

Compliance with International Standards in the Marine Fisheries Sector

A Supply Chain Analysis from Pakistan

Shaheen Rafi Khan, Fahd Ali, Azka Tanveer
Sustainable Development Policy Institute (SDPI)

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- Governance;
- Environment;
- Human Development; and
- Economy.

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Glossary of terms

Banya	Local shopkeeper who provides groceries and other household items to fishermen on credit.
Bhoolo Gujjo	Fine mesh net used to catch shrimp in creeks. Introduced by migrant Bangladeshi fishermen.
Beopari	Intermediary who buys fish directly from the fishermen or from the mole-holder (auctioneer).
Challa	Fish basket made of reeds, straw.
Gaatu	Expert fisherman.
Chappal Gujja	Net used to catch small and juvenile shrimp near mangroves and sea-shore. Two slippers (chappals) are tied to the net at opposite ends and embedded in the sand. Introduced by Bangladeshi fishermen.
Ghutka	A mouth wad, made of betel nut and other substances with known carcinogenic properties. Addictive.
Khalasi	Boat workers (labour) used on boat to throw out and pull in nets, cook food and carry out other menial activities.
Kutchra	The catch caught using the “qatra” net. Local term for trash fish (mostly sardines).
Lada	Loss.
Lathay ka Bun	A net with a large eye size. Used to catch adult fish it allows small fish and juveniles to escape.
Mole-holder	Auctioneer, officially designated by the FCS to auction the catch.
Nakhuda	Launch, boat captain.
Paan	Betel leaf.
Pathans	The dominant ethnic group in Pakistan’s Northwest Frontier Province and in the northern Balochistan province.
Pati	Share.
Qatra	Fine mesh net, used to catch trash fish.
Seth	Local businessman/investor.
Thukri	A net of large eye size (two to four inches), used to catch shrimp.
Trawler Gujja	Gujja of larger size used by large trawlers that scrapes the ocean floor. Also known as a bag net.
Vichaatay	Local mole-holders on a jetty. These are not appointed by FCS and only found in Ibrahim Hyderi.
Wadera	Local feudal, formerly a landlord and now a sea lord by virtue of forcibly taking possession of the creeks along the Sindh coast.

Acronyms

ADBP	Agricultural Development Bank of Pakistan
BCDA	Balochistan Coastal Development Authority
EEZ	Exclusive Economic Zone
FCS	Fishermen Cooperative Society
FAO	Food and Agriculture Organization
FGD	Focus group discussion
GOP	Government of Pakistan
HACCP	Hazard Control and Critical Control Point
KFHA	Karachi Fish Harbour Authority
LBOD	Left Bank Outfall Drain
MAF	Million acre feet
MFD	Marine Fisheries Department
MINFAL	Ministry of Food and Agriculture
MPB	Maritime Pollution Board
MSC	Marine Stewardship Council
NM	Nautical miles
OAR	Open access resource
PEPA	Pakistan Environmental Protection Act
PFF	Pakistan Fisherfolk Forum
RBOD	Right Bank Outfall Drain
SMEDA	Small and Medium Enterprise Development Agency
SGS	Société Générale de Surveillance
SPS	Sanitary and Phytosanitary (Measures)
TBT	Agreement on Technical Barriers to Trade
UNIDO	United Nations Industrial Development Organization
USD	US dollars
WWF	Worldwide Fund for Nature

Compliance with International Standards in the Marine Fisheries Sector: A Supply Chain Analysis from Pakistan

Shaheen Rafi Khan, Fahd Ali, Azka Tanveer
Sustainable Development Policy Institute (SDPI)

Abstract

The study focuses on Pakistan's marine fisheries, which span a 700-mile coastline and include the territorial waters of two provinces, Sindh and Balochistan. The analysis addresses the scope for compliance with international food safety (SPS) and sustainable harvesting (MSC) standards. Food safety standards cover both pre-processing and processing activities. Compliance with such standards is key to Pakistan's fish exports and foreign exchange earnings and to ensuring livelihoods for the coastal fishing communities. A gap analysis illustrates that processing plants tend to comply with food safety standards, primarily due to the threat of loss of market share. However, exporters/processors have less control over pre-processing and harvesting activities further up the supply chain, even though these activities, ultimately, affect their ability to export. Pre-processing is the responsibility of the harbour authorities and entails food safety interventions at three stages: on board the fishing vessels; at the fishing docks; and in transit to the processing plants. Compliance lapses at the pre-processing stage are frequent.

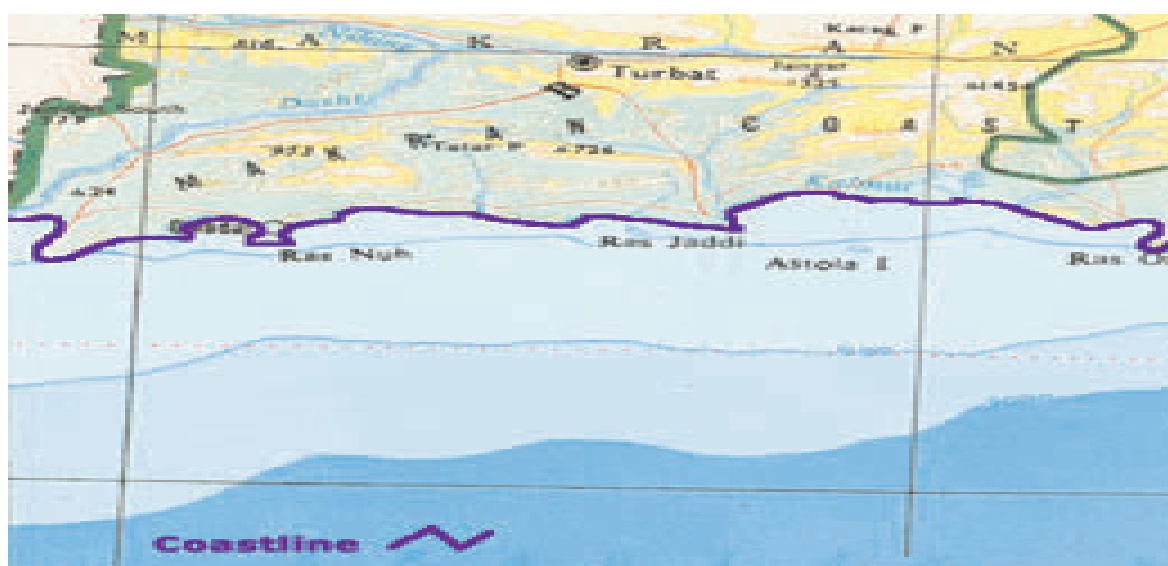
Moving further back in the supply chain to fish harvesting highlights even more complex issues. The policy, social, economic and ecological dynamics are difficult and the perverse interplay of these variables has led to a sustained degradation of Pakistan's coastal fisheries, extending well beyond its territorial waters with adverse consequences for the livelihoods of coastal fishing communities. Degradation, here, refers to stock reduction due to both over-fishing and to habitat destruction. The problems at this stage underscore the need for sustained remediation. A first attempt would entail harmonizing federal and provincial fishing policies through a consultative process involving all the important stakeholders; in particular, the representatives of the fishing communities who have first-hand knowledge of the problems and issues which affect their livelihoods.

1. Introduction

1.1 Overview

Pakistan's marine resources are a direct source of livelihood for over a million people and have supported fishing communities for generations. These communities are dispersed along a 700-mile coastline, lying between Sir Creek in Sindh and Jiwani in Balochistan.¹ The bulk of the fishing population resides in the Karachi division. The other concentrations are in Thatta, Sindh, and Gwadar and Pasni, Balochistan.

Figure 1: Coastal Map of Pakistan



The fishing sector employs 125,000 men and women with family dependants numbering close to one million. More than 15,000 fishing vessels of various sizes, ranging from small to medium-sized boats, large launches and trawlers, engage in fishing. Almost one-third are shrimp trawlers; the bulk of these are owned by investors outside the community. Boat and shore fishing is done in creeks and within the 12-mile territorial limit which falls under provincial jurisdiction. The larger launches go further off shore into deeper waters on extended fishing excursions, some reaching as far as the Somalian coast. Table 1 provides details on the number and types of fishing vessels operating in Pakistan's sea waters.

Domestic fish consumption is small, with Pakistan having one of the world's lowest annual per capita consumption of fish (SMEDA 1998). Most of the fish catch is exported to Europe, the USA, the Far East and the Middle East. Pakistan exports fish with little value addition. The bulk of the exports comprise a few fish species, mainly shrimp that constitute approximately 66 per cent of total fish exports. The other species exported are Indian mackerel, ribbon-fish, tuna, sole and crab. Over-fishing, including during the breeding season (June–August), has led to a steep decline in shrimp catches. Sardines are caught as trash fish and converted into chicken feed.²

1 Birwani, Z., Aly Ercelawn and M. A. Shah. "Sustainable and Just Livelihoods For Coastal Fisherfolk: Securing Rights in Environmental Law and Policy." Pakistan Institute of Labour Education and Research. 1999.

2 This has been a factor in fish stock depletion, as sardines are a source of food for larger fish.

Table 1: Registered Fishing Vessels (1993-2003)

Vessels (Categories)	Numbers										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Sindh											
Trawlers	2,028	2,245	2,252	2,310	2,427	2,522	2,564	2,570	2,611	2,677	2,702
Gill-netters	1,604	1,865	1,871	1,945	2,015	2,236	2,305	2,317	2,432	2,489	2,510
Motorized cum-sailing vessels	3,211	3,424	3,430	3,526	3,611	3,695	3,755	3,923	3,998	4,202	4,388
Sail boats (marine)	5,651	5,884	5,895	5,922	6,253	6,285	6,358	6,504	6,713	6,718	6,809
Total	12,494	13,418	13,448	13,703	14,306	14,738	14,982	15,314	15,754	16,086	16,409
Balochistan											
Trawlers	-	-	-	-	-	-	-	-	-	-	-
Gill-netters	765	860	941	1,019	1,111	1,162	1,295	1,329	1,389	1,680	1,508
Motorized cum-sailing vessels	3,313	3,552	3,826	4,022	4,195	4,250	4,279	4,314	4,372	4,227	4,463
Sail boats (marine)	142	89	23	26	39	39	25	29	34	33	25
Total	4,220	4,501	4,790	5,067	5,345	5,451	5,599	5,672	5,795	5,940	5,996
Total Marine	16,714	17,919	18,238	18,770	19,651	20,189	20,581	20,986	21,549	22,026	22,405
Progressive addition		1,205	319	532	881	538	392	405	563	477	379

Source: Marine Fisheries Department, GoP, 2005

Table 2 shows annual fish exports over 10 years. These have increased steadily from US\$77 million in 1993 to US\$131 million in 2003.³ While this is low as a percentage of total exports, in absolute terms fish exports generate an important share of Pakistan's foreign exchange earnings. Table 4 shows comparative trends in fish catch for the two provinces, and in the Exclusive Economic Zone (EEZ), which extends up to 200 miles from the coast. The increased catches over time are due to greater ingress by foreign trawlers, facilitated by both a change in zoning policy and the liberalization of licenses. The consequences for stock depletion are detailed in Section 7 (Degradation and its Causes). The table also indicates the relatively greater fishing pressure in Sindh coastal waters.

Table 2: Pakistan's Fishery Exports (USD million)

	Fresh & Simply Preserved	Fish In Airtight Containers	Total	Percentage of Total Exports
1993-94	69.11	8.29	77.40	2.26
1994-95	69.76	9.58	79.34	1.90
1995-96	66.84	11.53	78.37	1.60
1996-97	84.72	11.92	96.64	1.78
1997-98	110.85	12.20	123.05	1.98
1998-99	89.81	13.11	102.92	1.58
1999-00	106.46	13.38	119.85	1.62
2000-01	117.85	15.39	133.24	1.48
2001-02	113.45	15.65	129.10	1.38
2002-03	111.27	18.84	131.12	1.21

Source: Pakistan Statistical Yearbook 2003, 2004

³ At Pak rupees 60 to the US dollar.

Table 3: Export of Fish Shell-Fish Fishery Products (quantity in metric tons)

Year	Total	Year	Total
1993	83,783	1999	90,384
1994	70,522	2000	84,693
1995	62,262	2001	83,521
1996	71,283	2002	80,088
1997	83,138	2003	101,256
1998	73,710		

Source: Hand Book of Fisheries Statistics of Pakistan, Volume 18, 2002
Marine Fisheries Department, GoP, 2005

Table 4: Marine Catch by Province ('000 metric tons)

	1950	1960	1970	1980	1985	1990	1995	2000	2003
Sindh	26	46	102	175	229	260	281	294	271
Balochistan	11	16	37	58	94	107	123	130	127
EEZ	-	-	-	-	10	2	2	14	3
Total	37	62	139	233	333	370	406	438	401

Source: Marine Fisheries Department, GoP, 2005

1.2 Fishing Infrastructure

Pakistan's sea-coast measures 682 miles. Of this, 477 miles constitute the Balochistan and 205 miles the Sindh coast. Some 30 aggregations of fishing communities are to be found along this coastline. The few large aggregations are permanent; the smaller groups come together during the beginning of the fishing season and vacate their habitations at its end. Table 5 shows the names of the locations for the harbours, jetties and fish auction halls.

Table 5: Fishing Village/Landing Points

Sindh Province	Kharo Chaan
Karachi	Jatthi
Korangi	Jhungi Sir
Ibrahim Hyderi	Badeen
Shams Peer	Balochistan Province
Lath Basti	Gwadar
Hawks Bay Coast	Pasni
Manjhar	Ormara
Sonari	Gaddani
Mubarik Village	Bhunda Wari
Ketee Bandar	Beroo
Shah Bandar	Sonmiani Daam
Surbandar	

Source: SDPI Survey, July 2005

Four harbours and nine important landing sites and jetties are situated along the Sindh-Balochistan coast. The harbours are located in Karachi and Korangi in Sindh and Gwadar and Pasni in Balochistan. On the Sindh coast, the jetties and fish landing sites are located in the fishing villages of Ketee Bandar, Ibrahim Hyderi, Shah Bandar, Kharo Chaan, Jhatti, Jhungi Sur and Badin. In Balochistan, the jetties and landing sites are located in Gaddani, Ormara, Sonmiani and Daam.

