



OPEN ACCESS

EDITED BY

Yen-Chiang Chang,
Dalian Maritime University, China

REVIEWED BY

Moe Sin,
University of Malaysia Terengganu, Malaysia
Arie Afriansyah,
University of Indonesia, Indonesia

*CORRESPONDENCE

Muhammad Murad Zaib Butt
✉ muradzaib98@gmail.com
Liu Lina
✉ liulina@xjtu.edu.cn

†These authors share first authorship

RECEIVED 29 September 2024

ACCEPTED 22 January 2025

PUBLISHED 21 February 2025

CITATION

Lina L and Murad Zaib Butt M (2025)
Analysing Pakistan's fisheries legislation and
institutional framework: integrating
Sustainable Development Goal 14 within the
scope of International Fisheries Law.
Front. Mar. Sci. 12:1503748.
doi: 10.3389/fmars.2025.1503748

COPYRIGHT

© 2025 Lina and Murad Zaib Butt. This is an
open-access article distributed under the terms
of the [Creative Commons Attribution License
\(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction
in other forums is permitted, provided the
original author(s) and the copyright owner(s)
are credited and that the original publication
in this journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

Analysing Pakistan's fisheries legislation and institutional framework: integrating Sustainable Development Goal 14 within the scope of International Fisheries Law

Liu Lina*[†] and Muhammad Murad Zaib Butt*[†]

School of Law, Xi'an Jiao Tong University, Xi'an, Shaanxi, China

International Fisheries Law (IFL) provides innovative approaches to fisheries governance at national levels. The emergence of Sustainable Development Goal 14 (SDG 14) is phenomenal for fisheries because it creates new means for implementing IFL. Under SDG 14, fisheries governance for sustainable fisheries has become a complex and challenging task for any state. Developing States like Pakistan are struggling to achieve SDG 14 with new approaches to fisheries governance. The current situation of fisheries governance in Pakistan motivated the content of this research paper. This research paper adopted the comprehensive literature review (CLR) methodology to analyse existing fisheries governance mechanisms in Pakistan. Besides CLR, the paper also analysed a 'case study' on fisheries governance of Pakistan entitled 'National Policy and Strategy for Marine Fisheries'. Furthermore, one hundred sixty-seven research articles and national and international legislation on fisheries governance from 2010 - 2023 are analysed. The results of the CLR methodology suggested that an extensive integrated mechanism under a comprehensive framework should be developed for fisheries governance. The framework forwarded a policy mechanism incorporating sustainable development goals with SDG 14 that should be implemented coherently for sustainable fisheries. The discussion followed the analysis and suggested that regional to local and bottom-up and top-down approaches in fisheries governance are required to address the challenges to sustainable fisheries in Pakistan. The conclusion of the discussion portrayed that future research related to fisheries governance in Pakistan shall be based on the practical implementation of SDG 14.

KEYWORDS

fisheries governance, SDG 14, Pakistan, International Fisheries Law, South Asia

1 Introduction

Marine fisheries as an industry in the Islamic Republic of Pakistan (Pakistan) was initiated after independence in 1947. In 1958, a fish harbour was constructed in Karachi to expand marine fisheries resources (Siddiqi, 1992). Pakistan became aware of its potential in marine fisheries and developed a mechanised ocean exploitation system. While recognising the importance of international fisheries trade and other multilateral economic ties, Pakistan formally became a member of the United Nations (UN) in 1947 (Kaczan and Patil, 2020). It initiated a process of adopting international law instruments (including ocean and fisheries) into its national legal system. Pakistan has signed and ratified crucial international law instruments related to public health, human development, and environmental protection, directly or indirectly related to the global, regional, and national fisheries governance mechanisms (Shahzad and Gillani, 2022).

While vigorously participating in the UN General Assembly (as a permanent member) and Security Council (as a non-permanent member), Pakistan has joined important international fisheries organisations, including but not limited to the UN Division for Ocean Affairs and the Law of the Sea (UN-DOALAS), Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP), World Food Programme (WFP), International Union for Conservation of Nature (IUCN), United Nations Environment Programme (UNEP) and International Maritime Organization (IMO) (Hussain and Bhatti, 2023). International organisations endorse fisheries as a pertinent part of ocean governance besides marine environment and coastal conservation (Panneerselvam, 2017). The international organisations also ratified the Sustainable Development Goal 14 (SDG 14) to protect and preserve 'life below water'. SDG 14 is divided into three parts: i) marine environmental protection, ii) conservation of coastal and marine areas and iii) preservation of fisheries (Zhang et al., 2024).

Various developed States have already adopted the approaches provided by SDG 14 for fisheries and ocean governance. Albeit in ways, developing States like Pakistan are far behind in the effective implementation of SDG 14. In this scenario, Regional Fisheries Management Organisations (RFMOs) and aforementioned international organisations assist the developing States (like Pakistan) in forming and enabling institutions for national and local implementation of SDG 14 (Andrew and Lugten, 2008). The (fisheries-related) organisations provide different guidelines under international and regional conventions, treaties and declarations to develop appropriate legal and policy frameworks with institutional mechanisms to effectively implement SDG 14 (Butt et al., 2022).

SDG 14 advocates for local implementation of international instruments related to fisheries or international fisheries law (IFL). SDG 14 states that local implementation mechanisms are developed systematically with national, regional and international law instruments. This approach is also known as a bottom-up approach of implementation through top-down policy and

governance (Cormier and Elliott, 2017). Therefore, a critical step in implementing SDG 14 in (States like) Pakistan shall be effective local governance, operative national policy, robust regional cooperation and better participation in international organisations. Integration of national policies with local, regional and global systems is becoming imperative for (developing States like) Pakistan because of its involvement in regional projects through bilateral arrangements (for example, China's Belt and Road Initiative) (Zhang et al., 2023a). The fisheries resources exhibit great potential for emerging economic opportunities (under regional initiatives) in (States like) Pakistan. At the same time, fisheries are threatened due to marine pollution, climate change, depletion, and unregulated fishing practices (Khawaja et al., 2018).

Considering such significance, Pakistan's marine fisheries are now strategically important and integral to the economy. However, the threat to fisheries resources is increasing, and Pakistan has no specific umbrella legislation governing marine fisheries. Although Pakistan has signed and ratified several IFL instruments, there is a lack of coordinated policy mechanisms and effective fisheries governance. In the context of SDG 14, it is argued that Pakistan shall rearrange its segmented and fragmented rules and regulations of fisheries governance (Awais et al., 2019). For such purposes, Pakistan shall establish constructive policies and legislation for the long-term conservation and protection of marine fisheries.

Given the above, Pakistan needs to address the knowledge, institutional capacity building and science-policy gaps in fisheries governance. This research paper is motivated by the existing situation of fisheries governance in Pakistan, and it has analysed existing legislative and policy frameworks, institutional capacity, and mechanisms of fisheries governance in Pakistan. This paper adopted the 'Comprehensive (international, regional and national) Law and Literature Review (on the subject matter) (CLR)' methodology and data (based on reports) for analysis (Zulfiqar and Butt, 2021). The methodology is applied in two sections according to standards. The first section analyses the existing IFL to establish a research framework, and the second section analyses Pakistan's existing legislation, policies, and data.

In the next section, this paper explains the CLR methodology process, a step-by-step application and analysis procedure. After initiating and reviewing IFL and relevant literature (from 2010 – 2023), a research framework with policy principles is established under the objectives of SDG 14. The developed research framework analyses Pakistan's fisheries policy, legislation and governance mechanisms. In Section 4.1, the CLR methodology is applied in the context of Pakistan, analysing the existing reports and a case study of fragmentation among central and provincial governments (National Policy and Strategy for Fisheries and Aquaculture Development in Pakistan - Part - I, 2007). After applying the research framework, this paper observed the gaps and lacunas in existing fisheries governance mechanisms in Pakistan. The suggestions are made based on CLR that legislative reform and improvement in institutional mechanisms can help Pakistan achieve fisheries goals as provided under SDG 14.

