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RESEARCH REPORT

Proposal for the Implementation of
Framework for Fishing Licensing with
reference to Identification of Potential
Fishing Grounds/Zones in EEZ of Pakistan



NATIONAL INSTITUTE OF MARITIME AFFAIRS -
PAKISTAN

PREAMBLE

This proposal outlines a framework for sustainable fisheries management and the development of an effective fishing license policy in Pakistan's Exclusive Economic Zone (EEZ), which extends over approximately 290,000 square kilometers. Pakistan's coastline spans approximately 1,001 kilometers, and its EEZ was expanded by 50,000 square kilometers through the approval of an extension of the Continental Shelf by the UN. This expansion makes Pakistan's EEZ larger than the combined land areas of Sindh and Khyber Pakhtunkhwa, leading experts to refer to it as the "fifth province of Pakistan." The importance of this initiative lies in understanding and highlighting the significant contribution of the marine fishing sector to the national economy, which engages over 1.4 million individuals. Furthermore, the proposal emphasizes the challenges faced by fishermen in identifying potential fishing zones and the risks associated with over-exploitation.

Further study review to formulate fishing license policy, and evaluate present fishing practices in the coastal and offshore areas. GIS technique was adopted to identify potential fishing zones, and verification sites through communication with fishermen and experts, and to develop potential fishing grounds to ease fishers and stakeholders for effective fisheries management. In addition, the scope of the study extends to provide Geospatial mapping of fish aggregation in Pakistan's Exclusive Economic Zone (EEZ), which will be important for making useful national policies for fish licensing and planning for the formulation of export policies that support the country's economy without harming marine resources.

To improve the fisheries sector following are highly recommended: establish a regulatory foundation, define fishing license categories, specify eligibility criteria, outline the application process, identify potential fishing grounds, integrate conservation measures, enforce compliance, collect and report fishing-related data, engage stakeholders, provide capacity-building and training, consider international cooperation, and establish a mechanism for periodic review and adjustment of the framework.

CHAPTER 1

1.1 Introduction

a. Pakistan possesses vast aquatic resources, including rivers, dams, lakes, and coastal waters, along with a substantial Exclusive Economic Zone (EEZ). Pakistan's maritime territory lies in the Exclusive Economic Zone (EEZ), extending from the coast to 200 nautical miles, equivalent to approximately 370 kilometers, offshore (Watto, et al., 2021). Pakistan's coastline spans approximately 1,001 kilometers, and its EEZ was expanded by 50,000 square kilometers through the approval of an extension of the Continental Shelf by the UN. The country's population, projected to reach 244 million by 2030, underscores the importance of these resources. Despite covering a small fraction of global land and aquatic area, Pakistan's coastline plays a vital role in its economic and demographic landscape.

b. Pakistan has about 0.57% of the world's land area, and 0.59 % of the world's inland aquatic area. Pakistan's daily per capita average protein consumption increased from 59.4 g/day to 65.5 g/day from 1993 to 2023. Fish export in Pakistan increased from 86,294 m.t. (\$150 million) in 2000 to 166267 mt (\$431 million) in 2021. Pakistan's fish import increased from \$ 0.3 million in 2000 to \$ 10.5 million in 2021. Pakistan's aquaculture production increased more than tenfold, from 12,485 M.T in 2000 to 157,469 M.T in 2017. Population growth of Pakistan is expected to increase fish demand by about 120,614 M.T (350,473 M.T in 2013 to 471,088 MT in 2030).

c. If the additional demand of 120,614 M.T needs to be entirely covered through aquaculture, aquaculture production in Pakistan would need to reach up to 278,110 M.T by 2030 (Worldometer, 2023).

d. The marine fishing sector stands as a cornerstone of Pakistan's economy, engaging over 14 million individuals and yielding export earnings essential for acquiring foreign goods exchange. Specifically, the marine fisheries sector constitutes the primary segment, contributing approximately 57 percent of total production (Mehak, et al., 2023). In the coastal villages and settlements, where it serves as the sole source of employment and income, fisheries constitute the most significant economic activity. Around 80 percent of Pakistan's coastal populace is engaged in fisheries-related pursuits, with fishermen being the pivotal group. They rely on fish catches for their livelihoods and make substantial contributions to Pakistan's GDP. These fishermen eagerly seek support from pertinent authorities to gather scientific data about fishing grounds (Nusrat, 2021). Fishermen primarily rely on repeated trials and the exchange of information with fellow fishermen to guide their fishing expeditions. Frequently, they face uncertainty regarding the whereabouts of potential fishing zones.

e. This uncertainty leads to wasted time and financial resources, negatively impacting fishermen's earnings, and potentially resulting in the overexploitation or under exploitation of fishing areas.

f. The execution of policies regarding deep-sea fishing falls under the jurisdiction of the Marine Fisheries Department (MFD), headquartered in Karachi. Established in 1951, the MFD stands as the federal government's oldest department, operating under the purview of the Ministry of Port and Shipping. Its core responsibilities encompass the regulation of fisheries in the Exclusive Economic Zone (EEZ) beyond the 12-nautical mile territorial waters. Additionally, the department conducts vital assessments of fish stocks, exercises oversight and regulation of seafood exports from Pakistan, compiles comprehensive national fisheries data, and engages in crucial oceanographic, biological, and technical research on fisheries. To uphold the integrity of fisheries practices, the MFD enforces both the Exclusive Fish Zone (Regulation of Fishing) Act of 1975 and the Pakistan Fish Inspection and Quality Control Act of 1997. However, since the mid-2000s, there has been a notable decline in deep-sea fishing activities beyond the Continental Shelf. Experts and resource personnel attribute this trend to diminishing stocks resulting from overfishing, coupled with the phenomenon known as "fishing down the food chain," as well as the sharp increase in operational costs driven by rising fuel prices (FAO., 2022).

g. Fisheries research covers a range of areas including environmental studies, stock assessment, and gear development (Fisheries, 2022). Advanced technology has greatly improved the ability to locate fishing zones using precise coordinates, creating detailed digital databases with visual tools, and analyzing species data alongside ocean conditions to protect marine life. Effective enforcement of maritime laws will impact fishing permits, with regulations in Sindh and Balochistan governing the marketing, processing, and licensing of fishing vessels. Harmful practices like the use of fine mesh sizes, certain trawls, and stationary nets pose severe threats to resource sustainability. Illegal, unreported, and unregulated (IUU) fishing is a global concern, particularly in Pakistan's territorial waters (Vann, 2021).

h. This study's primary objective was to chart potential fishing areas by identifying various environmental factors influencing fish aggregation along the Pakistani coastline. The driving force behind this research is the fact that the fishing communities in Pakistan's coastal regions face extreme poverty and lack familiarity with modern tools and methodologies that could enhance their catch and ultimately, their livelihoods. Employing geospatial methods to accurately delineate potential fishing zones. To enhance fishing efficiency, potential fishing zones can be identified by analyzing sea surface temperatures, chlorophyll-a, and salinity distribution through remote sensing systems.

i. In this research study aimed at identifying potential fishing areas within the Exclusive Economic Zone (EEZ) of Pakistan, we evaluated the spatial patterns of chlorophyll concentration, and sea surface temperature spanning the years 2018 to 2022.

1.2 Main Objectives of the Study

a. Our main focus lies in identifying prospective fishing areas within Pakistan's Exclusive Economic Zone (EEZ), paying special attention to fishing licenses and noteworthy policy deficiencies, encompassing deep sea fisheries policy and the Fisheries Act.

b. The principal aim is to formulate a comprehensive fishing license policy and create effective strategies for the management of fishing harbors and jetties located along the Pakistani coastline.

c. Furthermore, this research entails a concise evaluation of fishing practices along the coast of Pakistan.

1.3 Methodology

a. A methodology serves as a fundamental component of the system. To realize the goals of Identification of Potential Fishing Grounds/Zones in EEZ of Pakistan in this scientific investigation, a methodology framework has been elucidated using a flow chart. (Fig 6.1).

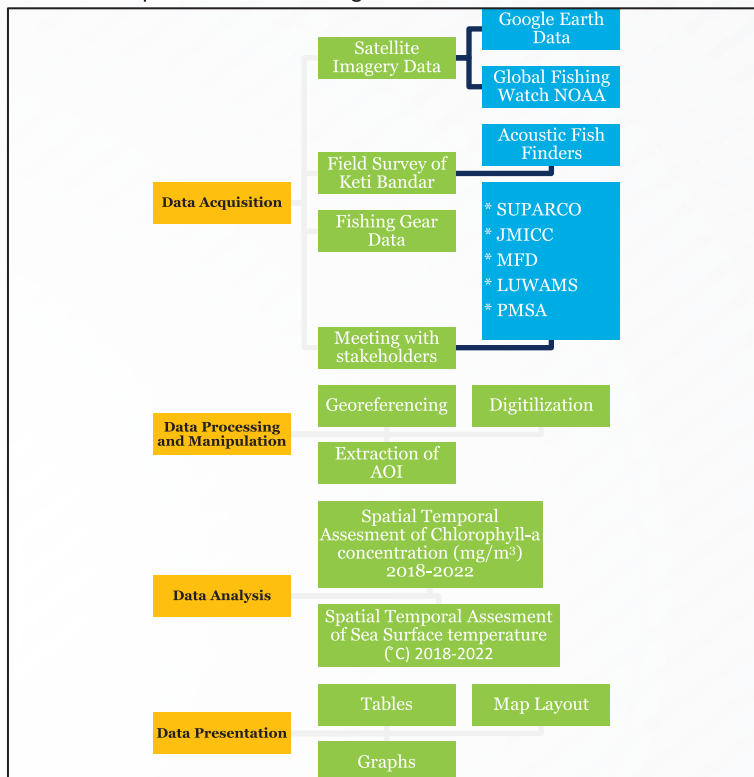
Figure 6.1: Methodology Flow Chart of Potential Fishing Grounds/Zones in EEZ of Pakistan

b. In this research, Geospatial methods were employed to identify promising fishing areas within Pakistan's Exclusive Economic Zone (EEZ). The study involved observing sea surface temperature (SST), chlorophyll-a, and salinity (PSU) from 2018 to 2022 in Pakistan's EEZ, utilizing satellite image data obtained from the website <https://globalfishingwatch.org/>.

c. For ground-truthing, we have used pioneering Acoustic fish finders in this research to accurately detect fish aggregations beneath the water's surface. This advanced technology enabled trawling vessels to detect fish in real time using sophisticated sonar capabilities. Information from fish finder devices, strategically placed on a variety of fishing trawlers, was systematically gathered during on-site visits and surveys along Pakistan's coastal area.

d. To comprehensively oversee and document the movements of fishing trawlers, Vessel Monitoring Systems (VMS) were methodically affixed. Historical VMS data played a pivotal role in identifying areas with a historical track record of thriving fishing endeavors. These datasets were sourced from the Joint Maritime Investigation and

Information Center and meticulously recorded and updated through the Joint Maritime Information software (JMIS), supplemented by invaluable input from local fishing communities.



e. The study extensively engaged with nearby fishermen and fishing communities to glean traditional wisdom regarding optimal fishing sites and the migratory patterns of diverse fish species. This local knowledge proved instrumental in pinpointing lucrative fishing locales. Collaborative efforts were undertaken with these communities to extract historical information and gain insights regarding ecologically significant areas and high-yield fishing grounds. In addition to on-site data collection, we incorporated information from pertinent literature, including the Offshore Survey 2010 and the FRAP 2015 report, further enriching the study's dataset

1.4 Limitation of study

Despite the study's diligence in addressing various constraints, it's crucial to acknowledge a notable limitation stemming from restricted financial resources in the GIS implementation. This financial constraint may have influenced the extent and precision of data acquisition and

processing. However, the study made concerted efforts to mitigate these limitations, employing alternative strategies to ensure a robust and comprehensive analysis of the maritime landscape. While financial constraints may have impacted certain aspects, the study aims to provide valuable insights within the confines of available resources.

1.5 Approach of study

a. Commencing the endeavor to enhance sustainable fisheries management in Pakistan, our research methodology seamlessly incorporates advanced technology. Specifically, we deploy Acoustic fish finders on trawling vessels for instantaneous fish detection, while Vessel Monitoring Systems (VMS) systematically gather historical data to pinpoint thriving fishing areas. The active participation of local fishermen and communities is integral, providing invaluable insights for identifying lucrative fishing locales. This comprehensive approach integrates data from diverse sources, including the Joint Maritime Investigation and Information Center, literature, and GIS techniques, analyzed spatially through the point density methodology (fig 6.2).

b. The study approach involves the pivotal use of GIS techniques for identifying potential fishing zones within the study area, subsequently validated through the wealth of local knowledge. Further steps encompass generating final maps delineating potential fishing grounds, utilizing satellite and in-situ measurements, and accurately identifying areas with high catch potential. Simultaneously, the research scrutinizes operational procedures of fishing licenses and devises governance and management strategies for jetties and harbors.



Figures 6.2: Study approach adopted for the present study

1.6 Consecutive Meetings and Survey

In a series of consecutive meetings with various key stakeholders, significant progress and valuable insights were gained for the ongoing survey and policy development:

1.6.1 Consultative Meeting with SUPARCO

NIMA officials engaged in discussions with SUPARCO regarding the identification and mapping of potential fishing zones. This initiative is contingent on funding availability from the Ministry, with SUPARCO estimating a cost of 14 lakhs PKR for the task.

1.6.2 Consultative Meeting with WWF

WWF provided pertinent literature that proved instrumental in the report-making process.

1.6.3 Consultative Meeting with MFD

MFD furnished annual data concerning fish catch and vessel statistics, which is invaluable for the comprehensive analysis.

1.6.4 Consultative Meeting with FCS

Officials from FCS delved into discussions concerning issues related to the previous Fisheries Policy. They also addressed the shortcomings of the existing license mechanism, offering crucial insights for policy refinement.

1.6.5 Consultative Meeting with JMICC

JMICC officials engaged in discussions highlighting the deficiencies in the License Mechanism and provided valuable input regarding the Fisheries Policy.

1.6.6 Consultative Meeting with Earth and Environment Science (EnS)

EnS expressed their agreement and nominated a faculty member to collaborate on the identification of fishing grounds using GIS-based technology. The progress of this initiative is contingent upon the availability of funds for surveys, necessary software, and instruments.

1.6.7 Consultative Meeting with CEMB

CEMB expressed their willingness to contribute their perspective as a stakeholder in the development of strategies for the governance of harbors and jetties in Pakistan. They also

provided relevant materials for report writing and expressed their intention to offer suggestions for policy enhancements.

1.6.8 Consultative Meeting with PMSA

PMSA offered valuable insights into the Policy & Framework for implementation documents. They affirmed their commitment to assist NIMA in conducting onboard surveys along the Sindh and Balochistan Coast. Additionally, they expressed their readiness to provide Special Regulatory Orders (SROs) if needed for policy formulation.

1.6.9 Consultative Meeting with LUAWMS

LUAWMS shared their perspectives as a stakeholder in the development of strategies for governing harbors and jetties in Pakistan. They also committed to providing support in the mapping of fishing grounds, addressing policy constraints, and understanding fishing practices along the Balochistan coast.

1.6.10 Consultative Meeting with GLLSP

GLLSP contributed to the formulation of an operational procedure for licenses and fishing practices on the Balochistan coast. They offered assistance in facilitating research activities in key areas along the Balochistan coast, namely Pasni, Jiwani, and Omara. An important development is the commitment from PMSA to provide vessels equipped with hydrographical equipment for fish stock assessment beyond 12 nautical miles. Both parties expressed their intent to formalize this collaboration through the signing of a Memorandum of Understanding (MoU) in the near future.

1.6.11 Consultative Meeting with MMD

MMD provided essential data on the registration of fishing vessels in Pakistan. They offered insights into potential amendments required for fishing licensing rules, demonstrating their expertise and willingness to assist in refining license regulations.

1.7 Consecutive Surveys for this Project

- a. The exploration of Ketī Bundar, situated at coordinates 24° 8' 59" North, 67° 26' 59" East in Thatta District along the Arabian Sea coast, aims to invigorate Pakistan's economic endeavors. This harbor possesses the capacity to accommodate large vessels, offer rich fishing grounds, and enhance cargo discharge efficiency. Compared to established ports like Gawadar, Port Qasim, and Karachi, Ketī Bandar promises a substantial contribution to the nation's economic landscape.

However, it remains one of the least examined areas, with limited studies conducted on aspects such as the geological history of the Indus Delta, coastal hydraulics, currents, fishing grounds, hydraulic modeling, and coastal geomorphology.

b. As per the Indus Delta Map, access to Keti Bandar may be gained through the Hajamaro Creek, which extends past Ghora Bari. The survey of Hajamaro Creek involved a comprehensive assessment of its geographical and hydrographic characteristics. This included mapping out the creek's topography, studying its currents, and evaluating its potential as a navigational route. Additionally, the survey focused on understanding the ecological aspects of the creek, such as fishing grounds and marine habitats. The gathered data will be crucial in making informed decisions regarding the utilization and management of Hajamaro Creek, particularly in the context of economic activities and maritime operations in the region.

c. However, there is a notable absence of hydrographic or recent research data spanning the past decade. To address this, the National Institute of Maritime Affairs (NIMA), under the Ministry's directive, is tasked with formulating a framework for fishing licensing. This initiative involves identifying and mapping potential deep-sea fishing grounds in Pakistan's EEZ to establish guidelines for issuing licenses. The collaboration of the Pakistan Maritime Security Agency (PMSA) has been instrumental in providing resources for this research survey, supervised by Cdr Faisal Saddiq, with coordination from Lt Adnan at headquarters and Cdr Nadeem Khuddad as the focal point.

d. During the study, the NIMA team utilized a chart plotter to pinpoint fishing grounds at various stations in the adjacent deep sea. They closely observed fishing activities and documented locations provided by local fishermen, who also shared insights on their equipment and fishing methods. The project's objective within Pakistan's EEZ is to identify and designate potential fishing grounds, a responsibility overseen by the PMSA. Our interaction with the PMSA to discuss the fisheries licensing project and access fishing grounds in the EEZ was a highly valuable experience. We sought clarification from NIMA and PMSA officials regarding PMSA's support on the following matters:

- (1) Assisting in obtaining up-to-date water quality data and its source.
- (2) Facilitating surveys in active commercial fishing sites in Sindh (Karachi, Keti Bandar, and Korongi) and Balochistan (Pasni, Jiwani, and Ormara).
- (3) Aiding in gathering current Special Regulatory Orders (SROs) and relevant data for appropriate agencies.

