251	-0.4	n.a.	2 803 603	347830
Viet Nam	1700000	1 437 300	30.6	30.0	3 367 200	2741127
Myanmar	n.a.	474 510	45.1	n.a.	2 217 466	460057
Nepal	n.a.	22 480	n.a.	1.6	42 463	15
Iran	n.a.	117 354	16.5	6.1	527 912	34,107
Thailand	8,563,820	1 144 011	10.8	32.0	3 743 398	4465767
Pakistan	n.a.	80 622	4.2	2.2	515 095	194

Table 5: Comparison of water resources and production in Pakistan and Bangladesh

	Area		Production ('000 tonnes)			
	Marine (km ²) ***	Freshwater (ha)	Marine	Freshwater	Total	In million tonnes
Pakistan* (2006)	290,270	8,563,820	425.0	179.9	604.9	0.60
Bangladesh** (2003-2004)	207,163	4,560,900	455,207	1,646,819	2,102,026	2.1

Source: *MINFAL PK **Fishery Statistical Yearbook of Bangladesh 2003-2004, ***FAO

According to FAO statistics, the contribution of aquaculture to global supplies of fish, crustaceans, molluscs and other aquatic animals continues to grow, increasing from 3.9 percent of total production by weight in 1970 to 27.1 percent in 2000 and 32.4 percent in 2004. Aquaculture continues to grow more rapidly than all other animal food-producing sectors. Worldwide, the sector has grown at an average rate of 8.8 percent per year since 1970, compared with only 1.2 percent for capture fisheries and 2.8 percent for terrestrial farmed meat production systems over the same period. Production from aquaculture has greatly outpaced population growth, with per capita supply from aquaculture increasing from 0.7 kg in 1970 to 7.1 kg in 2004, representing an average global annual growth rate of 7.1 percent. In 2004, countries in Asia and Pacific accounted for 91.5 percent of the production quantity and 80.5 percent of the value in the world aquaculture production, with China, India, Viet Nam, Thailand, Indonesia and Bangladesh among the top 10 producers in aquaculture production. Further, the majority of aquaculture production of fish, crustaceans and molluscs continues to derive from the freshwater environment (56.6 percent by quantity and 50.1 percent by value). Mariculture contributes 36.0 percent of production quantity and 33.6 percent of the total value (FAO 2007).

This situation requires taking necessary steps to enhance fish production from the existing resources on one hand and to explore new ways to get additional production through aquaculture, on the other. Although Pakistan has better growth in fisheries sector, an eye on some selected Asian countries (table 4) will help to compare ourselves in an overall scenario (data correspond to the year 2005 except where indicated).

Viet Nam and Thailand are the highest foreign exchange earners in the region mainly as a result of the export oriented growth in their aquaculture production (FAO 2007). On the other hand, Bangladesh which seems to be a natural role model in fisheries sector for Pakistan due to many aspects including similarity in fish fauna, climatic conditions, socio-economic behaviour, socio-demographic characteristics of farmers etc, has almost half the Inland fisheries resources to Pakistan but 7-8 times more production, only from inland sector, 53 % of which comes from aquaculture (Mazid 2002). According to FAO,

Figure 1: Source: Economic Survey of Pakistan 2002-2003

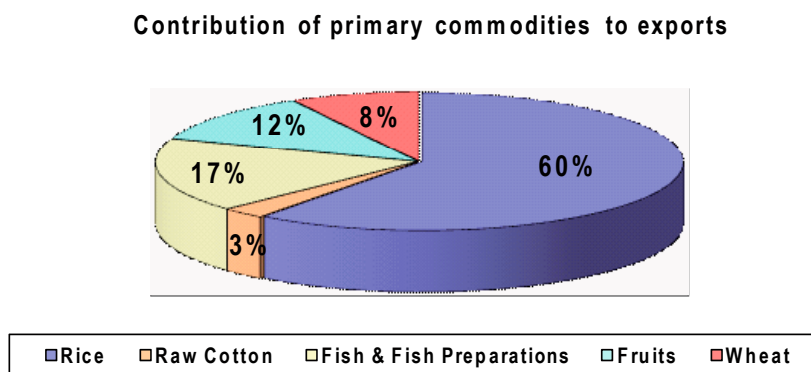
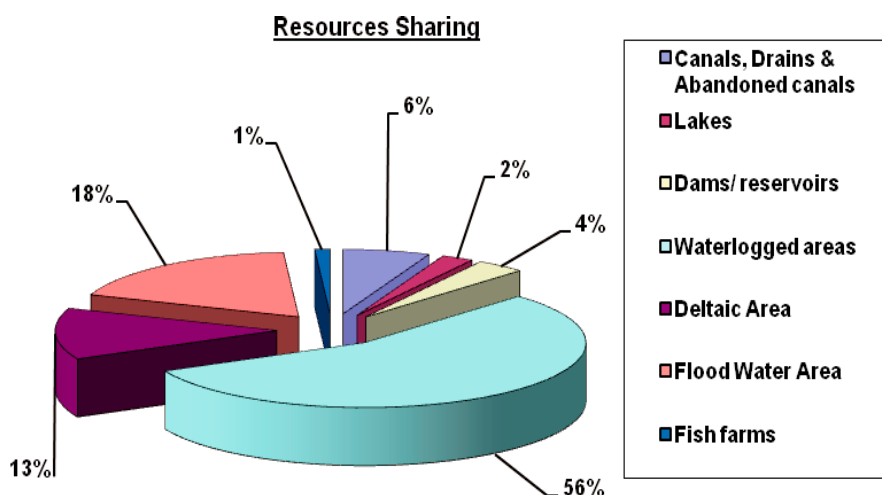