2 Section I of methodology – comprehensive literature review of international law

This paper adopts a comprehensive approach to investigate the policy, legislation and governance mechanisms for effective implementation. In this section, a comprehensive approach has been applied to establish a ‘Research Framework’ (for national governance) that will assist in reviewing the (existing) ‘Legislation’, ‘Literature’ and ‘Policy’ of the particular national governance mechanism (Hussain and Bhatti, 2023). The CLR methodology was adopted after reviewing various research articles on ‘law and governance’. The CLR methodology adopted by the research articles on law and governance provided significant results and innovatively discussed policy implications. Therefore, it is stated that CLR is a methodology that helps to demonstrate the existing best practices of law enforcement (Hunt and Watkiss, 2011).

The CLR methodology takes one of two forms: analysis of the existing literature on international law and global governance and the analysis of the existing policies, legislation and literature on national implementation (Zulfiqar and Butt, 2021). From this perspective, the CLR methodology also assists in analysing the reports and case studies conducted by non-governmental and governmental organisations. The two forms of CLR methodology (analysis of the existing literature on the IFL and the analysis of the existing policies, legislation and literature on Pakistan fisheries governance) align seamlessly with the research objectives as stated above (Butt et al., 2021a). The methodology allowed for a holistic exploration of the interplay between legislation and institutional practices in achieving SDG 14 targets in Pakistan.

CLR integrates qualitative and quantitative methodologies as a research design, enabling a thorough examination of the literature, policy and legal instruments governing fisheries, and the practical implications of institutional arrangements (Hunt and Watkiss, 2011). The qualitative aspect involved an in-depth analysis of relevant legal documents, encompassing policies, regulations, and agreements pertinent to fisheries governance at international and regional levels. The quantitative aspect assists in developing legal principles and governance rules to achieve sustainable fisheries.

2.1 Data selection mechanism – articles selected for the CLR

The data extraction and selection method is provided below in steps that establish a reasonable basis for developing the research framework for fisheries governance utilised in this paper (Table 1). One hundred and sixty-seven articles were selected through the stepwise method (as provided below and shown in Figure 1) that matches the keywords of governance principles under international law. The governance principles are selected based on repetition and reiteration in the literature on IFL and Sustainable Development Goals (SDGs) that establish mechanisms to achieve sustainability.

2.1.1 Step 1

The data for this paper was extracted from three sources: i) Web of Science, ii) Google Scholar, and iii) Research Gate. The sources are the primary databases for updated research articles on any subject and are globally recognised. Therefore, many researchers and scholars widely utilise these sources (databases) to review the literature and available data on any topic (Papaioannou et al., 2010).

2.1.2 Step 2

The search criteria for extracting the articles were: i) ‘fisheries governance’, ii) ‘international fisheries law’, iii) ‘fisheries management’, iv) ‘regional fisheries management organisations’, and v) ‘global fisheries law’ under the timeline of years 2010 – 2023.

2.1.3 Step 3

After reviewing international law on global fisheries governance, the selection criteria of the articles were established. That criterion is the governance principles of international law as provided below:

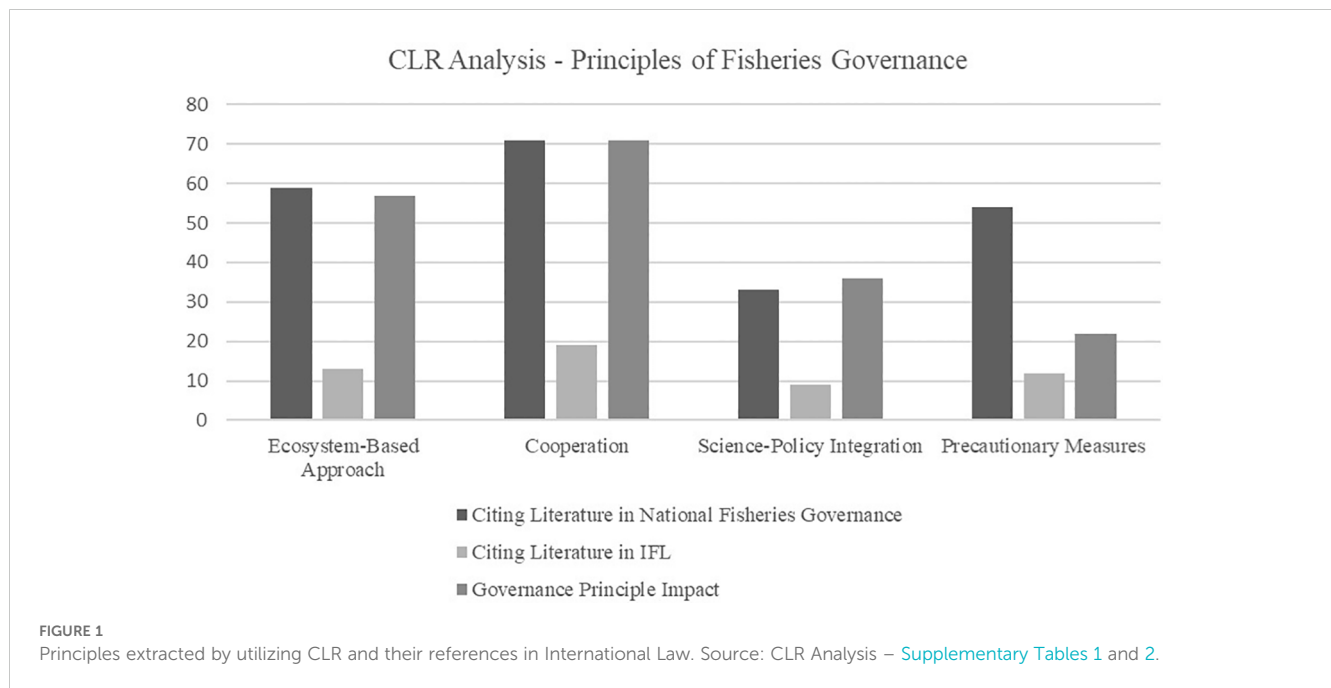
- i. ecosystem-based approach,
- ii. cooperation,
- iii. science-policy integration,
- iv. precautionary measures, and
- v. institutional capacity.

TABLE 1 Stepwise application of CLR methodology.

Step – 1 The databases	Step – 2 Search Criteria and Terms/Keywords	Step – 3 Establishing Principles	Step – 4 Selection of Articles	Step – 5 Review, Writing and Developing Research Framework
→	→	→	→	→
<ul style="list-style-type: none"> • Web of Science • Google Scholar • Research Gate 	<ul style="list-style-type: none"> • fisheries governance • international fisheries law • fisheries management <ul style="list-style-type: none"> • regional fisheries management organisations • global fisheries law 	<ul style="list-style-type: none"> • ecosystem-based approach <ul style="list-style-type: none"> • cooperation • science-policy integration • precautionary measures <ul style="list-style-type: none"> • Institutional capacity (for implementation) 	<ul style="list-style-type: none"> • Selection of 85 articles each on International Fisheries Law and Governance and National and Regional Fisheries Law and Governance 	<ul style="list-style-type: none"> • Review from SDG 14 Perspectives

Refer to Supplementary Material and as Explanation Below.

The arrows portray stepwise approach and bold letters indicate from where the data has been taken as shown in the header of the table.



The given principles are repetitively utilised in the literature related to IFL and governance and related to RFMOs (further details of the given principles are provided in the sections below).

2.1.4 Step 4

After utilising the search criteria of the given principles, one hundred and sixty-seven (167) articles on international, national, and regional fisheries' governance were selected for further review.

2.1.5 Step 5

Due to the importance of SDG 14 in fisheries governance, the articles from 2010 – 2015 were selected based on discussion on the 'importance of sustainability in fisheries'. Further articles from 2015 – 2023 were selected based on discussion on 'integration of SDG 14 in fisheries'.