1.3 Fishing policy and acts

Pakistan's deep-sea fishing policy was formulated in 1982, in the wake of the UN Convention on the Law of the Seas. For the first time, the convention defined territorial and exclusive economic zones for all states in the world. An objective of the federal government's deep-sea policy was to boost exports in this sector. Consequently, it allowed joint ventures between foreign and local investors. However, the policy was changed in 1989, permitting only Pakistani flagged vessels. This failed to restrict foreign trawlers as local feudals and investors began to front for them. In 1995, responding to pressure from local fishermen, the government altered the policy by creating a buffer zone lying between 12–35 nautical miles (NM). This was designed to protect territorial waters from incursions by trawlers and large local launches. However, in 1999, the newly-installed military government abolished the buffer zone. Commercial fishing operations were allowed up to the 12-NM limit but transgressions into coastal waters and into the creeks are reported frequently. The consequences for livelihoods and sustainability are self-evident.

Frequent policy changes are a direct outcome of dual jurisdiction. Constitutionally, jurisdiction over the sea is shared both by the federal and provincial governments. The 12-NM territorial zone bordering the coast falls under provincial jurisdiction. The 12 to 200-NM Exclusive Economic Zone (EEZ), where trawlers and local launches are free to operate, falls within the federal government's remit. In addition, federal control has traditionally extended into territorial waters in the shape of agencies in charge of maritime security, shipping and ports. In recent years, this control has become more pervasive via the Maritime Pollution Board and the Karachi Fishermen Cooperative Society.

The Marine Fisheries Department (MFD) of the federal government performs the following functions:

- conservation of fisheries resources;
- management and development of resources along scientific lines;
- training of fisheries and fish farmers and in-service training;
- extension services of the private sector;
- revenue earning through auctioning/licensing of water resources; and
- supplies of quality fish-seed to private fish farmers on subsidized rates.

The provincial and federal laws and regulations governing the fishery sector are:

Provincial laws

- The Sindh Fisheries Ordinance, 1980, includes rules and regulations for marketing, handling, transportation, processing and storage of fish and shrimp for commercial purpose and sale of fish used for domestic and inter-provincial trade
- Sindh Fisheries Rules 1983, 1995.
- Karachi Fisheries Harbour Authority Ordinance, 1984.

- Coastal Development Authority Act of Sindh, 1994.
- The Balochistan Sea Fisheries Act No. IX 1971. Fishing vessels operating in Balochistan's territorial waters are registered under this act. Furthermore, fishing licenses and processing of fish and fishery products in territorial water of Pakistan along the coast of Balochistan are issued under this act.
- Balochistan Sea Fisheries Ordinance Amendment, 1994.
- Balochistan Sea Fisheries Rules, 1971.

Federal laws

- Exclusive Fishery Zone Act, 1975.
- Exclusive Fishery Zone Rules, 1990.
- Territorial Waters and Maritime Zones Act, 1976.
- Pakistan Environmental Protection Ordinance, 1983.
- Pakistan Environmental Protection Act, 1997.

In addition, there is the following fisheries-related legislation:

- The Agricultural Produce (Grading and Marketing) Act, 1937. Dry fish, shell fish and fishmeal are graded according to this act.
- The Pakistan Animal Quarantine (Import and Export for Animal and Animal Products) Ordinance 1979: The "health certificates" are issued to regulate trade and to check the introduction of or spread of diseases.
- The Karachi Fisheries Harbour Authority Ordinance 1984: Covers smooth functioning of harbour operations and provides laws to periodically inspect hygienic conditions prevalent at the harbour and in various processing and ice plants, and cold storages located at the harbour.
- The Coastal Development Authority Act Sindh Act No. XXVIII 1994: Covers development operations, management and maintenance of coastal areas including development of fisheries, livestock, horticulture and agriculture.
- Pakistan Fish Inspection and Quality Control Act, 1997: Deals with the registration and inspection of fish processing plants.

2. Literature review

The literature review focuses on two aspects:

- impact of commercialization on livelihoods; and
- community rights and management.

2.1 Impact of commercialization on livelihoods

Appropriate citations have been made at the relevant places in this report. In this section, a synthesis follows of the relevant documents consulted.

The commercialization of fisheries in the subcontinent is fairly recent. As indicated, South Asian countries, especially India and Pakistan, opened up their deep-sea waters to commercial fishing relatively recently. Le Sann (1998) assesses the consequent threats to fishing communities. The entry of large companies has led to the marginalization of traditional fisherfolk. He states, “It is absolutely vital to restore the role of fish workers and their communities in resource management, and to ensure their access rights and the rights to participate in their own development are upheld.” Similarly, “the use of modern factory-made synthetic nets has rendered many women jobless as their hand-made cotton nets are no longer in demand.” Le Sann also notes that the development of modern port facilities for landing fish has resulted in lack of work opportunities for women, catch used to land at beaches where women would take an active role in post-harvest activities. In Pakistan, opening up deep-sea water to foreign trawlers has led to further commercialization of the fisheries sector. There is a deficiency of local empirical literature assessing the effects of government policies, trawling companies and ecosystem degradation on livelihoods.

2.2 Community rights and management

An important policy challenge is to address the open-access and over-fishing issues in Pakistan’s marine fisheries sector. The two are interrelated as the former facilitates the latter. However, a ban on fishing to promote conservation is neither possible nor advised in view of the Pakistani fisherfolk, who depend on fishing for their livelihoods and traditionally have had open access rights to the fisheries. The political economy of Pakistan gives rise to a unique set of socio-economic problems which cannot be dealt with a simple, single-focus policy. Beddington and Rettig (1983) argue that regulations aimed solely at conserving biological stock will not address such complex socio-economic problems of the fisheries sector. Since those problems arise from other reasons such as over-exploitation and open-access, conservation will allow fishing to take place at a level where “economic rent is dissipated and a catch is taken at a level of investment where the average level of profit in the industry is low.” Policy measures to address the problem, by implementing fishery management and conservation plans, must integrate these measures with access rights, community-based management and community exit strategies.

Integrated rural development is proposed as an exit strategy. Smith (1983) states:

“In contrast to the focus of the traditional fisheries development on fish production, the objective of new development programs is to raise the standard of living of fishing communities.... This re-direction in emphasis is important because it permits the search for solutions to the problems of low standards of living in fishing communities to expand beyond those areas which are fishery-specific.... Solutions are beginning to be sought in the context of rural development programs and

have as their objective as a general uplifting of rural areas. The fisheries sector should be understood in a broad sense with its linkages to other sectors in rural areas. With little or no education and few non-fishing skills, the fishermen have little hope to shift to another occupation... What is implied is the necessity for viewing the fish production sector on the one hand as vertically integrated with factor input markets and with product markets and on the other hand as horizontally integrated with other non-fishery sectors and institutions within rural area.”

On fishery management, Aguero and Costello (1986) note that the problems associated with fisheries are seldom solved by focusing on fishery management plans.

“The fact that fisheries management is really people and fisherfolk management” is usually forgotten. The emphasis is to get to know the fish, the resource environment, fish behaviour, its taxonomy physiology and best technique for capture. Rarely is the emphasis and the interest in getting to know and understand the fisherman, his rationale for fishing, his acceptance and denial of management regulations or his adaptation of new technologies.”

Community-based management plans have already shown that conservation of natural resources is easier whenever the local community is actively involved in the processes. Ostrom (1990) and Bromley (1992) state that “institutional theories favoring community-based management assert that individuals will cooperate to conserve an open-access resource (OAR) when they are able to design, monitor and enforce rules regulating the ways in which members utilize and allocate natural resources.” Similarly at another point, Craig (1998) states that “being the users of the resources, the community should be capable of managing its own resources. They have necessary information on the resources and their exploitation such that, within the rights they have been granted, they can perform the necessary management functions such as limiting entry, fishing gear regulation, collection of resource rent, and benefit distribution.”⁴

3. Hypothesis and objectives

3.1 Hypothesis

The study hypothesis is that market forces are a better driver of compliance than policy or institutional interventions. This hypothesis draws upon Bhagwati’s demonstrated result in international trade that the effectiveness of intervention varies inversely with its distance from the source of the problem.⁵ In other words, direct interventions are more effective than indirect ones. This premise is tested in Pakistan’s marine fisheries sector in a supply chain context and in the actual or potential application of international food quality and environmental sustainability standards.

3.2 Objectives

The objectives of the study are: a) to undertake a supply chain analysis of compliance with international standards; b) to examine the economic, and institutional determinants of compliance; c) to assess the impacts of unsustainable harvesting on marine ecology; d) assess livelihood implications of such impacts and; d) to develop policy and legal alternatives for remediation.

4 Johnson, Craig. “Beyond Community Rights: Small-Scale Fisheries and Community-Based Management in Southern Thailand.” Published in *TDRI Quarterly Review* Vol. 13 No. 2 June 1998, pp. 25–31. Editor: Bruce Anderson and Ryratana Suwanraks.

5 Bhagwati, J. *et al.* 1963.

4. Methodology

The data for this study were collected employing the following techniques:

- household survey;
- focus group discussions; and
- stakeholder interviews.

4.1 Household survey

Household surveys were designed to gather the following information from fisherfolk households in Sindh and Balochistan:

- income levels;
- assets;
- indebtedness; and
- use of banned nets.

The household survey was conducted in fishing villages in Karachi (Sindh) and Gwadar and Pasni (Balochistan). The fishing villages selected in Karachi were Ibrahim Hyderi and Rehri Goth. The selection was made on the suggestion of the Pakistan Fisherfolk Forum (PFF), which considered these two adjacent villages ideal for the type of information sought in the survey. Both villages combine to form the largest marine fisherfolk settlement in Sindh. Similarly, the majority of Balochi fishermen live in Gwadar and its surrounding villages/towns of Pasni, Surbandar and Jiwani.

The survey classified fishing households into three income groups, low, middle and high. The sampling was done using non-probability (snowball and purposive) methods. The reason for this was the lack of easy accessibility to population data. Although the problems of generalizing survey results in non-probability sampling remain, the results here are used largely for a descriptive analysis. The numerical distribution of households is shown in Table 6.

Table 6: Household Surveys

	Sindh	Gwadar
Low Income Group	10	10
Middle Income Group	10	10
High Income Group	4	4

Source: SDPI Survey, July 2005

The household questionnaire is in Annex 1.

4.2 Focus group discussions

We collected qualitative data from focus group discussions (FGD) in both Sindh and Balochistan. The specific aim was to collect information on pricing and loaning mechanisms and, more generally, on the

major concerns of fishing communities. Particular attention was given to the existence of organizations and institutions. The FGDs were carried out in the following villages and locales:

- Mubarik Village (Karachi);
- Hawks Bay (Karachi);
- Ibrahim Hyderi and Rehri Goth (Karachi);
- Gwadar;
- Surbandar (District Gwadar); and
- Pasni (District Gwadar).

4.3 Stakeholder interviews

Apart from the FGDs, we also conducted one-on-one interviews with various stakeholders associated with the fishery sector. These included representatives of fishing communities, mole-holders (auctioneers), officials from the PFF, Fishermen Cooperative Society (FCS), Balochistan Coastal Development Authority (BCDA) Marine Fisheries Department (MFD), Balochistan Planning and Development Department (BP&DD), fish processing unit managers, SGS (certification agency) representatives, policy analysts and academics. A list of people interviewed is in Annex 3 of this report.

5. Compliance with international standards

Countries are becoming increasingly aware of the important contribution that international standards and certifications systems can make in ensuring quality, production efficiency, health and environmental sustainability. By sovereign law, they are free to set and implement standards for the protection of human, animal and plant health. The WTO Agreement on Sanitary and Phytosanitary (SPS) Standards disciplines the way member countries exercise that sovereign right. To quote the agreement:

“Recognizing that no country should be prevented from taking measures necessary to ensure the quality of its export, or for the protection of human, animal, or plant life or health, of the environment...”

The Agreement on Technical Barriers to Trade (TBT)—the more general standards agreement of which the SPS is a sort of specialized complement agreement on food, plant and animal safety—defines the term “standard” for all signatories as a “document approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method.”⁶ Though the WTO does not name any organization as a recognized standard-setting body, several such organizations are named as examples of those competent enough to set international standards under the SPS Agreement.

⁶ P. 16, Agreement on Technical Barriers to Trade, Tokyo Round Agreements, World Trade Organization. http://www.wto.org/english/docs_e/legal_e/legal_e.htm

There are three types of standards relevant to this study:

1. **International standards** are standards set by multilateral agreement in one of a handful of recognized standards-setting bodies. For example, standards on hygiene and food safety (applicable to both the processing and the final products) are set by the Codex Alimentarius Commission.
2. **Domestic import standards** (technical regulations, in WTO terminology) are set by countries to control the quality and form of imports. The WTO strongly encourages countries to follow international standards when setting their domestic import standards, but under some circumstances they may set them higher or lower.
3. **Most voluntary standards**, the third type of standards, are set by private-sector buyers. These are not subject to WTO rules. Another type of voluntary standard is industry quality standards such as ecolabels. These are self-imposed standards, and attest to the quality of the product or the manner of its processing, usually in the hopes of fetching a higher price.

The WTO does not mandate that exporters comply with any standards, but rather sets rules on how countries can formulate their domestic import standards, trying to prevent importing countries from using such standards to unfairly protect their own industries. Many developing countries not only see SPS and TBT standards as non-tariff barriers to trade but also as a type of protectionist tool employed by the developed countries. To allay such concerns, the TBT and SPS documents address specifically the contentious issues of harmonization, equivalence, transparency, technical assistance and processes for dispute settlement.

This study aims to assess compliance in Pakistan's fisheries sector in the light of the TBT and SPS standards. The analysis addresses both health and sustainability aspects and is carried out in a supply chain context. This reflects both the diverse demands of international buyers and the recognition that standards should concern themselves not only with the final product but with the processes that enter into its production.

5.1 Food safety standards

5.1.1 Pre-processing

Measures enacted to protect human, animal and plant life and health were, previous to the Tokyo Round of multilateral trade negotiations, covered by Article XX(b) of the General Agreement on Tariffs and Trade (GATT) which specified that:

“Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustified discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be constructed to prevent the adoptions or enforcement by any contracting party of measure: (b) necessary to protect human, animal or plant life or health.”

