Inadequacy In Fisheries Infrastructure: A Major Obstacle In Accruing The Benefit Of Blue Economy

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ABSTRACT

Fisheries sector is expected to be a major contributor in the blue economy of Pakistan, however, development in this sector is hampered by major inadequacy in the required infrastructure. There are about 70 major and minor fish landing centers along the coast of Pakistan, however, fish harbors are established at 3 sites in Sindh and 2 sites in Balochistan. In addition, 14 floating jetties have been established in the creek system of Indus Delta whereas one floating jetty was established along Balochistan coast. In almost all cases, fish landing centers have been established without proper planning and taking into consideration the requirement of the fishermen of the area. Karachi Fish Harbour being the biggest landing center is marred with massive congestion, cul-de-sac turning basin which is highly polluted and prevalence of extreme unhygienic condition. Gwadar Fish Harbor and Miniport and landing centers at Pushukan, Jiwani, Damb and Gaddani are improperly designed, therefore, either non-operational or inadequately utilized. Pasni Fish Harbour, because of negligence got heavily silted. Korangi Fish Harbour, although constructed about 30 years back but still could not put into operation because of inadequate facilities and commitment. In almost all cases, fish harbours established in Pakistan are not designed to cope with the development need of blue economy. Additionally other infrastructure such a coastal road and link roads (“farm to market” roads) are also not appropriate for increasing pressure expected of blue

economy. The paper will describe major shortcomings in the fisheries infrastructure in Pakistan.

Keywords: Blue economy, infrastructure, fish harbours, improper designs, roads, inadequacies.

INTRODUCTION

Infrastructure refers to the basic systems and services that a country or organization needs in order to function properly. It includes all the physical systems such as the road and railway networks, utilities, sewage, water, telephone lines and cell towers, air control towers, bridges, etc., plus services including law enforcement, emergency services, healthcare, education, etc. For fisheries sector, main infrastructures are fish harbours/landing jetties, allied facilities at landing centres, communications including access roads, basic amenities in fishermen towns/villages/settlements and health and education facilities. Formal fisheries infrastructure refers to locations and structures built for the purpose of fishing and includes public piers whereas informal fisheries infrastructure refers to structures built for other purposes but used for fishing, like roads, bridges and other communications (telephone, cell-phones) and electricity (Nieman *et al.*, 2021).

Fisheries sector, although extremely important for national economy in terms of foreign exchange earnings, employment opportunity and as an important source of high value protein, however, it did not receive the attention it deserves. The government has not proactivity supported this industry in the past seventy five years especially in terms of provision of required infrastructure. With the exception of construction of a fish harbour and allied facilities in Karachi in 1958, no major infrastructure was established in Pakistan for fisheries sector. Although construction of RCD (Regional

Cooperation for Development) highway and improvement of National Highway in 1960s provided some ease in the access to Sonmiani area in Balochistan and towns/villages in Indus Delta. However, no major road infrastructure was made available to fisheries sector till 1980's. Although fisheries infrastructure in coastal areas is substantially improved in last four decade, however, there are still major infrastructural inadequacies which are considered impediments in development of fisheries sector in Pakistan. The paper encompasses shortcomings in the existing fisheries infrastructures and identifies development requirement in such facilities which may ensure requirements and expectations under blue economy regime.

FISHERIES INFRASTRUCTURE DEVELOPMENT

Pakistan inherited in 1947, a small but historically old fisheries sector consisting of sail-driven boats and salted drying processing industry, however, there was almost no infrastructure facilities. Salted-dried fish used to be exported to many countries including India, Sri Lanka, Southeast Asia and African countries. Being a part of Agriculture Sector of the country, Government of Pakistan took step to strengthen fisheries institutions by recruiting manpower, providing abroad training and help in improvement of fishing boats. Sind Fisheries Department was the main fisheries organization in Karachi was assign this task. Later on, Zoological Survey Department and Central Fisheries Department was established after abolition of Sindh Fisheries Department in 1948. Officers of this Department were sent abroad (mainly USA for training and skill improvement).Later on, in 1950, Central Fisheries Department was declared a separate entity responsible for fisheries

development in coastal areas of Sindh, Balochistan and East Pakistan (now Bangladesh).