2.2 Next steps for CLR

The timeline for selected articles is made based on 'updates in data and recent developments' (Rotenberg and Jacobs, 2013). These bases are adopted with the given developments of timeline in international law for sustainable development. The update in data and developments is used in CLR to provide the latest structures of governance as provided in IFL. Therefore, the bases and CLR provided a clear structure for analysing fisheries governance in Pakistan under SDG 14 and IFL perspectives (Fabbri, 1998).¹

The selected articles were further divided into two categories: first, they provided the top-down approach of IFL in national

governance mechanisms, and second, they provided a bottom-up approach to fisheries governance through national governance and RFMOs (Matz-Lück and Al-Hajjaji, 2024). The principles of IFL (as reiterated in the articles) are discussed in a manner that establishes the legitimacy of the research framework, as provided in Figure 1, Table 2. The selected articles with the IFL and SDG 14 perspectives clarified how coordinated mechanisms can be developed to achieve 'sustainable fisheries'.

2.3 Review of selected articles from SDG 14 and IFL perspectives

The primary instrument governing global fisheries is the United Nations Convention on Law of the Sea (UNCLOS) (United Nations Convention on Law of the Sea, 1982). Under UNCLOS, coastal states are granted jurisdiction over fisheries within their Exclusive Economic Zones (EEZs) and are tasked with implementing measures to ensure the sustainable use of fisheries (Alencar Mayer Feitosa Ventura, 2020b). Such a position of the UNCLOS develops a nexus between national fisheries institutions and RFMOs and also urges institutional capacity building (Table 2). Fifty-six articles selected through this CLR established that the principles of fisheries governance for 'coordination' between national and regional institutions are requisite to achieve sustainable fisheries (Rahman, 2023). Furthermore, thirty-two articles discussed the role of the United Nations Declaration on Environment and Development (Rio Declaration) in the preservation and sustainable exploitation of fisheries with institutional capacity building and coordination.

During the Earth Summit, three international agreements emphasised sustainable fisheries, including the Rio Declaration and the Convention on Biological Diversity (CBD) (Table 1; Figure 2) (Convention on Biological Diversity, 1992; United Nations

¹ The formula used for quantitative analysis for governance establishes the rules and principles of international law which are utilised for administration of an institution.

TABLE 2 Purpose of the IFL in national fisheries governance.

Year	IFL	Citing Literature	Relevant Principle	Sustainable Fisheries Objectives
1982	UN Law of the Sea Convention	56	Reiterated all the principles for fisheries governance	Promote and Enhance the Preservation of Fisheries
1992 (Earth Summit)	Rio Declaration	32	Ditto	Preservation of Genetic Resources and Biodiversity (including fisheries)
	Convention on Biological Diversity	16	Science-policy integration	
	United Nations Framework Convention on Climate Change	19	Cooperation in all forms of governance, including ocean and fisheries	Preservation of Oceans as an ecosystem – including Fisheries as its part
1995	FAO Code of Conduct for Responsible Fisheries (CCRF)	61	Precautionary Measures in Fisheries Governance – Institutional Capacity at National Levels	Promote research on fisheries and relevant ecosystems to sustain fisheries as a stock
1995	CBD Jakarta Mandate on Marine and Coastal Biological Diversity	35	Cooperation in all forms of governance, including ocean and fisheries	Facilitate research and other activities which assist in achieving sustainable fisheries
2001	UN Fish Stocks Agreement	63	Under the UNCLOS, all principles are reiterated	Preservation of fish stocks
2002	Johannesburg Declaration on Sustainable Development and Plan of Implementation	10	Reinforcement of Sustainability and Improvement of Institutional Capacity	Preservation of ecosystems (including fisheries)
2015	The 2030 Agenda for Sustainable Development or Sustainable Development Goals	22	Reiterated all the principles for fisheries governance and Enhancing Institutional Capacity	Preservation of ecosystems, marine scientific research and other associated programmes for sustainable fisheries

Source: Developed through the conduct of CLR – International Legal Framework for Fisheries Governance.

Conference on Environment and Development/Rio Declaration on Environment and Development, 1992). Effective implementation of CBD envisions the interconnectivity of SDG 14 with other SDGs because the impact of marine pollution (mainly from land-based sources), climate change, and biodiversity protection on fisheries was realised by the parties at the Earth Summit. As the impacts of climate change were visible on the ocean and fisheries, the United Nations Framework Convention on Climate Change (UNFCCC) also became a relevant instrument in fisheries governance (Table 1; Figure 2) (United Nations Framework Convention on Climate Change, 1992).

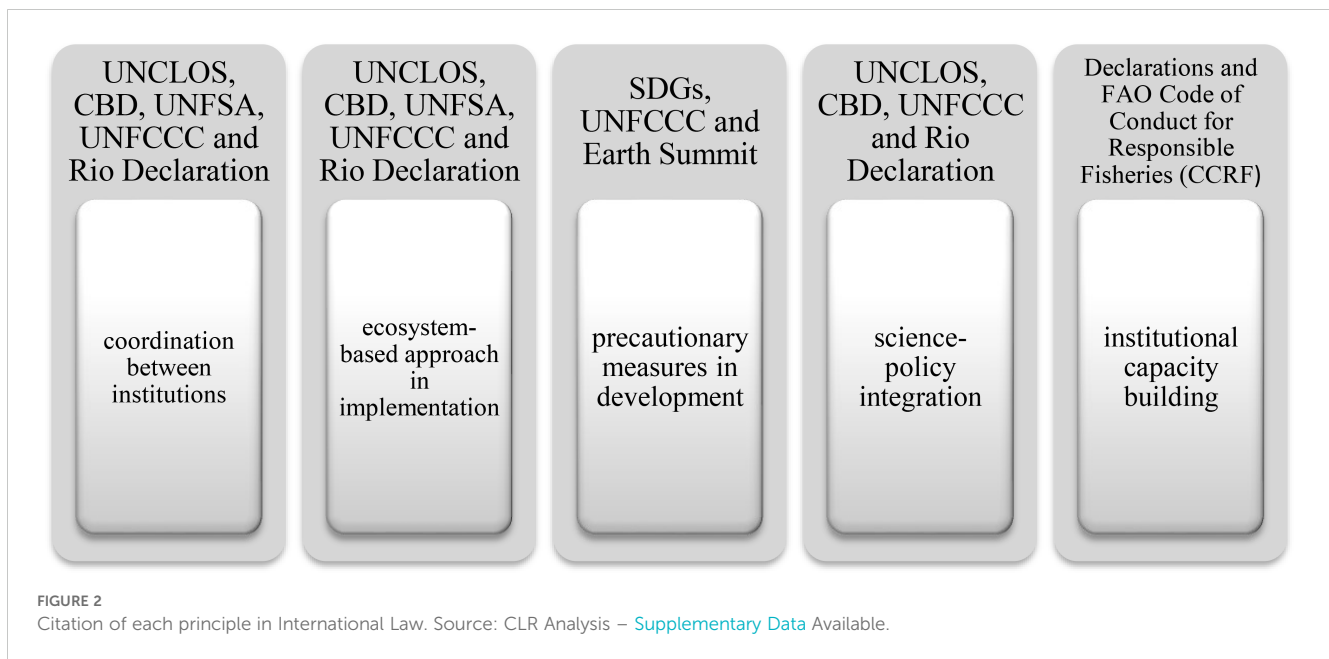
Sixteen articles thoroughly discussed fisheries as part of biodiversity protection, and nineteen articles discussed the impacts of climate change on fisheries. In this manner, these articles connected SDG 14 (for fisheries governance), SDG 6 for clean water and sanitation (as part of land-based pollution, sanitation impacts the marine environment and fisheries), SDG 12 on responsible consumption (because overconsumption impacts biodiversity) and SDG 13 on Climate Change (because climate change is affecting oceans and fisheries) (Arlinghaus et al., 2019).

Responsible consumption is part of responsible fisheries under the IFL, as discussed in sixty-one articles related to the FAO Code of Conduct for Responsible Fisheries (CCRF). Furthermore, sixty-three articles urge the States to enhance ‘institutional capacity’ for responsible fisheries because fisheries are part of nutrition as provided under SDG 2 (for improved nutrition) (Carlisle and Gruby, 2018). The Agreement relating to the Implementation of Part XI of the UNCLOS (Implementing Agreement about the Area

and its resources) and the Agreement Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement) precisely regulate fisheries in a particular manner (as discussed in sixty-three articles and mentioned in Table 2, Figure 2) (Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995).