The SPS agreement, a product of the Uruguay Round of multinational trade negotiations, cites the Codex Alimentarius Commission's standards, recommendations and guidelines as a preferred way of facilitating international trade in food. Codex standards have become the benchmarks against which

national food measures and regulations are evaluated within the legal parameters of the Uruguay Round Agreements.⁷

The Codex Commission has over 140 member countries, including Pakistan. Codex standards on fisheries and related products are comprehensive and even go to the extent of suggesting fishing vessel construction and sanitary design. For example, section 4.1 of Codex's "Recommended International Code of Practice for Shrimps and Prawns" (CAC/RCP 17-1978) outlines the considerations for fishing vessel construction and sanitary design. Section 4.1.1 states that:

"The fishing vessel should be designed for efficient and rapid handling of shrimp, ease of cleaning and disinfection and should be of such material and construction as to minimize any damage or contamination of the catch."

Similarly, outlining the considerations for the construction of the vessel it says that:

"Deck pounds or pens, stanchions, dividing boards and holding tanks should be constructed of suitable corrosion-resistant material. They should be adequate in number and height to prevent crushing of the catch due to excess weight or to the vessel's motion and to hold the estimated catch."

The EU standards go further in requiring food safety/sanitation controls in the docking areas/auction halls and in transit to the processing plants.

5.1.2 In-plant processing

Codex standards also focus on the provision of suitable facilities for onshore processing. The Codex's "Recommended International Code of Practices for Shrimps or Prawn, for Fresh Fish and for Frozen Fish" provide for the construction design of the processing facilities. While providing guidelines for plant construction, a clear emphasis is given to keeping the plant and all its facilities disinfected so as to minimize contamination of fish food products. In addition, the Codex standards spell out hygienic operating requirements for those working in a fish processing plant. These cover suitable protective clothing, personal hygiene and disease. Section 5.5 also requires management to employ a full-time employee to monitor plant cleanliness.

5.1.3 Implementation of standards: Hazard Control and Critical Control Point (HACCP)

HACCP is a set of standards and procedures that involves the implementation of the Codex-SPS standards. It operates by identifying Critical Control Points (CCPs), which are points at which contamination risk is highest and then takes necessary steps to eliminate, or reduce the contamination to an acceptable level. HACCP has to be applied methodically and entails a series of steps:⁸

- **Analyze hazards:** The hazard could be biological, such as a microbe; chemical, such as a toxin; or physical, such as ground glass or metal fragments.

7 "Understanding the Codex Alimentarius," Food and Agriculture Organization of the United Nations World Health Organization. <http://www.fao.org/docrep/w9114e/W9114e00.htm#TopOfPage>

8 FDS Backgrounder current and useful information from the Food and Drug Administration. HACCP: A State-of-the-Art approach to Food Safety. <http://www.cfsan.fda.gov/~lrd/bghaccp.html>

- **Identify critical control points:** These refer to stages of processing—from a raw state through processing and shipping to consumption by the consumer—at which the potential hazard can be controlled or eliminated. Examples are cooking, cooling, packaging and metal detection.
- **Establish preventive measures with critical limits for each control point:** For frozen fish, this might include setting the minimum freezing temperature and time required to ensure the elimination of any harmful microbes.
- **Establish procedures to monitor the critical control points:** Such procedures might include determining how and by whom freezing temperature should be monitored.
- **Establish corrective actions to be taken when monitoring shows that a critical limit has not been met:** For example, re-processing or disposing of fish if the minimum freezing temperature is not met.
- **Establish procedures to verify that the system is working properly:** For example, testing time-and-temperature recording devices to verify that a freezing unit is working properly.
- **Establish effective record keeping to document the HACCP system:** This would include records of hazards and their control methods, the monitoring of safety requirements and action taken to correct potential problems.

When applying HACCP, all food borne hazards are to be considered during both bacterial and chemical processing (pesticides and drugs).⁹

HACCP's worldwide acceptability is based on sound science. An important feature of an effective HACCP system is detailed documentation of the implementation plan. Such documentation allows investigators to see how well a firm is complying with food safety standards.

5.2 Standards for sustainability: Marine Stewardship Council (MSC)

There are no binding harvesting standards in the fishing industry. However, various organizations have attempted to introduce voluntary harvesting standards that promote sustainable fisheries. The Marine Stewardship Council (MSC) is one such organization.

The MSC was established in 1996 as a result of efforts by the Worldwide Fund for Nature (WWF) and Unilever (one of the world's largest fish buyers) to maintain and promote the productivity of the oceans, and has been working as an independent organization since 1999.¹⁰ The MSC is a non-profit organization that certifies harvesting practices adopted by various fisheries all over the world. The MSC has developed principles that govern activities related to harvesting practices. The three principles, their intent and criteria are presented in Box 1. Although not mandatory, these principles enshrine an important aspect of international food trade—the growing desire to regulate international trade through harmonized standards, which aim to achieve environmental sustainability and, by implication, social justice. These principles advert to market forces as a driver to promote sustainable harvesting.

⁹ The bacterial contaminants can be salmonella, campylobacter jejuni, e.coli, listeria monocytogenes, yersinia enterocolitica, cryptosporidium parvum and trichinella.

¹⁰ http://www.sharkinfo.ch/SI2_00e/msc.html

Box 1

Principle 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Intent:

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short-term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

Principle 2

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically-related species) on which the fishery depends.

Intent:

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

Principle 3

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent:

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

Source: <http://www.msc.org>

Lately, the MSC has come under criticism and its impartiality has been questioned. This partly arises from the power struggle within the NGO community over control of the lucrative and influential certification process and, partly because MSC's certification is often used as an advertising gimmick, several NGOs dispute controversial certificates awarded to some fishing companies. In a generic sense, criticism of the MSC stems from the fact that many disagree with its philosophy of collaborating with international businesses to bring about environmental change and question its corporate ties. Moreover, the MSC has kept certain environmental groups at arms length from its certification process¹¹ which casts doubt over the objectivity of the certificates awarded. Further, investigations carried out on the instructions of the MSC's five U.S. donors found that the Council lacked credibility in its certification process and would "face collapse unless drastically reformed."¹²

The criticism notwithstanding, one cannot quibble with the principles developed by MSC to promote sustainable harvesting. The contention that MSC's practices lack credibility does not nullify the utility of the harvesting standards the Council aspires to promote. In addition, while we recognize that these standards are not applicable to trade between countries, we use them as a benchmark to assess their feasibility in expectation of similar regulatory standards being instituted in the foreseeable future.

Two additional stipulations (not included in the box) are that fishery operations:

- ensure present and future economic and social options and benefits; and
- are conducted in a socially and economically fair and responsible manner.

5.3 Gap analysis of compliance

Pakistan exports its major catch of shrimp to the European market. Because of its inability to comply with EU health safety standards (technical regulations), it has faced embargoes on its exports first in 1998 and again in February 2005. The embargo still stands and its removal is contingent upon complying with European processing standards. The manner of their articulation is very similar to HACCP requirements.¹³

In the light of the embargo, a gap analysis is conducted in relation to processing standards. It is important to note that processing is a broad term which applies not only to health and sanitation practices in the processing plant but links backward to such practices in fishing vessels, in the auction halls and in the transportation of catch to the plants. While compliance within the perimeters of the processing plants is stringent, the lapses occur at the earlier stages, from the fishing vessels, to auction and transportation up to the plants. The inability to rectify these lapses is the primary reason for the imposition of the embargoes. Pollution is a concern via bacterial and chemical contamination. So, processing standards become redundant in the light of such contamination.

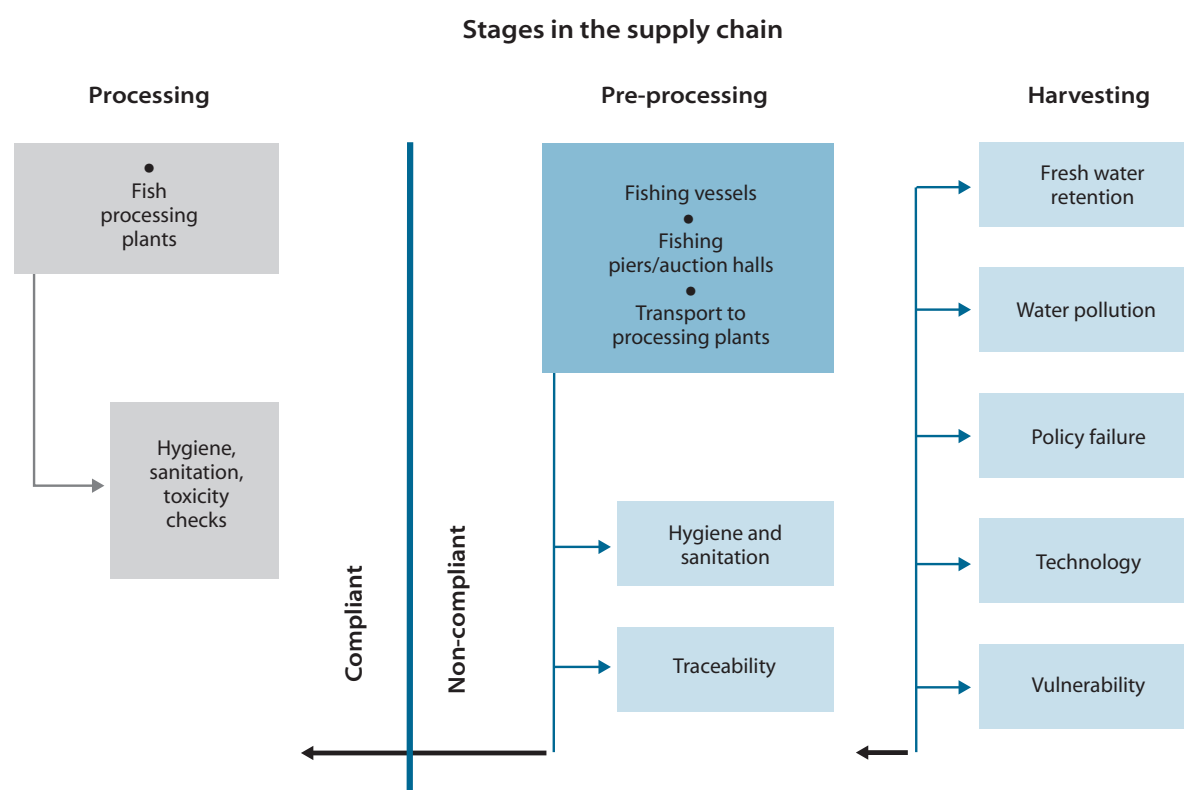
The unaddressed problems at the pre-processing stage represent the first lapse (pollution-related contamination and problems in handling) and, as will be demonstrated, are difficult to rectify. Sustainable harvesting as articulated in the MSC is far more difficult to address. *A priori*, these standards have raised controversy. The analysis further underscores the various elements that have a bearing on sustainable harvesting and how difficult they are to get a handle on.

11 <http://biotech.ifcnr.com/article.cfm?NewsID=450>

12 http://www.icsf.net/jsp/publication/samudra/pdf/english/issue_37/art06.pdf

13 Personal Communication with Société Générale de Surveillance (SGS) Pakistan officials.

Figure 2: Compliance along the Supply Chain



5.3.1 In-plant processing

The certified plants maintain HACCP standards, which are accepted by European countries.¹⁴ The certification process is thorough and the Société Générale de Surveillance (SGS) is the sole accredited certifying agency for marine products in Pakistan. It started its activities in 1997, concurrently when the U.S. Food and Drug Administration (FDA) made the adoption of HACCP standards mandatory for all fish imports into the U.S. Over time a visible change in the management culture has emerged. The processing plants have made large investments in the requisite safety equipment and procedures, and have also installed in-house laboratories to check fish toxicity.

The drivers of compliance at the processing stage are markets and the underlying unpredictability of the business. The first is self-evident; if exporters fail to comply with standards they lose export markets. Second, processing is both high-risk and costly. Contamination in a single container means the entire consignment has to be destroyed. Finally, catches fluctuate daily. The high risks, high capital and processing costs involve owners closely in plant management. The EU inspectors have noted high awareness levels with regard to HACCP among plant workers, comparing it with conditions in India and Thailand.

¹⁴ While the EU has developed its own standards, and updates them periodically, its standards are similar to HACCP.

However, there is also evidence that some processors circumvent these standards by out-sourcing or sub-contracting work. Khan *et al.* (2005) show that in Pakistan sub-contracting of prawn shelling takes place at meager wages. The workers, who are at the lowest rung of the socio-economic ladder, work in unhealthy and unclean environments. In this case, processors not only violate the sanitation requirements specified in both SPS and HACCP, they also absolve themselves of their corporate responsibilities such as providing fair wage rates and a healthy work environment.

5.3.2 Pre-processing

HACCP standards are both plant specific and apply to all stages of pre-processing. The three stages of pre-processing are:

- on board fishing vessels;
- docks/auction halls; and
- transport to processing plants.

Traceability¹⁵

The EU requirements include traceability. The monitoring and auditing that it entails involves both processors and vessel owners. The need was triggered by the presence of chemicals and antibiotics in some containers. Subsequently, procedures were put in place for monitoring. First, fishing vessels are now registered—with a name and identification number. Second, the vessel owners are required to install radio systems so they can be monitored. Third, processors are required to test each batch and, if found contaminated, to backtrack through the vessel owners to the source of the catch. The processors are also required to prepare regular reports. The system has been found to have flaws and the EU is considering hiring an outside agency to monitor traceability.

Hygiene and sanitation

The HACCP standards technical specifications for fishing vessels and fish storage and holding areas have been developed to ensure hygienic conditions and public health (freedom from disease). In contrast, compliance is poor. Contamination levels on board the fishing vessels, landing docks and auction halls are high and have been pointed out by the EU inspectors.

The inspectors found insects and rodents on board the fishing vessels. With regard to the handling of raw fish, the buckets and cans were rusted and fish was being handled with bare hands. Containers made of jute and wood instead of plastic were being used. The washing arrangements were found unsatisfactory. There was no proper washing area and the fish were flushed with a mixture of fresh and seawater. Dirty ice was being used.¹⁶ Some interventions have been made, such as installation of fresh water tanks on the vessels, supply of clean ice and improvement of storage and handling. However, the compliance gap is still large.

¹⁵ “Traceability refers to the completeness of the information about every step in a process chain.” <http://en.wikipedia.org/wiki/Traceability>. Within the food industry it is an important consideration to ensure food safety. It implies the ability to trace food and food producing animals through various stages of production and distribution. Specifically, in the fishery sector, this means tracking the fish catch through processing, and harvesting stages and areas of origin of the fish catch.