During 1950 to 1960, a programme for motorization of fishing vessels was initiated with a few inboard engines installed in fishing boats, modification in large category of double-edged fishing boat (Bateel) into shrimp trawling but making transom at one end and installation of inboard engine and net haulers. Shrimp fleet started to grew from only 3 in 1958 to about a 1,000 in 1974. To cope with need of berthing of shrimp trawlers and other category of larger vessels, a fish harbour was constructed in Karachi in 1958 which has facilities of loading/offloading, flake-ice production, auction halls, turning basin, supply jetties and net mending facilities. A bit delayed, but seafood processing industry (freezing and canning) was started to established in 1969 which opened avenue for accelerated development in fisheries sector including export of frozen shrimp to Japan, Europe and USA and canning shrimp to USA. With accelerated development during 1970's it was felt that Karachi Fish Harbour needs to expanded and additional fish harbours may be established at Korangi in Sindh and Pasni in Balochistan. However, it was only by middle to 1980's but the construction of these harbour started to materialize. Strengthening of other infrastructure facilities, however, was kept generally ignored.

FISHERIES INFRASTRUCTURE (STATUS)

Although both formal and informal fisheries infrastructures have established in last 75 years but these are considered inadequate and marred with a number of serious shortcomings. Some of the glaring inadequacies are described in the paper.

Basic Amenities in Fishermen Towns/Villages/Settlements

There are more than 75 fishermen settlements along the coast of Pakistan. Of these, Karachi is a megalopolis including a number of fishermen areas/settlements including Ibrahim Hayderi, Rehri, Chasma Goth, Kemari, Baba Island, Bhit island, Shamspir, Salehabad, Manora, Kaka Pir, Mauripur, Goth Mubbarak, Manjhar and Bhuleji which in addition to a number of places where fishermen are living along with other communities. With the exception of tertiary medical facilities available to residence of Karachi no specialized medical facilities are available to fishermen. There are basic heath units in almost all settlements but a major part of medical needs are met with by private doctors and clinics.

The situation is almost similar in all major towns along Pakistan coast including Kharo Chan, Keti Bundar, Garho, Daryapir, Bagan, Gaddani. Damb/Sonmiani, Ormara, Pasni, Gwadar, Sur and Jiwani. Other coastal villages either lack medical facilities or only cursory arrangements are available to fishermen.

There is imminent shortage of potable-water in Karachi whereas situation in almost all other towns/villages and settlements is better as none of them have supply of tapped water. In addition, distantly located settlements along Balochistan coast and those located in the Indus Delta are deprived of any water supply and they are relying on fetching brackish or sweat water from wells and water channels located far away from their settlements. Almost all fishermen settlements are deprived of quality education facilities. As such

basic amenities are not adequately available to fishermen whether they are living in Karachi or any island in Indus Delta.

Communication and Electricity

Electricity is available in Karachi and its vicinity, however, it is marred with load shedding and unreliable voltage in most fishermen villages. In some of other coastal towns, villages and settlements the electricity is available but supplies are inadequate with major load shedding and break-downs. In almost all distantly located settlements along Balochistan coast and those located in the Indus Delta there is no supply of electricity available to fishermen communities.

With the exception of Karachi, telecommunication linkage was extremely poor till 1990s, however, with the advent of mobile phone technology now almost all coastal towns/villages and settlements are adequately connected. These facilities are adequately being utilized by the fisheries sector for marketing and other operational uses (Hingorjo and Memon, 2021). There may be exceptional few villages along extreme eastern part of Indus Delta which may be not having mobile phone connectivity; else these facilities are adequately being used by fishermen in Pakistan.

Road network is considered to be the one of the most important infrastructural facilities required for the fishery sector and considered both part of formal and informal infrastructure facilities for this sector. Prior to 2003, there was no reliable road link available along the coast of Balochistan, therefore, only two settlements Gaddani and Sonmiani (Damb) were linked to Karachi through

RCD highway, however, none of the fishermen villages/settlements of coastal waters of Sindh was connected to national highways or to Karachi.

In 2003, N-10 or National Highway 10 commonly known as Makran Coastal Highway was constructed linking RCD Highway to Gwadar and then to Jiwani which open unprecedented avenues for fisheries development along Pakistan. This 653 km was constructed with the inter alia aim to develop the seafood industry along Pakistan's coastline by reducing the time and costs involved in transporting fresh seafood from seafood catchment areas to major cities in Pakistan as well as export processing zones in Karachi and Gwadar.

Construction of this highway has a major impact on the fisheries development along coastal areas of Balochistan. It resulted in development of a large seafood processing plants (freezing and fishmeal) plants. Prior to construction of Makran Coastal Highway, there were only 4 seafood freezing and 3 fishmeal plants along Balochistan coast which now numbered 65 (38 freezing and 27 fish meal plants). Previously salted-drying was only mode of fish processing along Balochistan coast which used to be done in 23 curing yards in coastal area. Now almost all of these curing yards have been closed except one extremely small working in Gwadar.