The aforementioned international instruments, as part of IFL, urge States to develop mechanisms of ‘total-allowable catch (TAC)’ under the principle of ‘maximum sustainable yield (MSY)’ (Andrew and Lugten, 2008). Such provision of MSY provides that institutions governing marine fisheries shall adopt an ‘ecosystem-based approach’. As part of the UNCLOS and CBD, the Jakarta Mandate on Marine and Coastal Biological Diversity further provides that enhancing ‘institutional capacity’ under the principles of ‘precautionary measures’ and ‘science-policy integration’ is part of fisheries governance under IFL (Dereynier, 1998). Accurate information about the fisheries, trained personnel, relevant research capabilities, and equipment for analysis are part of the institutional capacity provided in Jakarta Mandate (also discussed in thirty-five articles).

The principles of governance establishing mechanisms for implementation are mainly part of SDG 14 and SDG 17 (Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development) (Mamun et al.,



2016). ‘Science-policy integration’ in SDG 14 and SDG 17 is based on scientific information in governance objectives. Similarly, ‘precautionary measures’ are part of IFL that provide means for preventing marine pollution. Furthermore, ‘coordination’ and ‘ecosystem-based approach’ are envisioned in policy coherence and multistakeholder partnerships. ‘Institutional capacity’ is developed with the appropriate knowledge and research, technical training and equipment, effective monitoring and robust financial structure as per SDG 17 (Spijkers et al., 2023).

3 Towards research framework – principles for fisheries governance under IFL

The selected articles on IFL further explained how a legal framework for national fisheries governance should be developed. The rules and principles reiterated in the research articles have a unique capacity to develop a mechanism for coordination between institutions, institutional capacity building, science-policy integration, ecosystem-based approach in implementation and precautionary measures in development (Zhang et al., 2023b). The rules and principles are used to establish multiple modes of fisheries governance and their evolving patterns in interpretative debates (Butt and Chang, 2021). The rules and principles also demonstrate that a top-down approach is required for legislation under IFL and a bottom-up approach for implementation mechanisms.

With an apparent resolution of the conflict, the rules formed are determined by interpreting research articles. The success of the rules is measured through an effective implementation mechanism. The impact of principles is determined by the ratio of their repetition in articles (Figure 1). The reviewed articles provided that the principles are cooperative with common interests, are interpreted through the literature and are applicable to the

national legislation of various States. The principles are interconnected because they intersect with each other and guide the States to develop a legislative system, which shall be from the national to the local level. As reflected in these principles, the reforms required are rigorous, iterative and transparent through consensus-building. Therefore, through quantitative analysis, CLR methodology provides qualitative discussion to develop the impact of the principles on a scale of governance. The impact of a principle is measured through its repetition in research articles, as shown in Figure 1.

While understanding how the legal provisions should be manoeuvred at national levels, CLR methodology further involves extracting information from legal documents regarding the roles of institutions involved at local and sub-national levels (Table 2; Figure 2). The principles are further explained below in a manner that connects with SDGs as a whole and SDG 14 in principle. The principles are reiterated in SDGs for global sustainable development and can be applied to fisheries governance under SDG-14, as shown in Figures 2, 3. In the following sections, the institutional arrangements encompassing the organisational structures, roles, and responsibilities assigned to various entities involved in fisheries governance are analysed under the given principles.

3.1 Ecosystem-based approach

An ecosystem-based approach is a fundamental principle for governing complex marine ecosystems, including fisheries, as emphasised by IFL instruments, including UNCLOS and the Earth Summit (Atkins et al., 2011). The UNCLOS advocates the integrated nature of fisheries and supports the ecosystem-based approach, which involves recognising the interdependence of environmental components (Cicin-Sain and Knecht, 1993). This approach necessitates cooperation across governing institutions and consistent legislation from international to local levels to align with

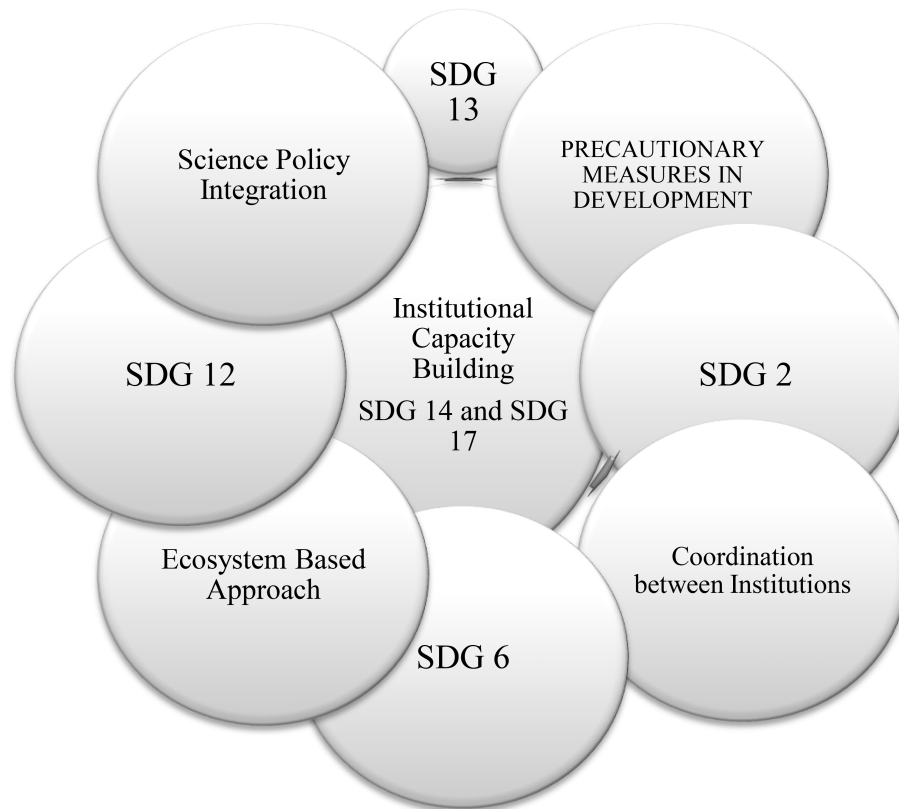


FIGURE 3
Interconnected SDGs with SDG-14. Source: CLR Analysis – [Supplementary Data](#) Available.

SDG 14 (Alencar Mayer Feitosa Ventura, 2020a). The ecosystem-based approach links SDG 14 with SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation), and SDG 17 (Policy Coherence) (Figures 2, 3) (Friess et al., 2019). SDG 13 highlights the need to integrate climate change into national strategies, making it crucial for fisheries governance. SDG 6 calls for reducing waste, recycling wastewater, and minimizing agricultural runoff to protect marine ecosystems (Final list of proposed Sustainable Development Goal indicators, 2016). SDG 17 emphasises policy coherence, advocating for integrated, intersectoral governance. Collectively, these SDGs underscore the need for an interconnected, ecosystem-based policymaking process to ensure effective fisheries management and sustainability.

3.2 Coordination

Effective coordination, supported by robust monitoring and information-sharing systems, is crucial for building institutional capacity and driving technical development in fisheries governance (Kim, 2023). Legal reforms, expert capabilities, and adequate resources are essential to strengthen these processes (as shown in Figures 2, 3) (Schubert and Gupta, 2013). Coordination is best achieved through a bottom-up approach, where local institutions

monitor and share data with higher-level institutions, ensuring alignment across governance scales. Institutional coordination is vital for sustainable fisheries management, encompassing cooperation across all relevant ocean and environmental ecosystem institutions (Figures 2, 3) (Al Arif, 2017). SDG 14 highlights the need for scientific collaboration at all levels, linking fisheries governance with SDG 2 (food security and nutrition), SDG 6 (clean water), and SDG 13 (climate action). SDG 2 calls for addressing malnutrition and reducing overproduction and overconsumption of fisheries. Interconnections between SDGs 6, 13, and 14 further underscore the importance of national-level coordination to address fisheries-related challenges effectively (Zhang et al., 2024).