¹⁶ The inspectors noted that the ice came in many colours: pink, blue and green.

On-shore handling also falls below the basic sanitary and health standards. The fish are shovelled in to challas (reed, straw baskets) with spades and transported in open lorries, to the auction halls. Larvae are seen in profusion in the challas. The auction halls are equally unsanitary. Animals (cats and dogs) and birds are seen in abundance. Fish deposit areas are littered with cigarette butts, discolored with *paan* (betel) spit, humans walk over these areas and it is not uncommon to see cockroaches come out of the drains and scurry over the fish. Storages constructed near the auction halls for storing unsold fish exhibit similar unsanitary conditions. Fish tend to be dumped on the floor, rather than in the trolleys meant to hold them. Rodent and insect activity is strongly in evidence. The transportation of fish from the auction halls to the processing plants meets acceptable cleanliness criteria if the processors use their own mobile vans. Other forms of transport, including open mode, tend to be sub-standard.

Compliance failure has institutional roots. In the absence of a market driver and facing a measure of cultural resistance, the onus is on institutions to educate, inform, implement and enforce. Three potential players in compliance are the Fishermen's Cooperative Society (FCS), the Marine Fisheries Department (MFD) and the Karachi Fish Harbour Authority (KFHA). Overlapping responsibilities are a source of tension among them and none of the three are technically, financially or administratively equipped to cope with the various aspects of compliance. Also, financial allocations tend to be mis-utilized, for instance, a recent large allocation to the KFHA to improve harbour conditions was diverted to build a shopping center.

To some extent, official apathy can be countered by the processors as compliance failure affects their ability to export. Processors have been known to exert financial and political leverage with harbour authorities. However, their involvement needs to be institutionalized as part of an integrated approach to compliance. Getting the fishermen on board is more difficult; their primary concern is getting a good price for their fish in order to feed their families and pay off their debts. One possibility is to form a multi-agency group, including the MFD, FCS, MFHA, with the SGS in a consultative role. This group would be entrusted with carrying out an extended awareness creation, training and capacity building program.

5.3.3 The compliance infrastructure

SGS

SGS is a commercial organization. Its mandate covers system development, implementation training, certification and audits. However, its protocol does not allow consultation services—preparing client documents or formats. SGS has expertise in both processing and pre-processing and a wide client base, including the processors, the MFD and the EU. For instance, the EU called upon its services to improve hygienic conditions on the launches. The MFD contracted it to write its technical reports and conduct workshops on HACCP.

The MFD

The MFD among its various functions also has a regulatory role. The EU has designated it as its executing agent and delegated limited authority to it to the extent that it stands in occasionally for EU inspectors or auditors. The MFD also short-lists processing plants for certification. Because of its capacity constraints, the MFD draws upon SGS for technical and system support. While it can recommend certification, the EU, ultimately, audits the plants itself.

5.3.4 Harvesting standards

The MSC principles are reproduced as benchmarks for compliance with sustainability standards:

- a fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery;
- fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically-related species) on which the fishery depends; and
- the fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Two additional stipulations are that fishery operations:

- ensure present and future economic and social options and benefits; and
- are conducted in a socially and economically fair and responsible manner.

Section 7 illustrates the complex dynamics of degradation. Clearly, interventions aimed at arresting degradation and species and habitat loss have complex ramifications. Thus, the freshwater retention issue can only be addressed through a national consensus building process, which is, basically, beyond the scope of this study. Similarly, urban, industrial and agricultural effluent discharges have a sector context. Consequently, mitigation has to be rooted in sector imperatives—while, the impact on fisheries can be a factor in mitigation, it cannot be its driver. In a similar vein, resource rights issues can only be confronted through a political process of lobbying, advocacy and passive resistance. The Pakistan Fisherfolk Forum (PFF) has instigated such a campaign but the gains have been incremental. Finally, policy initiatives (see Section 8) aimed at reversing commercial trends and promoting conservation and sustainable harvesting require constitutional amendments, interdepartmental coordination, capacity building and good governance.

6. Returns to fishermen: The vicious circle of indebtedness

A combination of technology upgrades and rising costs have made local fishermen increasingly dependent on loans to finance their expenditures, which fall into two categories:

- capital expenditures, which include loans taken to purchase boats, launches, nets and engines; and
- running expenses, which include boat, net and engine repairs, ice, fuel and food.

In the absence of institutional credit, the fisherman's only recourse is the informal credit system. The repayment conditions are similar for the two types of loans. In either case, the fisherman pays commission until he pays off his entire debt. However, there is no deduction for the principal which is required to be paid separately. The system has five variants, all of them exploitative but in differing degrees. Exploitation

is explained in terms of the difference between market and realized returns. The various fishing arrangements are explained briefly to set the context for analyzing the debt-return linkage.

6.1 Informal credit systems

The commission system: The *nakhuda* (launch/boat captain) owns his vessel, net and engine, but borrows from the mole-holder (fish auctioneer) or *beopari* (middleman) to meet running expenses. He is not compelled to sell to the same *beopari* but must pay him a commission (varying from five to 10 per cent of the value of the catch) as repayment for the loan.

The Gaatu system: The *nakhuda* does not have the means to purchase his own fishing vessel and equipment (nets, engines), or to finance running costs.¹⁷ Instead, he secures these through a loan from a mole-holder or *beopari*, who provides the upfront capital and loans for operating expenses. In the case of the *beopari*, the fisherman is required to sell his catch to him at a discount.

Mole-holders are officially registered with the Fishermen Cooperative Society (FCS). They provide loans on behalf of their financiers in order to ensure a captive market. Under the terms of the FCS agreement, they receive a 6.25 per cent commission on the sale of catch, half of which they pay to the FCS. When a mole-holder lends money to a fisherman, the latter is constrained to auction his catch through him and pay him a higher commission (seven per cent). The mole-holder also tends to under-weigh the catch.

“Baskets of various sizes are used in bringing the catch to the auction. It is up to the mole-holder to guess the weight of the basket, which is subtracted from the weight of the fish auctioned. All is done on the basis of a rough estimate. The fishermen complain that they sustain losses as a result of this” (Brohi, 2004).

The Pati system: The term *pati* means share. The *nakhuda* hires *khilasis* (fishermen) to assist him with various chores while out at sea.¹⁸ These trips can be short (a single day) or, in the case of large launches, may extend up to two months. The net earnings (after deducting costs) are divided into *patis* according to a formula. If the *nakhuda* is the owner, he gets 4.5 shares: one for the boat, one for the engine, one for the net and 1.5 for his expertise. If the boat is leased from an investor, then the lessor gets three *patis*, while the *nakhuda* gets 1.5 *patis*. The *khilasis* get one *pati* each. Clearly the monetary value of the share varies with the volume and price of the catch. The term for loss is *lada*. If, for instance, a trip costs Rs.50,000/- and the catch sells for Rs.40,000/- the *lada* amounts to Rs.10,000/-. *Ladas* are occurring with increasing frequency in Sindh and, on days, fishermen return empty handed. Recent years have seen a surge in investments in boats and launches both by investors and local *beoparis* which has contributed visibly to over-fishing.

Loan sharking: Loan sharks, mostly *pathans*, charge extortionate interest rates (up to 10 per cent a month) for running expenses, often deducting a portion up-front as advanced repayment. Obviously, fishermen take such loans only in distressed conditions which are occurring with increasing frequency.

The contract system: There is also a system of contract fishing prevalent in the large creeks in Sindh controlled by sea lords. Their designated *beoparis* provide fishing permits and loans to fishermen, secure and pay them for their catch without any reference to market conditions.

¹⁷ The term *gaatu* means expert fisherman and in the context of credit refers to the *nakhuda* who is also a *gaatu*.

¹⁸ Namely rowing, steering, fishing, cleaning, salting, etc.

The situation in Sindh is more stressed than in Balochistan. Rising capital and running costs, and the increasing frequency of *ladas* have combined to create a situation where fishermen are unable to repay their running costs, with resultantly mounting debts.

6.2 Fish marketing

The fish marketing system is complex, involving auctioneers (mole-holders), middlemen (beoparis) and fishermen. The process reflects the impact of the systems described above: it varies by species of fish; the type of net used and; whether the fish are exported, consumed locally, or both.

Karachi is the main fish market in Pakistan, both for fresh and saltwater species, as well as the country's only legal export outlet. The Karachi harbour was inaugurated in 1951 and its marketing functions were handed over to the Fishermen Cooperative Society (FCS), which predated the harbour.¹⁹ The society introduced an auctioning system, to be managed by its designated auctioneers (mole-holders, also abbreviated to moles). The harbour currently has about 45 of these auctioneers working full-time. In order to regulate marketing, the system has been made mandatory in both Sindh and Balochistan. The Gwadar harbour currently has 11 active moles but these fall under the jurisdiction of the harbour authority. Moles are also present in smaller numbers at the jetties in the smaller coastal villages. In general, the moles are salaried munshis (managers), back-stopped by prosperous and influential individuals, referred to in local parlance as *seths* (businessmen, investors) or *waderas* (landlords). While the initial membership fee for a mole-holder is nominal (Rs 15,000), a sufficiency of capital is required to provide loans to fishermen for their running expenses.

As mentioned, an authorized mole is allowed to charge a 6.25 per cent commission on every auction of which he pays half to the FCS or to the harbour authorities. He is allotted a space in the auction hall where he auctions the fish unloaded at the jetty by boats and launches. The beoparis (middlemen) bid for lots, which go to the highest bidder and are then either sold to the processing plants, or in the local market to both wholesalers and retailers. The mole also doubles as a commission agent, collecting money from beoparis and paying it to the fishermen for the commission he charges. Basically, he injects stability in the process by ensuring fishermen get paid.

Other parallel systems are also in place which bypasses the mole-holder. In Sindh, a category of small beopari called *vichaatay* in the local language purchase fish directly from fishermen. The *vichaatey* work for large *beoparis*, who are agents for the processing plants which export fish and shrimp, or convert trash fish into chicken feed. The *vichaatey* charge the large beoparis a commission between five and 10 per cent. In Gwadar, the processing plants have designated *beoparis* who buy fish directly from fishermen. At Sorbandar, a fishing village in Balochistan, Iranian power boats enter Pakistani waters and buy fish directly off the fishermen at sea.

The presence of these middlemen and systems suggests different pricing arrangements. These need to be viewed along a continuum where exploitation varies directly with indebtedness.

¹⁹ The Fisherman Cooperative Society was founded in 1945, originally as the Karachi Fishermen's Cooperative Purchase and Sale Society Ltd. It is situated at the Karachi Fish Harbour. The objectives of the Society are to ensure the welfare and provide benefits to the poor fishermen by supplying them basic amenities (e.g., nets) at cheaper prices. The Society's board of directors consists of 15 directors, seven of which are elected by members where as eight directors are nominated by the government.

6.1.1 Market determined returns to fishermen

The small *beoparis* (*vichaatey*) assure competitive prices by virtue of their numbers. There is little evidence of price collusion. As mentioned, these *beoparis* charge their costs to the large *beopari* who they work for. This is the closest to a fair return to poor local fishermen.²⁰ The option of going through the mole is less preferred because of the mandatory commission and the delayed payments. However, the *vichaatey* are illegal and their ability to operate depends on how effective is enforcement.

Under the mole system, fair returns to fishermen are only possible to those who are debt free or if they are able to repay their loans within the season. The mole extends loans to meet fishermen's operating costs. This indebtedness ensures a steady supply of fish, the fishermen being constrained to auction their fish through him. In this case, the fishermen get a lower effective price for the fish due to the deductions (commission and debt repayment).

Alternatively, fishermen take loans directly from the large *beoparis* (backstopped by the processing plants) and, in general, it is a preferred arrangement as it means an avoidance of commission payments and immediate cash payments to fishermen upon delivery. This practice is prevalent in Gwadar for fish that are frozen and exported to the Far East.²¹ As it is a "demand pull" arrangement, the *beopari* does not impose extortionate terms. However, this arrangement co-exists in an uneasy relationship with the mandatory auction system.

6.1.2 Less than market-determined returns

Fishermen become vulnerable when the debt to the mole reaches a certain limit, the trade-off becomes unviable and he discontinues the loan. The fishermen then turn to the large *beoparis*, who provide loans but ensure repayment through a lower price for the fish they purchase. A fair question is why should the *beopari* extend loans when the fisherman has lost credit worthiness? Primarily, because *beoparis* are locked into the system. As a fixture in the fishing economy, he can absorb extended debt but this comes at a price to the fisherman in the shape of higher commissions. This growing cycle of indebtedness and distress pricing is becoming increasingly evident in Sindh, especially among the small fishermen, who are struggling to cope in a regime of declining fish catches and mounting debt.

Further along the continuum are fishermen bound by contract arrangements to the sea lords who control the creeks along the Sindh coast.²² Numbering significantly among them are marginalized Bangladeshi fishermen. These groups tend to be high in the vulnerability ranking, as they do not enjoy open access to the sea's resources. Permission to fish the creeks translates into low returns for the catch, a situation further compounded by loan repayments.

The loan shark is the lender of last resort. He charges extortionate interest rates and his repayments are time bound. While not a market player, fishermen locked into this nexus of dependence get the lowest effective returns on the catch.