Fig.1. Makran Coastal Highway

Prior to construction of Makran Coastal Highway, fish in chilled form used to transported to Karachi through all-weather dirt roads from coastal villages through Pasni, Turbat, Hoshab, Awaran, Jhal Jho to Bela (joining RCD Highway), now not only frozen but chilled fish is transported to Karachi but even chilled seafood raw-material is transported from Karachi to coastal town. Under a series of development projects (such as Gwadar Lasbela Livelihood Support Project-GLLSP), a series of link roads (on pattern of "Farms to Market Road") have been constructed and now almost all coastal villages along Balochistan coast are connected with Makran Coastal Highway. This is one of the reason for accelerated development of fisheries sector along Balochistan coast.

Sindh coast was somehow could not be adequately connected to Karachi through National Highway (N-5). Still coastal roads have been constructed along western part of the Indus Delta including N-110 (linking Gharo-Keti Bundar) and other coastal villages/town, however, because of interwoven

system of Indus Creek System, it seems impossible to link all or most coastal village to National Highway (N-5). It may be added that road network in the coastal areas of Sindh have been substantially improved in recent years.

Fig.2. Sindh Coastal Highway N-110 (linking Gharo-Keti Bundar)

Harbour/Landing Jetties along Sindh Coast

Karachi Fish harbour

Prior to creation of Pakistan, there were no dedicated fish harbour or landing facilities. In Karachi, fish used to be landed at Karachi Port near Native Jetty Bridge whereas all along Sindh and Balochistan coast, fish is landed on the beaches. Fish from the port area used to be shifted to Khadda market for auction and sale. Khadda Market was hub of fisheries activities in Karachi.

Karachi Fish Harbour was constructed in 1958 north-west of Karachi Port almost adjacent to Karachi Shipyard. Initially it has only one auction hall (presently used mainly for auction of freshwater fish) whereas a long wharf for berthing of fishing vessels. It also used to have manual cranes and a conveyor belt for offloading of fish catch. The harbour has all necessary facilities

including a flake ice plant, chill room, net-mending shed. It has a wide turning basin. Initially fishermen were reluctant to shift from Khadda Market to Karachi Fish Harbour, however, a Martial Law regulation was issued and all auctioning activities were forcibly shifted to the harbour on Pakistan navy trucks.

With a few years, especially after establishment of fish processing industry in late 1960's, Karachi Fish Harbour became hub of all fisheries activities. This harbour used to be owned by federal government (through Marine Fisheries Department) whereas its operation was managed by Fishermen's Cooperative Society.

Because of exponential increase in the fishing fleet, the harbour started to get choked making smooth operation difficult. In order to handle the situation and cope with requirement of increasing fleet, a plan for expansion of Karachi Fish Harbour was prepared. With the restoration of provinces under 1973 Constitution of Pakistan, ownership of Karachi Fish Harbour was transferred to Government of Sindh which established an authority namely Karachi Fish Harbour Authority under Livestock and Fisheries Department. This Authority was entrusted the responsibility of operation and implementation of expansion plan (funded by European Commission).

Fig. 3. Karachi Fish Harbour

Under the expansion plan which was completed in 1990, five auction halls were constructed. In addition, 10 floating pontoons (for berthing and waiting) were added in the harbour channel and turning basin. This is in addition to a long quay wall, a jetty for ice plant (never constructed), a slipway repair and 2 ship lifting platform all other ancillary facilities. The harbour facilities included a large chill room and flake ice unit (which are now illegally used for fish processing). Major part of the shrimp and large tuna fleet is based in this harbour. In order to facilitate small fishing boats, a floating jetty has also been constructed on the southern part of Karachi Fish Harbour. The harbour has a large area for seafood processing and boat building. There are now more than 30 seafood processing plants operating in this harbour.