(4) Engaging as a stakeholder in formulating strategies for harbor and jetty management, contributing to the development of operational procedures for licenses, fishing equipment, vessels, and net practices (including assessing their pros and cons). Instruments employed in the study included the Global Positioning System (GPS), electronic chart plotter, and Eco sounder/fish finder equipped with a transducer.

e. The outcome of the survey yielded valuable insights and data regarding the fishing grounds and maritime conditions in the vicinity of Ketī Bandar. This information will be instrumental in formulating strategies for efficient governance and management of Fish Harbors/Jetties in the area. Additionally, the survey identified potential sites for deep-sea fishing, which will aid in the issuance of fishing licenses and contribute to sustainable fishing practices. The collaboration between the National Institute of Maritime Affairs (NIMA) and PMSA proved to be a crucial partnership in conducting this research, highlighting the significance of inter-agency cooperation in maritime studies and governance.

1.8 Scope of the Study

The scope of this study lies in providing local fishermen and the marine fisheries sector with Geo-Spatial mapping of fish aggregation in Pakistan's EEZ, which is crucial for the food industry and national economy. The study encompasses consecutive surveys, data analysis of environmental factors, and on-site data collection to inform policies and strategies. Inter-agency cooperation and stakeholder engagement are integral components, ensuring a holistic approach towards achieving sustainable and responsible fisheries practices along the Pakistani coastline.

1.9 Significance of the Study

The significance of this study extends to managers, decision-makers, policy influencers, and business owners. It also contributes to the mapping of habitats. The precise mapping of potential fishing zones using geospatial techniques, along with GPS navigation systems, holds the potential to greatly enhance the productivity of the fishing community. Moreover, the efficient use of remotely sensed data in maritime fishing analyses can be instrumental in ensuring food security and elevating Pakistan's coastal resources globally.

CHAPTER 2

Sustainable Fishing Beyond 12 NM: Eco-Based Zone Planning for Responsible Practices

2.1 Introduction

a. With increasing pressures on marine ecosystems, there is a growing need for a strategic and organized approach to marine space management (Halpern, et al., 2008). This requires careful delineation and mapping of ecosystem and socio-economic components, forming a vital component of the broader ecosystem-based spatial management approach (Katsanevakis²⁰¹¹). Among the pivotal aspects of this endeavor, the recognition of fishing activities and the demarcation of fishing grounds arise as fundamental considerations. It is highly important to determine areas of notable significance for fisheries within marine spatial plans and to gauge the expenses linked to regulating fishing activities in specific areas. Such expense evaluation forms an essential element of systematic marine conservation planning, aiming to achieve conservation goals with optimal resource allocation (Ban and Klein, 2009).

b. The integration of advanced technology has notably transformed the landscape of deep sea fishing, allowing fishermen to push boundaries and access previously unreachable areas. Modern vessels equipped with cutting-edge sonar systems, satellite connectivity, and specialized gear enable more efficient and precise fishing operations. These technological advancements not only enhance productivity but also improve safety and navigation for fishermen operating in remote and challenging maritime environments. However, alongside these advancements come concerns regarding their potential ecological impact on deep marine ecosystems. The increased accessibility afforded by modern technology raises the risk of overfishing and habitat destruction in vulnerable underwater environments. Targeted species may face depletion, disrupting the delicate balance of marine ecosystems and impacting biodiversity. Additionally, indiscriminate fishing practices could inadvertently harm non-targeted species and damage essential habitat structures such as coral reefs and underwater canyons.

c. The implementation of the Vessel Monitoring System (VMS) is a critical development in regulating and enforcing ship movement, particularly in areas where fishing activities are restricted. Developed nations have already integrated VMS into fisheries management in response to advancements in science and technology, as well as the depletion of traditional fishery resources. For instance, the European Union has incorporated VMS since 2002 to enhance fisheries management. An ecosystem-based approach is imperative for the

conservation of fisheries resources and the protection of endangered species. This approach strikes a balance between economic interests and ecological preservation, offering a sustainable path forward for the management of Pakistan's marine fisheries (European Parliament, 2023).

d. Ensuring a high degree of compliance, effective control, and enforcement through frameworks like the Common Fisheries Policy is of critical importance for achieving more sustainable management, particularly for sectors like the bottom trawl fishery, which target a diverse array of fish, cephalopods, and crustaceans (Bose, 2021). Spatial analytical techniques have emerged as powerful tools for unraveling complex spatial patterns and trends within fisheries, revolutionizing research and ecosystem-based management perspectives (Fortin and Dale, 2005). While these methods have predominantly focused on spatial indicators of fishing pressure, the enforcement of VMS has led to the development of new fishing pressure indicators and insights into fishing effort patterns (Lambert et al., 2012; Russo et al., 2013). However, fewer studies have explored the spatial distribution of catches and fishing effort, using the latter as a proxy for understanding patterns in indices like Catch per Unit Effort (CPUE) (Murawski, 2005; Bastardie et al., 2015; Jalili et al, 2015).

e. The Fisheries Resources Appraisal Project (FRAP) in Pakistan, initiated in 2008 in collaboration with the Food and Agriculture Organization and the Government of Pakistan, conducted a stock assessment survey. This comprehensive endeavor involved fisheries surveys, analysis of the fishing fleet, and capacity-building efforts. The FRAP final report emphasizes the critical need to regulate fishing efforts, advocating for a 50% reduction in fishing activity to potentially double the economic value of fisheries resources. Data compiled from surveys spanning several decades, from the 1970s to 2015, reveals a worrying trend of overfishing, with over 70% of commercially important species being overfished in Pakistan's waters, underscoring the urgent need for sustainable management practices. In 2010, Pakistan's offshore program surveyed its Exclusive Economic Zone, using acoustic and trawl methods for various fish species. The initiative also included oceanographic observations and collaborative efforts between organizations like FAO, NIO, and MFD. The goals were to estimate biomass, study the marine environment, and conduct exploratory fishing in deep-sea regions like the Murray Ridge. Additionally, they aimed to create three-dimensional maps of specific areas.

f. Considering the stated need, NIMA has undertaken the initiative to propose fishing areas beyond the 12-nautical-mile EEZ. This work is geared towards promoting sustainable fishing, safeguarding marine ecosystems, and fostering economically viable fishing practices by mitigating overfishing. The ultimate result will be the creation of a comprehensive map delineating these vital fishing zones, thereby

furnishing fishermen and other stakeholders in the fishing industry with invaluable resources and insights.

2.2 Methodology

2.2.1 Identification of Potential Fishing Zones (PFZs)

The study conducted an in-depth analysis within Pakistan's Exclusive Economic Zone (EEZ), covering up to 200 nautical miles. Seasonal maps were generated to identify PFZs, validated through field observations and fish catch data. Insights gained informed strategies for enhancing Catch per Unit estimates and addressing overfishing and illegal practices.

2.2.2 SST Assessment (2018-2022)

Utilizing Global Fishing Watch data, the spatial-temporal assessment of Sea Surface Temperature (SST) classified zones as potential, moderate, or less potential. This served as a key indicator for optimizing fishing efforts and understanding ecological conditions.

2.2.3. Chlorophyll-a Assessment (2018-2022)

The study assessed Chlorophyll-a concentration in the EEZ using Global Fishing Watch data, categorizing zones based on specific thresholds. This provided insights into phytoplankton distribution, influencing fish abundance and aiding in identifying potential fishing zones.

2.2.4. Digitization of Potential Fishing Grounds

Results were digitized into potential fishing zones through a temporal assessment of SST and chlorophyll-a content. This spatial representation supports informed decision-making for sustainable fishing practices within Pakistan's EEZ.

2.3 Results

a. The study conducted an extensive analysis of potential fishing zones within Pakistan's Exclusive Economic Zone (EEZ), spanning up to 200 nautical miles from the territorial sea baseline (Fig 6.3).

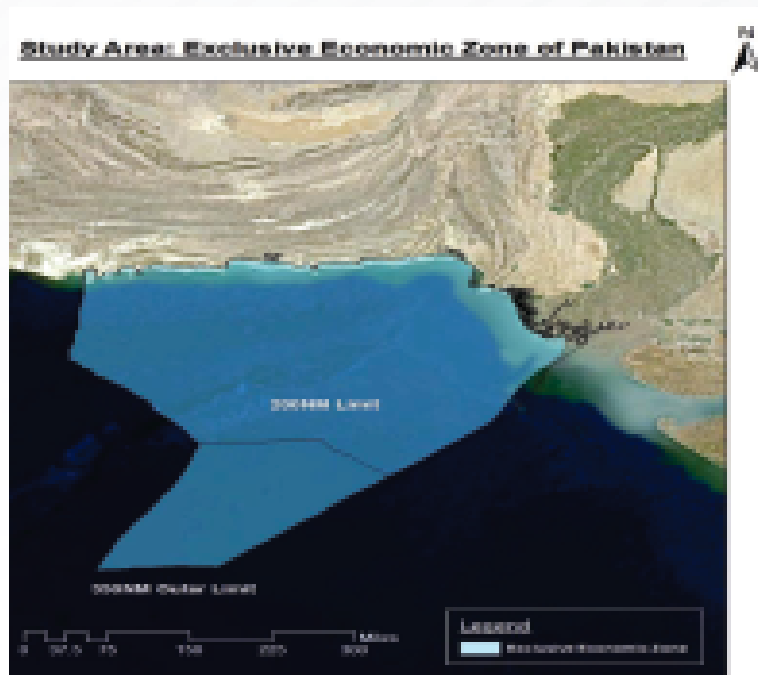


Figure 6.3: Baseline Study Area Map of the Coastal Belt of Pakistan Representing Balochistan and Sindh Coastline

b. Seasonal maps were generated to identify Productive Fishing Zones (PFZs) displaying higher ecological diversity and fish species richness. These maps provided a clear visualization of fishing hotspots and aggregating areas. The data was further validated through field observations, specifically fish catch data from selected areas within the EEZ. The study's findings offer valuable insights for promptly identifying PFZs, enhancing Catch per Unit estimates, and reducing operational costs. Addressing challenges such as overfishing, illegal practices, and environmental conservation measures are crucial for the sustainability of traditional fishing methods within Pakistan's EEZ. Additionally, diplomatic efforts and legal proceedings are essential in resolving territorial disputes and conflicting claims for fishing rights in the area. Lastly, combatting unreported, unregulated, and illegal fishing requires global cooperation and strengthened monitoring and surveillance procedures.

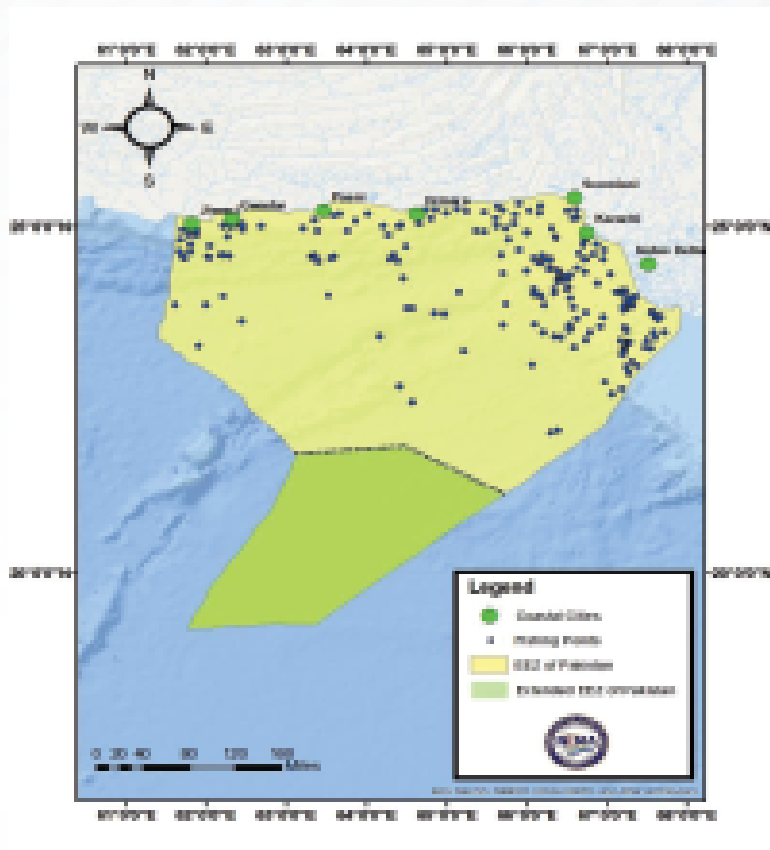


Figure 6.4: Seasonal Maps Displaying Pfzs Within Pakistan's EEZ (Potential Fishing Zones) from local fisherman and published data.

2.4 Spatial-Temporal Assessment of Sea Surface Temperature (°C) in Pakistan's EEZ

a. Sea Surface Temperature (SST) serves as an indicator for identifying potential fishing zones. The spatial-temporal assessment of SST in the Pakistan EEZ from 2018 to 2022, based on Global Fishing Watch satellite image extraction, reveals varying values, as illustrated in (Figure 6.5). If the SST falls within the range of 24°C - 27°C, it is classified as potential; between 27°C - 30°C, it is considered moderate; and if the temperature exceeds 30°C, the water is categorized as less potential.

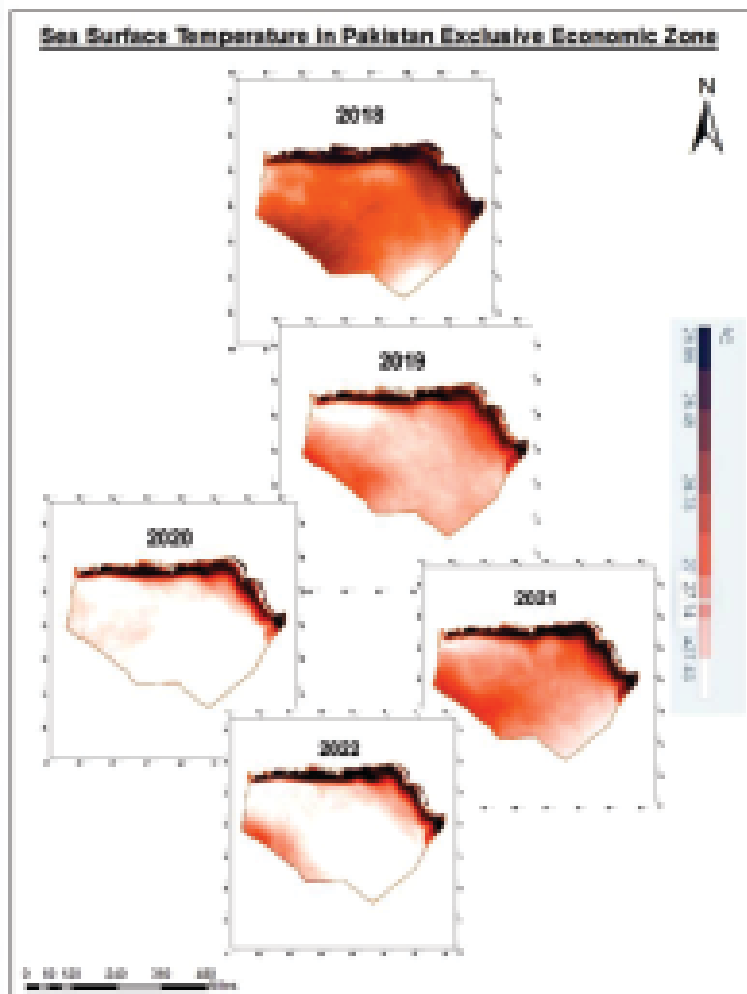


Figure 6.5: Spatial-Temporal Assessment of Sea Surface Temperature (C) in Pakistan's EEZ, Data Source: Global Fishing Watch

b. The chlorophyll-a content is utilized to identify potential fishing zones. The spatial-temporal assessment of chlorophyll-a content in the Pakistan EEZ from 2018 to 2022, based on Global Fishing Watch satellite image extraction, shows diverse values, as depicted in Figure 6.6. If the chlorophyll-a content exceeds 0.2 mg/m^3 , it is classified as potential; between 0.1 mg/m^3 - 0.2 mg/m^3 , it is considered moderate; and if the chlorophyll-a content is less than 0.1 mg/m^3 , it is categorized as less potential.