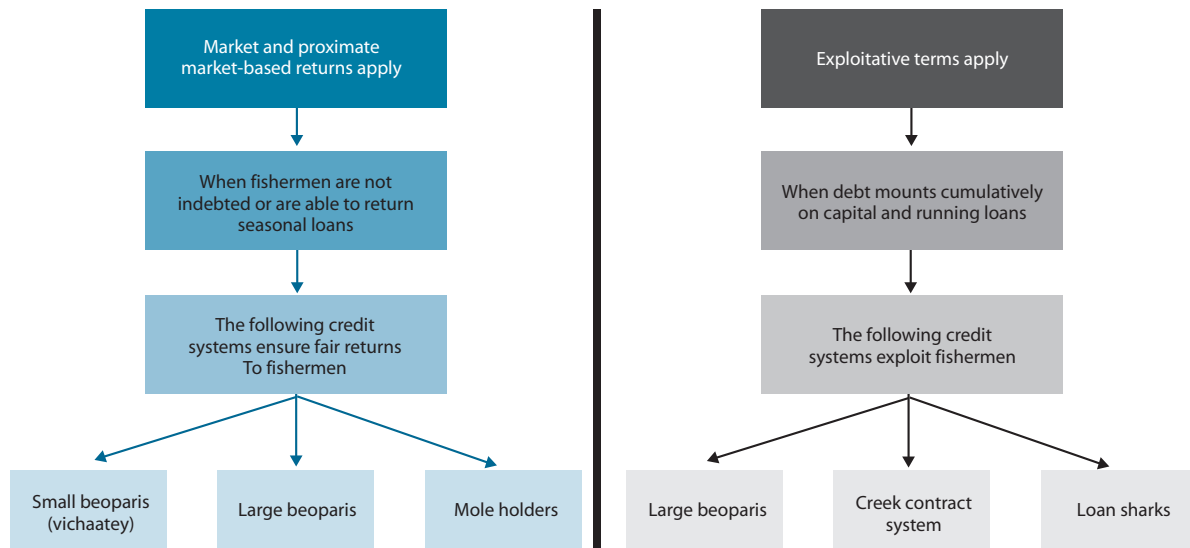
The debt-return linkage is profiled in Figure 3.

²⁰ The Sorbander situation which falls in this category, is an outlier. While the fishermen get a competitive price for their catch and are not required to pay commission, the volume of fish marketed in this manner is extremely small.

²¹ These fish are Indian mackerel, ribbon-fish, sole and crabs.

²² These were landlords, who lost their lands to sea incursion and asserted their claims on the basis of their landholdings.

Figure 3: The Debt-Return Linkage



6.1.2 The debt-poverty link

We observed an empirical link between poverty and indebtedness. Even the smallest boats require substantial capital and running cost outlays. For example, the poorest fisherman, who owns a small boat, first spends Rs.200,000/- to Rs.300,000/- to construct the boat and spends Rs.500–600 on every fishing trip. During the fishing season, he makes at least 20 such one-day trips, averaging about Rs.10,000 per month. Rising costs and decreasing catches have resulted in falling income levels and increased indebtedness. We plotted household income levels against the level of debt for 27 households across Sindh and Balochistan, for which we were able to gather complete data. It suggests an inverse relationship between the two variables, as shown in Figure 4.

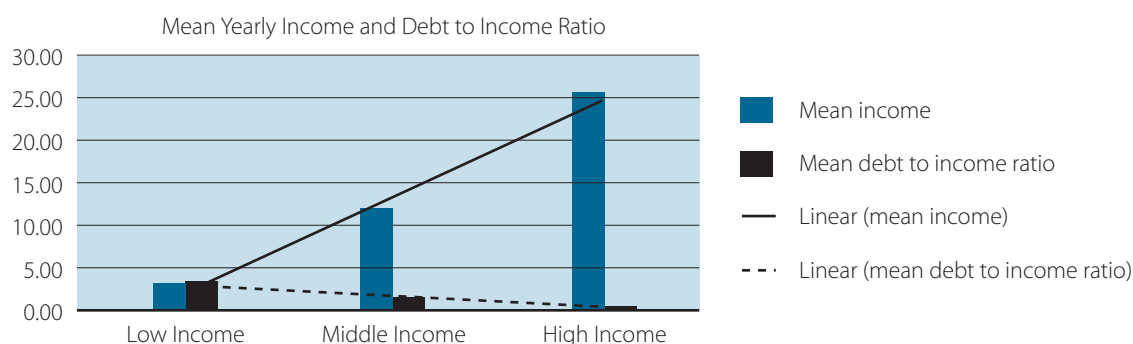
Table 7: Mean Comparisons

	Mean Yearly Income in PKR (x105)	Mean Debt to Income Ratio
Low income	3.03	3.27
Middle income	12.04	1.46
High income	25.28	0.38

Source: SDPI in-house calculation

The data suggest indebtedness is acute among low-income groups in both Balochistan and Sindh. The absence of policies aimed at stemming degradation, limited occupational choices for fishermen and the exploitative terms they get for their catch, have locked them into a cycle of debt dependence and made their livelihoods extremely precarious.

Figure 4: Income-Debt Comparisons



7. Degradation and its causes

Degradation of the marine resources has also contributed to reduced fish catch and depletion of fish stock. The degradation has occurred for various reasons. The retention of freshwater inflows has adversely affected Mangrove forests in Indus Delta. Similarly, untreated industrial effluents and city sewage continues to be poured into the creeks and the open sea either directly or through the Malir and Korangi rivers that pass through the two largest industrial estates in Karachi. In this section, we look at the major causes of degradation and their possible effects on fish catch and stock.

7.1 Policy enforcement failure

7.1.1 Stock assessment

A prerequisite for a sustainable marine fishing policy is regular and accurate stock assessments. This was last carried out in 1980 and there has been no revaluation since then. The provincial and federal governments have acted on the premise of adequate stocks, setting no limits on the number of fishing vessels, restricting catch sizes or protecting threatened species. The absence of a stock survey is convenient as well, as it avoids hard policy and enforcement choices, which the government may not be able to make in the face of powerful opposition. Based on the 1980 stock survey, the prescribed number of launches was 70, however the policy was revised in 1995 and the number was increased to 120. Similarly, 500 fishing boats were recommended as opposed to the 15,000 currently registered with the FCS and the KFH. Many of these vessels are not in operation.²³

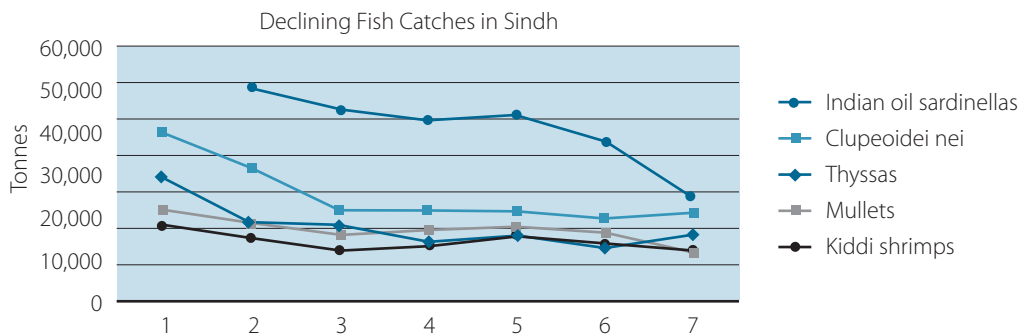
A stock assessment is also in order in view of the evidence of decreasing catch size in certain species, such as Indian mackerel. The data in Table 8 show trends in fish catch for the most important species caught in Pakistan waters (both coastal and offshore), over the period 1993 to 1999. Figure 5 presents the same information graphically.

²³ The fact that there are more vessels registered than in use indicates monitoring lapses.

Table 8: Fish Species with Declining Yearly Catch (metric tons)

Local Name	English Name	1993	1994	1995	1996	1997	1998	1999
Boi	Mullet	21,620	18,439	16,567	16,622	17,678	16,392	11,367
Tarli	Indian oil Sardinella	73,960	50,543	45,231	42,611	44,410	38,110	25,100
Padon	Thryssas	29,260	18,111	17,564	14,091	16,113	13,165	15,154
Palli	Clupeoidei nei	40,210	31,198	21,615	21,982	20,100	19,209	21,103
Kiddi	Kiddi shrimp	18,210	15,121	12,289	13,171	15,912	13,854	12,121

Source: Handbook of Fisheries Statistics of Pakistan, Volume 18, 2002

Figure 5: Species Loss in Sindh

7.1.2 Zoning

A second aspect of policy failure pertains both to arbitrary changes in zoning laws, as well as to weak enforcement. Until recently, the fishing waters off the Sindh and Balochistan coasts were divided into three zones. The territorial waters (also known as the coastal zone) extend up to 12 nautical miles and come under provincial jurisdiction. The continental or buffer zone falls between 12–35 nautical miles. The waters beyond and up to 200 nautical miles are designated as the exclusive economic zone (EEZ), and are fished largely by deep-sea trawlers. Both the buffer zone and the EEZ fall in the federal government's policy remit. The buffer zone was established to protect fish stocks in territorial waters. In 2001, the federal government abolished this zone and, subsequently, trawlers have begun to ingress into territorial waters. The local fishermen complain they denude fish stocks by intercepting the inbound fish spawning runs, and degrade the ocean habitat with their drag nets. In promoting trawler fishing, federal policy is at odds with provincial concerns.

The lack of enforcement also has an inter-provincial aspect. Over-fishing in the Sindh coastal waters has encouraged local launch owners to intrude into the more productive Balochi waters. The federal and provincial maritime agencies and departments are known to collude in this by taking informal pay-offs (between US\$500–650 per trip).²⁴

²⁴ Reportedly, these agencies are the federal Maritime Security Agency and the Balochistan Fisheries Department.

7.1.3 Seasonal bans

The seasonal ban (June–August) to protect spawning fish coincides with the monsoon squalls and makes fishing difficult. In this case, nature comes to the aid of policy. We did observe this in the shape of empty fish auction halls, inactive processing plants and grounded fishermen repairing boats and nets. While the ban applies to sea-going vessels, it does not prevent shore fishing by locals, including in the shrimp breeding grounds.

7.2 Unsustainable fishing methods/technologies

A major reason for unsustainable harvesting is the rapid influx of new fishing methods and technologies which have begun to replace traditional practices. This influx reflects a policy-market nexus as well as livelihood concerns. We alluded to policy failure in the form of data gaps, conflicting laws and weak enforcement. Basically, such policies are commercially driven, as quick returns to investors and foreign exchange earnings (via exports and trawler licenses) override sustainability concerns. Efforts to maintain livelihoods in the face of declining catches, as well as limited opportunities outside fishing are another aspect which force local fishermen into using inappropriate methods.

Traditional fishing methods are environmentally-friendly spanning zones, different types of fishing vessels and fish species. The type of nets were made of silk (*resham*) or a cotton variety (*latha*), were used for stationary fishing and had a sufficiently wide mesh (2.4–6 inches) to release small fry. Some of these are described:

- **Thukri:** A shrimp net used in small boats (18–25 feet) and hand casting. A similar type of net used for the same purpose is called *phat*. Another type of casting net is called the “bin” net. This net is used to catch fish along the coastline. The *dori* is used for creek fishing. Yet another type of environmentally-friendly net, the “jhaari” is no longer in use.
- **Hook and line:** A line baited with a single, a few, or multiple hooks.
- **Rach lara, lathay ka ban (gill net):** This type of net is used on medium-sized boats (25–35 feet) which fish the buffer zone.

Environmentally-harmful nets have been inducted in an effort to increase fish catches. These are made of nylon, have a fine mesh and catch small fry. The translucent nylon allows fishing both by day and night. The smaller nets are prone to rip off on undersea coral, washing up later on the beach. Stationary fishing methods have made way for trawling which scrapes the ocean floor and damages fish habitat. The mechanization of boats and launches has both facilitated the use of these nets as well as permitting mobility. The increasing use of winches has accelerated the pace of fishing and encouraged the use of bigger nets. Some examples of the nets being used are:

- **Bhulo gujja (tidal trap net):** A fine mesh cone net made of nylon, with the mesh getting finer toward the cone. The net is tied by wire cords to two iron rods, which are embedded in the creek mouth. Meant for shrimp, small fry get trapped in the fine mesh and decompose. The net was introduced by migrant Bangladeshi fishermen but the uptake by local fishermen has been rapid. A variant is the *chappal gujja*, which is tied along the sea-shore near mangroves. It catches juvenile and small shrimp.²⁵

²⁵ The Sindh coast has 17 large and hundreds of small creeks, which are actually branches of the larger creeks.

- **Launch gujja:** This is a larger version of the *bhulo gujja* and is used on medium-size and large boats (20–35 feet) and launches. It is a drag or trawling net made of thicker nylon but the mesh is still fine and traps fry. The net scrapes the ocean floor and damages fish habitat. This net was first introduced here in 1951 and is rapidly replacing the gill net. The use of these nets and winches has earned these traditional launches the pseudonym of “mini deep-sea launches.”
- **Qatra (fine mesh net, also referred to as a wire net):** This net is used in medium and large-sized boats and launches to catch trash fish, mostly sardines, which are converted to chicken feed.
- **Plastic nets:** This is the term used for fine mesh nylon nets used in Balochistan. They come in all sizes and are used in small and medium-sized boats. They were originally introduced about three years ago by the migrant Bangladeshi community, working under contract to the processing plants to catch Indian mackerel, ribbon-fish and sole for export largely to the Far East. In time, they have been assimilated more widely.
- **Deep-sea trawler nets:** Deep-sea trawlers use a variety of nets; trawl liners, bag type trawl nets that scrape the ocean floor, hooked rope nets (used by long liners). The combination of these nets and winches causes considerable ecological damage. Also, the trend towards target fishing results in unwanted dead fish being thrown back into the sea, which is both wasteful and harmful to the ocean ecology.

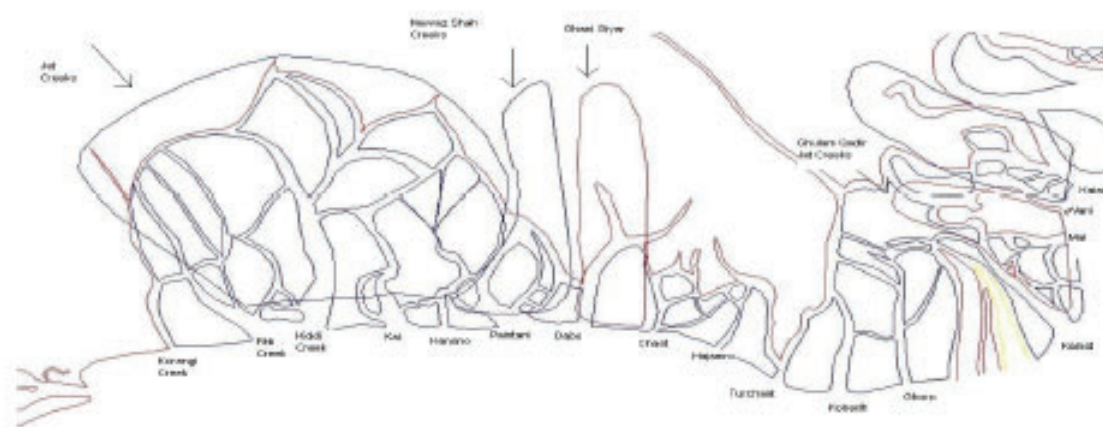
7.3 Vulnerability: Resource rights and the poverty-environment nexus

Poverty contributes to resource degradation and vice versa. This vicious cycle defined in the literature (see Khan *et al.* 1999) as the poverty-environment nexus is an appropriate context for the behaviour of poor coastal fishing communities. The Bangladeshis, by virtue of their migrant status and consequent vulnerability, are captive to contractors of the sea lords, the processing plants and to maritime agencies. The environmentally-destructive practices they have introduced, in particular, the *bhulo gujja*, the *qatra* (plastic net) and the off-season shrimp fishing can be seen as an effort to stay afloat under highly adverse conditions. These conditions reflect a combination of distress prices for their catch, declining fish catches and illegal payoffs.²⁶ The indebtedness of poor fishermen we referred to in an earlier section is a more pervasive condition, which also explains the rapid uptake of these destructive fishing practices.