Despites being the main hub of fishing activities in Pakistan, its management and operation are considered extremely undesirable especially its operation is considered extremely unhygienic. Main hall of the Karachi Fish Harbours has 10 raised platforms but still bulk of fish is auction on harbour floor or outside auction halls. Since the turning basin is a cul-du-sac and presence of floating

pontoons make circulation of water difficult, therefore, almost no natural flushing takes place resulting in accumulation for floating debris in the turning basin. The seawater in the fish harbour is extremely polluted but ironically still used for washing of harbour floor. There is no control on movement of traffic and general public making operation of Karachi as chaotic. Offloading and loading of putrefied "trash" fish make Karachi Fish Harbour to be one of the most filthiest harbour in Pakistan, if not globally. A plan for expansion of the harbour facilities is being implemented but it is generally feared that it will not help in the operation of the harbour or prevailing unhygienic conditions. Despites major shortcomings, Karachi Fish Harbour is the most important fisheries centres along Pakistan coast and it is estimated that about 70 % of fisheries activities of Pakistan is concentrated at this landing centre.

Korangi Fish Harbour

Korangi Fish Harbor was constructed in early 1990's at a total cost of Rs 1.0 billion. The main purpose of the harbour was to provide a landing facilities for the vessels operating in the Exclusive economic Zone of Pakistan as well as to reduce congestion from Karachi Fish Harbour. It was also envisaged to handle about 500 fishing boats (supposed to be shifted from Karachi Fish Harbour). It has a large auction and all other ancillary facilities. It has a quay wall of about 2 km. There are about 10 seafood processing plants, ice plants and fiberglass boat building recently started operation whereas 3 processing plants are being established. The harbour is not yet fully operational because local fishing boats are not willing to operate from this harbour.

Fig. 4. Korangi Fish Harbour

It is very difficult to assign any particular reason which may be the main cause that resulted in failure to achieve the operational tasks envisaged for this harbour, however, its remote location, no major landing centre in the area, fishing method being used in the area, strong hold of the so called 'sea lord' in the area, adequate patronage from the provincial governments, some lacunae in the required infrastructure, strong control of middlemen in the operation of fishing boats in the vicinity and Karachi and Ibrahim Hayderi Fish Harbours and non-existing of a marketing system are some of the glaring shortcoming which hampered operation of Korangi Fish Harbour. There are a number of other factors of lesser consequences but their combined effects are also responsible for non-utilization of Korangi Fish Harbour.

Ibrahim Hayderi Landing Jetty

In terms of landings, this is the second largest fish landing centre in Pakistan. This harbour is not properly designed and lacks basic amenities, still a large of

artisanal fishing boats use this landing centre as their base. This landing centre is main base of fishing boats that are engaged in one day fishing for shrimp using bottom set gillnetting (locally known as “thukri”). This landing facilities is being used by fishing fleet based in Korangi Creek (Ibrahim Hayderi, Chasma Goth, Wagudhar and Rehri Goth) as well as a few fishing boats from which avoid congestion at Karachi Fish Harbour also use this as their operational base. Ibrahim Hayderi Jetty consisted of about 330 m long quay wall which is being used as landing jetty. In addition, a 20 x 10 m floating jetty which is linked with main jetty by a 50 m long bridge is established at this landing facilities. The turning basin is very small and heavily silted, thus not adequately being used by large fishing vessels. The landing centre lacks adequate facilities for auction, sale or marketing and extremely unhygienic conditions prevails in this landing centre.

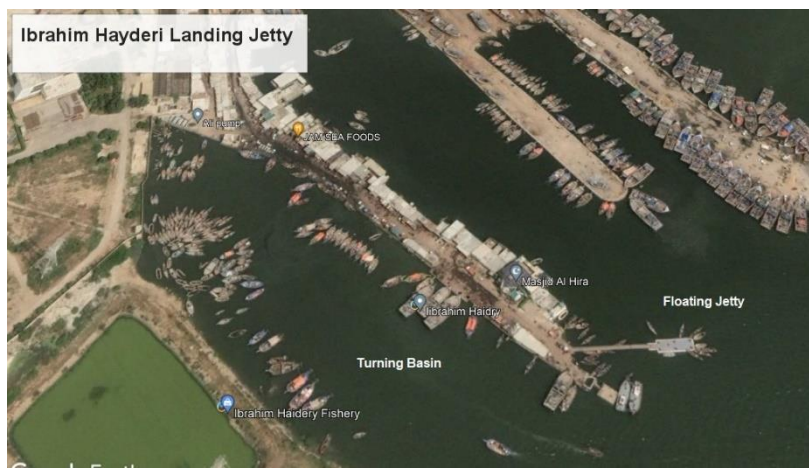

Fig. 5. Ibrahim Hayderi Landing Jetty

There are about 15 private jetties in the area where fishing boats are berthed after landing their catch at Ibrahim Hayderi. These jetties generally do not

facilities for landing of fish catch but generally act as supply jetties. These jetties lack facilities required for a fish harbour and generally owned by influential ("sea lords") or the area. These jetties are generally regarded as "illegal jetties" because these were constructed with prior approval, have any approved design and believed to being used for illicit trade. These jetties are also being used as net mending areas.