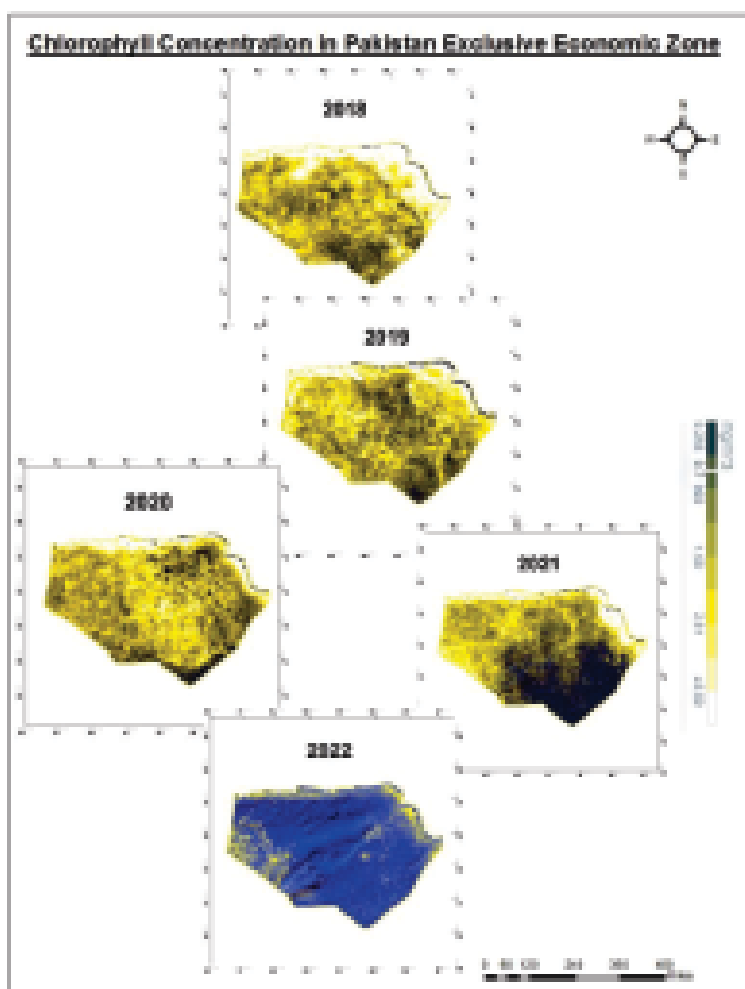


Figure 6.6: Spatial-Temporal Assessment of Chlorophyll-a concentration (mg/m^3) in Pakistan's EEZ, Data Source: Global Fishing Watch

2.5 Potential Fishing Grounds in Pakistan's EEZ

Figures 6.7 display the outcomes of identifying potential fishing zones. The study's results led to the digitization of suspected potential fishing zones through a temporal assessment of sea surface temperature and chlorophyll-a content values from 2018 to 2020.

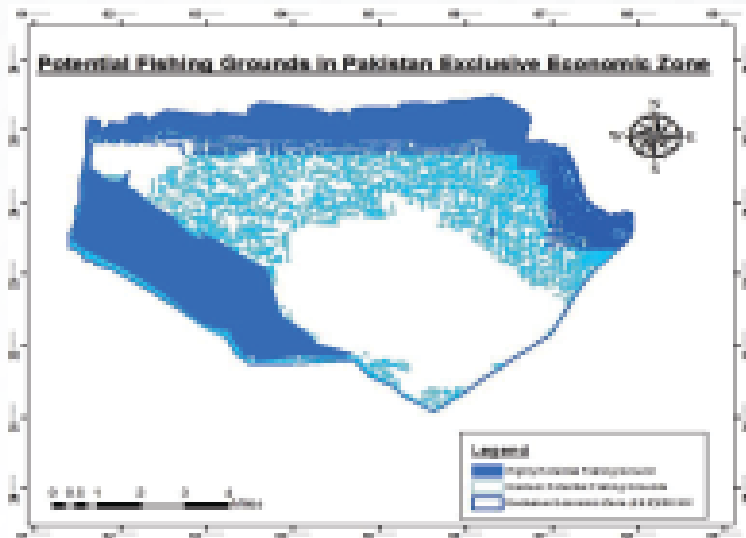


Figure 6.7: Potential Fishing Grounds in Pakistan's EEZ, Data Source: Global Fishing Watch

2.6 Way Forward

- a. Implement modern technology and advanced data integration methods to improve the accuracy and comprehensiveness of fishing data collection within Pakistan EEZ. This involves integrating Vessel Monitoring Systems (VMS) with various geolocation data sources to create detailed maps of fishing activities.
- b. Facilitate partnerships between government agencies, local fishing communities, and research institutions. Implement training and capacity-building initiatives to empower stakeholders with the knowledge and tools necessary for effective and sustainable fisheries management.
- c. Advocate for the development and enforcement of policies addressing critical issues such as overfishing, illegal practices, and environmental conservation. Strengthen legal frameworks and regulatory mechanisms to ensure compliance and encourage responsible fishing practices.
- d. Engage in diplomatic discussions and collaborate with neighboring countries, including Northern European nations like Norway, to resolve territorial disputes and conflicting claims for fishing rights within Pakistan's EEZ. This collaborative approach aims to find mutually agreeable solutions and maintain regional security, while also aligning with the fishing policies being followed by other nations in the region.

CHAPTER 3

Combatting Illegal Fishing Gears: Enforcing a Strategic Ban for Sustainable Seas

3.1 Introduction

a. Illegal, unreported, and unregulated (IUU) fishing remains a pressing global concern, exerting adverse effects on the environment, economy, and livelihoods. In the context of Pakistan, these activities present a critical challenge to the nation's marine resources and the communities dependent on them. This report delves into the enforcement strategies targeting illegal fishing activities, particularly those involving banned fishing gears, as outlined in national fisheries legislation (NOAA, 2019). This aspect, despite its pivotal importance, has yet to be systematically examined in the Pakistani context.

b. The International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU) by the Food and Agriculture Organization of the United Nations (FAO) provides a crucial framework for defining and addressing these activities. Within this framework, this report narrows its focus to 'illegal fishing,' as described in Para 3.1 of the IPOA-IUU. The common denominator that designates fishing or related activities as illegal lies in the violation of applicable laws and regulations. This encompasses a spectrum of actions within the fisheries value and supply chains, obstructing the global pursuit of legal and sustainable fisheries. Notably, small-scale fisheries governed by traditional and customary rules pose a unique challenge due to their informal recognition (NOAA, 2019).

c. Despite efforts by the Pakistani government to implement policies and regulatory measures, widespread non-compliance with fisheries laws persists, necessitating an exploration of the most effective approaches within the local context. This report engages with the discourse surrounding the intersection of environmental law, wildlife conservation law, transnational organized crime law, and fisheries law, shedding light on the connection between 'illegal fishing' and crimes within the fisheries sector in Pakistan.

d. The ensuing sections of this report delineate the international legal framework and Pakistan's obligations in combatting illegal fishing, the integration of international law into national legislation, and the debate surrounding the criminalization of violations. Moreover, a comprehensive assessment of primary fisheries legislation at the national and EU levels unveils a dual enforcement approach that encompasses administrative and criminal processes.

e. This study endeavors to contribute to the realization of Sustainable Development Goal 14, target 14.4, by scrutinizing the

enforcement strategies within Pakistan's national fisheries legislation. By shedding light on the multifaceted nature of illegal fishing in the Pakistani context, it seeks to pave the way for effective regulation, ultimately curbing overfishing, IUU practices, and destructive fishing within the nation's waters.

3.2 Fishing Techniques

In Pakistan, a variety of fishing techniques are employed to harness marine resources. These methods include trawling, which involves dragging nets through the water to catch a diverse range of fish species, and seine fishing, a targeted approach using nets to encircle free-swimming schools of fish. Gillnetting deploys vertical panels to capture fish by their gills, while longlining uses baited hooks on a main line, commonly for larger species like tuna and swordfish. Purse seining is employed for surface-swimming fish like tuna, and handline fishing offers a traditional, low-impact method with a single line and hooks. Traps, pots, and dredges are also used for specific types of catch. Additionally, cast nets are utilized in shallower waters, while spearfishing involves free-diving and using a spear. Each technique presents its own set of advantages and drawbacks, and their suitability depends on factors such as target species, location, and environmental considerations. Effective management and regulation of these methods are imperative for ensuring sustainable fishing practices and safeguarding marine ecosystems (NOAA. 2020).

Table 6.1: Types of Fishing in Pakistan

Gear	Local Name	Legal Status
Gillet	Rach, Mahore	Legal, most common fishing gear
Handline	Chirdani, Kundi	Legal
Longline	Sangal	Legal
Trawling	Gujja	Illegal in Balochistan, Sindh
Seine net	Katra, wirenet	Illegal in Balochistan
ESBN	Bulla	Illegal in Balochistan
Troll	Bram	Legal

3.2.1 Trawling

a. Trawling stands as a dominant fishing method in Pakistan, with a fleet comprising approximately 2,500 fishing boats. These boats utilize two main types of trawls: fish trawl nets and shrimp trawl nets. The distinction between the two lies in their design and usage. Shrimp trawl nets are specially crafted to target shrimp, and they typically extend up to 40 meters in length. On the other hand, fish trawl nets are built for a broader range of fish species and can stretch well beyond 200 meters, demonstrating their versatility and capacity for large-scale operations (Suuronen et al., 2020).

b. However, despite the widespread use of trawling, it is not without its drawbacks.

(1) One significant disadvantage is the potential for habitat destruction. The heavy trawl gear can disturb and damage the seafloor, impacting delicate marine ecosystems.

(2) Additionally, trawling is associated with high bycatch rates, meaning that non-targeted species, including juvenile fish and non-commercial species, can be unintentionally caught and discarded. This can lead to a waste of valuable marine resources and negatively impact the overall ecosystem. Furthermore, the size and scale of trawl nets can sometimes make it difficult to accurately target specific species, contributing to overfishing concerns. As such, while trawling is a prevalent and effective fishing method, it is essential to carefully manage and regulate its use to mitigate these potential downsides and ensure sustainable fishing practices

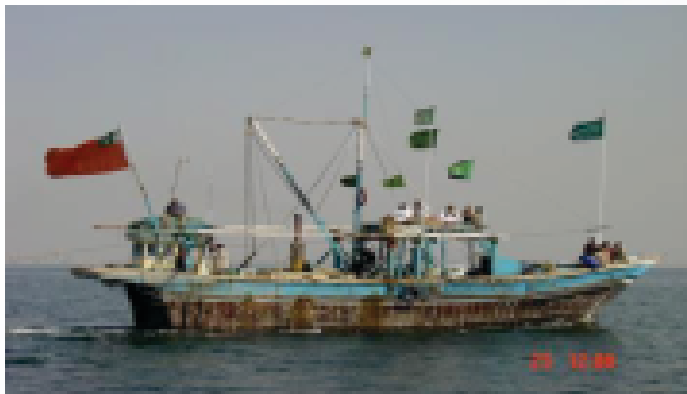


Figure 6.8: A Pakistani fishing trawler equipped with a fish trawl net, showcasing the dominant fishing method in the region.

c. These trawlers play a vital role in Pakistan's fishing industry, but their use requires careful management to ensure sustainable practices and minimize environmental impact.

3.2.2 Seine Wire net

Seine fishing constitutes a significant aspect of Pakistan's fishing industry, with 2,200 seine boats operating in Sindh and an additional 100 in Damb and Sonmaini. These boats primarily target free-swimming schools of fish, a practice that distinguishes seine fishing from other methods. What sets these

schools apart is their typically monospecific composition, meaning they primarily consist of a single species of fish. This characteristic significantly reduces the likelihood of bycatch, which refers to the unintentional capture of non-targeted species. This distinct advantage makes seine fishing a more targeted and selective approach compared to certain other fishing methods. However, it's worth noting that while seine fishing offers advantages in terms of bycatch reduction, it's crucial to manage and regulate this method to ensure sustainable fishing practices and protect marine ecosystems. Despite its advantages, seine fishing has drawbacks, including dependence on fish behavior, potential gear loss, and competition among fishermen. Proper oversight, enforcement, and management are crucial to ensure sustainable seine fishing in Pakistan.



Figure 6.9: Seine Wirennet: A Time-Honored Fishing Method in Pakistan's Coastal Villages"

3.2.3 Estuarine Set Bagnet (ESBN)

Estuarine set Bagnet (ESBN), introduced by Bangladesh in the late 1970s, has become a prevalent fishing gear in certain regions of Pakistan, particularly in creek areas of Sindh. However, it's important to note that ESBN is now under a complete ban in both Sindh and Balochistan. Despite the ban, its usage remains widespread, with many families along the coastline owning one or more of these nets. The popularity of ESBN is attributed to its effectiveness in capturing fish, making it a favored choice for many fishermen. However, the continued use of this gear raises concerns about its impact on marine ecosystems and fish stocks, highlighting the need for strict

enforcement of the ban and the promotion of sustainable fishing practices.



Figure 6.10: Estuarine Set Bag Net (ESBN): Traditional Fishing Technique Along Pakistan's Coastline

3.2.4 Line

Pakistan's line fisheries encompass three primary methods: handline, demersal longline, and tuna longline. Among these, handline fishing is characterized by its small-scale, artisanal nature. It involves a single fishing line with a hook, making it a relatively simple and accessible method for coastal communities. However, the disadvantage of handline fishing lies in its limited capacity for large-scale commercial operations. In contrast, demersal and tuna longline fishing techniques involve the use of multiple hooks attached to lines, enabling the targeting of specific species like bottom-dwelling demersal fish or large pelagic tuna. While these methods offer higher yields and economic benefits, they also pose challenges related to bycatch and potential impacts on non-targeted species and marine ecosystems. Therefore, careful management and regulation are crucial to ensure the sustainability of these line fisheries.

3.2.5 Longline Fishing

Longline Fishing is a specific technique primarily utilized in small-scale fisheries. This method involves deploying a longline with baited hooks on the ocean floor to target demersal species such as eels, groupers, sharks, and stingrays. While demersal longlining can be an effective way to catch specific commercially valuable species, it has its limitations. Nowadays, this technique

is largely confined to "doonda" boats, which are small, traditional vessels. The restriction to small-scale operations may limit the overall economic benefits that could be derived from this method. Additionally, like other longline methods, there is a risk of bycatch and potential impacts on non-targeted species and the broader marine ecosystem. Therefore, careful management and monitoring are essential to mitigate these disadvantages and ensure the sustainability of demersal longline fishing practices.



Figure 6.11: Single-Line Fishing: A Traditional Practice in Pakistan's Coastal Communities

3.2.6 Gill net

Gill nets are a widely used fishing gear characterized by their mesh-like structure, which allows fish to pass their heads through but not their bodies, effectively entrapping them. In Pakistan, gill nets are commonly manufactured by local artisans using various materials such as nylon, monofilament, and multifilament. These nets are typically crafted in different sizes to target specific fish species. The use of gill nets in Pakistan is prevalent, particularly in coastal areas, estuaries, and rivers, where they play a crucial role in the livelihoods of many fishing communities. However, this fishing method is not without its disadvantages. One significant concern is the issue of bycatch, where non-targeted species, including endangered marine life, can become entangled and perish in the nets. This can contribute to overfishing and habitat disruption, ultimately impacting the overall health of marine ecosystems. Additionally,

abandoned or lost gill nets, known as "ghost nets," continue to pose a threat to marine life long after they have been discarded. These factors highlight the need for effective monitoring, regulation, and enforcement measures to ensure sustainable gill net fishing practices in Pakistan.



Fig 6.12: Meshing Livelihoods: Gill Net Fishing in Pakistan's Coastal Water

3.3 Provisions Pertaining to Illegal Fishing Gears

In Pakistan, provisions pertaining to illegal fishing gears encompass a set of regulations and guidelines established by relevant authorities to govern the use of fishing equipment and techniques. These regulations aim to combat the use of gear that is deemed detrimental to marine ecosystems, unsustainable, or in violation of established norms. Illegal fishing gears refer to equipment or methods that do not comply with legal standards, often resulting in overfishing, bycatch of non-targeted species, and damage to aquatic habitats. These provisions serve to protect marine resources, promote sustainable fishing practices, and maintain the ecological balance of Pakistan's coastal waters. Violations of these regulations may incur penalties or legal consequences to deter non-compliance and safeguard the long-term health of the marine environment.

3.3.1 The Exclusive Fishery Zone (Regulation of Fishing) Rules, 1976

The Exclusive Fishery Zone (Regulation of Fishing) Rules, 1976, outlines crucial provisions aimed at regulating fishing activities in Pakistan's exclusive fishery zone. Article 1 establishes the short title and commencement of these rules, officially designating them as the Exclusive Fishery Zone (Regulation of Fishing) Rules, 1976. Article 4 addresses the registration of fishing craft and fishing gear, emphasizing that no person is permitted to operate a fishing craft unless it has been duly registered and bears its registration number along with the owner's name in clear and visible numerals and letters. Additionally, fishing gear must also undergo registration before use. This demonstrates the government's commitment to overseeing and controlling fishing operations within its exclusive fishery zone. It not only ensures compliance with established regulations but also promotes responsible and sustainable fishing practices for the preservation of marine resources. The licensing authority is entrusted with specifying the registration process for both fishing craft and gear, placing an onus on owners to adhere to these regulatory measures (Exclusive Economic Zone, 1976).

3.3.2 Sindh Fisheries Ordinance, 1980

a. Sindh Fisheries Ordinance, 1980 Sindh Fisheries Ordinance, 1980 amended in 2011, directs and regulate for sale, handling, processing, transportation and storage of shrimp/ fish for commercial purpose.

b. Core regulation applicable in Sindh region, the regulations aim to enhance fisheries supervision by (Sindh Laws, 2017): a. Applying Restriction on catching some species of fish. b. Regulated closed season for shrimp. c. Banning the use of Explosive or other noxious materials. d. Restriction of destructive fishing gears. e. Issuing license or permit for commercial and sports fishing. f. Issuing licenses to fish dealer and factory owners for sale/ purchase. g. Applying penalties and fines.