The increasing poverty of fishermen is linked in important ways with the deprivation of their resource rights (open access). There are three manifestations of resource capture. First, sea lords claim ownership over the coastal creeks (see map).

²⁶ Near the Indian border, coastal rangers demand pay-offs from local fishermen in exchange for permission to fish the creeks.

Figure 6: Sea Lord Claims Over Creeks



These sea lords, formerly owners of the inundated agricultural lands, have taken possession of these creeks by virtue of their prior status as landlords. They link permission to fish the creeks to the sale of their catch to designated beoparis. It is not difficult to see the connection between the resultant distress pricing and the use of harmful nets. Second, as fish stocks in the Sindh waters have dwindled, launch owners have begun to intrude into Balochistan's territorial waters. This practice, as we noted, is facilitated by the Fisheries Department and the Maritime Security Agency. Not only do these launches catch fish illegally, their drag nets cut the smaller stationary nets of the boat fishermen. On occasion, communities have resorted to violent action to assert their resource rights. For instance, the Pasni fishermen reported violations to the authorities. Absent of a response, they took matters into their own hands and impounded the fishing nets of the Sindhi launches.²⁷ Third, resource capture is embedded in existing fishing policies. The institution and revocation of zoning laws has allowed trawler intrusions into coastal fishing waters. As another example, dredging in the Gwadar port has destroyed rich shrimp breeding grounds. Also, the Maritime Security Agency now requires prior security clearances to allow fishermen access to waters around the port.

While the analysis above suggests that poor fishing communities do degrade resources, it also suggests strongly that this is an induced response, rather than a deliberate or wanton act. It is induced by commercial pressures which, in turn, are supported by policies. Federal and provincial fishing policies, through both intent and default, support commercial interests at the expense of environmental and livelihood concerns. Zoning laws and price manipulation by the processing plants, middlemen and the sea lords leads to reduced catches and low returns on these. Consequently, poor fishermen resort to environmentally-harmful technologies to sustain themselves. However, these cause relatively less harm than these technologies employed on a much larger scale by deep-sea trawlers and launches.

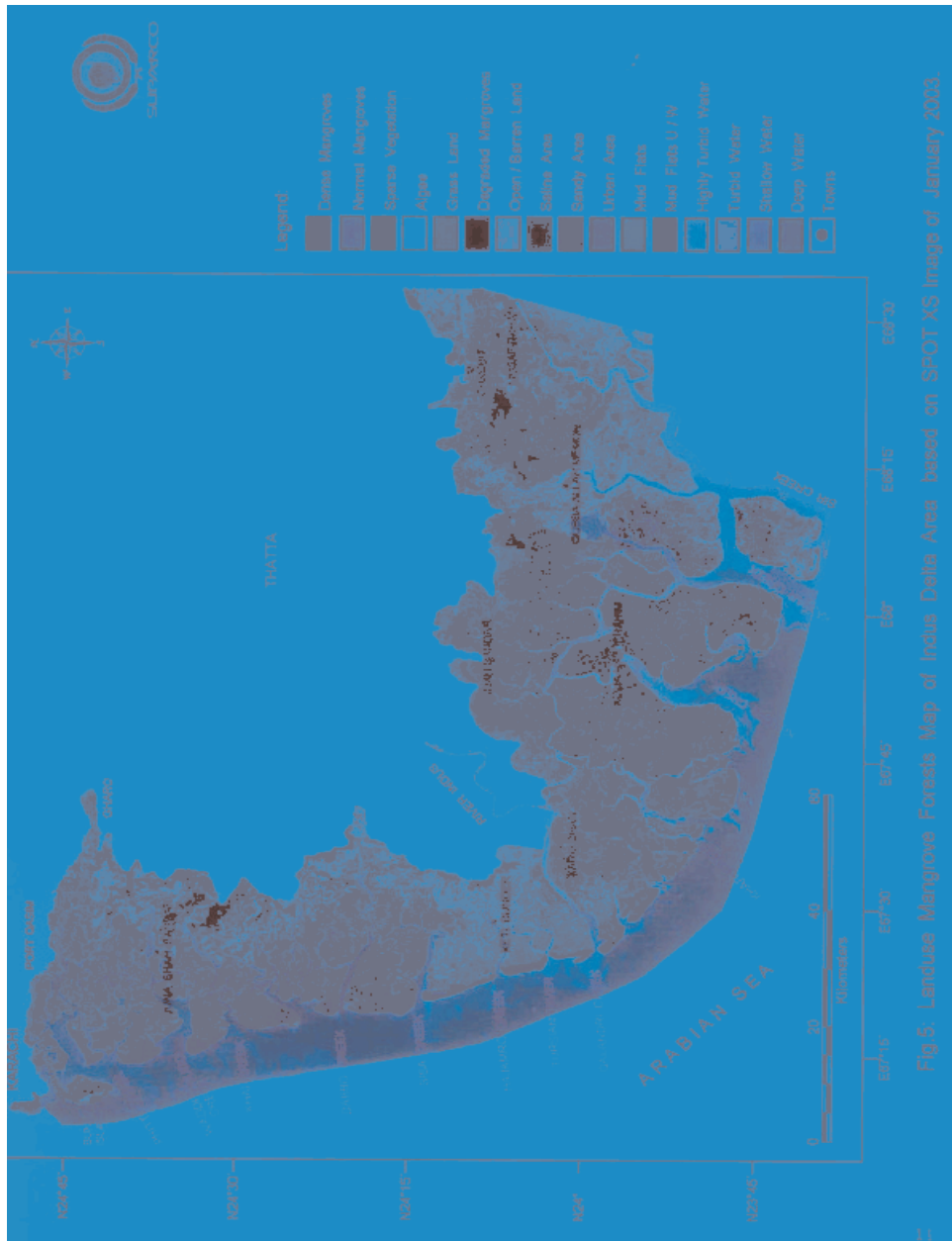
7.4 Fresh water retention

Degradation of the Indus delta ecosystem as a result of reduced freshwater outflows is already a highly visible phenomenon. The present level of silt discharge, estimated at 100 million tons per year, is a four-fold reduction from the original level before the rivers were dammed. The combination of saltwater

²⁷ In conversations with the Pasni fishermen, they claimed they were asserting their rights under customary law.

intrusion (some reports show this as 30 km inland), and reduced silt and nutrient flows has changed the geomorphology and hydrology of the delta considerably.²⁸ The area of active growth of the delta has reduced from an original estimate of 2,600 sq. km (growing at 34 metres per year) to about 260 sq. km. Freshwater reaches only a few of the creeks and others have become blocked. The delta is being transformed by strong wave erosion, an increasing dominance of sand at the delta front and an increase in wind-blown sand deposits as a result of losses in vegetation.

Figure 7: Satellite Image of the Indus Delta Depicting Mangrove Forests



28 In theory the change in parts per million of sodium concentration would cause a shift in species diversity and impact breeding patterns and success. However, there is no documentation available to validate this.

The consequent ravages to the ecosystem have been exceptionally severe, in particular to the mangroves which are its mainstay. One of the major causes of degradation and (possible) reduction in fish stock is the degradation and depletion on mangrove forests in the Indus Delta. The degradation has taken place primarily because of state negligence. The National Commission on Agriculture in its report published in 1988 observed that mangrove forests were more seriously threatened than any other forests in the country.²⁹ A WWF report on mangrove forests in Pakistan observes that Pakistan has lost 1,700 sq. km. of mangrove forest area in past 50 years.³⁰ The report notes that the Indus delta had eight different species of mangroves, most of which are not found in Pakistan today.

Mangroves are important as they sustain fisheries through their role as breeding grounds, act as natural barriers against sea and storm surges, keep bank erosion in check and are a source of fuelwood, timber, fodder and forest products, a refuge for wildlife and a potential source of tourism. Without mangroves and the nutrients they recycle and the protection they provide, other components of the ecosystem would not survive.

The health of mangroves is directly linked to freshwater outflows. Releases below Kotri barrage average 34 million acre feet (MAF). Of this, about 10 MAF actually reaches the mangroves, and that, too, between the kharif months of July and September. The rest is lost due to evaporation or diversions. According to the Sindh Forestry Department, about 27 MAF is required to maintain the existing 260,000 ha. of mangroves in reasonably healthy condition. This is seven MAF more than currently available, a situation which has contributed to ecosystem instability and mangrove loss. Within the framework of the Indus Water Accord, the intent is to divert an additional 11 MAF for upstream dam construction—including Kalabagh, to meet agricultural and hydropower needs. This would result in a further reduction in existing sub-optimal flows and aggravate an already critical situation.

Land reclamation works have also contributed to mangrove depletion, closing the creeks and destroying fishing grounds. Such construction suggests the need for a coastal zone management law akin to the one in India which prohibits construction anywhere within a distance of 500 metres from the shore.

7.5 Pollution

There are multiple sources of water pollution: oil spills at the ports and harbours; household and industrial waste; and effluents and agricultural runoff.³¹ Karachi and the surrounding industrial estates (Korangi, Landhi and SITE) are the main source of household and industrial wastes and effluents. Agricultural run-off, which used to spill into inland lakes (Manchar, Haleji, Dhabeji), is now being diverted to the lower Sindh coast through the donor-funded Left Bank Outfall Drain (LBOD) with a parallel drain on the right bank of the Indus on the anvil. The following extract from a United Nations Industrial Development Organization (UNIDO) study gives a quantitative measure of pollution flows to the sea.³²

29 P. 27, "Regional Technical Assistance for Coastal and Marine Resources Management and Poverty Reduction in South Asia – Pakistan Component." Asian Development Bank IUCN – The World Conservation Union Pakistan, June 2003.

30 <http://www.panda.org/downloads/policy/rcpakistan.doc> (cited on November 14, 2005).

31 The recent Tasman Sea oil spill and its effects have been well documented.

32 Aftab *et al.* 2000.

“Karachi uses approximately 500 million gallons per day (mgd) of water, discharges at least 250 mgd of sewage and generates 3,000–5,000 tonnes of solid waste. Approximately 70 per cent of wastewater reaches the marine environment without any form of treatment, and the city has the capacity to properly dispose of only 20–33 per cent of its solid waste. There are three sewage treatment facilities for the city of Karachi and none of them run at full capacity, due to a deteriorating collection system and the inefficient removal of pollutants. The problem of sewage and solid waste disposal is complicated by the rapid growth of unplanned settlements.”

Ercelawn, Shah and Birwani (2000), citing local fisherfolk, state that the fish catch has been reduced to one-fourth its original level because of discharges into the sea from oil factories, power plants and city sewage. Their report states, “the effects of pollution extend from degradation of breeding areas to poisoned stock of adult fish.” In the extreme, natural habitats can be virtually destroyed, as has happened around Baba and Bhit islands. An additional burden of pollution is the increased distances fisherfolk have to travel to catch fish driven away by the pollution.

8. Fishery policy issues

8.1 Federal jurisdiction

As indicated earlier, jurisdiction over Pakistan’s maritime waters is shared by the federal and provincial governments. However, in addition to its control over the EEZ, the federal government also maintains a strong presence in territorial waters through various federal agencies of customs, immigration, maritime security, shipping and ports. In recent years, this presence has increased further with the creation of the Fishermen’s Cooperative Society (FCS) and Maritime Pollution Board (MPB).

The federal government’s key policy thrust over the past two decades was on the commercial aspects of marine fishing. Little attention was paid to the concerns of local fishing communities or to the sustainable management of marine fisheries. The new deep-sea fishing policy of 2001 is more inclusive. It refers to the “human dimension” and describes the “socio-economic uplift of the small scale fishermen” as one element in its two-pronged strategy to rejuvenate the sector. The other element is the conventional improvement in “foreign exchange earnings through an increased export of fish and fishery products.” The policy aims to uplift small-scale fishermen by:

- equipping boats with modern gadgets;
- up-grading fishing skills by imparting training in modern fishing techniques to encourage fishing in the 12–35 nautical mile zone-II; and
- ensuring better market prices through an improved marketing system.

In addition, the policy proposed a revolving fund to be established by the Agricultural Development Bank of Pakistan (ADBP) with US\$0.5 million in seed money. Long-term financing was to come from licensing fees. The loans were to be provided to local fishermen on a deferred payment basis. Marketing system improvements entailed removing the middleman from this sector to ensure maximum returns to the local fishermen. The policy also proposed the following measures/plans to improve the conditions of small-scale fishermen:

- post-harvest sectoral improvements;
- diversification of fishing efforts;
- development of coastal aquaculture; and
- fish inspection and quality control program.

Various stakeholders that we interviewed expressed disappointment that there had been no substantive implementation of the range of proposed measures. Generically, the new deep-sea fishing policy has many shortcomings. To begin with, it gives short shrift to traditional resource rights of the local fishermen. Instead, the policy defines fisheries as an open access resource. Equally critical, it only recognizes over-exploitation in shrimp catching but does not acknowledge over-fishing as a wide-spread problem. This leads to the misguided recommendation to diversify into fin fishing. This is at variance with the reality of fish catches dropping across the board. Furthermore, the policy chalks out no strategy or plan for long-run sustainable development, conservation and management of marine fisheries.

8.2 The provincial remit

As stated above, the process of policy-making and its implementation vis-à-vis marine fisheries is complex and largely ineffective when it comes to addressing problems of fisherfolk communities. The ineffectiveness primarily stems from the shared jurisdiction over sea waters. The Federal Legislative List of 67 items defines “fishing and fisheries beyond territorial waters” as a federal subject. Similarly, it also describes “maritime shipping and navigation, including shipping and navigation on tidal waters” and “major ports... and the constitution and powers of port authorities therein” as federal subjects.