Fig.6. "Illegal" Jetties at Ibrahim Hayderi

Floating jetties along Sindh Coast (mainly Indus Delta).

Considering the construction of a landing jetty will require high coast in deltaic environment of the Indus River, therefore, Government of Sindh has constructed 14 jetties at various fish landing centres/village in the Indus Delta (Table-I). In addition 3 jetties are established in Karachi. Of these, 7 jetties are established in District Sujjawal, 6 in District Thatta, 3 in District Karachi and 1 in District Badin. These floating landing jetties consists mainly of a floating platform which is linked through a bridge the coast. At some of the location, desalination plants were established, however, according to information almost

all of these desalination plants are now closed. Some of these floating jetties are extensively used by the communities for fish landings such as Karachi Fish Harbour. Kharo Chan, Keti Bundar and Zero Point whereas some of these such as Shams Pir Island are used for parking only. Almost all of these jetties lack onshore facilities such as auction hall, chill room or ice making facilities.

Harbour/Landing Jetties along Balochistan Coast

Bundewari Floating Jetty

Bunndewari is a village located between Hub Power Plant and Gaddani where only a few small "rachin" boats are based. In 2020, a floating jetty was established by Government of Balochistan with the assistance of Chinese investor engaged in establishment of coal power plant. The harbour consisted of a small floating jetty which is connected to the coast with a long causeway bridge. Because of the intensive wave action in the area, the floating jetty cannot be used during southwest monsoon month (May to September), therefore, taken out of waters. Even in non-monsoon moths, the utility of the harbour is bare minimum, as only one of its side can be used. Because of it limited use, fishermen have stopped its use and now the floating platform is kept of out of water and only used by Chinese company, once in a while. The design of this floating jetty make it a "joke" for fishermen community.

Fish Harbour at Gaddani

Under Balochistan Coastal Development Authority (BCDA) construction of fish harbours was started in 2001.These included Gaddani, Damb (Sonmiani) and Jiwani.

Fig. 7. Floating jetty at Bundewari (Lasbela)

Fig. 8. Fish Harbour at Gaddani

Fig. 9. Fish Harbour at Gaddani showing massive siltation at the harbour entrance.

A small fish harbour was constructed at Gaddani rocky shore which consisted of a breakwater wall, a turning basin, landing quay and an auction hall and a large cemented area for other fisheries related activities such as net mending. Since design of the harbour does not took care of prevailing oceanographic conditions and intensive wave action, therefore, heavy siltation in the basin and choked the entrance. As such the harbour is not useable and can only be put into operation after major modification.

Fig. 10. Fish Harbour at Damb (Sonmiani)

Another small fish harbour was constructed at Damb (Miani Hor) which consisted of breakwater walls, a turning basin, landing quay and an auction hall and an area for other fisheries related activities such as net mending. Since design of the harbour does not took care of prevailing oceanographic conditions, fast current and intensive wave action, therefore, the harbour basin get heavily sited and choked the entrance. As such the harbour is not useable and can only be put into operation after major modification. Because of the construction of the harbour current pattern in the lagoon (Eastern side) is changed resulting in massive erosion and heavy loss to property and other infrastructure has taken place.

Fig. 11. Fish Harbour at Damb showing inadequate design.

Pasni Fish Harbour

Located in the town of Pasni along Mekran coast, this is possibly one of best designed fish harbour which is also used up to its fullest capacity. Because of excessive siltation and inadequate dredging, the harbour basin, approach channel and adjoining area of the harbour is practically choked and now the entire entrance is totally blocked. An imagery (Fig. 14) indicates of small siltation on south-eastern part in 2005 which spread to entire harbour area due to lack of dredging. Presently the harbour is being used by a few small artisanal boats 'rahins' which may enter the harbour during high spring tides only. Adequate onshore facilities are were available in this harbour but due to disuse of the harbour, these cannot be adequately used.