3.3 Science-policy integration

Science-policy integration in fisheries governance means policy decisions informed by scientific knowledge for sustainable fisheries governance. The Earth Summit established that effective governance mechanisms require scientific data to inform policy frameworks (Butt et al., 2021b). SDG 14 reinforces this by urging states to enhance scientific knowledge and research capacity to protect marine biodiversity, linking fisheries governance to SDG 13 (climate

action) and SDG 17 (policy coherence). Scientific data is critical for fisheries management concepts like Total Allowable Catch (TAC), Maximum Sustainable Yield (MSY), and precautionary measures under the Biosafety Protocol (Achbari, 2015). This principle requires cooperation between institutions, with scientists supporting policymakers in addressing overfishing, environmental threats, and illegal, unreported, and unregulated (IUU) fishing (Figures 2, 3) (Convention on international trade in endangered species of wild fauna and flora 1973 (Enforced 1975), n.d.). The integration of scientific information is also vital for monitoring climate change and pollution under SDG 13 and for ecosystem-based governance approaches implemented through top-down methods. The interconnected principles of science-policy integration, cooperation, and an ecosystem-based approach were foundational elements of the Earth Summit and international agreements like CITES (Chircop, 2010).

3.4 Precautionary approach or measures

Precautionary measures in fisheries governance are to mitigate the impacts of development and production on ecosystems. SDG 14 emphasises the need for regulating fisheries harvesting, ending overfishing, combating IUU fishing, and implementing science-based management plans to restore fish stocks to sustainable levels (MSY) (Kaebnick et al., 2016). These precautionary approaches are critical for addressing issues like climate change, pollution, and ecosystem degradation, which are interconnected with SDG 14 and other related SDGs. The Rio Declaration establishes precautionary measures as a fundamental principle, urging their adoption before any development or use of genetic resources to prevent significant environmental harm (Figures 2, 3) (Fousteris et al., 2018). This approach is integrated into fisheries governance frameworks to combat overfishing, IUU fishing, and fish stock depletion, which negatively impact marine ecosystems (Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific, 2002). As a legal and policy principle, the precautionary approach is linked with other governance principles and forms a core part of sustainable fisheries management.

3.5 Institutional capacity building

Institutional capacity building in fisheries governance involves enhancing the ability of institutions to implement laws, policies, and regulations effectively (Ibrahimi, 2017). Institutions play a critical role in managing fisheries across all stages, from hatching to export, by enabling effective policies and ensuring robust monitoring and reporting mechanisms supported by data and research. They also facilitate communication, policy development, and collaboration with stakeholders (Kim, 2023). SDG 14 underscores the importance of institutional capacity building, linking it to the integration of

scientific knowledge and the transfer of marine technology to ensure the effective implementation of the IFL (Figures 2, 3).

4 Assessment of existing legislation and institutional framework of Pakistan based on rules and principles of research framework

The results of the CLR indicate that a legal framework based on five principles is required to govern fisheries. The principles consistently develop cooperation among institutions, integrate scientific information into policy, and consider interconnected issues like climate change and pollution (Allison, 2001). The ecosystem-based approach is a fundamental principle for governing complex marine systems and fisheries, as emphasised in IFL and SDG 14. SDG 14 aligns closely with the ecosystem approach and can serve as a comprehensive framework for implementing IFL. Improved coherence across governing instruments and increased cooperation among institutions are necessary to govern fisheries effectively.

In this section, the fisheries governance framework of Pakistan is analysed based on the principles of fisheries governance as established above through the CLR of IFL. This section describes the applied methodology for a comprehensive analysis of law, policy and governance framework for fisheries in Pakistan. The analysis in this section is based on CLR (comprehensive review of law and literature) related to Pakistan's fisheries governance mechanism. This analysis is divided into three parts because Pakistan is a pertinent player in global and regional governance. Therefore, the fisheries governance framework of Pakistan has been analysed through three parts: i) Pakistan in International Fisheries, ii) Pakistan in Regional Fisheries and iii) the National Fisheries Governance Framework of Pakistan (Khan and Khan, 2011).

4.1 Section II of methodology – CLR (review of law and literature) of fisheries governance in Pakistan (case study and analysis)

This part has argued that international and regional developments are pertinent to Pakistan's national fisheries governance. It has been observed that Pakistan, as a state, recognises marine fisheries as a global, regional, and national subject. The practical governance mechanisms of Pakistan are analysed by determining its relationships with regional fisheries governance organisations. In this manner, the CLR methodology captures how responsibilities are distributed and coordinated among different entities. Similar stepwise methods have been used for this part of CLR to observe how IFL and RFMOs have impacted fisheries governance in Pakistan.

Therefore, CLR assists in identifying government agencies, departments, and other institutions responsible for implementing and overseeing the fisheries policies and regulations.

4.1.1 Step 1

The articles on the Web of Science, Google Scholar, and Research Gate related to Pakistan's fisheries' governance were selected.

4.1.2 Step 2

Due to the scarcity of literature on the subject, the search terms were 'fisheries + management + governance + law + Pakistan'. These terms produced relatively low output, with no more than fifty research articles.

4.1.3 Step 3

The principles searched in these articles are also in meagre numbers as compared to governance principles' impact (Figure 4).

4.1.4 Step 4

Review of Law – federal and provincial laws, rules, regulations and policies are analysed and presented below. An analysis is conducted to determine whether Pakistan has followed international law principles, and the results can be observed below.

The literature review on fisheries governance in Pakistan observed that institutional capacity is the major problem. Nine articles discussed institutional capacity issues in national and local fisheries governance, and eleven articles raised concerns about

institutions not having an appropriate international engagement policy (Figure 4). Seven articles suggested engaging with RFMOs for institutional capacity building, marine technology development, transfer, and information exchange. Ten articles recommended that Pakistan adopt technological means for information and assessment through international organisations, including the World Trade Organization (WTO) and FAO (Figure 4).

Eleven articles raised concerns about the lack of an ecosystem-based approach to fisheries governance in Pakistan (Panneerselvam, 2017). These articles suggested that such approaches are necessary to preserve fisheries sustainably. Fifteen articles discussed a similar approach differently, entitled 'lack of cooperation' between local, national and regional institutions in fisheries governance (Noman et al., 2022). The articles suggested that Pakistan should cooperate with the South Asian Region and neighbouring States (mainly China) in fisheries governance (Figure 4). Bilateralism in fisheries governance with China shall assist Pakistan in transferring marine technology and sustainable practices to preserve fish stocks and to develop mechanisms for long-term sustainability in fisheries production (Ahmed et al., 2019).

4.2 National policy and strategy for fisheries and aquaculture development in Pakistan – case study

Initially, there was no specific mechanism in Pakistan for fisheries governance. In 1987, the Agricultural Commission,

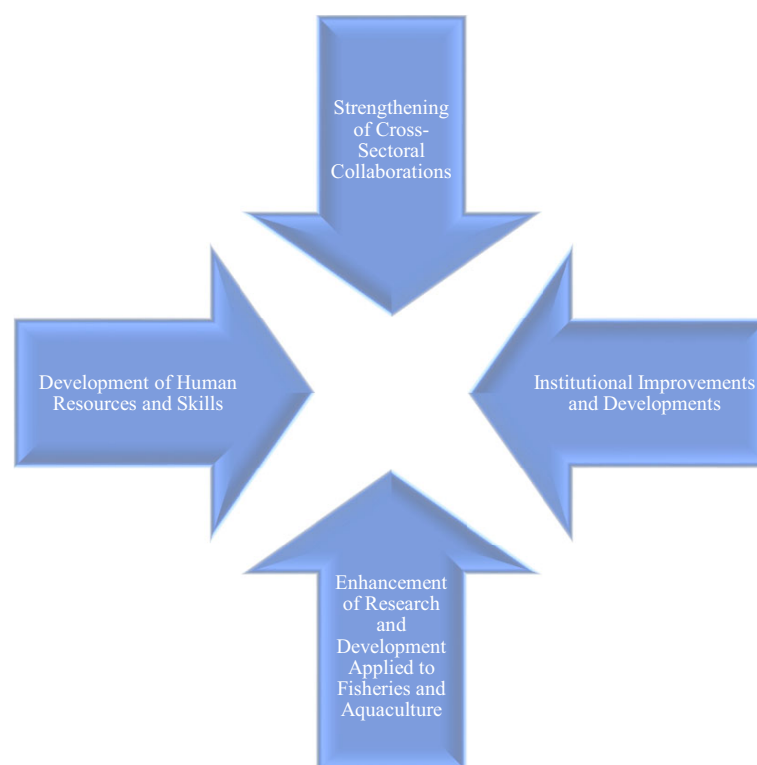


FIGURE 4

Recommendations of National Policy Strategy for Fisheries and Aquaculture Development in Pakistan. Source: Report of National Policy Strategy for Fisheries and Aquaculture Development in Pakistan.