The provincial governments are empowered to make policies for territorial waters. However, in the absence of such policies, there is no substantive basis for taking up issues on legal grounds with the federal government. For example, environmental pollution and ecology are on the concurrent list; therefore, the provincial governments are free to legislate on these. There are precedents. The Sindh government invoked its Provincial Wildlife Act to stop drilling in the Kirthar National Park when the federal government gave a concession to a multinational oil giant in the area. The Sindh Government could only take up this issue because legislation was in place disallowing such activities.

MINFAL only issues licenses to vessels of a certain type and has no check on local large-sized mechanically propelled launches (45 feet and above) fishing in the EEZ. These launches are registered with Mercantile Marine Department (MMD) but operate without a deep-sea license since the deep-sea fishing policy does not limit the number of traditional fishing launches fishing in EEZ. Consequently, the number of these large launches has been increasing continuously. The provincial government also does not limit the number of boats (small or medium-sized) fishing in territorial waters. As a result, their numbers have also increased significantly in past ten to fifteen years. Further, the use of destructive gear and fishing techniques is widespread among the fisherfolk. Although the Sindh government banned the use of destructive nets³³ (bhoolo, gujjo and qatra), the ban has not been implemented. The policy failure on the part of local and federal governments has contributed to over-fishing in both territorial and EEZ waters.

³³ Fishermen for cancellation of deep-sea trawlers' permits. <http://www.jang.com.pk/thenews/jul2005-daily/05-07-2005/metro/k9.htm> (cited on 06-08-2005).

Besides over-fishing there are other issues that require the attention of policy-makers in Islamabad and Karachi. Although the policy intends to improve post-harvest processing facilities, it pays little attention to on board processing of fish. The catch at this stage is susceptible to various toxins and pollutants because of the use of unclean water and ice on the boat. The deep-sea policy stops short of discussing this issue by keeping it focused on the insulation of the refrigeration system in traditional boats. While this is a step in the right direction, it will only partially solve the problem. The GOP also needs to look into standardizing fishing methods. The fisherfolk over the years have developed techniques using local knowledge that would maintain the ecosystem balance. The introduction of destructive techniques in the past two and a half decades without any effort to curb them has disturbed that balance. The government, therefore, needs to listen to the local voices when making fishery-related policies and regulations.

The policy issues in the marine fishing sector are not specific to fishing alone and, by the same token, difficult to address as they need a blend of political will and strong policy advocacy. Karachi currently is the hub of all marine fishing activities in Pakistan. At the same time, the sea happens to be the “dumping ground” of wastes being generated in the city causing the traditional fishing grounds along the Karachi coastline to degrade. Similarly, a reduction in freshwater inflow into the sea has resulted in a decrease in mangrove forest areas. This issue continues to be politically contentious with more large dams upstream being planned.

With regard to effluent dumping, provinces are—as mentioned—free to legislate on environmental issues and such provincial acts and regulations in other sectors already exist. Furthermore, the Pakistan Environmental Protection Act, 1997 (PEPA), broadly includes water and its ecosystem as one of the areas to be environmentally protected. The provincial Environmental Protection Agency (EPA) is empowered to implement federal environmental protection laws. Similarly, the mandate of the Coastal Development Authority Act of Sindh, 1994, also includes the protection of the marine environment. The point of the above discussion is to show that enough legislation and laws and acts exist at the federal and provincial levels to protect the marine fisheries sector. Like other natural resource sectors, these “good” laws and acts need to be implemented.

8.3 The need for a sustainable fisheries policy

Over-fishing and the use of destructive nets and gear are essentially symptoms of a larger problem. These relate to poverty, lack of education and alternative livelihoods/sources of income. Consequently, policies should not focus on the symptoms, instead they should address the source of the problem. The Philippines experience (see Box 2) can be a useful starting point, with the observation that the fishing communities participated actively in their coastal resource management plans and projects.³⁴

Serious efforts in formulating a sustainable fisheries policy are recent in nature. The Pakistan Fisherfolk Forum (PFF), as its name suggests, is a representative body of fisherfolk working in the coastal areas of both Balochistan and Sindh. The PFF was formed in May 1998 to address the threats to livelihoods of the local fisherfolk community. It is engaged actively in creating awareness, mobilizing and organizing the fisherfolk community for the protection of their livelihoods and sustainable management of the fisheries. PFF has recently prepared a draft sustainable fisheries policy. It is the only comprehensive document of its kind that exists in Pakistan presently, is essentially based on local voices and is geared towards addressing the problems of local fishermen. The initiative on the part of PFF is also important

³⁴ Asuncion *et al.* (undated) and White *et al.* (undated).

as it represents a serious effort from civil society to improve governance and policy-making processes in the provincial government. The draft policy is broadly based on principles of sustainable ecosystem management. It envisages “to protect fisherfolk communities livelihoods resources in the country, bringing sustainability in the fisheries resources of Pakistan for the present as well as coming generations and ensuring complete protection and rehabilitation of the coastal as well as freshwater biodiversity.”

Box 2: From Central to Local: Management of Marine Fisheries – The Case of the Philippines

In 1932, the Fisheries Act gave most management responsibilities to the central government. The focus after that shifted to increasing efficiency in fishing. The premise did not recognize resource decline as a problem but instead considered lack of proper exploitation of the resource a reason for the declining catch. This led to intensification of both commercial and small-scale fishing with use of destructive fishing gear. Coupled with habitat loss, the problem of over-fishing became exacerbated in the Philippines. “As early as the late 1960s, the country had reached the maximum economic yield of its demersal fish stocks.” Currently, fish is being harvested at a level which is 30 per cent more than the production capacity. With current rate of over-fishing, the per capita annual availability of fish will fall down to 10 kg by 2010. Fortunately, there is much that can be done to avoid such a scenario. Issues in the Philippines’ fisheries are not different from fisheries in other third world countries. The reasons for over-fishing are also universal: “open access, widespread technological advances; economic development policies of governments, especially those providing subsidies to keep inefficient boats running and encouraging even more investment in fishing technology and boats; growing human population; and insatiable demand for fish from a growing, lucrative global market.” As the awareness about these problems grew and effects became known, the government responded by adopting laws and policies that promoted conservation and management of marine fisheries. At the same time, laws were introduced banning all types of destructive gear and methods in use in this sector. However, at the same time, the government devolved its powers. The management of fisheries was transferred from the central government to local government units. This shift to “people’s power” improved the participation of small-scale fishermen in the affairs of the government. The government, at the same time, started Coastal Resource Management (CRM) activities. CRM focused on information, education and communication; enterprise development; and national policy formulation. These CRMs are running in nearly all the municipal fisheries in the Philippines. Although, the problems are far from being over, the Philippines is on the right path to cure various ills afflicting its fisheries sector.

Box 3: The Sustainable Fisheries Policy, prepared by the PFF contains the following proposed measures:

1. Determination of fisherfolks' rights
2. Fish stock survey
3. Rehabilitation of threatened species and heavily fished grounds
4. Introduction of sustainable fishing practices and fishing gear
5. Water allocation for the biodiversity/fishing grounds
6. Water allocation for the Indus River delta
7. License system in fisheries livelihoods
8. Training and provision of alternative livelihoods
9. Improvements in marketing systems
10. Fish net manufacturing plants
11. Introduction of safety measures during fishing trips
12. Community-based sustainable aquaculture
13. Establishment of district-level fishermen cooperative societies
14. Registration of nets
15. Mangroves conservation
16. Alternative skill development training for fisherwomen
17. Ban on over-fishing
18. Revision of deep-sea fishing policy
19. Proper implementation of ban on harmful nets
20. Representation of fisherfolk in the policy/decision-making bodies
21. Ban on the construction of new fishing boats
22. Rehabilitation of fishing communities affected due to large dams
23. Abolition of sea lords
24. Formation of trade unions and implementation of labour laws
25. Community-based natural resource management
26. Enhancing community participation and ownership
27. Reviving the institutional credit facility
28. Reduce and eliminate the by-catch

9. Conclusions

This report discusses primarily issues in compliance with international standards in Pakistan's marine fisheries sector. The compliance with international standards has been analyzed in the context of a supply chain analysis at three different stages namely, harvesting, pre-processing and processing. The harvesting standards are basically covered by the MSC principles discussed in earlier sections. Although, the standards are purely voluntary, there is a possibility of their becoming an "international norm" in future years. Similarly, the processing standards are spelled out in Codex Alimentarius and implemented through HACCP guidelines. The standards chiefly deal with processing of seafood, however, they spill over to harvesting by including on-board processing standards.

In the processing industry, market forces work towards ensuring compliance from processors—the opportunity cost of non-compliance can be as high as a complete loss of foreign markets for local business. Our survey shows that the processors have, over the past six to eight years, been willing to invest in implementing HACCP plans to ensure compliance for their European and American clients.

In contrast, there is weak compliance with harvesting (voluntary or otherwise) and pre-processing standards. This is largely due to the absence of institutional mechanisms capabilities to cope with this requirement. Similarly, deep-sea fishing policies introduced since 1980 have focused on the commercializing aspects of fishing without much regard to quality control and fisheries management. Underscoring this problem is the perception of marine fisheries as an open-access resource. As a result, the sector has witnessed severe over-fishing and the threat of species depletion.

The lapses at the harvesting stage signal two messages: first, a sustainable fisheries policy needs to be formulated and; second, in the interim, the good aspects of existing policies need to be implemented. With regard to the first, policies need to recognize the interdependence between fishing methods and conditions of fisherfolk communities. Aguero and Costello³⁵ (1986) state that:

“If fisheries management is to be integral, it must be based on information data and interpretation which is also integral. The need is for research leading to an integral analysis and understanding of the fisheries sector where biological, technological, socioeconomic, cultural and institutional factors are properly accounted for in active interaction with other components” (p. 819).

Similarly, Smith³⁶ (1983) states:

“The fishery is seen as encompassing input supply, production, and distribution sectors, with linkages to other sectors in rural areas. Changes in the resource base and the heterogeneity of fishermen and fishing communities require projects that are ‘locale-specific’ and that recognize the needs that fishermen themselves identify. Such projects should also appreciate the vertical and horizontal linkages that fisheries and fishing communities have with other sectors and institutions” (p. 2).

35 As quoted in John, Joshua. 1994. “Managing Redundancy in Overexploited Fisheries.” World Bank Discussion Papers 240, Fisheries Series. Washington.

36 *Ibid.* 27.

We therefore recommend the following policy measures:

- formulation of a sustainable fisheries policy that focuses not only on ecosystem management but also includes economic uplift of fisherfolk communities;
- restricting access rights to the marine fishery resources;
- a complete ban on industrial fishing and use of destructive fishing gear by both local and foreign fishing vessels. Adequate resources and manpower allocated for enforcement;
- an improved marketing system that ensures just prices and immediate payments to small fishermen; and
- micro-credit schemes, supported through the PFF. Reduction of fishing capacity by imparting training in other skills to local fishermen and provision of alternative livelihoods.

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Annex 1: Household survey, focus group discussions, interviews

Questionnaire for fishing communities

Livelihood aspects

1. For how long have you and your family been living in this area?
2. a) Is fishing the only source of income for your family?
b) Are there any other sources of income and livelihood in the community?
3. What is your average daily/weekly/monthly income?
4. a) How many times do you have to go out to sea to earn this amount?
b) For how long do you have to set sail to ensure a good catch?
5. What is the cost of each trip?
6. Do you own your own boat(s) and nets or do you rent/lease your equipment? (What is the cost of renting such equipment?)
7. What methods do you use for fishing?
8. What types of nets are being used?
9. Do you use banned nets like “gujjo” and “bhoola”?

If yes

- a) Why are these nets being used? Does everyone use them?
- b) Have they always been in use?

If no

- c) Why not?
- d) What made you decide not to use banned nets as they could catch more fish?
10. a) What is the average size of your catch?
b) How much is caught per day? (How many catches per day?)
11. How much of your catch are you able to sell in the market?

12. How much of it is wasted?
13. Have you noticed any change in the size of your catch over the past number of years/seasons?
14. What reasons can you cite for this change?
15. a) Do you think Government policies have played a role in this?
b) How can government policies help to alleviate these problems?
16. a) Do you think fish stocks have reduced in the past decade?
b) By how much has stock depletion taken place?

If yes

17. What are the possible reasons for this decrease in the size of fish stocks?
18. Have you noticed pollution from upstream waters? A lack of water entering the delta from upstream sources? If yes, where do you think the contamination is coming from? Have you noticed factories or agriculture upstream that has increased output in the past? Have you noticed increased export activity or industrial/agricultural activity in the surrounding areas?
19. Have large trawlers/commercial ventures impacted on stock depletion?
20. Do the trawlers operate in provincial waters (the 12-NM zone adjacent to the sea-shore)?
21. How have you been affected by the abolition of the 12 to 35-NM buffer zone?

Problems

1. a) What are the general problems you face in earning your livelihood?
b) What problems require immediate attention from the government?
2. What is the nature of these problems?
3. Have you approached government officials/institutions to assist in solving these problems?
4. What type of response do you get when you approach various officials/institutions?
5. Have there been any efforts of community mobilization to solve such problems?
6. What type of problems have you faced due to the degradation of mangrove forests?
7. Can you cite any reasons/causes for this degradation?

Processing

1. What storage facilities are available to you?
2. Are the current facilities adequate for your needs?
3. How do you rate existing storage facilities?
4. Do you think that current facilities can be improved? If yes, how? If no, what are the constraints?
5. Do you sell fish to exporters or do you sell directly to the local market?
6. Are you required to process the catch in any way?
7. If yes, how do you process it?
8. Are you aware of any specific processing techniques/methods? What are these? Are there any standards followed?
9. How do you ensure that the catch does not rot/decompose?

Sub-contracted work (processing of shrimp and prawns)

1. Do you receive any work from contractors?
2. How much do you earn by doing contracted work?
3. How much are you paid for such type of work?
4. What are you required to do?
5. Where do you do it? Do you work in your homes or do the lead contractors provide you a workspace/room/hall?
6. Can you describe the environment of the workplace?
7. Does the lead contractor ask you to follow certain practices while doing the work? If yes, what are these practices?
8. What is the mode of payment adopted by these lead contractors?
9. Do you think that you receive a fair wage rate from the lead contractor?
10. Do you have any other way of earning your livelihood?