Fig. 13. Pasni Fish Harbour

Fig. 14. Pasni Fish Harbour (Imagery taken in 2005)

Gwader Fish Harbour and Miniport

In order to provide landing facilities to the major coastal settlement of Gwadar a fish harbour and mini-port was established in 1994. This harbour is not

properly designed as its jetties are o high to be used by small artisanal boats. Previously, two steel pontoons were floated along the jetties to provide landing of small fishing boats. These pontoons were linked with pier through gangplanks. Both the pontoon sank after a few year and now HDP floating jetties have been install on the northern side for use of small scale vessels. Adequate onshore facilities are not available in this harbour. For parking of small scale fishing boats a breakwater was constructed on the Gwadar East Bay providing a safe anchorage place for these boats. A similar breakwater was also constructed on the Gwadar (West Bay) for the same purpose (Fig. 16). It is planned to be made this landing facility to be a part of the Gwader Deep Sea Port and as alternate two small harbours are constructed at Sur and Pushukan.

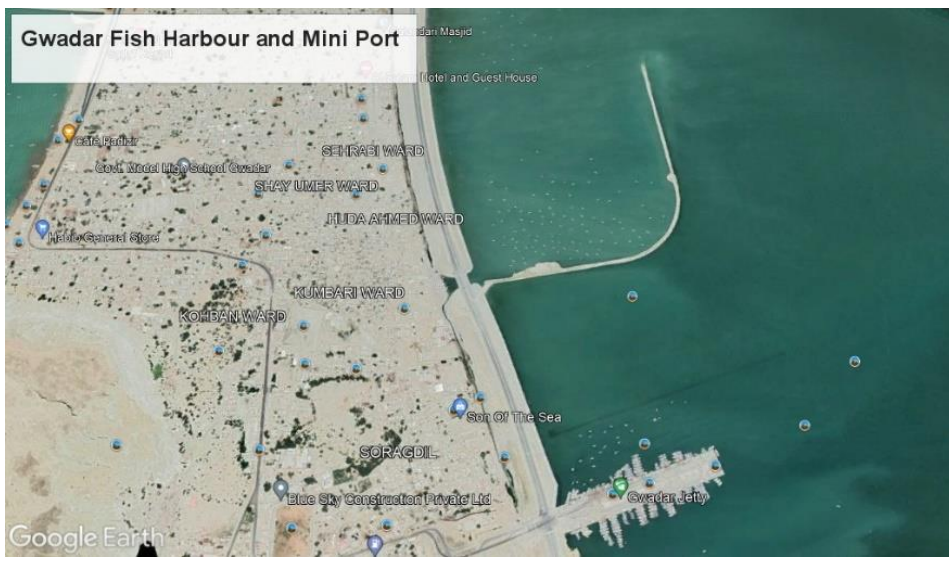

Fig.15. Gwadar Fish Harbour and Mini Port

Fig.16. Gwadar (West Bay)

Fish Harbour at Sur

As an alternate of Gwadar Fish harbour, a landing facility is established at Sur at north of Gwadar (East Bay) for which a breakwater was constructed at southern side whereas additional break waters were provided at northern side making two bays. Western Bay is used for parking of small scale fishing boats whereas in the eastern bay a floating jetty is provided for offloading. An auction hall is also constructed between the two bays. Despite persuasion, no fishing boat has shifted their operational base from Gwadar to Sur.

Fig. 17. Fish Harbour at Sur

Fish Harbour at Pushukan

As an alternate of Gwadar Fish harbour, a landing facility is established at Pushukan at western part of Gwadar (West Bay) for which a breakwater was constructed at southern side whereas another breakwater was provided at northern side. A landing jetty was provided in the harbour basin whereas an auction hall was also constructed. Heavy siltation has occurred at th entrance of the harbour and now the harbour is being used by small scale fishing boats whereas larger fishing boats used outer anchorage north of Pushukan. Despite persuasion, no fishing boat has shifted their operational base from Gwadar to Sur.

Fig. 18. Fish Harbour at Pushukan

Fish Harbour at Jiwani

Work on a new fish harbour was started at Jiwani, however, because of its improper design the work has now been stopped and fishermen are landing their catch at the tradition landing places with the bay. Only construction that has been done is a north-western breakwater wall, which does not provide any respite to fishermen from extreme wave action especially during monsoon. Construction of this breakwater was has changed current pattern and hydrographic regime in the area and massive erosion took place in the eastern part of Jiwani Town resulting in serious loss to the property.

Fig. 19. Landing facilities at Jiwani

MANAGEMENT OF FISH HARBOURS AND LANDING JETTIES IN PAKISTAN

Although a number of fish harbours, floating jetties and landing facilities have been established along Pakistan coast, however, there is no uniform management of these facilities in Pakistan. Table-II presents the information about management control of the landing jetties in Sindh province.