Figure 2: Source: DOF Sindh Province



Bangladesh was the sixth top country in aquaculture production with 914,752 tonnes and third top in inland capture fisheries with a catch of 732,000 tones (FAO 2006). The obvious reason behind this extraordinary performance being the higher development investments from government as well as donor sides. In Bangladesh, 54% of all the investments in the fisheries sector have been spent on aquaculture development (Mazid 2002). A comparison of Pakistan and Bangladesh has been given in table 5 to readily assess the above situation.

The fisheries sector needs prompt attention with regards to planning vigorous efforts to enhance production from all resources including marine, brackish and freshwater, which have tremendous potential for fish and shellfish production especially through aquaculture development. While planning, it is necessary to consider global trends which clearly show that more than 60% (28.9 million tonnes) of aquaculture production comes from inland areas. In the local

scenario inland areas offer considerable opportunity for aquaculture growth owing to the extensive irrigation system and water logged areas that could be made available to aquaculture with little modification. In contrast, the coastal areas are sparsely populated and would require relatively huge investments most probably by corporate culture. As such the inland aquaculture sector needs to be addressed on priority basis.

It is essential to divert the aquaculture sector towards export orientation by changing culture practices and adopting species suitable for export markets. This will also boost the rural economy and play in poverty alleviation among farming communities. Overall, aquaculture development can boost the economy of the country through export earnings. It is thought that the fisheries have the potential to bring in US\$ 1 billion annually (EC Prep report June 2005).

Recommendations

In this context following recommendations are put forth for the steady growth of fisheries and aquaculture sector in Pakistan. These measures include:

- Shrimp are an important source of export earnings and as such shrimp culture needs due consideration, but this should not ignore the environmental impacts and should adhere to the International Principles for Responsible Shrimp Farming 2006 and FAO's "Code of Conduct for Responsible Fisheries".
- There is potential for enhancing fish production from irrigation and multipurpose reservoirs through stocking and conservation programs.
- Pen and cage culture need to be developed on priority basis in irrigation canals, lakes/ reservoirs and coastal areas to improve fish production from these huge resources which at present are underexploited.
- Pond culture needs to be improved on intensive lines; more importantly catfish and tilapia culture need immediate attention.
- As indicated by the global trends, new vistas in aquaculture may be explored which include prawn and crab culture, oyster culture, seaweeds culture etc.
- Integrated Fish Farming (IFF) is an area that has a tremendous potential for producing additional fish if promoted. Poultry farming and cattle raising is well developed and can be integrated with fish culture; rice-fish culture has a high potential.
- Improvements in post harvest technology and value additions for better export earnings need to be taken into consideration.
- It is essential to divert culture trends towards export markets by changing the culture practices and selecting species of demand in export markets.
- Food safety measures must be ensured as per the principles of HACCP, SPS and CODEX in order to capture higher portion of foreign markets and enter the competitive environment under WTO. These

need implementation at all levels from production to consumption and capture to culture.

- Soft small and medium loans (microfinance programmes) with easy accessibility to aquaculturists and fishermen need to be made available.

- Cluster development of aquaculture along the coast with provision of all the basic amenities can bring about a major breakthrough in coastal aquaculture production. Allotment of land in these clusters should be made only to solid investors with time-bound terms of reference.