under the auspices of the Ministry of Agriculture, provided some recommendations for developing a mechanism for marine fisheries governance (Siddiqi, 1992). In 1988, the first-ever fisheries policy was established by providing a mechanism of institutional coordination and capacity building (Nazir et al., 2015). The policy also suggested that there should be strong coordination among and between federal, provincial and local governments for appropriate fisheries governance mechanisms. In 2007, a national case study was conducted to analyse the existing fisheries governance mechanisms in Pakistan (National Policy and Strategy for Fisheries and Aquaculture Development in Pakistan - Part - I, 2007). The study clearly indicated fragmentation issues and a lack of cooperation among the institutions. The study also highlighted that due to such challenges, the fish stocks are depleting and IUU fishing is increasing. Moreover, the report suggested implementing specific measures regarding precaution and scientific integration into policy frameworks. Accordingly, the report suggested that territorial policy fragmentation is another root cause of challenges because provincial governments govern fisheries in territorial seas, and EEZs are governed by the federal government.

The study recommended increasing the national fisheries supply management through better and sustainable governance mechanisms (as shown in Figure 4). First and foremost is institutional coordination to develop a conducive environment that will create suitable and sustainable conditions in the market (as shown in Figure 4). Such a conducive environment will be created through the realisation of four fundamental 'common elements' including cross-sectoral coordination, institutional development, enhancement of research and human skills. Given that, it is necessary to create an enabling environment with legal and policy specifications, which is further discussed in the light of this study in the following sections.

4.3 Pakistan in international fisheries

According to the given study, the CLR establishes that active participation in UNCLOS negotiations paved the way for Pakistan to work with pertinent international fisheries organisations. Pakistan regularly receives assistance from the FAO in producing and preserving fisheries because FAO was a pertinent stakeholder in the study. Pakistan also engages with UNDP and UNEP for ocean governance and fisheries development as per regional and international agendas. Pakistan is an active member of WFP (due

to its food and health issues), IUCN (for the protection of the marine environment) and IMO (for the shipping and fisheries vessel development) (Mohsin et al., 2017).

As Pakistan recognises the importance of its marine resources (including fisheries) and underdeveloped mechanisms of exploiting oceans, it aligned itself with other developing coastal States in the Group of Seventy-seven (G-77) (Shafique and Mahmood, 2008). Pakistan adopted a soft-law approach in marine fisheries under the UNCLOS. Pakistan acknowledged the rights and obligations in the maritime zones related to fisheries (and other marine resources) and urged other States in G-77 to cooperate (Butt et al., 2021a). Pakistan also cooperates with land-locked (disadvantaged) states in the fields of trade, transit, and marine fisheries. Pakistan refers to the doctrine of 'unity' and considers that it is unfair to keep disadvantaged States away from the oceans.

Although this position of Pakistan was disregarded during the negotiations for UNCLOS, Pakistan still cooperates with many land-locked States and provides them with various advantages of oceans (Kumar, 2021). In 2022, during the UN Ocean Conference, the G-77 plenary, supported by Pakistan, endorsed the commitments made under international environmental agreements related to oceans (Wyns, 2022). Pakistan adhered to the principle of 'international cooperation' or 'cooperation' while participating in international environmental negotiations. Pakistan advocated for 'cooperation' in ocean governance and maritime security in the Indian Ocean Region. It cooperated with the United Arab Emirates, the Sultanate of Oman and the Islamic Republic of Iran in this region.

4.4 Pakistan in the Indian Ocean Region fisheries

In 1982, the South Asian Cooperative Environment Programme (SACEP) laid its foundation. As Pakistan is in the South Asian Region, it followed the initiatives of SACEP, including i) Plastic Free Rivers, ii) Biodiversity Conservation, iii) Sustainable Consumption and Production, iv) Climate Change, v) Waste Management and vi) South Asian Seas Programme (Noman et al., 2022). All these initiatives are linked to the governance of marine fisheries in the Indian Ocean (Table 3) (Programme and Programme, 1997; Ali, 2008). The neighbouring States to Pakistan, except India, have a good relationship with it, and there are several opportunities to develop a fisheries governance framework at the regional level by utilising the abovementioned principles.

TABLE 3 Pakistan in the Regional fisheries arrangements.

Year	Title of the Regional Agreement	Citing Literature	Objective in the field of Marine Fisheries	Progress
1982	South Asian Cooperative Environment Programme	6	Preservation and Protection of the Environment, including habitat (fisheries)	Ineffective implementation due to lack of resources
1995	South Asian Seas Programme	3	Protection and Preservation of Ocean Ecosystems, including fisheries	No follow-up to develop a regional framework
1996	IOTC – Agreement for Establishment of the Indian Ocean Tuna Commission	2	Preservation of Indian Ocean Tunas	Effective implementation due to the interests of many States in the Indian Ocean region

Source: CLR Analysis and Governance of Ocean and Fisheries in Pakistan.

After the South Asian Seas Programme, Pakistan joined the Indian Ocean Tuna Commission (IOTC) to conserve and optimise tuna and other tuna-like fish stocks ([Agreement for the establishment of the Indian Ocean Tuna Commission, 1993. \(Enforced - 1996\) \(1927 UNTS\)](#) - Available Online: <https://treaties.un.org/pages/showDetails.aspx?objid=08000002800a7f47>, n.d.). Two articles observed that effective implementation of the IOTC agreement is lacking at various levels ([Table 3](#)). IOTC itself is not subject to scrutiny through neighbouring States in the Indian Ocean. With continued overfishing in the Indian Ocean, specifically in the Arabian Sea, marine fisheries' lives are impacted disastrously ([Sinan and Bailey, 2020](#)). Therefore, appropriate measures are required in the Indian Ocean region to preserve marine fisheries. In these regards, Pakistan can play an influential role in the region for the conservation of its own interests and for the overall goal of achieving sustainable fisheries.

Regarding regional development, South Asia lacks a coordinated and multifaceted approach to any environmental or ecological issue, as discussed in six articles ([Table 3](#)) ([Riskas et al., 2018](#)). Fisheries governance faces the same threats because there is no existing RFMO in the region. South Asian Seas Programme under the SACEP is ineffective without developing a mutual agreement like other agreements governing RFMOs ([Anwar, 2020](#)). Therefore, it is argued that ocean governance in South Asia requires a coordinated approach and cooperative mechanisms. On the other hand, it is also argued that Pakistan should cooperate with the Gulf and African States located in the west of the Indian Ocean for fisheries and other ocean-related issues.

4.5 Analysis of national, provincial and local fisheries legislation of Pakistan

After reviewing Pakistan's fisheries legislation and institutional frameworks, this CLR observed a lack of coordination and

cooperation among the institutions at all levels. The study also indicated that there is a sheer disregard for 'precautionary measures' and 'scientific' information to be taken into fisheries policy. This is mainly because of territorial policy disintegration, as provincial governments govern fisheries in territorial seas, and EEZs are governed by the federal government. Therefore, the institutions of both governments lack coordination and capacity to address the concerns of sustainable fisheries as advocated by SDG 14.