S. No.	Name of Landing Centre	Administrative Control	Remarks
1.	Floating jetties in Indus Delta	Government of Sindh, Fisheries and Coastal Development	14 Jetties in Indus Delta

		/Department of Livestock and Fisheries	
2.	Floating jetties in Shams Pir	Government of Sindh, Fisheries and Coastal Development /Department of Livestock and Fisheries	2 Jetties in Shams Pir
3.	Floating jetties in Karachi Fish Harbour	Government of Sindh, Karachi Fish Harbour Authority	1 Jetty in Karachi Fish Harbour
4.	Karachi Fish Harbour	Government of Sindh, Karachi Fish Harbour Authority	Operated by Fishermen's Cooperative Society
5.	Ibrahim Hayderi Fish Landing Centre	District Government!	Operated by Fishermen's Cooperative Society
6.	Landing jetties (waiting jetties) at Ibrahim Hayderi	Individuals	Considered illegal
7	Korangi Fish Harbour	Korangi Fish Harbour Authority, Ministry of Maritime Affair, Government of Pakistan	Not fully operational

8.	Bundewari Floating Jetty	Coastal Development of Fisheries Department, Government of Balochistan	Non-operational and seasonal jetty!
9.	Gaddani Fish Harbour	Balochistan Coastal Development Authority, Coastal Development of Fisheries Department, Government of Balochistan	Non Operational due to siltation. Being operated through a private party
10.	Damb Fish Harbour	Balochistan Coastal Development Authority, Coastal Development of Fisheries Department, Government of Balochistan	Non Operational due to improper design
11.	Pasni Fish Harbour	Pasni Fish Harbour Authority, Coastal Development of Fisheries Department, Government of Balochistan	Non Operational due to heavy siltation
12.	Gwadar Fish Harbour	Gwadar Port Authority, Ministry of Maritime	Being shifted too Sur and Pushukan

		Affairs, Government of Pakistan	
13.	Sur Fish Harbour	Gwadar Development Authority	
15.	Pushukan Fish Harbour	Gwadar Development Authority	Silted
16.	Jiwani Fish Harbour	Balochistan Coastal Development Authority, Coastal Development of Fisheries Department, Government of Balochistan	Only a breakwater wall is constructed

It is evident that management of the landing centres/fish harbour/floating jetties is not under uniform regime. There are two harbours under the federal regime (Ministry of Maritime Affairs) including Korangi Fish harbour located in Korangi Creek, Karachi and Gwadar Fish Harbour and Miniport located in Gwadar. All floating jetties established in Indus Delta and two located in Shams Pir Island are under the control of Government of Sindh, Livestock and Fisheries Department, Director General (Marine Fisheries and Coastal Development). Karachi Fish Harbour and Pasni Fish Harbours are operating under separate authorities under provincial governments of Sindh and Balochistan respectively. Two newly constructed harbours at Pushukan and Sur are working under Gwadar Development Authority whereas Fish Harbours at Gaddani, Damb and Jiwani are under Balochistan Coastal Development Authority (BCDA), Coastal Development of Fisheries Department,

Government of Balochistan whereas Bundewari floating jetty is direct under Coastal Development of Fisheries Department, Government of Balochistan. Ibrahim Hayderi landing facilities are under district government whereas its operation is under the control of Fishermen's Cooperative Society. Fifteen landing jetties (waiting jetties) at Ibrahim Hayderi are under the control of influential (sea lords) of the area and considered illegal, as these are considered to be hub of illegal activities.

Because of these divergent administrative control, there is no uniform control, rules and regulations and management of the harbours resulting in massive leakage of revenues, uncontrolled landing and other operations and prevalence of extreme unhygienic conditions. Improper design of harbours in Balochistan has resulted in massive siltation and operations are practically stopped in Gaddani, Damb, Pasni and Jiwani Fish Harbour. Floating jetties established in Sindh are not supported by required onshore facilities, therefore, the desired benefits could not be accrued. The need for having uniform regulations of fish harbours and landing jetties are required to be developed and implemented so as to make these facilities cope with the forthcoming demand under blue economy regime.

CONCLUSION

Although fisheries infrastructure is available all along the coast of Pakistan, however, in most cases there are serious shortcomings in almost all infrastructure facilities being available for the fisheries sector. In some cases, like supply of electricity and potable water are highly unreliable in most places along the coast of Pakistan whereas it is not available in some parts of Indus

Delta and along Balochistan coast. Major deficiencies have been noticed in cases of landing jetties and fish harbours along both Sindh and Balochistan coast especially there is prevalence of unhygienic conditions in almost all harbours, landing jetties and their vicinities which is considered to be major obstacle in meeting required standards laid down under the Pakistan Fish Inspection and Quality Control, Act, 1997 and Rules, 1998.