3.3.3 Under the United Nations Convention on the Law of the Sea (UNCLOS)

Under the United Nations Convention on the Law of the Sea (UNCLOS) established in 1982, coastal states are granted sovereign rights within their Exclusive Economic Zones (EEZs) extending up to 12 nautical miles from their baselines. This includes the authority to enact regulations governing fishing activities and the types of fishing gears employed. The convention places a strong emphasis on the conservation and

sustainable management of marine resources, urging states to prevent overfishing and the use of destructive practices. Additionally, UNCLOS encourages cooperation among neighboring states for the conservation of shared fish stocks that may traverse maritime boundaries. In essence, UNCLOS provides a comprehensive legal framework empowering coastal states to oversee and manage fishing operations, including the regulation of fishing gears, within their respective EEZs, thereby fostering responsible and sustainable fisheries practices.

3.3.4 Exclusive Fishery Zone (Regulation of Fishing) Rules, 2021

The process for obtaining a fishing license involves providing specific equipment and documents for inspection by the Mercantile Marine Department and Pakistan Maritime Security Agency. These departments are responsible for reviewing the craft, equipment on board, electronic and wireless devices, vessel registration, ownership proof, and details of fishing gear. The inspection is expected to be completed within seven working days, and once approved, the Marine Fisheries Department is informed. The Inter-Ministerial Steering Committee (IMSC) plays a crucial role in overseeing fishing licenses. It comprises various key officials, including representatives from the Ministry of Maritime Affairs and Marine Fisheries Department. The IMSC is responsible for scrutinizing license applications, recommending issuance of licenses annually, conducting open auctions if there are more applications than required, and forwarding the names of highest bidders for license awards. Additionally, the new amendment categorizes fishing gears into long liners and gillnetters, with specific restrictions on gillnet length and mesh size to ensure sustainable fishing practices. This information is detailed in the Gazette of Pakistan dated August 3, 2021.

3.4 Fishing Industry Challenges with Illegal Fishing Gear in Pakistan

a. In Pakistan, the fishing industry plays a vital role in the economy and livelihoods of coastal communities. However, it faces several critical challenges related to fishing gear practices.

b. One pressing issue is the prevalent use of unregulated and illegal gear, including fine nets and destructive methods like dynamite or poison. This contributes to overfishing and poses significant threats to non-targeted species and overall ecosystem health. Additionally, there's a notable lack of gear selectivity in many traditional fishing methods. This means that they capture a wide range of species, including juveniles and non-targeted fish. Consequently, high levels of bycatch are a common occurrence, which can lead to adverse impacts on fish stocks and broader marine ecosystems.

c. Conflicts arising from competing interests among different gear users further compound the issue. Trawlers, gillnetters, and longliners often find themselves in disputes over access to fishing grounds and competition for resources. These conflicts can escalate, potentially leading to resource depletion. Furthermore, certain fishing gears, such as bottom trawling, have significant environmental implications. They can cause habitat destruction, disrupt benthic ecosystems, and result in long-lasting damage to the seafloor. This environmental impact has long-term consequences for the overall health of marine ecosystems.

d. The use of indiscriminate fishing gears, particularly gillnets, in Pakistan has led to significant harm to marine life. Prior to 2012, thousands of turtles and dolphins were trapped annually, with many dolphins succumbing to suffocation but there were no counts made until 2012 (Tribune, 2021). Pakistan's extensive fleet of around 28,000 fishing boats, primarily employing gillnets, seine nets, and trawling methods, has resulted in substantial bycatch, impacting both targeted and unintended species. Gillnets, in particular, pose a significant challenge, often entangling various marine creatures. Despite regulations, some fishers employ oversized nets, contributing to a substantial decline in fish populations (The third pole, 2023).

e. Efforts to monitor and enforce regulations pertaining to fishing gear practices face significant challenges, particularly in remote or poorly regulated areas. This often leads to non-compliance with gear restrictions, exacerbating unsustainable practices. An illustrative example of these challenges is the declining population of mostly fish species in Pakistan. For instance, the population of the Indian mackerel (*Rastrelliger kanagurta*) has experienced a sharp decline in recent years due to overfishing and the use of indiscriminate gear types.

f. Addressing these challenges requires a comprehensive approach, including strengthened regulation, enhanced enforcement, investment in research and development of more selective gear technologies, and active engagement with fishing communities to ensure sustainable and responsible gear practices in Pakistan.

3.5 Conservative Management Considerations: Selectivity and Other Ecosystem Effects of Fishing

a. The use of destructive fishing methods poses a significant threat to marine ecosystems and the livelihoods of coastal populations reliant on fisheries. To address this issue, Pakistan, along with several other countries, has implemented laws and regulations to combat the use of harmful fishing equipment. Destructive fishing gears, such as drift nets, gillnets, and other unlawful strategies, are considered illegal practices in Pakistan, mirroring similar regulations in many nations. These methods can cause substantial harm to fish populations, marine environments, and the socio-economic well-being of coastal

communities. Examples of destructive fishing equipment include bottom trawling, which involves dragging large nets across the ocean floor and can lead to damage to delicate ecosystems like coral reefs and seagrass meadows. Additionally, drift nets, characterized by their large size, can inadvertently capture and kill non-target species like sea turtles and marine mammals. Gillnets, with their fine mesh, pose a risk of entangling and suffocating marine life, particularly endangered species. Their use has raised concerns about overfishing, bycatch, and habitat destruction in Pakistan.



Figure 6.13: Location of dolphin mortalities along Pakistan coast during gillnet

b. Addressing the issue of detrimental gillnets in Pakistan requires a comprehensive approach encompassing legal measures, educational initiatives, community involvement, and a commitment to sustainable fishing practices. Prioritizing the well-being of marine ecosystems and biodiversity is essential for Pakistan to transition towards a more ethical and sustainable fishing sector.

c. The ecosystem effects are rated on a scale from 1 (unfavorable) to 10 (favorable), resulting in an average ecosystem effect index. It's important to note that this table serves as a general guideline for evaluating fishing gears and fisheries management. Specific fisheries in a given area should undergo a more detailed analysis, considering the local or regional importance of proposed ecosystem factors. While a fishing method may have a general level of responsibility, attention should be given to where, when, and how it is utilized. Collaboration with fishers is crucial in refining technical regulations, ensuring a clear understanding of their purpose, and incorporating their input in the implementation process. This evaluative approach can also be employed to pinpoint current or potential weaknesses related to ecosystem impacts in existing fishing methods, providing a foundation for research and development to enhance selectivity and mitigate undesired effects on the ecosystem (FAO, 2022).

Table 6.2: provides an overview of how different fishing gears can be assessed based on their selectivity and impact on the ecosystem.

Ecosystem effects and Gear type	Size selection	Species selection	By-mortality	Ghost fishing	Habitat effects	Energy efficiency	Catch quality	Eco-system effect index
Gillnets	8	4	5	1	7	8	5	5,4
Trammel nets	2	3	5	3	7	8	5	4,7
Handlining	4	4	6	10	9	9	9	7,3
Longlining	6	5	6	9	8	8	8	7,1
Pots	7	7	9	3	8	8	9	7,3
Traps	5	5	8	8	9	9	9	7,6
Spear, harpoon	8	9	5	10	10	8	9	8,4
Pelagic trawl	4	7	3	9	9	4	8	6,3
Demersal trawl	4	4	6	9	2	2	6	4,7
Beam trawl	4	4	6	9	2	1	6	4,6
Shrimp trawl	1	1	7	9	4	2	6	4,3
Seine net	5	5	6	9	4	5	8	6,0
Purse seine	-	7	5	9	9	8	8	7,7
Beach seine	2	2	5	10	6	9	9	6,1

3.6 Implications for Future Policy and Implementation

a. Policies addressing fishing gears should be tailored to specific local or regional conditions, recognizing that a uniform approach may not yield optimal results. This approach is underscored by statistics indicating variations in fishing gear efficacy across different ecosystems and regions. Actively involving fishers in the regulatory process is crucial. Collaborative efforts between regulatory authorities and fishers lead to higher compliance rates and a better understanding of the underlying conservation goals. This participation-based approach has been shown to be effective in multiple case studies.

b. Policies should encompass broader ecosystem factors beyond just catch statistics. By-mortality, habitat effects, and energy efficiency play pivotal roles in marine environments. Addressing these elements is vital for maintaining overall ecosystem health and resilience. Ongoing efforts in research and development are essential for enhancing gear selectivity and sustainability. Providing support for the adoption of more responsible gear can significantly contribute to long-term conservation endeavors.

c. **Implementation Goal.** The primary goal of implementing these strategies is to achieve a balanced and sustainable coexistence between human communities and marine ecosystems. This is evidenced by successful cases, where tailored policies, stakeholder

engagement, and a comprehensive understanding of ecosystem dynamics have led to improved conservation outcomes and livelihoods for fishing communities. The aim is to create a resilient framework that adapts to evolving environmental and socio-economic conditions, ultimately ensuring the long-term health of marine ecosystems and the prosperity of coastal communities.

3.7 Proposed strategies, action points, and objectives for Combatting Illegal Fishing Gears: Enforcing a Strategic Ban for Sustainable Seas.

Objective:

The objective of this comprehensive strategy is to combat the use of illegal fishing gears in Pakistan, enforcing a strategic ban to protect marine ecosystems, promote sustainable fishing practices, and safeguard the livelihoods of coastal communities.

Strategy:

3.7.1 Strengthen Regulatory Framework and Enforcement

Enhance and enforce existing fisheries legislation with a focus on banning and penalizing the use of illegal fishing gears.

Action Points:

- a. Conduct a thorough review of current fisheries laws to align with the strategic ban within the next 6 months.
- b. Allocate additional funding and personnel to enforcement agencies for effective implementation by the end of the year.

3.7.2 Promote Stakeholder Engagement and Education:

Engage with fishing communities, industry stakeholders, and NGOs to raise awareness about the environmental impacts of illegal fishing gears and the benefits of sustainable practices.

Action Points:

- a. Initiate community workshops, awareness campaigns, and training programs within the next 3 months.

- b. Develop educational materials and resources in collaboration with NGOs by the end of the year.

3.7.3 Implement Advanced Monitoring and Surveillance Technology:

Invest in advanced technology, such as satellite imagery, drones, and electronic reporting systems, for real-time monitoring of fishing activities and gear usage.

Action Points:

- a. Procure and deploy monitoring technology within the next 12 months.
- b. Launch electronic reporting systems and training for fishers within the next 6 months.

3.7.4 Strengthen International Cooperation:

Collaborate with neighboring countries and international organizations to share information, coordinate efforts, and develop joint initiatives against illegal fishing gears.

Action Points:

Establish bilateral agreements and participate actively in regional and international forums on illegal fishing within the next 18 months.

3.7.5 Research and Development of Selective Gear Technologies:

Invest in research projects to develop and promote the use of selective fishing gear that reduces bycatch and minimizes environmental impact, thereby encouraging their adoption.

a. Action Points:

- a. Allocate research grants and initiate projects within the next 12 months.
- b. Implement incentives for gear transition and provide support for adoption within the next 6 months.
- c. Phase 1 (Months 1-6): Review and amend fisheries legislation, allocate additional resources

to enforcement agencies, initiate community workshops, awareness campaigns, and training programs.

d. Phase 2 (Months 7-18): Procure and deploy monitoring technology, establish bilateral agreements with neighboring countries, and launch electronic reporting systems.

e. Phase 3 (Months 19-36): Engage in research projects for selective gear technologies, develop educational materials and training programs, and implement incentives for gear transition.

f. Reduction in illegal fishing activities using banned gears.

g. Increase in adoption of sustainable fishing practices among communities.

h. Improved marine ecosystem health indicators (e.g., bycatch reduction, habitat preservation).

i. Successful establishment of bilateral agreements with neighboring countries.

j. Implementation of electronic reporting systems and monitoring technology.

k. The successful implementation of this strategy will lead to a significant reduction in illegal fishing activities, promoting sustainable seas, and contributing to the protection of marine ecosystems and livelihoods in Pakistan. It aligns with the overarching theme of "Combatting Illegal Fishing Gears: Enforcing a Strategic Ban for Sustainable Seas.

3.8 Way Forwards towards Sustainability

a. Implement rigorous checks, tracking systems, and penalties to ensure adherence to fishing gear regulations. For instance, regular inspections of fishing vessels can deter the use of illegal gear.

b. Invest in Research and Development for eco-friendly fishing gear: Developing selective gear can significantly reduce bycatch, preserving marine life and habitats. For example, the introduction of Turtle Excluder Devices (TEDs) in trawl nets.

- c. Fostering partnerships between authorities, fishers, and local communities is crucial. Involving fishers in rule-making enhances compliance and leads to more effective conservation, as evidenced by community-led marine protected areas.
- d. Acknowledge diverse ecosystems and fishing practices across regions: Tailor policies to local conditions for optimal effectiveness. For instance, different regulations may be needed for the Arabian Sea and the Indus Delta. Consider factors like by-mortality, habitat
- e. Impacts, and energy efficiency. Implement measures to protect critical habitats: For example, establishing no-fishing zones in sensitive areas.
- f. Encourage adoption of sustainable practices through awareness campaigns, training, and incentives: For instance, promoting the use of circle hooks to reduce bycatch of sea turtles. Set up a robust, real-time monitoring system for fishing activities. Use this data to adapt policies swiftly, addressing emerging challenges. For instance, satellite-based vessel tracking systems can provide valuable information.
- g. Collaborate with neighboring states to manage shared fish stocks and combat illegal fishing: Joint patrols and information sharing can lead to more effective conservation efforts. Provide training and capacity-building programs for fishers. Equip them with knowledge and skills for sustainable fishing. This could include workshops on responsible gear handling and marine conservation.
- h. Educate the public about the importance of sustainable fishing: Emphasize the role of responsible gear use in safeguarding marine ecosystems. This could be achieved through public campaigns, workshops, and educational programs. For example, highlighting the impact of illegal gear on endangered species like the Indus River Dolphin.
- i. By implementing these strategies, Pakistan can move towards a more sustainable and balanced coexistence between human communities and marine ecosystems. This approach will not only safeguard the nation's marine resources but also contribute to the long-term prosperity and well-being of coastal communities.

3.9 Conclusion

In conclusion, addressing illegal fishing gear practices in Pakistan is crucial for the preservation of marine ecosystems, the sustainability of fisheries, and the well-being of coastal communities. The extensive use of various fishing gears, coupled with challenges in enforcement and compliance, has led to overfishing, habitat degradation, and significant bycatch. The existing legal framework provides a foundation for regulation, but effective implementation and continuous adaptation to evolving environmental and socio-economic conditions are imperative.

CHAPTER 4

Developing a Comprehensive Strategy for Implementing Deep Sea Policies

4.1 Introduction

a. The document under scrutiny outlines a series of amendments to the Exclusive Fishery Zone (Regulation of Fishing) Rules, 1990, as empowered by section 16 of the Exclusive Fishery Zone (Regulation of Fishing) Act, 1975. This set of amendments, officially known as S.R.O. 981(I)/2021(Annex A), represents a pivotal step taken by the Federal Government of Pakistan towards refining the regulatory framework governing fishing activities within the EEZ. These amendments encompass a range of critical aspects, including definitions, licensing procedures, sustainability measures, and inter-agency cooperation. In this analysis, we will delve into the specific modifications introduced, considering their potential implications on the sustainability and management of fisheries resources in Pakistan's maritime jurisdiction.

b. Here is a summary of the main changes and additions:

(1) Rule 1 – Definitions

This section provides definitions for various terms used in the rules, such as "Act", "Catch per unit effort (CPUE)", "Electronic logbook", "Fishing permit", and others. These definitions clarify the meanings of these terms within the context of the rules.

(2) Rule 2 - License to operate a fishing craft

This section outlines the process for applying for a license to operate a fishing craft within the EEZ. It specifies the requirements for application, the criteria for approval, and the necessary inspections.

(3) Formation of Fisheries Sector Advisory Body (FSAB)

This section establishes the Fisheries Sector Advisory Body, which is tasked with framing policies and regulating the fisheries sector. It outlines the composition of the body, including various government officials and representatives from relevant departments and associations.

(4) IMSC (Inter Ministerial Scrutiny Committee)

This section establishes the Inter-ministerial Scrutiny Committee, which is responsible for scrutinizing applications for fishing licenses, recommending license

issuance, conducting auctions if necessary, and forwarding names of highest bidders to the Licensing Authority.

(5) Categorization of Fishing Gears

This section categorizes fishing gears into "long liners" and "gillnetters" and sets specific restrictions on the length of gillnets that can be used.

(6) Validity of License, Fishing Permit, and Identity Cards

This section specifies the validity periods for licenses, fishing permits, and identity cards.

(7) Fees for License, Fishing Permit, and Identity Cards.

This section outlines the fees for different categories of fishing licenses, permits, and identity cards.

(8) Departmental representative on board the fishing craft

This section mandates that a senior research assistant from the marine fisheries department must be on board for a certain percentage of fishing trips to collect data and photographic evidence.

(9) Prohibition on transshipment of fish on high seas

This section prohibits licensees from transshipping fish or supplying fish on high seas to other vessels.

(10) Penalties for violating license conditions

This section outlines penalties for licensees who violate any conditions of the rules.

(11) Installation of Vessel Monitoring System (VMS)

This section mandates that all fishing vessels intended for fishing within the EEZ must have a VMS installed on board, which provides real-time information on the vessel's location and activities.

(12) Repeal of Deep-Sea Fishing Policy, 1995

This section repeals the Deep-Sea Fishing Policy, 1995.

These amendments seem to be aimed at regulating and monitoring fishing activities within Pakistan's EEZ in order to ensure sustainable and responsible fishing practices.