According to the Constitution of Pakistan, the fisheries in the territorial seas are governed by the provincial governments of (Sindh and Baluchistan) Pakistan. However, fisheries in the seas beyond 12 nautical miles up to 200 nautical miles (also known as EEZ) are governed directly by the federal government of Pakistan ([Territorial Waters and Maritime Zones Act, 1976, 1976](#)). The two types of governments governing fisheries have enacted a multitude of legislation and regulations that provide the policy and regulatory framework ([Table 4](#)) ([Constitution of the Islamic Republic of Pakistan, 1973: as Amended up-to-Date. Lahore: All Pakistan Legal Decision, 2015, n.d](#)). The Rules of Business is essential legislation designating fisheries business specifically for institutions ([Pakistan and Cabinet Division, 1973](#)). Pakistan Fisheries Act operates as an umbrella law and adopts a generalised approach towards fisheries ([Siddiqi, 1992](#)). The West Pakistan Fisheries Rules are developed under the Pakistan Fisheries Act for fishing boats, trawlers and other fishing vessels ([Table 4](#)).

The provincial governments have their own rules and legislation for fisheries, as mentioned in [Table 4](#). In principle, provincial Rules of Business and Fisheries Rules are the primary framework governing fisheries within territorial seas. The government of the province of Sindh govern fisheries under the Sindh Government Rules of Business (which is the primary document of governance), the Sindh Fisheries Ordinance, the Sindh Fisheries Rules and Korangi Fisheries Harbour Ordinance ([Table 4](#)) ([Kaczan and Patil, 2020](#)). The Directorate General Fisheries Department works under the direction of the Livestock

TABLE 4 Laws, policies & agreements impacting fisheries.

Government	Legislation	Objectives
Federal	The Constitution of the Islamic Republic of Pakistan 1973	Establishing Authority for Fisheries
	Rules of Business 1973	Designating Authority to Institutions
	Pakistan Fisheries Act 1897	General Rules and Principles for Fishing
	West Pakistan Fisheries Rules 1965	Regulation of Fishing Equipment
Baluchistan Province	The Baluchistan Government Rules of Business 2012	Designating Authority to Baluchistan Provincial Institutions
	The Baluchistan Sea Fisheries Ordinance 1971	General Rules and Principles for Fishing
	Baluchistan Sea Fisheries Rules 1971	Regulation of Fishing Equipment
Sindh Province	The Sindh Government Rules of Business 1986	Designating Authority to Sindh Provincial Institutions
	The Sindh Fisheries Ordinance 1980	General Rules and Principles for Fishing
	Sindh Fisheries Rules 1983	Regulation of Fishing Equipment
	Korangi Fisheries Harbour Ordinance 1982	Regulation of Fisheries in Harbour

Source: CLR Analysis and Official Website of Government of Pakistan - (Further sources are provided in the references section).

and Fisheries Department (Table 5). Similarly, the government of the Province of Baluchistan govern fisheries under the Baluchistan Government Rules of Business, the Baluchistan Sea Fisheries Ordinance, and the Baluchistan Sea Fisheries Rules (Table 4) (Deep Sea Fishing Policy of Pakistan, 1995). The Directorate General Fisheries Department works under the direction of the Coastal Development and Fisheries Department (Table 5) (Siddiqi, 1992).

In Sindh province, the legislative system is comprehensive for fisheries governance. However, the government departments

governing fisheries are not coherent (Noman et al., 2022). Similarly, in Baluchistan province, the cooperation of government departments at upper and lower levels is flawed, and stakeholder consultation is not part of any policymaking mechanism. The specific implementation of fisheries laws, regulations, and rules depends on local government departments. There is no policy for seasonal bans, fishing trawlers, impact assessments, or climate change (Nazir et al., 2015).

Effective implementation of the given rules and legislation is questionable because the government adopts an isolated approach

TABLE 5 Institutions governing fisheries.

Government/Ministry	Governing Division	Department	Objectives
Ministry of National Food Security and Research	National Food Security and Research Division	Fisheries Development Board (FDB)	Promotion of fisheries as nutrition according to national nutrition and food policy
		The Marine Fisheries Department (MFD)	
Ministry of Maritime Affairs	Maritime Affairs Division	Office for promotion of Deep-Sea Fisheries Resources in Exclusive Economic Zone.	Protection of fisheries in CITES Convention, exploitation of fisheries and promotion of fisheries production
		Directorate of Marine Fisheries, Karachi.	
		Fisheries Training Centre/Deep Sea Fishing Vessel.	
		Korangi Fisheries Harbour Authority, Karachi	
		Marine Fisheries Research Laboratory Karachi.	Research on fisheries for preservation and protection
Baluchistan	Coastal Development and Fisheries Department	Provincial Directorate General of Fisheries	Regulation of Fisheries in the Coastal Areas of the province and Seasonal bans help in the development and production of fisheries.
Sindh	Livestock and Fisheries Department	Directorate General Fisheries Department	

Source: CLR Analysis.

in policymaking and legislation (Pakistan and Cabinet Division, 1973). The institutions under the federal government known as the Office for Promotion of Deep-Sea Fisheries Resources in Exclusive Economic Zone, Fisheries Training Centre/Deep Sea Fishing Vessel and Directorate of Marine Fisheries promote the exploitation of fisheries. Conversely, the institutions of provincial governments known as Directorates of Fisheries are developing mechanisms to preserve fisheries.

The Marine Fisheries Department under the Ministry of National Food Security and Research and National Food Security and Research Division (formerly Ministry of Food, Agriculture and Livestock) responsible for ensuring the growth and production of fishery resources at sustainable levels works under the federal government (Noman et al., 2022). However, the Marine Fisheries Department works for policy development and approaches the provincial governments with limited authority and resources. Similarly, the Fisheries Development Board of the federal government promotes sustainable fisheries in EEZ without any mechanism that the provincial governments should implement in territorial seas (Table 4). Although the institutions in the provinces coordinate with each other at some scale (such as seasonal bans and protection of fisheries under the CITES Convention), further coordination for the preservation of fish stocks is required to strengthen the governance mechanism (Table 4).

Based on the analysis above, it can be argued that the governments of Pakistan (both provincial and federal) are already involved in multiple and multilevel governances of fisheries at global and regional levels (Khan and Khan, 2021). Several coordination and policy issues hamper the development of any preservation policy. At provincial levels, Pakistan's approach is top-bottom, which means that the national level for local implementation influences the policy (Pakistan Environmental Protection Agency, Archives, 2012). The principal issue is the lack of centralised policies, which contributes to the degradation of fisheries' resources (through destructive fishing practices) and impacts overall ocean ecosystems.

4.6 2004 fisheries policy and institutional framework

In 2004, the Fisheries Development Board initiated a 'National Fisheries Policy' and established a task force to deal with inland and marine fisheries and aquaculture. Under a collaborative process (at the provincial and federal levels), the two sub-groups prepared policy documents related to their areas (Mohsin and Mu, 2019, pp. 1950–2014). A five-year plan was proposed for medium-term planning, with the recommendation of approaching FAO to fund a technical cooperation project (TCP) to assist in formulating a policy and a strategy to enhance fisheries and aquaculture (Mehmood et al., 2020).

The project goal was to create an environment conducive to the sustainable development and management of a growing fisheries and aquaculture sector. The emphasis was on the contribution of fisheries to economic growth, poverty alleviation, food security and environmental conservation (Allison et al., 2009). After that, the project was initiated

to support the ongoing fisheries and aquaculture policy and strategy development process in Pakistan and to facilitate its implementation. A separate committee for fisheries was constituted to prepare these plans, and its recommendations were accommodated. However, none of the five-year plans have addressed many of the broad issues faced by those in the fisheries and aquaculture sectors.

As output of the project, an agreement on the appropriate course of actions for the project to follow and required contribution to Pakistan's ongoing policy processes; i) A well-defined fisheries and aquaculture policy and strategy based on good consultation; ii) An effective implementation plan for the policy and strategy at national and Provincial/Areas levels (Mohsin et al., 2017). It was also agreed that all Provinces of Pakistan should implement TAC and MSY measures as provided in the UNCLOS. Furthermore, effective implementation of regional and international instruments related to IFL was suggested to be reasonably implemented in coastal areas.