Under the blue economy regime, it is expected that fisheries sector will play a major role, as it is one of the areas which has capacity of expansion and major improvement. It is generally considered that with only reduction in post-harvest losses, fish available for processing can be enhanced three times. A large of fish species which presently are destined for fish meal production can be exported in frozen and other forms. Diversion of some of the fish species such as sardinellas (sardines) and mullets have already taken place. These species used to be dried and converted into poor quality fish meal but now a major part of landings of these species is processed are exported in frozen form. This trend may expand in future and many species and their small sized specimens can also be diverted for processing.

On-board handling and handling in landing centres can be substantially improved which may lead to major reduction in post-harvest losses. For this, there is a need to improve facilities and management regime in all landing centres. Proper transportation of fish and fishery production through road infrastructure using reefer trucks and improved transmission means may be another major change required for reduce post-harvest losses. Under the blue economy regime, it is expected that landings of hitherto unexploited resources such as mesopelagic fish may start. Present infrastructure especially fish harbours and landing centres and road infrastructure will not be able to cope

with increased landings and their proper disposition. Major improvement in road network and landing centres will be mandatory required.

Aquaculture in the coastal and offshore areas are expected to flourished under the blue economy regime, for which all stakeholders are endeavouring. It is expected that in the next 10 years about 100,000 m. tons of high value aquaculture products will be available for processing and export as well as for local consumption. For promotion of aquaculture proper road network will be essentially required to access areas suitable for coastal aquaculture. Similarly present fish harbours and landing centres will not be able to handle with increased production through aquaculture. Major improvement in road network and landing centres will be mandatory required to cater to the need of forthcoming aquaculture industry.

Although some development has taken place in establishment of infrastructure in Pakistan, but need for its improvement and strengthening is immediately required to support present seafood industry as well as to cope with the changes expected of blue economy. Need not to mention that livelihood of coastal fishermen communities is directly dependant on reliable infrastructure.

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Table-I. List of Floating Jetties in Sindh			
S. No.	Name of Jetty	District	Geographical Location
1	Shah Bandar	Sujawal	Latitude: 24° 09’45.51 N Longitude: 67°54’08.48 E
2	Jati Tar	Sujawal	Latitude: 24° 18’31.99 N Longitude: 68°46’28.73 E
3	Kalka Chani	Sujawal	Latitude: 24°13’36.53 N Longitude: 68°13’26.59 E
4	Kodario Village – Umer Jat	Sujawal	Latitude: 24° 11’16.69 N Longitude: 67°50’55.98 E
5	Haji Ali Muhammad Jat	Sujawal	Latitude: 24° 09’28.07 N Longitude: 68°01’69.02 E
6	Abdul Rehman Thahi Mor - Jat	Sujawal	Latitude: 24° 14’33.09 N Longitude: 68°20’37.44 E
7	Pir Jani Shah – Shah Bunder	Sujawal	Latitude: 24° 13’40.62 N Longitude: 67°58’44.41 E
8	Sholani Goth	Thatta	Latitude: 24° 19’59.69 N Longitude: 67°36’00.71 E
9	Gafoor Dublo Village Parlo	Thatta	Latitude: 24°26’18.67 N Longitude: 67°28’01.71 E
10	Jhor Malook Shah	Thatta	Latitude: 24°16’29.38’’ N Longitude:67°32’14.49’’E
11	Derya Pir Landing Center	Thatta	Latitude: 24°34’57.70 N Longitude: 67°26’20.79 E
12	Keti Bunder	Thatta	Latitude: 24°08’39.51’’N Longitude:67°27’08.72’’E
13	Kharo Chan	Thatta	Latitude: 24°04’47.38’’N Longitude:67°34’’40.99 E

14	Ghungro Kar (Zero Point)	Badin	Latitude: 24°20’13.89 N Longitude: 68°35’47.16 E
15	Floating Jetty for Transportation at Shams Pir Island,	Karachi West	Latitude: 24°50’44.15”N Longitude:66°54’58.62”E
16	Rehabilitation & Extension of fishermen jetty at Shams Pir Island	Karachi West	Latitude: 24°50’30.25”N Longitude:66°54’19.78”E
17	Karachi Fish Harbour Jetty	Karachi West	Latitude: 24°86244 Longitude: 66.97631