In the provided document, while there are commendable efforts to regulate fishing activities within Pakistan's EEZ, several policy gaps persist. These gaps primarily revolve around enforcement, sustainability, socio-economic considerations, and global cooperation.

4.2 Policy Gaps

- a. **Enforcement and Compliance.** While the document introduces measures like Vessel Monitoring Systems (VMS), ensuring consistent and accurate reporting remains a challenge. Stricter penalties for non-compliance and regular audits of VMS data could help bridge this gap.
- b. **Sustainability Measures.** Although the concept of Maximum Sustainable Yield (MSY) is introduced, specific guidelines and quotas for different species are not outlined. A more robust scientific assessment process, in collaboration with relevant stakeholders, should be established.
- c. **Socio-Economic Impacts.** The document does not extensively address the socio-economic aspects of fisheries. It is crucial to consider the livelihoods of local communities dependent on fishing and implement measures that promote both conservation and economic well-being.
- d. **Foreign Vessels and Joint Ventures.** The involvement of foreign vessels and joint ventures is a complex issue. While restrictions have been put in place, there may still be challenges in effectively regulating their activities. Strengthening international cooperation and agreements for monitoring foreign vessels, along with stringent penalties for non-compliance, could be explored.

4.3 Challenges

- a. Adequate resources and capacity for enforcement agencies are crucial for effective monitoring and regulation of fishing activities. Without sufficient resources, enforcement efforts may be hampered.
- b. Accurate and up-to-date data is essential for sustainable fisheries management. Challenges may arise in collecting comprehensive data on fish stocks, catch rates, and other relevant metrics.
- c. Balancing the interests of various stakeholders, including local communities, industry representatives, and environmental organizations, can be challenging. Ensuring that policies are fair and inclusive requires effective engagement with these groups.

4.4 Way Forward

- a. Investing in technology (Satellite communication systems, GPS tracking technology, Data transmission and reporting systems, Geofencing and alert mechanisms & Integration with other monitoring systems) and capacity-building for monitoring and enforcement agencies is crucial for effective regulation. This includes ensuring the consistent use and accurate reporting of VMS.
- b. Data analysis and reporting tools and capacity-building for monitoring and enforcement agencies is crucial for effective regulation. This includes ensuring the consistent use and accurate reporting of VMS.
- c. Engaging with a diverse array of stakeholders, including industry representatives from chambers of commerce, environmental organizations with regional offices, and local community committees, is paramount for refining policies effectively. These stakeholders offer invaluable insights into economic impacts, ecological concerns, and community needs, respectively. Key contact points such as local chamber offices serve as hubs for industry representation, while environmental organizations contribute expertise on sustainability. Local community committees and associations ensure that policies address the unique socio-economic dynamics of the communities they represent, fostering inclusivity and informed decision-making.
- d. Implementing specific quotas and guidelines for different species, based on robust scientific assessments, will be crucial for preventing overfishing and ensuring long-term sustainability; furthermore, establishing a collaborative platform among stakeholders to regularly review and adjust these measures can enhance their effectiveness and adaptability to changing environmental conditions.
- e. Implementing measures to support affected communities, such as providing alternative income-generating opportunities, can help mitigate the social and economic impacts of fisheries regulations; proposed measures may include vocational training programs for diversification into other industries, microfinance initiatives to support small-scale businesses, and community development projects focused on ecotourism or sustainable agriculture.
- f. Pakistan has entered into multiple agreements with various countries to address issues related to maritime activities, including fisheries regulations and monitoring foreign vessels. While the exact number of agreements may vary, Pakistan actively engages in international cooperation to enhance maritime security, promote sustainable fishing practices, and combat illegal, unreported, and unregulated (IUU) fishing. Additionally, Pakistan may seek to become a party to ongoing agreements to further strengthen its capacity for monitoring foreign vessels and enforcing regulations beyond its national borders. By fostering international cooperation and collaboration in this regard, Pakistan aims to safeguard its marine resources, support its

fishing communities, and contribute to global efforts towards sustainable ocean governance.

4.5 Proposed Strategic Steps for Responsible Fisheries Management in Pakistan's EEZ"

c. The following strategies are proposed to improve Pakistan's EEZ, supporting sustainable fisheries management, dynamic ecosystems, and resilient coastal populations." Here are strategies, implementation objectives, and actions for each of the rules and amendments outlined in the document:

Role 1: Strengthening Compliance Monitoring

Strategy. Enhanced Surveillance and Monitoring

Implementation Objective. Improve monitoring capabilities to enforce regulations effectively.

Actions.

- (1) Invest in advanced surveillance technologies such as satellite monitoring systems.
- (2) Increase patrols and inspections in high-risk areas.
- (3) Implement electronic reporting requirements for fishing vessels.

Role 2: Community Engagement and Capacity Building

Strategy. Empowering Local Communities

Implementation Objective. Build capacity and engage coastal communities in fisheries management.

Actions.

- (1) Provide training and resources to local communities on sustainable fishing practices.
- (2) Establish community-based monitoring programs to gather data and monitor fishing activities.
- (3) Support alternative income-generating activities for coastal communities, such as eco-tourism or aquaculture initiatives.

Rule 3: License to Operate a Fishing Craft

Strategy. Streamlined Licensing Process

Implementation Objective. Simplify and expedite the licensing process to encourage compliance.

Actions.

- (1) Develop an online platform for submitting Form "A" applications.
- (2) Establish clear criteria for evaluating applications to ensure timely processing.
- (3) Provide training to licensing authority staff on efficient application processing.

Rule 5: Departmental Representative on Board

Strategy. Enhanced Data Collection for Monitoring

Implementation Objective. Ensure accurate and comprehensive data collection during fishing trips.

Actions.

- (1) Train senior research assistants on proper data collection techniques and equipment use.
- (2) Conduct random balloting to select fishing vessels with representatives on board.
- (3) Provide necessary resources, including cameras with GPS coordinates, to senior research assistants.

Rule 6: Validity of License, Fishing Permit, and Identity Cards

Strategy. Efficient Renewal Process

Implementation Objective. Streamline the renewal process to minimize administrative burden.

Actions.

- (1) Implement an automated renewal system with reminders sent to license holders.
- (2) Establish clear guidelines for renewing fishing permits and identity cards.
- (3) Conduct regular training sessions for licensing authority staff on renewal procedures.

Rule 8: Fee Structure

Strategy. Fair and Transparent Fee Structure

Implementation Objective. Ensure that fees are reasonable, fair, and transparent to all stakeholders.

Actions.

- (1) Conduct a comprehensive review of fee structures for different categories (A, B, C).
- (2) Seek input from industry representatives and stakeholders to determine appropriate fee levels.
- (3) Publish fee schedules and justifications for public review and awareness.

Rule 9: Categorization of Fishing Gears

Strategy. Sustainable Gear Management

Implementation Objective. Promote sustainable fishing practices by categorizing and regulating fishing gear.

Actions.

- (1) Conduct a thorough assessment of fishing gear types and their environmental impact.
- (2) Develop guidelines for gear specifications, including mesh size and length restrictions.
- (3) Implement a monitoring system to ensure compliance with gear regulations.

Role 10: Stakeholder Engagement and Advocacy

Strategy. Facilitate Collaboration and Advocacy

Implementation Objective. Foster stakeholder engagement and advocate for policies supporting sustainable fisheries.

Actions.

- (1) Establish a multi-stakeholder forum for dialogue and information sharing.
- (2) Organize regular meetings and workshops to address concerns.
- (3) Develop joint advocacy campaigns to raise awareness.

(4) Ensure representation from all stakeholder groups in decision-making.

(5) Foster partnerships with international organizations for coordination.

Rule 11: Ban on Transshipment of Fish on High Seas

Strategy. Strengthening Resource Conservation

Implementation Objective. Prevent overfishing and illegal activities by prohibiting transshipment.

Actions.

(1) Conduct awareness campaigns for fishing vessel operators on the ban's importance.

(2) Establish monitoring mechanisms to detect and deter transshipment activities.

(3) Enforce strict penalties for violations of the transshipment ban.

Role 12: Research and Innovation

Strategy. Promote Scientific Advancements

Implementation Objective. Enhance understanding of marine ecosystems and improve fisheries management.

Actions.

(1) Allocate funding for marine research initiatives.

(2) Collaborate with academic institutions and international partners.

(3) Support development of innovative technologies.

(4) Encourage interdisciplinary research approaches.

(5) Disseminate research findings for informed decision-making.

Rule 13: Repeal of Deep-Sea Fishing Policy, 1995

Strategy. Policy Alignment and Streamlining

Implementation Objective. Ensure that all policies are consistent and up-to-date.

Actions.

- (1) Conduct a thorough review of the Deep-Sea Fishing Policy, 1995 for any remaining relevant provisions.
- (2) Align the repealed policy with the new amendments to eliminate conflicting regulations.
- (3) Communicate the changes to stakeholders and provide guidance on compliance.

d. By employing these strategies and taking corresponding actions, Pakistan can effectively implement the rules and amendments outlined in the document. These efforts will contribute to sustainable fisheries management, conservation of marine resources, and the well-being of local communities dependent on fishing activities. Regular monitoring and adaptation of these strategies will be crucial for long-term success.

4.6 Conclusion

In conclusion, the amendments outlined in the document represent a significant stride towards the regulation and sustainability of fishing activities within Pakistan's EEZ. These changes address key aspects such as enforcement, sustainability, and stakeholder engagement. However, there are still policy gaps and challenges that need attention for a comprehensive and effective regulatory framework. Notably, enforcement mechanisms and monitoring technologies, particularly the Vessel Monitoring Systems (VMS), need to be consistently strengthened. This will ensure that fishing activities are conducted in compliance with regulations, ultimately safeguarding marine ecosystems and resources. Sustainability measures, such as the introduction of Maximum Sustainable Yield (MSY), signify a commitment to preserving fish stocks for future generations. However, more specific guidelines and quotas are required to prevent overfishing and maintain a balanced marine ecosystem. Socio-economic considerations and the impact on local communities are crucial aspects that deserve further attention. Striking a balance between conservation efforts and the livelihoods of those dependent on fishing is essential for the long-term success of these regulations. Global cooperation and coordination remain imperative, especially in dealing with foreign vessels and joint ventures. Strengthening international agreements and ensuring compliance with regulations across borders will be essential in achieving the goals set forth in the document. In essence, the document lays a solid foundation for responsible and sustainable fishing practices. However, ongoing efforts, stakeholder collaboration, and adaptive policy-making will be essential to bridge the remaining policy gaps and effectively implement these regulations for the betterment of both marine ecosystems and the communities' dependent on them.

CHAPTER 5

A review of the Fishing vessels' registration rules in 2021 and devising strategies for their implementation and identifying potential gaps

5.1 Introduction

a. Registering fishing vessels enables rapid identification and serves four key purposes: (1) shaping national policy, (2) monitoring fishing activities, (3) generating revenue, and (4) ensuring safe fishing operations at sea. It involves gathering information about fishing boats, including their numbers, characteristics, and operational areas, providing insights into catch types, rates, and port visits.

b. Registration is vital for fishing management authorities to make critical decisions, serving as a tool for controlling market outputs, fishing efforts, and load distribution. It also empowers authorities to combat illegal, unreported, and unregulated (IUU) fishing. In Pakistan, the Merchant Marine Department (MMD) under the Ministry of Ports and Shipping handles fishing boat registration. While registration is mandatory for all fishing boats under the Pakistan Merchant Shipping Ordinance 2001, boats under 30 tons GRT are exempt.

c. To register a new fishing boat, MMD requires specific documents, including application forms, ownership declarations, and engine purchase receipts. The process involves address verification, boat measurement, engine survey, and fee payment, culminating in the issuance of a registration number.

d. MMD officials conduct inspections during new registration, ownership transfers, and major modifications. Currently, Pakistan's registration mechanism falls short in contributing to effective fisheries management due to a lack of comprehensive monitoring tools.

5.2 Consequences of Registration and Non-registration:

Non-registration of fishing boats in Pakistan leads to significant issues, such as unfair market competition, negative impacts on others, threats to food security, socioeconomic instability, reduced coastal inhabitant productivity, and hindered sustainable fisheries management. Non-registration hampers monitoring and management efforts.

a. IUU Fishing Issues:

IUU fishing, particularly by regional countries and Karachi-based fishing boats, presents a significant challenge. The international conventions for high seas had provided that each ship must have one flag only and must not change its flag during the voyage or for any reason. However, in the last years many ships

have infringed this rule and had registered with other states that had allowed any foreign ships to register in their ports. Dual nationality fishing boats further complicate the issue, with estimated losses of 50 million USD due to tuna fish smuggling.

b. Registration Situation in Sindh Region:

Various institutions, including the fisheries department, maritime authorities, local government bodies, and other relevant regulatory agencies, provided varying records of registered fishing boats in Sindh, highlighting inconsistencies in registration processes.

c. Need for Improvement:

(1) Addressing registration issues promptly is crucial for effective fisheries management, revenue generation, safety at sea, and fair competition. However, various challenges such as overlapping jurisdiction among regulatory bodies, lack of standardized procedures, inadequate infrastructure for data management, and limited resources for monitoring and enforcement contribute to the complexities in the registration process. Therefore, better coordination and simplified registration processes are recommended to streamline operations, enhance transparency, and ensure compliance with regulations.

Table 6.3: Record of fishing vessels registered

<u>PERIOD</u>	<u>HARBOUR CRAFT</u>	<u>VESSELS</u>	<u>FISHING VESSEL</u>
2003-2014	542	02	-
2015	22	04	587
2016	187	04	230
2017	200	01	436
2018	165	00	595
2019	185	01	616
2020	36	00	401
2021	21	00	465
2022	28	02	226

Table 6.4: Boats Used for Survey & Examination

<u>PERIOD</u>	<u>SURVEY</u>	<u>EXAMINATION</u>
2014	4228	4702
2015	6430	6782
2016	5617	6856
2017	5524	5528
2018	6352	5262
2019	4167	1098
2020	3940	550
2021	2215	1054
2022	1699	510

(2) Table 6.3 & 6.4 provides record of fishing vessels registered information on boats utilized for survey and examination purposes.

(3) It covers the years 2014-2022 and includes the count of boats employed in surveys and examinations for each corresponding year. These tables offer insights into the registration and utilization of fishing-related and survey/examination boats over the specified periods.

(4) Table 6.3 presents data on boat registrations in Pakistan from 2010 to 2022, categorized by provinces and areas. It includes the total number of registered boats, distinguishing between marine and inland regions. The information is further broken down for specific areas such as the Sindh and Balochistan coasts, inland regions like Punjab and Gilgit Baltistan, and details on trawlers and gillnetters.

Table 6.3: Province- Wise Boat registration data from 2010 to 2022

PROVINCE/AREA	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
TOTAL NUMBER	38,720	38,557	39,190	40,414	42,153	43,102	44,126	46,718	46,593	49,076	49,379	49,613	49,832
MARINE	24,546	25,316	25,874	26,427	26,915	27,494	28,298	28,801	28,962	31,073	31,220	31,303	31,365
Sindh coast	17,686	18,130	18,278	18,516	18,930	19,316	19,733	20,112	20,196	20,196	20,196	20,196	20,196
Balochistan coast	6,860	7,186	7,596	7,911	7,985	8,178	8,565	8,689	8,766	10,877	11,024	11,107	11,169
INLAND	14,174	13,241	13,316	13,987	15,238	15,608	15,828	17,917	17,631	18,003	18,159	18,310	18,467
Sindh	4,964	4,991	5,025	5,293	5,424	5,601	5,723	7,543	7,215	7,346	7,451	7,488	7,493
Punjab	8,439	7,439	7,448	7,708	8,784	8,908	9,028	9,248	9,248	9,409	9,446	9,497	9,591
Khyber Pakhtoon Khwa	163	168	200	215	219	236	246	252	250	261	269	275	288
Mangla dam	173	181	181	201	207	217	234	244	252	270	279	293	302
Tarbela dam	24	28	28	32	38	46	52	59	62	67	38	45	48
Chashma barrage	260	268	268	348	357	366	284	291	308	326	334	347	358
Hub dam	71	77	77	86	93	103	118	125	132	149	160	166	175
Khanpure	9	12	12	16	19	26	29	32	36	39	42	48	52
Gilgit Baltistan	71	77	77	88	97	105	114	123	128	136	140	151	160
TRAWLERS													
TOTAL NUMBERS	3,102	3,215	3,265	3,336	3,439	3,526	3,612	3,690	3,702	3,804	3,865	3,894	3,956
MARINE	3,102	3,215	3,265	3,336	3,439	3,526	3,612	3,690	3,702	3,804	3,865	3,894	3,956
Sindh	3,102	3,215	3,265	3,336	3,439	3,526	3,612	3,690	3,690	3,810	3,877	3,895	3,986
Balochistan	-	-	-	-	-	-	-	-	-	-	-	-	-
INLAND	-	-	-	-	-	-	-	-	-	-	-	-	-
GILLNETTERS													
TOTAL NUMBERS	4,592	4,809	4,970	5,238	5,227	5,357	5,561	5,646	5,830	7,383	7,578	7,709	7,786
MARINE	4,592	4,809	4,970	5,238	5,227	5,357	5,561	5,646	5,830	7,383	7,578	7,709	7,786
Sindh	2,845	2,978	3,012	3,125	3,264	3,356	3,458	3,526	3,687	3,725	3,876	3,963	3,988
Balochistan	1,747	1,831	1,958	2,113	1,963	2,001	2,103	2,120	2,143	3,658	3,702	3,746	3,798
INLAND	-	-	-	-	-	-	-	-	-	-	-	-	-

5.3 Fishing Permit

The primary purpose of a fishing permit is to regulate sea operations after vessel registration, defining specific fishing zones. The operational limits extend up to 12 nautical miles, with a buffer zone reaching 35 nautical miles. In Sindh, the responsibility for permit issuance lies with the Sindh Fisheries Ordinance 1980, as amended in 2003. Initially, due to a shortage of human resources, the Livestock and Fisheries Department of Sindh delegated permit issuance to Karachi Fish Harbour Authority. However, currently, both institutions are involved, indicating a need for better coordination. Proper permit control is essential for efficient fisheries management, acting as a vital monitoring tool. During interviews, it was revealed that some fishers do not possess valid fishing permits, signaling an ineffective licensing

system. This lack of oversight may contribute to increased illegal fishing activities. Additionally, foreign fishing trawlers used Pakistan flag in Iran raises questions about proper documentation, necessitating further investigation.