Figure 3: Growth of aquaculture

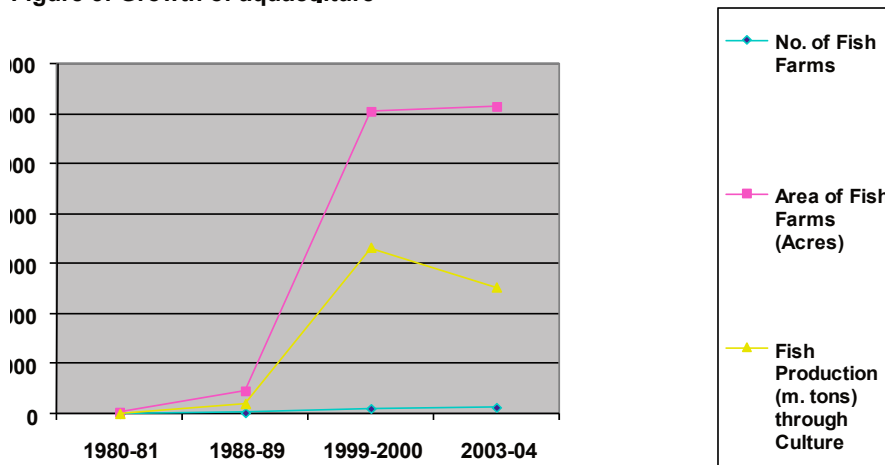


Figure 4. Source: Jarwar AMA, 2004

Difference of data before & after survey

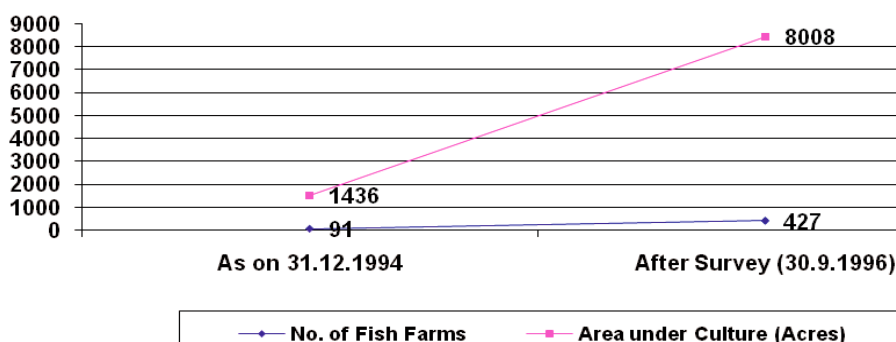
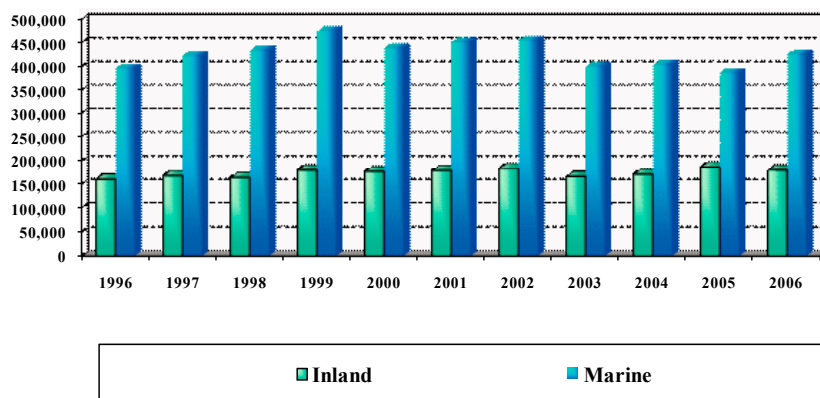


Figure 5. Source: MINFAL



- Tax holiday for aquaculture industry and processing zones is a must for rapid growth of sector including duty free imports of latest machinery.
- Effective extension services are needed to be established with quality assurance for steady growth of the sector. The private sector may also be involved in this area.
- Fisheries and Aquaculture should be brought under a "code of practice" to be devised in line with FAO's "Code of Conduct for Responsible Fisheries".
- Protected areas (PAs) should be declared and enforced and alternate fishing zones may be introduced to provide relief to fish and shellfish stocks.
- Sea ranching should be investigated as a means to reduce pressure on natural stocks.
- Fine mesh nets used for trapping fish meal species catch significant amounts of juvenile fish of larger species and small edible fishes as well as endangered, associated or dependent species, without any consideration of target or non-target species. These need to be strictly stopped from such practices and such nets removed from creeks areas to protect the fisheries resources.
- Community Based Fisheries Management should be encouraged for sustainable management of fisheries resources.
- The annual fishing-ban be implemented in its nature and spirit and alternate means of livelihood should be provided, along with incentives, to the fishing communities to sustain traditional fishing grounds.
- All this cannot be achieved without capacity building of concerned institutions for which following steps can be taken:
- The organizational structure of fisheries institutions needs to be strengthened and widened and the nature of posts/skill staff adjusted to allow specialized work to be conducted.
- A better remuneration packages for employees needs to be adopted to assist in recruitment and retention of specialist staff, improve productivity and eradicate corruption.
- The R and D wings in the fisheries departments are not commensurate with the needs of the sector therefore they need to be upgraded and streamlined.
- There are many organizations involved in research on fisheries and aquaculture on federal and provincial level. These efforts need to be monitored and coordinated as well as streamlined as per the applied requirements of the sector.
- Infrastructure development is required to make available sufficient hatcheries, nurseries, soil and water testing and disease diagnostic laboratories, extension/support centers and vehicles for extension staff to support the industry.
- To cater the post harvest improvements small jetties and processing plants need to be established along the coast, rivers and inland lakes along with allied facilities of cold storage, fish carrying boxes, insulated transportation vehicles etc.
- Intensive training programmes should launched for human resource development in the sector for which overseas trainings need to be arranged for fisheries managers and trainers. The fisheries training facilities must be functionalized to the maximum capacity and multifaceted working for training of farmers and fishermen.
- Aquaculture development authorities may be established with clear mandate to develop inland and coastal areas and full support should be extended to these bodies. Such authorities should be equipped with effective extension tools and a committed team with chalked out targets and strategy to achieve the set targets in stipulated time frame.
- As the nature of fisheries resources and the problems of the fisheries sector are different from livestock or agriculture, it is necessary to separate and strengthen the fisheries administration at both federal and provincial levels.

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