Questions for focus group discussions

1. In your opinion, what are the main problems/issues of the fishery sector? How can these problems/issues be solved/resolved?
2. How has pollution within the Indus River and Arabian Sea affected the fishery population? What have the sources of such pollution and water flow reduction been? Agricultural or industrial in the surrounding areas? Upstream industrial development?
3. What common social and economic hardships do fisherfolk face?
4. What will be the major challenges in the future that will have to be addressed?
5. Has the government taken any measures to improve your conditions? Are any subsidies available?
6. Do large foreign trawlers enter your waters to fish?
7. How have these trawlers affected your livelihoods?
8. Have you tried to stop them from doing so? What has the government response been? Are local trawlers also involved in such practices?

Checklist for policy-makers

1. Trade commentators claim that, while immense potential lies within Pakistan's fishery sector, particularly in earning valuable foreign exchange, little gains are reflected in our export figures from this sector. What do you think is the prime reason for these low earnings? In your opinion, what are the key hurdles and bottlenecks (market-based and regulatory-based) that need to be removed to realize potential gains?
2. How effective have government policies been so far in facilitating export gains within this sector? What evidence (including documents and statistics) do we have that illustrate the results of such policies?
3. Do you envisage the success of policies different from the current ones? What should they encompass (market/regulatory/hybrid)?
4. Reports indicate the operation of large foreign-owned trawlers in provincial waters, in violation of government rules. Have you witnessed such violation and if so, to what degree? (How many trawlers have you seen and how frequently do they cast their nets within the buffer zone?)
5. Reports indicate that local fishermen feel threatened by the presence of these trawlers, claiming that they are encroaching upon their sole means of livelihood. To what extent is this true? What evidence exists and what other means of livelihood are available to such communities?
6. Do you think the abolition of the 12 to 35-NM buffer zone was an appropriate policy decision for the development of this sector?

7. Commercial fishing ventures' practices indicate that harvesting is being done beyond sustainable levels. Are there any policy regulations in place to promote sustainable harvesting?
8. What possible role can the government play in promoting sustainable harvesting? (Policies, cooperatives for trading, subsidies to sustainable livelihoods?)
9. Early last year, the European Union imposed the complete checking of consignments after detecting chloramphenicol in an export consignment of shrimp from Pakistan to an EU member nation. Although the condition was waived off in October 2002, this incident reflects poorly on our policy-makers and their ability to communicate latest market developments to exporters. What are the provincial and federal governments doing to improve this situation and raise awareness among the policy-makers on various standards like SPS and/or HACCP? Are there any monitoring bodies? Agencies?
10. Commentators claim that if relevant policy measures are taken to promote value addition in this sector then fishery export figures can realize annual gains of up to US\$500 million. What measures that you know of have been taken to improve the output from this sector?
11. Has increased industrial/agriculture activity been seen upstream within the Indus Delta? Freshwater flow reductions have resulted in saltwater intrusion. What has been the cause of this? Has pollution from upstream sources been noticed? What types of contamination are of concern?

Does the government of Pakistan or Sindh consider harvesting and its sustainability an issue that needs to be addressed? If yes, what prompted them to consider it? If no, what are their reasons for not believing it is an issue?

Annex 2: Themes emerging from the interviews

1. Over-fishing

The interviews and focus group discussions revealed that there are many factors contributing to the phenomenon of over-fishing. First of all, the data for the stock of fish in the sea date back to 1980. Current figures for the number of fish in the sea are not available. While, on the one hand, this leads to the government over-estimating the resources available to the country from the sea and thus a distorted fishing policy, on the other, it prevents the fishermen from knowing the optimal and sustainable catch size to harvest which would ensure their livelihood not just in the present but also in the future.

Secondly, the building of jetties and ports has led to rapid commercialization of the coastal areas and especially the fishing communities, which have also attracted outsiders. There has been a great demand for modernized fishing equipment and boats which has led the small fishermen to borrow from the local *seths*. Such borrowing has forced them into selling to the *seths* at amounts lower than the market prices, thus pushing them deeper into the cycle of poverty. Faced with such a situation, the only way fishermen can make a living is by trying to catch more and more fish. In the same vein, the number of boats in the seas is rising despite the easily observable decline in fish stocks because fishermen are building more and more boats so that their chances of landing catch are maximized.

Moreover, the use of banned nets by small-scale fishermen, as well as by the trawlers, combined with the harmful fishing methods employed by the trawlers is leading to over-fishing. Another factor contributing to over-fishing is the increase in the population in coastal fishing villages. Outsiders, like the Bengalis who have come to settle in these areas, have also contributed to the population pressure on the limited resources offered by the sea.

2. Banned nets and species depletion

Nets such as the *bulloo* and *gujjoo* were introduced in Pakistan by the Bengali fishermen. Despite being rightly regarded by the local fishermen as harmful to fish and their initial resistance to these nets, their usage caught on in the coastal areas of Pakistan because they ensured a safe and guaranteed income. The use of these nets, as well as variations of harmful *resham* and plastic nets, is now widespread. *Khukri* and wire nets are also harmful.

The main reason for the continued use of these banned nets is that these bans are not enforced properly. The government has declared nets as banned but there is no check on their use. Some nets are banned seasonally by the locals themselves which is an effective measure. However, their surreptitious use cannot be prevented.

Plastic nets are invisible and catch juvenile fish, which contributes to species depletion as well. Sindhi trawlers using *palathay ka jaal* in Balochi waters is leading to stock depletion. The *dooboo* fishing method, whereby fish are caught during the time of day it breeds and feeds, leads to hampering the growth of stock. Other harmful fishing practices of the trawlers, such as bottom dragging, disturb the marine life on the sea bed and cause long-term damage to species.

Pollution is causing fish to move away from the coast into deeper waters. However, since shrimp cannot move away and must come to the creeks along the coast to breed, their stocks are shrinking rather than shifting away.

The stock of fish has not only reduced radically. In addition, some species of fish have been wiped out entirely, such as *gallo* and *kalaki* fish in Pasni, *zardum*, *paplet*, and *kalgun* in other areas of Balochistan and *palla* in Sindh. The size of fish has also become smaller. An Indian Mackerel from Sindh, where over-fishing is much more intense, is much smaller in size than ones found in Balochistan, as cited in an example by a respondent.

3. Foreign trawlers

Foreign trawlers are issued licenses by the federal government to fish 12 miles offshore. According to regulations, these trawlers have to be managed and run by Pakistanis despite foreign ownership. These trawlers employ fishing practices extremely damaging to the stocks of fish and the ecosystems of marine life. They use wire nets and carry out bottom dragging for up to a month at a time, destroying coral reef systems and marine life on the sea bed. After catching all sorts of species, since bottom dragging does not allow for targeted fishing, only the fish that is desired to be kept, or on which the foreigners do not have to pay any duty, is kept on board. The rest of the dead fish, up to 90 per cent of the total catch, is thrown back into the water.

Government policy governing these international trawlers is also flawed. While a two-month ban is imposed on small-scale fishermen on fishing within 12 NM over June and July, foreign trawlers are allowed to fish even then. This leads to further species depletion and translates into hardship for the small-scale fishermen on top of having no earnings for two months. In this way, the policy trying to allow fish to breed so that larger catches can later be made works against the very people it is designed to protect.

4. Pollution

Industrial and household waste falls into the sea at several spots. In Karachi, it falls into the sea at Kemari and Minora. This industrial waste is completely untreated. Even though, according to Government regulations, all factories are supposed to treat waste before it goes into the sea, there is no mechanism to keep a check on the enforcement of this regulation and, as a result, dangerous pollutants are added into the ocean at the rate of thousands of tonnes per day. There are no treatment plants to facilitate proper waste disposal. This pollution is driving away and killing the marine life in the region.

The LBOD and Right Bank Outfall Drain (RBOD) arrangements are also adding to the harmful effects of pollution. Chemicals from LBOD and RBOD have eroded embankments which has aggravated the phenomenon of sea incursion. The water from the sea flows upstream and turns river water saline, upsetting ecosystems such as the mangroves and damaging agriculture as well. Moreover, land reclamation work being undertaken around the coastal areas has led to irreparable loss to the environment. The sea is being pushed back, for example, on either side of the Mai Kolachi Bypass in Karachi to reclaim the land for housing schemes, construction of roads or establishment of factories and plants. In this process, mangroves are cleared away and the breeding grounds of fish are turned into commercial property, spelling disaster for the fishing economy.

5. Government negligence

The Government is playing a major role in creating problems in the fisheries sector rather than solving them. The fundamental issue is that of the ownership of problems. There is dual control of the waters

with 12 NM offshore under the control of the provincial government, and from 12 NM up to 235 NM the waters fall under the jurisdiction of the federal government. However, the fact that the provincial government is subservient to the federal government creates problems. Both issue licenses.

At the policy formulation level, this results in both the provincial and the federal government's involvement, while the local government, closest to the source of the issues, is left out of the decision-making. Therefore, the resultant policies neither reflect the true conditions, nor address the problems of the Sindhi and Balochi fishermen. An example of this is the way the FCS, a truly representative organization with a membership of almost 12,000 small-scale fishermen, was completely left out of the picture when a contract for the uplift of the Karachi Fish Harbour was signed with the EU by the federal government in the presence of provincial government officials. This was done despite the fact that the Karachi Fish Harbour was managed by the FCS at that time. In this fashion, slowly the FCS was sidelined with the Sindh government taking a more and more active part in the running of the harbour. Moreover, while the FCS has close ties with the fishermen, the Sindh government is the entity dealing with the donors. Thus the FCS or the fishermen have no direct link or interaction with the donors. Similarly, in Thatta and Badin, the Rangers were given control of the waters which led to a controversy over-fishing rights and required intervention by the President to settle the issue after which the Rangers were asked to give up their authority.

There has been no stock-taking of fish since 1980 and due to this fact the policies formulated are far removed from reality. There is no mechanism to cancel the registration of boats that are out of use and, therefore, the number of actual, operational boats in the seas is unknown. Sea lords are exploiting the fishermen and there is no check on their activities and their claims to the sea and its resources are not validated by any authority.

The breaches of bans on the use of certain nets, and violations by trawlers trespassing and fishing in prohibited areas, go unnoticed and unpunished. If there is a public outcry, errant trawlers are merely fined which does not deter future misdemeanors. Their nets are not confiscated and after the payment of fines which is just a fraction of their earnings, they are allowed to go free. Furthermore, government measures to keep watch on the activities of trawlers are insufficient and at night the local people have to keep guard themselves.

Fishermen are taxed at every stage of harvesting and selling but still have the barest minimum facilities for survival, if any at all. When new jetties or ports are built, entire villages are displaced. Compensation is insufficient and the places they are relocated to do not have appropriate facilities for their catches to be marketed or their boats to be docked and maintained. In this way, rather than facilitating, livelihoods are made more difficult to earn.

There is no system to check the industrial waste leading to pollution of the sea water. No studies to gauge the damage done to the environment by the garbage being dumped into the sea have been carried out by the government. Waste treatment facilities have not been provided anywhere. Moreover, when new ports and jetties are constructed, the environmental aspect is completely overlooked. For example, no such assessment has been undertaken for the construction of Gwadar port. It is common knowledge in the region that the area where large ships are set to be docked are the breeding grounds of shrimp, which will vanish as soon as the port becomes functional. Moreover, several areas of the fishing grounds will become inaccessible to the fishermen once the construction of the port is complete. Similarly, the ADB project for the uplift of the coastal areas does not take into account the environmental factors, and the government has not invoked the EPA.

6. Awareness

In broad terms, there is increasing awareness about all aspects of the fisheries sector across the board, at every level.

Starting from the point of sustainability of the fisheries, there seems to be more awareness in Balochistan than Sindh. The fishermen in Balochistan appreciate and follow the traditional methods of fishing and are against unsustainable fishing practices like those of the trawlers coming from Sindh. They impose seasonal bans on themselves against the use of certain nets and, in some areas, if a fish is caught during the season in which it breeds, it is thrown back into the water. However, these self-imposed bans are not fool-proof and some fishermen still use them, albeit surreptitiously. Fishermen in Surbandar took matters into their own hands when the authorities refused to take any action against trawlers from Sindh and threatened and drove them away. In Sindh, however, harmful fishing practices are being followed without any qualms. There is more over-fishing in Sindh than in Balochistan and the use of harmful plastic nets is still rampant.

At the processing level, processors picked up the threat to their exports and, as a result, have implemented HACCP standards with remarkable spirit in order to keep exporting. At present, 11 Pakistani processors are exporting to the EU with the EU's approval, and importers are satisfied with the conditions at the plants. However, harvesting, transportation and storage are areas along the chain that have been identified as weak and needing a great deal of improvement. Moreover, while the requirement of traceability is being fulfilled, it is not foolproof and loopholes allow for gaps in information. It was pointed out by respondents that any improvements to the harvesting stage will involve further investment and costs to the suppliers. However, were livelihoods to be ensured to the fishermen, standards at every stage could easily be implemented.

Annex 3: List of individuals interviewed

Moazzam Ali Khan

Marine Fisheries Department
Government of Pakistan
Director General MFD
Fish Harbour, West Wharf Karachi Harbour
Karachi, Pakistan

Arif Baloch

Balochistan Coastal Development Authority
Gawadar, Balochistan, Pakistan

Haji Shafi Mohammad Jamot

Vice Chairman
Fishermen's Cooperative Society
West Wharf, Karachi Fish Harbour
Karachi, Pakistan

Syed Akhlaq Hussain

Chief Executive Officer
Akhlaq Enterprises (Pvt.) Ltd.
F-2 Karachi Fish Harbour
West Wharf, Karachi Fish Harbour
Karachi, Pakistan

Asghar Noordin

Gawadar Seafood Corporation
Plot No. 468, Kolgari Ward, Near Fish Harbour
Gwadar, Pakistan

A. Rehman Reimoo

Proprietor
M/S. Karim Impex
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Mazhar Iqbal Shaikh

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SGS Pakistan (Pvt.) Limited
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S. M. Naushad Zafar

Department Head – Fumigation & Hygiene
SGS Pakistan (Pvt.) Limited
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Karim Murad

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Annex 4: Flow chart of main steps in the fishery assessment process