5.3.1 Survey of Ships and Certification

Effective surveys are crucial to ensure the proper maintenance of fishing vessels, including equipment, instruments, and crew competency. In Pakistan, traditional wooden fishing boats lack comprehensive regulations, potentially compromising safety and the well-being of fishers. While Section 442 of the Pakistan Merchant Shipping Ordinance 2001 mandates surveys for boats over 12 meters in length, there is no equivalent regulation for smaller vessels. The Merchant Marine Department (MMD) is responsible for conducting surveys of fishing boats capable of sea operations. Presently, stability surveys are only conducted during initial registration, with no routine inspections. Recommendations include establishing an annual inspection mechanism for improved safety standards. Coordination between fishing departments and strict regulations for inspections are essential for enhancing safety.

5.3.2 Training and Familiarization

a. Training plays a critical role in equipping vessel crews with the skills to identify risks, implement safety measures, and raise awareness. This training occurs onshore, while familiarization takes place onboard. The MFD is responsible for training fishers in Pakistan. The ratio of trained personnel to the total number of fishers engaged in marine harvesting is insufficient. Additionally, a significant percentage of fishers have not received any training. Safety at sea is not given sufficient attention, with a lack of clear laws and inadequate training programs. Formal familiarization regarding workplace safety is lacking, with a substantial portion of crews demonstrating a weak adherence to safe practices.

b. Improvements are needed in competency training, including basic courses on personal survival techniques, fire prevention, and elementary first aid. Skippers should receive specialized training to enhance their awareness and ensure proper familiarization onboard fishing vessels. Safety training in conjunction with fishing techniques is vital for improved catch handling, processing, and marketing.

5.4 Management and Legal Aspects

a. The management of fisheries in Pakistan heavily relies on privately held licenses, which are owned and managed by private individuals, companies, or organizations instead of being directly issued by the government. These licenses grant exclusive fishing rights, creating a disparity in access and control over marine resources. Additionally, the lack of government oversight may lead to exploitation of fish stocks, disregard for conservation measures, and inequitable distribution of fishing opportunities. This system may hinder efforts to enforce regulations effectively, monitor fishing activities, and ensure sustainable practices, posing challenges to the long-term viability of fisheries in Pakistan.

b. To ensure ethical fishing methods and the conservation of marine resources, adherence to local legislation is paramount, particularly for deep-sea fishing in Pakistan. This involves compliance with policy requirements, including boat registration with the Mercantile Marine Department, obtaining a fishing license from the Marine Fisheries Department, ensuring all fishermen possess the necessary credentials before embarking on deep-sea expeditions, installing a vessel Monitoring System (VMS) on all vessels, and confirming that all fishermen are Pakistani nationals.

c. The regulatory framework for fisheries in Pakistan encompasses both federal and provincial institutions. Federal agencies, such as the Ministry of Ports and Shipping, the Marine Fisheries Department, the Mercantile Marine Department, the Ministry of Defense, and the Ministry of Interior & Narcotics Control, are actively engaged in overseeing activities at sea. Their responsibilities range from registration and stock management to safety measures and Search and Rescue (SAR) operations. The Marine Fisheries Department, operating under the Ministry of Ports and Shipping, is specifically tasked with the development and management of fisheries resources. Similarly, the Mercantile Marine Department focuses on ship registration, navigational safety, and marine environmental protection.

d. In the Sindh region, provincial fishery institutions, like the Livestock and Fisheries Department, play a pivotal role in enforcing fisheries ordinances and acts. They oversee registrations, licenses, and fish permits for various fishing activities. Additionally, the Karachi Fish Harbour Authority (KFHA) provides crucial facilities to support local fishing markets and seafood exportation. Another significant entity is the Fisheries Welfare Organization or Fishermen's Cooperative Society (FCS), established in 1945 to promote the welfare of fishers and their families.

e. An extensive legal and regulatory framework further governs fishing activities in Pakistan. Acts such as the Exclusive Fishing Zone Act of 1993 and the Territorial Waters and Maritime Zones Act of 1976

regulate various aspects of fishing operations, including licensing, navigational regulations, and the protection of marine environments. For instance, legislation addresses the quality standards for fish and its by-products, as well as the import and export of animal-related products. These comprehensive legal frameworks collectively contribute to the sustainable management of fisheries resources and the protection of marine ecosystems in Pakistan.

5.5 Fishing Vessels Registration 2021: An overview and Analysis

This section sets the stage for understanding the Fishing Vessels Registration Rules, 2021(annex B). It highlights the importance of registering fishing vessels and outlines the purpose of the rules review. Additionally, it lays out the specific objectives that will be addressed in the study.

a. Key Definitions

This heading provides crucial definitions for terms used throughout the rules. It clarifies concepts like "Administrative Division," "Certificate (CoR)," "Fishing Vessel," and others, ensuring that readers have a clear understanding of the terminology employed in the document.

(1) Application Process for Certificate of Registry

This section outlines the steps and requirements involved in applying for a certificate of registry for a fishing vessel. It explains where and how to submit applications, along with the necessary accompanying documents. It also addresses any exemptions for vessels previously registered under specific circumstances.

(2) Official Number Assignment and Port Designation

This heading delves into the process of assigning an official number to a fishing vessel and designating the port of registry. It explains the format of the official number and provides the codes for different ports. The section also clarifies any restrictions on changing the official number.

(3) Tonnage Measurement Procedures

This section covers how the tonnage of fishing vessels is determined, ensuring compliance with established standards. It describes the specific procedures for vessels under 24 meters in length and outlines the role of the registrar in this process.

(4) Issuance of Certificate of Registry

Here, the process of granting and issuing a certificate of registry is explained. It details the timeline for application processing and presents the format for the certificate itself. Additionally, the responsibilities of certificate holders are outlined.

(5) Painting Requirements for Fishing Boats

This section addresses the specific requirements for painting the name and official number on fishing boats. It specifies the language, size, and placement criteria for these markings, as well as the application to rescue boats.

(6) Name Change Process

This heading provides guidance on changing the name of a registered fishing boat. It explains the application process, the registrar's role in reviewing and approving name changes, and the timeline for implementation.

(7) Transfer of Registry and Closing Procedures

This section outlines the procedures for transferring the registry of a fishing boat from one port to another. It also explains how the original registry is closed in such cases.

(8) Ownership Transfer and Mortgage

This heading addresses the process of transferring ownership or interests in a fishing boat, as well as the mortgage of fishing boats. It details the requirements for documenting these transactions and how they are recorded in the registry.

(9) Change of Ownership by Operation of Law

This section covers situations where ownership of a fishing boat is transferred due to legal circumstances. It outlines the application process, evidence required, and the registrar's role in verifying and registering the change.

(10) Fishing Boats Owned by Minors

This heading pertains to fishing boats registered under the name of a guardian for a minor. It explains the process for transferring ownership to the minor once they

obtain a National Identity Card (CNIC) and the associated timeline.

b. Issue of Duplicate Copies of Certificate:

The provision allows the registrar to issue a duplicate certificate of registry, clearly marked as "DUPLICATE" in red ink, upon application by the owner. This is permitted if the original certificate has been damaged, lost, misplaced, mutilated, or defaced. The applicant must provide a declaration explaining the circumstances leading to the need for a duplicate. If the original certificate is subsequently found or received by the owner after obtaining a duplicate, it must be surrendered to the registrar for cancellation. Additionally, if the original has been defaced or mutilated, a duplicate will only be issued if the damaged certificate is surrendered.

(5) Central Register:

The principal officer of the Mercantile Marine Department in Karachi is responsible for maintaining a central register, which consolidates all the entries recorded in the registers maintained by individual registrars. This centralized recordkeeping ensures comprehensive and accessible documentation of all registered fishing vessels.

(6) Inspection of Register and Supply of Copies of Entries:

Owners or interested parties can request to inspect the register maintained by a registrar during office hours, subject to a specified fee outlined in Appendix-J. Additionally, certified copies of any entry in the register can be obtained by application, accompanied by the relevant fee.

(7) Declaration of Ownership:

Any declaration of ownership under these rules must be made before a registrar, a first-class judicial magistrate, or an oath commissioner. This formal process ensures the accuracy and legitimacy of ownership claims.

(8) Fees:

Fees are levied in accordance with the rates and purposes detailed in Appendix-J. A challan evidencing the fee payment must be provided to the registrar along with the application for recording the transaction.

(9) Entry of Particulars of Existing Fishing Boats:

Owners of fishing boats previously registered before the implementation of these rules must, within a specified timeframe, present the relevant certificate of registry to the registrar. The registrar will then update the register with the particulars of the fishing boat and any outstanding mortgages. A new official number will also be assigned, if necessary, and painted on the boat.

(10) Statement Relating to the Crew:

Owners or skippers of sea-going fishing vessels are required to maintain a crew statement register, following the format provided in Appendix-I. Any changes in the crew, including the skipper, must be promptly recorded, specifying the date, time, and location of joining or leaving. These updates must be communicated to the registrar of the fishing vessel's port of registry.

(11) Appeals:

Any individual dissatisfied with a decision made by the registrar regarding ownership transfer, mortgaging, or certificate of registration can file a written appeal with the Director-General of Ports and Shipping within ninety days from the date of receiving the registrar's decision. This provides a mechanism for recourse in case of disputes or disagreements with registrar decisions.

5.6 Potential Gaps Analysis

a. The Fishing Vessels Registration Rules, 2021, while comprehensive, reveal some potential areas for improvement. For instance, there appears to be a gap in providing adequate training and awareness programs for fishing vessel owners and stakeholders. Ensuring a thorough understanding of the significance of registration and compliance with the rules could significantly enhance overall adherence. For example, conducting workshops and seminars on the benefits of registration and the legal obligations attached to it would empower stakeholders with the necessary knowledge.

b. Moreover, the document might benefit from a stronger emphasis on enforcement mechanisms. This could involve introducing penalties for non-compliance and instituting regular audits to ensure strict adherence to the rules. For instance, clearly stipulating fines for violations and establishing a routine auditing process would serve as effective deterrents against non-compliance.

c. Additionally, there is no explicit mention of the availability of digital platforms for application submission, fee payment, and accessing registry information. Implementing a user-friendly digital interface could greatly enhance accessibility and streamline the registration process. For instance, introducing an online portal for applications and payments, along with a searchable database, would significantly expedite the registration process and make information more accessible to stakeholders.

d. By addressing these potential gaps, the Fishing Vessels Registration Rules, 2021 can be enhanced to create a safer, more sustainable, and well-regulated fishing industry. This comprehensive approach will not only benefit the industry itself but also contribute to the overall welfare of the fisheries sector.

5.7 Proposed Strategies for the implementation of fishing vessel rules

This information can be used to formulate strategies and action plans for enhancing the registration process and addressing gaps. Here's a suggested approach:

5.7.1 Objective

a. To improve the effectiveness of the Fishing Vessels Registration Rules, 2021, and ensure a well-regulated, safe, and sustainable fishing industry in Pakistan.

Action Points:

(1) Conduct workshops, seminars, and training programs to educate fishing vessel owners and stakeholders about the importance of registration and compliance with the rules.

(2) Develop educational materials and resources.

(3) Organize workshops in key fishing communities within the next 6 months.

b. Strengthened Enforcement Mechanisms:

Introduce penalties for non-compliance with registration rules and conduct regular audits to ensure strict adherence.

Action Points:

- (1) Establish clear penalties for violations within the next 3 months.
- (2) Implement routine audits starting within the next 6 months.

c. Implementation of Digital Platforms:

Introduce a user-friendly online portal for application submission, fee payment, and accessing registry information to streamline the registration process.

Action Points:

- (1) Develop and launch the online portal within the next 12 months.
- (2) Provide training for stakeholders on using the digital platform within the next 6 months.

d. Integration with Environmental and Safety Standards:

To foster responsible and sustainable practices, harmonize the registration rules with pertinent environmental and safety standards applicable to fishing vessels.

Action Points:

- (1) Review and incorporate relevant environmental and safety standards within the next 6 months.
- (2) Provide guidance and training to stakeholders on compliance with these standards within the next 12 months.

e. Regular Review and Updating of Rules:

Establish a mechanism for regular review and update of the Fishing Vessels Registration Rules to ensure they remain effective and up-to-date.

Action Points:

- (1) Form a review committee to assess the rules annually, starting within the next 6 months.
- (2) Implement recommended updates within the next 12 months.

5.7.2 Timeline

- a. **Phase 1 (Months 1-6).** Conduct educational workshops, develop educational materials, establish penalties for non-compliance, and form a review committee.
- b. **Phase 2 (Months 7-18).** Launch the online portal, conduct routine audits, align rules with environmental standards, and organize seminars for stakeholders.
- c. **Phase 3 (Months 19-36).** Provide training on digital platform usage, review and update rules based on committee recommendations, and conduct regular awareness programs.

5.7.3 Key Performance Indicators (KPIs)

- a. Increase in the number of registered fishing vessels.
- b. Reduction in non-compliance instances.
- c. Improved understanding and awareness of registration rules among stakeholders.
- d. Successful implementation of penalties and enforcement measures.
- e. Enhanced integration with environmental and safety standards.
- f. By following this strategic approach, the Fishing Vessels Registration Rules, 2021, can be enhanced to create a safer, more sustainable, and well-regulated fishing industry in Pakistan.

5.8 Way Forward

- a. StrImplement a unified registration system, ensuring fishing permits are consistently issued by a single authority upon thorough vessel registration and inspection.
- b. Establish visible markings for easier aerial rescue operations. This requires an efficient registration system.
- c. Enact provincial legislation to mandate marking life-saving equipment and floating fishing gear, reducing the occurrence of abandoned gear.
- d. Centralize records and inspections for boats under 12m through provincial laws, enhancing safety measures and fish stock management.

- e. Implement regular inspections to ensure compliance with safety and regulatory standards.
- f. Enhance safety during construction by providing adequate crew space, adhering to international safety standards, conducting builder training, and emphasizing safety gear requirements.
- g. Conduct regular inspections to meet SOLAS stability standards, ensuring fishing boat safety.
- h. Review and align national laws with ILO Convention C188 recommendations for a safe working environment.
- i. FishCollaborate with MMD and partners to empower fishers with essential skills and knowledge through mandatory training programs.
- j. Include basic knowledge in crew training, especially for nakhuda/skippers seeking certification.
- k. Ensure suitable communication means and networks for fishing boats to facilitate prompt and effective search and rescue operations.
- l. Involve communities in policy-making, risk assessment, and coastal resource development. This collaborative effort will alleviate the burden on fisheries management and build trust within the community.

5.9 Conclusion

The review of the Fishing Vessels Registration Rules in 2021 and the proposed strategies for implementation have shed light on the critical role that registration plays in the management of fishing activities. Registration serves as a fundamental tool in shaping national policy, monitoring fishing operations, generating revenue, and ensuring safe practices at sea. It provides valuable insights into catch types, rates, and port visits, enabling authorities to make informed decisions. While the current registration process is comprehensive, there are areas that warrant improvement. Strengthening training and awareness programs for fishing vessel owners and stakeholders is essential to ensure a thorough understanding of the benefits of registration and compliance with the rules. Additionally, a more robust enforcement mechanism, including penalties for non-compliance and regular audits, will serve as effective deterrents. Introducing a user-friendly digital platform for application submission, fee payment, and access to registry information will streamline the registration process and enhance accessibility for stakeholders. Furthermore, aligning the rules with existing environmental and safety standards will promote responsible and sustainable practices within the industry.

CHAPTER 6

Strategies to Govern Fish Harbor/ Jetties and IUU Fishing at Sea

6.1 Introduction

a. The practice of Illegal, Unreported, and Unregulated (IUU) fishing poses significant economic, social, and environmental challenges, particularly in regions heavily reliant on fish as a source of nutrition and livelihood. IUU activities disrupt legal fishing operations, leading to economic losses and undermining efforts to sustainably manage marine resources. In developing countries, where fish is a vital protein source, IUU fishing exacerbates issues of hunger and poverty. It also hampers the ability of coastal states to effectively manage their waters, especially in areas lacking resources for surveillance and enforcement. IUU fishing exacerbates conflicts among different fishing sectors, contributing to accidents and injuries among fishers. The economic impacts of IUU fishing include losses in revenue, investments, and employment, affecting both large-scale and small-scale fisheries. Moreover, the environmental consequences of IUU fishing, such as overexploitation of fish stocks, further compound its negative effects. This chapter explores the multifaceted impacts of IUU fishing on fisheries management, encompassing economic, social, and environmental dimensions. It also sheds light on the challenges faced by specific countries, including India and Pakistan, due to cross-border violations in their maritime territories.

b. The effective governance of fish harbors and jetties, along with the combatting of Illegal, Unreported, and Unregulated (IUU) fishing at sea, is paramount for sustaining coastal communities and safeguarding marine ecosystems. These vital infrastructures serve as lifelines for countless coastal livelihoods, providing a critical platform for vessel operations and access to coastal resources. To ensure their continued support and sustainability, government intervention is essential. Thoughtful and well-structured management plans are the linchpin of any successful governing strategy for fish harbors and jetties. These harbor facilities also play a pivotal role as habitats for a diverse range of marine organisms, underscoring the necessity for their prudent management to preserve the delicate balance of marine life. Additionally, the success of any fish harbor or jetty is contingent upon its effective management, enforced through well-defined rules and regulations.

c. When implemented judiciously, these strategies not only sustain the current health of the harbor environment but also secure its vitality for generations to come. In this context, federal and provincial governments, alongside key stakeholders, must adopt a comprehensive approach to fisheries management to safeguard the enduring viability of fish harbors and jetties. This chapter delineates a range of strategies that can be employed to govern these vital coastal assets and ensure their long-term growth and stability. With over a hundred landing sites along the coast of Pakistan, including major ones like Karachi Fish Harbor Authority, Korangi Fish Harbor Authority, and Gwadar, the need for effective governance and management is particularly acute. The recognition of authorized sites, regulation of fishing activities, and the curbing of illegal landing sites are

pressing priorities. Through meticulous planning and rigorous enforcement, these strategies collectively aim to strike a harmonious balance between sustaining vibrant coastal communities and preserving the rich biodiversity of marine ecosystems.

6.2 Drivers of IUU Fishing Activities

6.2.1 Internal drivers

IUU fishing activities are primarily driven by human necessities for food and livelihood, intertwined with economic and social forces. Demographic factors, closely linked with food demands, short-term monetary gains, and weak governance, play a significant role in exacerbating this issue. Major constraints in combating IUU fishing include the absence of alternative livelihoods, particularly in rural areas, inadequate allocation of rights in line with the fishery's social and economic context, deficient governance marked by a lack of institutional cooperation and coordination, conflicting objectives among stakeholders, limited capacity in management institutions (especially for monitoring, control, and surveillance), incomplete knowledge about resources and ecosystems, and challenges in conducting real-world experiments for ecosystem-based fisheries management. Additionally, various interrelated factors provide incentives for IUU fishing, including the high value of catch relative to low capital and operating costs of IUU vessels, the ease of engaging in IUU activities compared to legitimate businesses, associations with other illegal activities like smuggling and money laundering, limited access to fisheries coastal towns leading to overcrowding, and the use of destructive nets with extremely small mesh sizes, especially in mangrove nurseries.

6.2.2 External Drivers

The most significant external driving factor for IUU fishing is the adoption of an open registry system, which allows IUU fishers to evade legislative constraints effectively. Many vessels engaged in IUU fishing, particularly in high seas areas, register under so-called "Flags of Convenience" or open registries. These open registry vessels often incur lower compliance and contract costs than vessels flagged by responsible states, giving them a comparative economic advantage in terms of reduced production and operation expenses. However, they also face the risk of detection and severe penalties if effective monitoring, control, and surveillance structures are in place. The costs associated with re-flagging to an open registry vary, but can be relatively low compared to the potential cost savings and catch values. Drivers encouraging vessels to re-flag under open registries include the increasing costs of fishing, diminishing catches relative to effort, globalization of capital, growing international and national regulations in fishing, and marine resource exploitation. This practice is especially prevalent among vessels targeting high-value species like tuna and swordfish. The advantages of open registers for both parties

include potential avoidance of various regulations and requirements related to health and safety, insurance, crew employment conditions, taxes, and compliance with fisheries, environmental, and maritime laws and conventions.

6.3 Illegal, Unreported, and Unregulated Fishing Activities in Pakistan (2021)

The following data represents information concerning IUU (Illegal, Unreported, and Unregulated) fishing activities in Pakistan for the year 2021 (IUU Fishing index, 2023). The data is organized into various categories, including IUU Score, World Ranking, Regional Rankings (Asia and West Indian Ocean), and specific scores related to coastal, flag, port, and general aspects. The following data includes trend information for the years 2019-2021, indicating changes in scores over time.

6.3.1 Key Points:

Please note that higher scores and rankings closer to 1 indicate worse/poor performance in terms of combating IUU fishing.

a. IUU Score and Rankings:

- (1) IUU Score: 2.23
- (2) World Ranking: 80 out of 152 countries (a decrease of 7 positions compared to previous data)
- (3) Asia Ranking: 17 out of 20 countries (an increase of 1 position)
- (4) West Indian Ocean Ranking: 15 out of 22 countries (a decrease of 3 positions)

b. Score Trends:

- (1) Overall, there has been a slight improvement in the IUU score from 2019 to 2021, with a decrease of 0.03.
- (2) Coastal score has decreased by 0.45 points, indicating a decline in coastal compliance.
- (3) Port score has also decreased by 0.22 points, suggesting a reduction in port compliance.
- (4) Flag score, however, has improved by 0.05 points, indicating better compliance with flag state regulations.

(5) General score has increased by 0.06 points, suggesting an overall improvement in the general aspects related to IUU fishing.

c. Coastal, Flag, Port, and General Scores:

- (1) Coastal Score: 2.00
- (2) Vulnerability: 2.33
- (3) Prevalence: 2.60
- (4) Response: 1.00
- (5) Flag Score: 1.70
- (6) Vulnerability: 1.00
- (7) Prevalence: 1.00
- (8) Response: 2.75
- (9) Port Score: 2.11
- (10) Vulnerability: 4.00
- (11) Prevalence: 1.00
- (12) Response: 2.00
- (13) General Score: 2.77
- (14) Vulnerability: 3.33
- (15) Prevalence: 1.00
- (16) Response: 3.29

6.3.2 Specific Indicators:

The data includes various indicators related to the size of EEZ, dependency on fish for protein, authorization of foreign vessels, MSC-certified fisheries, compliance incidents, and more. These indicators provide a detailed assessment of different aspects contributing to IUU fishing.

6.3.3 General Trends:

The data indicates trends in size, dependency, authorizations, and other factors related to IUU fishing in Pakistan.

6.3.4 Flag State and Port State Compliance:

- a. The data provides information on compliance related to flag states and port states, highlighting areas of strength and areas that may require improvement.
- b. Please note that higher scores and rankings closer to 1 indicate worse/poor performance in terms of combating IUU fishing.

6.4 Gap Analysis: Identified Gaps in Addressing IUU Fishing in Pakistan's Maritime Surveys

Illegal, unreported, and unregulated (IUU) fishing presents a significant challenge to Pakistan's maritime surveys and broader ocean governance. This form of illicit fishing has profound negative consequences on seafood value chains, the environment, society, and global food security. Globally, this critical oversight has resulted in substantial economic losses, estimated to be between US\$10–23.5 billion in 2009, with one-fifth of all wild-caught fish being potentially illegal or unreported.

6.4.1 Key Gaps Identified

a. Pakistan's maritime surveys suffer from a glaring deficiency in resources and technology, rendering them ineffective in comprehensive surveillance. This deficiency creates loopholes in monitoring and enforcing fishing activities, particularly in remote and distant regions. Consequently, illicit fishing operations slip through the cracks, perpetuating unsustainable practices and threatening marine ecosystems.

b. Compounding this issue are inadequacies within the regulatory frameworks governing fishing activities. These regulatory gaps provide fertile ground for exploitation by Illegal, Unreported, and Unregulated (IUU) fishing operators who capitalize on weak points in vessel registration, authorization protocols, and catch reporting systems.

c. Moreover, weaknesses in vessel identification and monitoring systems exacerbate the problem. IUU fishing operators exploit vulnerabilities in these systems, disabling or circumventing them to engage in illicit activities with reduced risk of detection. This clandestine behavior further undermines efforts to ensure sustainable fisheries management.

d. A lack of transparency in ownership and authorizations adds another layer of complexity to the issue. Complex ownership networks and fraudulent documents make it challenging to trace the true owners of fishing vessels, impeding accountability and thwarting attempts to combat IUU fishing effectively.

e. Despite being a party to international agreements aimed at combating IUU fishing, Pakistan struggles with the effective implementation of these agreements at the grassroots level. This implementation gap perpetuates the cycle of illicit fishing practices, exacerbating the problem and undermining global efforts to achieve sustainable fisheries management.

f. Furthermore, there is a glaring absence of focus on crew welfare and safety within IUU fishing operations. Exploitative working conditions and substandard safety standards for crew members remain unchecked, perpetuating human rights abuses and compromising the sustainability of fishing practices.

g. The critical oversight in Pakistan's maritime surveys regarding IUU fishing represents a significant concern with far-reaching consequences. It not only results in economic losses and environmental degradation but also jeopardizes food security and social stability in coastal communities. Additionally, the potential links to transnational organized crime, human rights abuses, tax evasion, piracy, and other illicit activities underscore the urgency of addressing this issue comprehensively and effectively.

6.5 Recommendations for Addressing Gaps

a. To effectively address the deficiencies in Pakistan's maritime surveillance and combat IUU fishing, the following targeted measures are recommended:

(1) Invest in advanced technology and allocate additional resources for maritime surveillance. This will help close gaps in monitoring and enforcement, making it more difficult for IUU fishing operations to evade detection.

(2) Conduct a thorough review of existing regulatory frameworks and implement necessary reforms to address vulnerabilities exploited by IUU fishing operators. Strengthening regulations will help create a more robust legal environment for combating illegal fishing activities.

(3) Implement and maintain robust systems for vessel identification and continuous monitoring. By ensuring accurate vessel tracking, authorities can better detect and deter IUU fishing activities.

(4) Implement measures to verify vessel ownership and fishing authorizations, enhancing transparency and accountability within the fishing industry. This will make it more difficult for IUU operators to conceal their activities.

(5) Ensure the effective implementation of international agreements aimed at combating IUU fishing. This can be achieved through capacity-building initiatives and the establishment of enforcement mechanisms to uphold treaty obligations.

(6) Enforce standards for working conditions and safety of crew members involved in fishing operations. Improving crew welfare will discourage participation in IUU fishing activities and promote ethical practices within the industry.

b. By addressing these identified gaps and implementing strategies based on transparency and international cooperation, Pakistan can make significant strides in combating IUU fishing and safeguarding its marine resources for future generations.

6.6 Proposed strategies for effective governance of Fish Harbors/Jetties

The following are the proposed strategies for effective governance of Fish Harbors/Jetties, encompassing various objectives and lines of action.

a. Catch Limits

Objective. Ensure sustainable fish populations and prevent overfishing. Line of Action: Calculate overfishing limit, recommend acceptable biological catch, specify annual catch limit, and set annual targets.

b. Minimum Size Limits

(1) **Objective.** Protect the health and welfare of fish populations.

(2) **Line of Action.** Implement and enforce minimum size limits for catch fish.

c. Restrictions on Fishing Activities

(1) **Objective.** Protect the harbor from overfishing and damaging practices.

(2) **Line of Action.** Implement restrictions on unregulated fishing activities.

d. Habitat Protection

(1) **Objective.** Create protected zones for marine species and nursery grounds.

(2) **Line of Action.** Establish and enforce protected areas within the harbor.

e. Penalties and Restrictions

(1) **Objective.** Address issues like water pollution and waste disposal.

(2) **Line of Action.** Implement penalties and restrictions for activities causing pollution.

f. Incentives for Fishermen

(1) **Objective.** Encourage sustainable fishing practices.

(2) **Line of Action.** Provide financial subsidies and recognition for eco-friendly practices.

g. Funding for Conservation

- (1) **Objective.** Support conservation projects.
- (2) **Line of Action.** Increase funding for projects focused on ecosystem preservation.

h. Environmentally-Friendly Design

- (1) **Objective.** Minimize the environmental impact of jetties.
- (2) **Line of Action.** Design jetties to mimic natural shorelines and adapt to ecological needs.

i. Overlapping Jurisdiction

- (1) **Objective.** Resolve jurisdictional conflicts for effective management.
- (2) **Line of Action.** Define clear mechanisms for federal and provincial collaboration.

j. Consultation with Stakeholders

- (1) **Objective.** Involve experts, fishermen, and communities in decision-making.
- (2) **Line of Action.** Seek input from stakeholders in the planning process.

k. Security Measures

- (1) **Objective.** Ensure security against piracy, smuggling, and terrorism.
- (2) **Line of Action.** Implement surveillance systems, security personnel, and access controls.

l. Modernization of Infrastructure:

- (1) **Objective.** Upgrade harbor facilities for efficiency and productivity.
- (2) **Line of Action.** Invest in infrastructure like cranes, storage, and equipment.

m. Strategies for Combating IUU Fishing:

- (1) Review Destructive Fishing Techniques:

(2) **Objective**. Address issues related to destructive gear and practices.

(3) **Line of Action**. Phase out destructive gear and replace with more selective, habitat-friendly options.

n. Community-Based Fisheries Management (CBFM)

(1) **Objective**. Implement community-driven management approaches.

(2) **Line of Action**. Grant territorial rights and promote sustainable resource use.

o. Species and Gear-Specific Management Plans

(1) **Objective**. Promote responsible fishing across all fleet segments.

(2) **Line of Action**. Formulate gear-specific management plans based on consensus among stakeholders.

p. Monitoring, Control, and Surveillance (MCS)

(1) **Objective**. Ensure compliance with management measures.

(2) **Line of Action**. Review and enhance MCS operations, reporting, and collaboration with enforcement agencies.

6.7 Conclusion

The effective governance of fish harbors and jetties, along with combating Illegal, Unreported, and Unregulated (IUU) fishing, is crucial for sustaining coastal communities and protecting marine ecosystems. These infrastructures serve as lifelines for coastal livelihoods and provide access to vital coastal resources. Government intervention through well-structured management plans is essential, as these facilities also serve as habitats for diverse marine life. Enforced regulations are pivotal for their success. Federal and provincial governments, in collaboration with stakeholders, must adopt a comprehensive approach to fisheries management. In Pakistan's maritime surveys, there are significant gaps in addressing IUU fishing, including the absence of specific assessments, strategies, and enforcement mechanisms to combat this illicit activity. A more comprehensive approach is needed to safeguard coastal assets and marine biodiversity effectively.

CHAPTER 7

Framework for fishing licensing with reference to the identification of potential fishing grounds/zones in EEZ of Pakistan

The framework for fishing licensing within Pakistan's EEZ is designed to establish a comprehensive and sustainable approach to the identification and utilization of potential fishing grounds.

7.1 Introduction

- a. Recognizing the significance of responsible fisheries management, this framework integrates considerations for environmental conservation, socio-economic impact, and international cooperation.
- b. **Objective.** Establish a comprehensive and sustainable approach to identifying and utilizing potential fishing grounds in Pakistan's EEZ.
- c. **Principles.** Prioritize responsible fisheries management, integrating environmental conservation, socio-economic impact, and international cooperation.

7.2 Regulatory Foundation

- a. **Objective.** Ensure alignment with EEZ 2021 and Fishing Vessel Registration Rules 2021.
- b. **Current Status.** Initial incorporation with limited alignment.
- c. **Action Points.**
 - (1) Conduct a comprehensive review.
 - (2) Ensure complete integration.
 - (3) Establish a task force for legal adjustments.

Example: Collaborate with legal scholars and maritime experts to conduct a thorough review, citing international maritime law standards [UNCLOS, Article 61] for EEZ regulations.

7.3 Potential Fishing Grounds Identification

- d. **Objective.** Identify sustainable fishing grounds within the EEZ.

e. **Current Status.** Limited identification based on historical data.

f. **Action Points.**

(1) Collaborate with experts and use advanced mapping technologies.

(2) Establish a comprehensive database.

Example: Utilize satellite imagery and underwater mapping technologies, citing successful models like the Australian Fisheries Management Authority's use of Geographic Information Systems (GIS).

7.4 Environmental Impact Assessment

a. **Objective.** Minimize ecological impacts through assessments.

b. **Current Status.** Minimal integration in licensing decisions.

c. **Action Points.**

(1) Implement mandatory assessments.

(2) Develop mitigation guidelines.

Example: Reference the success of New Zealand's Fisheries Act, requiring Environmental Impact Assessments for all proposed activities in the EEZ.

7.5 Socio-Economic Considerations

a. **Objective.** Balance economic interests with community well-being.

b. **Current Status.** Limited socio-economic consideration.

c. **Action Points.**

(1) Incorporate socio-economic assessments into licensing criteria.

(2) Support local communities.

Example: Cite Iceland's fisheries management, which integrates socio-economic factors in licensing decisions to maintain a balance between economic interests and community welfare.

7.6 International Collaboration

- a. **Objective.** Strengthen regional and international cooperation.
- b. **Current Status.** Limited collaborations; lack of standardized guidelines.
- c. **Action Points.**
 - (1) Enhance diplomatic efforts.
 - (2) Participate in international forums.
 - (3) Establish common standards.

Example: Refer to the North East Atlantic Fisheries Organization (NEAFC) as a successful international collaboration model with standardized guidelines.

7.7 Licensing Procedures

- a. **Objective.** Streamline for efficiency and transparency.
- b. **Current Status.** Manual processes with inconsistent criteria.
- c. **Action Points.**
 - (1) Develop an online platform.
 - (2) Establish clear criteria.
 - (3) Provide training.

Example: Model the online platform after successful systems like Norway's "Altinn," streamlining application processes for efficiency.

7.8 Monitoring and Enforcement

- a. **Objective.** Ensure real-time tracking through Vessel Monitoring Systems (VMS).
- b. **Current Status.** Sporadic VMS usage; limited data audits.
- c. **Action Points.**
 - (1) Mandate VMS on all vessels.
 - (2) Conduct regular audits.
 - (3) Establish penalties.

Example: Cite the success of the U.S. National Marine Fisheries Service's Vessel Monitoring Program in ensuring real-time tracking.

7.9 Scientific Assessment

- a. **Objective.** Establish a robust scientific assessment process.
- b. **Current Status.** Limited scientific input in setting guidelines.
- c. **Action Points.**
 - (1) Collaborate with experts for comprehensive guidelines.
 - (2) Invest in fisheries research.

Example: Reference the success of Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) in providing scientific input for fisheries management.

7.10 Stakeholder Engagement

- a. **Objective.** Engage stakeholders for inclusive decision-making.
- b. **Current Status.** Limited engagement beyond industry representatives.
- c. **Action Points.**
 - (1) Regular consultations.
 - (2) Conduct awareness campaigns.

Example: Refer to Scotland's approach of involving local communities and NGOs in decision-making through Regional Inshore Fisheries Groups.

7.11 Adaptive Management:

- a. **Objective.** Implement continuous monitoring and adaptive management.
- b. **Current Status.** No formal mechanism for ongoing evaluation.
- c. **Action Points.**
 - (1) Establish a body for continuous monitoring.

- (2) Conduct periodic reviews and updates.

Example: Cite the Adaptive Management Program in the U.S. Pacific Fishery Management Council as a successful model for ongoing evaluation.

7.12 Coping Mechanisms and Strategies

- a. Develop a crisis response plan.
- b. Invest in research and technology for sustainable practices.
- c. Establish a contingency fund.
- d. Encourage diversification of livelihoods.
- e. Collaborate with research institutions.
- f. Implement public awareness campaigns.
- g. Explore partnerships with international organizations.
- h. Regularly update the framework.

7.13 Conclusion

Emphasize the need for continuous evaluation, adaptation, and the implementation of coping mechanisms for the long-term viability of marine resources and coastal communities' prosperity. This framework for fishing licensing, enriched with clear objectives, current status assessments, and actionable points, aims to provide a resilient foundation for the sustainable management of potential fishing grounds in Pakistan's EEZ. Regular evaluation and adaptation will be essential for ensuring the long-term viability of marine resources and the prosperity of coastal communities.

CHAPTER 8

Discussion & Conclusion

8.1. Discussion

a. Pakistan's abundant aquatic resources, including rivers, dams, lakes, and coastal waters, coupled with a substantial Exclusive Economic Zone (EEZ), underscored the critical role of its maritime territory. Despite covering a small fraction of the global aquatic area, Pakistan's coastline played a vital role in its economic and demographic landscape. The marine fishing sector, engaging over 14 million individuals, stood as a cornerstone of the economy, contributing significantly to export earnings. However, challenges such as overfishing, increased operational costs, and illegal, unreported, and unregulated (IUU) fishing threatened the sustainability of these resources. The Marine Fisheries Department (MFD), responsible for implementing policies, faced the task of balancing economic benefits with conservation. A recent research study aimed to identify potential fishing areas within the EEZ using geospatial methods, recognizing the importance of incorporating local knowledge and technological advancements. The study also highlighted the significance of collaborative efforts with stakeholders and provided insights from consecutive meetings and surveys. The research's scope lay in real-time mapping of fish aggregation, offering a valuable framework for sustainable fisheries management, export policies, and marine resource conservation. Its significance extended to decision-makers, policy influencers, and the fishing community, emphasizing the potential for geospatial techniques to enhance productivity and ensure food security.

b. Chapter 2 focused on the imperative of sustainable fishing beyond the 12-nautical-mile EEZ through eco-based zone planning for responsible practices. Acknowledging the escalating pressures on marine ecosystems, the chapter emphasized the need for a systematic approach to marine space management, particularly in delineating and mapping ecosystem and socio-economic components. The recognition and demarcation of fishing grounds were crucial considerations within this broader ecosystem-based spatial management approach. Efforts to identify Pakistan's deep-sea fishing grounds were discussed, highlighting the technological advancements that enabled fishermen to explore greater depths. However, the chapter also underscored the ecological concerns associated with these technological strides, necessitating the implementation of the Vessel Monitoring System (VMS) to regulate and enforce ship movement, particularly in restricted fishing areas. The importance of an ecosystem-based approach for the conservation of fisheries resources and protection of endangered species was emphasized, balancing economic interests with ecological preservation. The chapter presented the results of an extensive

analysis of potential fishing zones within Pakistan's EEZ, incorporating seasonal maps and spatial-temporal assessments of sea surface temperature and chlorophyll-a concentration. The outcomes provided valuable insights for sustainable fishing practices, addressing challenges such as overfishing, illegal practices, and environmental conservation measures. The discussion concluded with a forward-looking approach, advocating for cutting-edge technology, partnerships, policy development, and diplomatic collaboration to ensure responsible and sustainable fishing practices beyond the 12-nautical-mile limit.

c. The report highlighted the pervasive issue of illegal, unreported, and unregulated (IUU) fishing in Pakistan, emphasizing its adverse impacts on marine ecosystems, the economy, and livelihoods. The focus on enforcement strategies, particularly addressing banned fishing gears, revealed a critical challenge in the nation's efforts to regulate fishing activities. Despite the government's policies, non-compliance persisted, necessitating a comprehensive exploration of effective approaches. The study delved into the intersection of environmental law, wildlife conservation law, organized crime law, and fisheries law to shed light on the complexities of combating illegal fishing. The detailed examination of various fishing techniques, their legal status, and associated challenges provided a nuanced understanding of the context. The report underscored the need for a strategic ban on illegal fishing gears, proposing a multifaceted approach involving regulatory strengthening, stakeholder engagement, advanced monitoring technology, international cooperation, and research and development of selective gear technologies. The proposed strategies aimed to achieve a balanced and sustainable coexistence between human communities and marine ecosystems, aligning with broader conservation goals and Sustainable Development Goal 14.4. The conclusion emphasized the urgency of addressing illegal fishing practices in Pakistan, emphasizing effective implementation and continuous adaptation to ensure the long-term health of marine resources and the prosperity of coastal communities.

d. In Chapter 4, the document explored the comprehensive strategy for implementing deep-sea policies, focusing on recent amendments to the Exclusive Fishery Zone (Regulation of Fishing) Rules, 1990, by the Federal Government of Pakistan. These amendments, detailed in S.R.O. 981(I)/2021(Annex A), aimed to refine the regulatory framework governing fishing activities within the Exclusive Economic Zone. The analysis delved into the specific modifications, including definitions, licensing procedures, sustainability measures, and inter-agency cooperation. While commendable efforts were made to regulate fishing activities, notable policy gaps persisted, particularly in enforcement, sustainability, socio-economic considerations, and global cooperation. The document acknowledged challenges such as resource constraints, data accuracy, and balancing stakeholder interests. It proposed a way forward, emphasizing

technology investment, stakeholder consultations, specific quotas, and international cooperation. The subsequent section outlined strategic steps for responsible fisheries management, providing strategies, implementation objectives, and actions for each rule and amendment. The conclusion recognized the document's significant strides but underscored the need for ongoing efforts, stakeholder collaboration, and adaptive policy-making to effectively implement regulations for the benefit of marine ecosystems and dependent communities.

e. The review of the Fishing Vessels' Registration Rules in 2021 underscored the indispensable role of vessel registration in shaping national policy, monitoring fishing activities, and ensuring safe operations at sea. While the existing framework provided a foundation for these goals, identified gaps such as non-registration issues, IUU fishing challenges, and inconsistencies in the registration process revealed areas for improvement. Proposed strategies, encompassing enhanced stakeholder engagement, strengthened enforcement, digital integration, and alignment with environmental standards, presented a comprehensive roadmap for creating a safer, more sustainable, and well-regulated fishing industry. The envisioned reforms not only addressed current shortcomings but also set the stage for improved compliance, awareness, and community involvement, ensuring a holistic and effective approach to fisheries management in Pakistan.

f. Chapter 6 delved into strategies for governing fish harbors/jetties and addressing the pervasive issue of Illegal, Unreported, and Unregulated (IUU) fishing at sea. Recognizing the multifaceted challenges posed by IUU fishing, the chapter emphasized the crucial role of effective governance in sustaining coastal communities and safeguarding marine ecosystems. It underscored the importance of thoughtful and well-structured management plans for fish harbors and jetties, considering their significance in supporting coastal livelihoods and serving as habitats for marine organisms. The proposed strategies ranged from setting catch limits and implementing minimum size regulations to habitat protection and penalties for environmental violations. Additionally, the chapter provided a comprehensive analysis of IUU fishing activities in Pakistan, highlighting key data points, trends, and specific indicators. The identified gaps in addressing IUU fishing in Pakistan's maritime surveys, such as limited surveillance and enforcement, inadequate regulatory frameworks, and weaknesses in vessel identification systems, were thoroughly examined. The chapter concluded with a set of recommendations, emphasizing the need for enhanced surveillance, strengthened regulatory frameworks, transparency in ownership, and improved implementation of international agreements to effectively combat IUU fishing and ensure the long-term sustainability of marine resources.

g. Chapter 7 presented a robust framework for fishing licensing within Pakistan's Exclusive Economic Zone (EEZ), prioritizing

sustainability and responsible fisheries management. The framework encompassed key elements such as regulatory alignment, identification of potential fishing grounds using advanced technologies, environmental impact assessments, socio-economic considerations, and international collaboration. It advocated for streamlined licensing procedures through an online platform, effective monitoring via Vessel Monitoring Systems, and the incorporation of scientific assessments and stakeholder engagement. Drawing inspiration from successful international models, the chapter underscored the importance of continuous evaluation, adaptive management, and the implementation of coping mechanisms to ensure the long-term viability of marine resources and the prosperity of coastal communities, aligning with SDG 14 on Life Below Water.

h. Additionally, throughout the document, there is a recurring emphasis on the broader context of the Sustainable Development Goals. The proposed strategies and interventions consistently aim to contribute to SDG 14, which focuses on the conservation and sustainable use of the oceans, seas, and marine resources. By addressing issues such as overfishing, illegal practices, and environmental conservation, the document aligns with the global commitment to achieve SDG 14 and underscores the interconnectedness of marine resource management with broader sustainable development objectives.

8.2 Conclusion

The research report illuminates the critical role of Pakistan's maritime territory and Exclusive Economic Zone (EEZ) in the face of challenges such as overfishing, rising operational costs, and illegal practices. With a focus on sustainability, technological advancements, and regulatory frameworks, the document provides comprehensive insights and recommendations. Emphasizing the urgency of addressing illegal fishing practices, the report proposes a strategic ban on illegal gear, regulatory strengthening, and international cooperation. Chapters on deep-sea policies, registration rules, IUU fishing, and fishing licensing contribute to a holistic understanding, underscoring the interconnectedness of marine resource management with broader Sustainable Development Goals. The recommendations advocate for responsible practices, adaptive policy-making, and collaborative efforts to ensure the long term health of marine ecosystems and the prosperity of coastal communities.

CHAPTER 9

RECOMMENDATIONS

Based on the research report produced by NIMA on the Proposal for the Implementation of Framework for fishing licensing with reference to the identification of potential fishing grounds/zones in EEZ of Pakistan, the following recommendations are made to the Government of Pakistan:

9.1 Recommendation 1: Enforce Regulations on Net Size, Mesh Size, and Net Quality

9.1.1 Background

In the rigorous examination of fishing registration and licensing practices, a critical concern emerged regarding the environmental impact of current fishing gear. This observation, combined with the recent implementation of the Deep Sea Fishing Policy and the EEZ terms, necessitates immediate action. We recommend the strict enforcement of regulations on net size, mesh size, and net quality to control fish capture size and protect marine species. This aligns with the commitment to sustainable fishing practices and ecosystem preservation outlined in the aforementioned policies.

9.1.2 Rationale

The unregulated use of fishing gear, especially nets, has been identified as a major contributor to the depletion of marine species and ecosystem degradation. Enforcing stringent regulations on net specifications is crucial for sustainable fisheries management, aligning with the objectives of the fishing registration rules and EEZ rules.

9.1.3 Key Components

Key components of this recommendation involve the establishment of clear guidelines on permissible net size, mesh size, and quality standards. Collaborative efforts with fisheries stakeholders, continuous monitoring, and periodic audits will ensure compliance with these regulations.

9.1.4 Objective

The primary objective is to control fish capture size, reduce bycatch, and promote sustainable fishing practices in line with the Deep-Sea Fishing Policy and EEZ terms and conditions. Implementing stringent regulations on fishing gear contributes to

the preservation of marine species diversity and ecosystem health.

9.1.5 Coping Mechanism

Fishers will be educated and provided with support to transition to sustainable gear. This coping mechanism ensures a smooth adaptation to the new regulations without adversely affecting the livelihoods of fishers, fostering a gradual shift toward more eco-friendly practices.

9.1.6 Conclusion

Enforcing regulations on net size, mesh size, and net quality is a pivotal step in ensuring responsible fishing practices, safeguarding marine biodiversity, and contributing to the long-term sustainability of fisheries.

9.2 Recommendation 3: Extend the current two-month fishing ban to three months annually to better regulate fish stocks

9.2.1 Background

Extending the current two-month fishing ban is proposed as a response to challenges in regulating fish stocks effectively. This recommendation recognizes the existing concerns and limitations within the current fishing regulations.

9.2.2 Rationale

The rationale behind extending the fishing ban to three months annually lies in the need for more robust regulation of fish stocks. This strategic move acknowledges the complexity of managing fisheries and aims to address potential gaps in the current regulatory framework.

9.2.3 Key Components

The key components of this proposal involve a thorough review of the ecological impact of the current two-month ban, consultation with fisheries experts, and consideration of seasonal variations in fish populations. Additionally, it requires collaboration with stakeholders to ensure a comprehensive and inclusive approach to fisheries management.

9.2.4 Objective

The primary objective is to enhance the regulation of fish stocks by extending the fishing ban. This extension is seen as a proactive measure to mitigate overfishing, promote the recovery

of fish populations, and contribute to the overall sustainability of marine ecosystems.

9.2.5 Coping Mechanism

To mitigate potential economic impacts on fishing communities due to the extended ban, a coping mechanism will be implemented. This could include the introduction of alternative livelihood programs, financial support, or initiatives to enhance skills diversification, ensuring that the extension does not disproportionately affect the well-being of those dependent on fishing.

9.2.6 Conclusion

Extending the current two-month fishing ban to three months annually is a strategic step toward achieving more effective regulation of fish stocks. This recommendation is rooted in a comprehensive understanding of the ecological dynamics and socioeconomic factors involved in fisheries management, aiming for a balanced and sustainable approach to marine resource conservation.

9.3 Recommendation 4: Mandate the installation of Vessel Monitoring Systems (VMS) in vessels over 16 meters for effective monitoring and control of fishing activities.

9.3.1 Background

The proposal to mandate the installation of Vessel Monitoring Systems (VMS) in vessels over 16 meters arises from the need for more effective monitoring and control of fishing activities. This recommendation acknowledges the challenges in overseeing large vessels and aims to address gaps in the current monitoring mechanisms.

9.3.2 Rationale

The rationale behind mandating VMS installation is grounded in the recognition of the limitations of existing monitoring systems. Vessels over 16 meters play a significant role in fishing operations and can have a substantial impact on fish stocks. Implementing VMS enhances real-time tracking, allowing authorities to monitor and regulate fishing activities more comprehensively.

9.3.3 Key Components

Key components of this proposal involve collaboration with maritime technology experts, regulatory bodies, and fishing

vessel operators. This includes the development of technical specifications for VMS installation, training programs for vessel operators, and establishing protocols for data management and analysis.

9.3.4 Objective

The primary objective is to improve the monitoring and control of fishing activities through the mandatory installation of VMS in vessels over 16 meters. This initiative is designed to provide authorities with accurate and timely information, enabling proactive management of fisheries resources.

9.3.5 Coping Mechanism

To address potential concerns or challenges associated with the implementation of VMS, a coping mechanism will be put in place. This may involve financial support for vessel owners to cover installation costs, educational programs to ensure understanding and compliance, and ongoing support for maintenance and troubleshooting.

9.3.6 Conclusion

Mandating the installation of Vessel Monitoring Systems in vessels over 16 meters is a strategic move toward enhancing the effectiveness of monitoring and control measures in fisheries management. This recommendation is built on a comprehensive understanding of the technological, regulatory, and operational aspects involved, with the aim of promoting sustainable and responsible fishing practices.

9.4 Recommendation 5: Declare 10% of Coastal Waters as Marine Protected Areas (MPA)

9.4.1 Background

The evaluation of fishing registration and licensing practices highlights the need for proactive measures to preserve marine biodiversity. Recommending the declaration of 10% of coastal waters as Marine Protected Areas (MPA) serves as a strategic initiative to safeguard critical ecosystems.

9.4.2 Rationale

Unrestricted fishing activities in sensitive areas pose a significant threat to marine biodiversity. Establishing Marine Protected Areas provides a sanctuary for marine life to thrive, promoting ecological balance and preserving essential habitats.

9.4.3 Objective

The primary objective is to preserve marine biodiversity by designating specific areas as Marine Protected Areas. This proactive measure contributes to the conservation of essential habitats and the overall health of coastal ecosystems.

9.4.4 Key Components

This recommendation involves collaborative efforts with marine biologists, local communities, and relevant authorities to delineate and designate the boundaries of Marine Protected Areas. Robust enforcement mechanisms will be established to ensure compliance with protection regulations.

9.4.5 Coping Mechanism

Alternative fishing zones and support programs will be introduced to compensate for the restricted access to designated Marine Protected Areas. This coping mechanism ensures that the declaration of MPAs does not unduly impact the livelihoods of fishing communities.

9.4.6 Conclusion

Declaring 10% of coastal waters as Marine Protected Areas is a strategic step in aligning fishing practices with ecological preservation goals. This recommendation stems from a careful review of fishing registration and licensing practices, aiming to foster a harmonious balance between fisheries management and environmental conservation.

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