The review of the 2004 policy through CLR also depicted that Pakistan's major marine fisheries are over-exploited (Ali, 2018). Due to untrained personnel and the capabilities of the officials, the reporting mechanism of fish stocks is inadequate. Furthermore, the weak infrastructure for policy implementation lacks an appropriate reporting mechanism. The institutions lack the capability and technology to assess the fish stocks, impacting the reporting mechanisms (Ali, 2018). This argument is based on the statement that only 30-35% of fish captured is reported, and more than 60% of stocks are depleted. The non-compliance of the industrial fisheries is due to weak compliance mechanisms in legislation and the ineffective capacity of the institutions.

4.7 Deep Sea Fishing (Licence) Policy 1995 – 2001 and 2018

In 1988, Pakistan adopted the national fisheries and aquaculture-specific policy. Marine fisheries issues were covered in the 1988 policy to some extent as livestock. Further policies were developed for deep-sea fishing in 1995 and 2001, specifically aiming to promote fisheries under licensing arrangements in the EEZ. Albeit in ways, the policies only marginally covered aspects of local/small-scale coastal fisheries and focused on large-scale industrial fishing (Mustafa and Ahmad, 2003). The reports of the Agriculture Enquiry Committee and National Agriculture Commission of Pakistan observed that the marine fisheries policies have not addressed the industrial issues and lack significant measures for sustainable fisheries.

A specific deep-sea fishing policy was established in 1995 and followed a six-year implementation process. The provincial regulations and departments were enhanced to implement deep-sea fishing policy effectively and allowed further exploration and exploitation of fisheries (Deep Sea Fishing Policy of Pakistan, 1995). It also grants curing yard licenses and issues certificates of quality for processed and unprocessed fish for domestic consumption, inter-provincial trade, and export. Accordingly, the advanced fishing trawlers based in Karachi were prohibited from fishing within the 3-mile inshore waters of Baluchistan.

The Deep Sea Fishing Licensing Policy was introduced in 2018 under the Exclusive Fishery Zone (Regulation of Fishing) Act. This policy recognises the extension of the EEZ of Pakistan to the continental shelf (from 200 to 350 nautical miles) ([Deep Sea Fishing Licensing Policy, 2018](#)). This policy observed IUU fishing and overexploitation of fisheries resources under the existing policies and practices in the EEZ of Pakistan. The stock-assessment surveys of 2009–2015 indicated a decline in fish stocks and even a decrease in endangered species (as per CITES). Therefore, through this policy, significant measures have been taken to curb IUU fishing and overfishing.

The policy divided the maritime zones into three parts with significant caps and control in fishing practices. For example, fishing of Tuna was limited to 90 days per year as per the TAC and MSY of UNCLOS and mesopelagic fishing up to 60 days per year ([Deep Sea Fishing Policy of Pakistan, 1995](#)). The MSY for tuna fish was decided as per UNCLOS implementation mechanisms (CCRF and UNFSA) that limit the licences for fishing. The policy stated that for a ‘sustainable fishing method’, the Pakistan Maritime Security Agency (PMSA) will monitor all the fishing fleets, and Marine Fisheries Department (in the provinces) shall develop regular reporting and monitoring mechanisms.

According to the government of Pakistan, the 2018 policy is equated with a sustainable fisheries mechanism. The CLR observed that the success of the 2018 policy depends on the results that have to be assessed, such as how far the relevant departments have adopted institutional coordination and pertinent other principles of governance. The policy is based on a two-pronged approach, as it initially stated that ‘Pakistan has exclusive rights over fisheries in EEZ and continental shelf’ and noted in the second portion that ‘sustainable fisheries’ are also important. Furthermore, the policy was established in 2018 (three years after SDGs) and has not included the relevant issues of SDG 14. Therefore, it is questionable to what extent this policy can effectively implement SDG 14 as per the given measures of IFL.

4.8 The approach used in the TCP: bottom-up and consensus-based policy formulation for fisheries

In 2005, the FAO-TCP Inception Workshop was conducted, and a wide range of stakeholders (institutions, fishing communities, and fishing companies) prepared a detailed project implementation plan. The outcomes from the two government task forces were amalgamated into a single ‘National Fisheries Policy’ draft ([Birnie, 1999](#)). The contents of this draft were synthesised into a policy brief by the international consultants hired by the government with the assistance of the Network of Aquaculture Centres in Asia-Pacific (NACA-STREAM) ([Hosch et al., 2011](#)). The policy brief was also sent to numerous stakeholders from provincial and local governments, harbour authorities and non-governmental (fisheries and environmental) organisations for comments.

The participants gave their input to prioritise the various recommendations in the draft policy and its implementation. The first phase of community consultations and the feedback received

from consulted stakeholders also recommended the various industrial usage of fisheries, preservation, and effective utilisation of fish stocks ([Mohsin and Mu, 2019](#)). FAO redrafted the draft policy after a round of provincial/area stakeholder consultations based on the scientific information. Task force members and other project stakeholders from the government made observations on its contents, which were then further revised by FAO ([Mohsin and Mu, 2019](#)).

According to FAO (after consultations), the 2005 policy recommendations devised that a comprehensive legislative system for fisheries governance at national and provincial government levels is the essential requirement ([Mehmood et al., 2020](#)). Further, integrating government departments at federal and provincial levels and institutional capacity enhancement is suggested ([Beunen et al., 2017](#)). After reviewing the policy, this CLR indicates that the 2005 policy recommendations for integrating marine fisheries were practical in institutional coordination at various levels. Under the 2005 policy, coastal provinces were required to be integrated into a governance mechanism with a bottom-up approach ([Zhang et al., 2023a](#)). Policymaking and implementation with a top-down approach requires cooperation between government departments at upper and lower levels. Effective implementation of seasonal bans and regulation of fishing trawlers are among other suggestions based on scientific information and precautionary measures approaches.

4.9 Results of CLR – top-down and bottom-up approach in fisheries governance

The primary issue identified through CLR analysis is the absence of a ‘precautionary approach’ and ‘institutional capacity’ because TAC and MSY are not integrated into any legislation in Pakistan. SDG 14 has been overlooked in Pakistan’s agenda of SDGs because the institutions working in the marine and fisheries areas have not taken policy measures for such implementation ([Zhang et al., 2023b](#)). The institutional capacity of SDG 17 for policy coherence and improving capability is not incorporated into fisheries policy and agenda in Pakistan ([Khan and Khan, 2021](#)). The institutions lack effective monitoring and reporting mechanisms for assessing the fish stocks and licensing ([Nazir et al., 2015](#)).

Another main issue identified through CLR analysis is the rationality and interests of the various institutions. Moreover, local stakeholders are not prioritised in the policymaking process, and industrial stakeholders reserve their interests in decision-making ([Butt et al., 2021a](#)). Therefore, there is a lack of ‘cooperation’ among the institutions, which definitely impacts the ‘ecosystem-based approach’ to fisheries as part of a larger ocean ecosystem. Moreover, only one institution (Marine Fisheries Research Laboratory) at the federal level is working for fisheries preservation with the approach of science-policy integration.

The institutions responsible for implementing SDG 2 are the Fisheries Development Board and the Marine Fisheries Department. These institutions shall develop the capacity to assess the nutritional value of the fish stocks at the national level ([Mohsin and Mu, 2019](#)). The institutions working under the federal

government shall coordinate and cooperate with the Maritime Affairs Division and the provincial Directorate General Fisheries Department to effectively implement SDG 2 (Table 6; Figure 5). Furthermore, the fisheries governing institutions (with SDG 14 approaches) can seek assistance from the developed States (such as China) for marine technology transfer and improving institutional capacity in reporting and monitoring mechanisms (Mohammed et al., 2018, p. 14).

Similarly, environmental protection in general and marine environmental protection specifically lack specific mechanisms to assess the situation of fisheries. There are no specific provisions to deal with marine and other coastal pollution. The marine pollution issues shall be dealt with on a priority basis as urbanisation, agriculture, and proposed expansions of ports increase. For such purposes, effective implementation of SDG 6 is required for waste and sewerage prevention from oceans. According to SDG 6, the municipal authorities, environmental and marine authorities, and fisheries governance institutions shall coordinate to mitigate waste and sewerage (Table 6; Figure 6).

Further policy development in fisheries governance shall integrate the Fisheries Development Board and Marine Fisheries Department with the Directorate of Marine Fisheries, Korangi Fisheries Harbour Authority and provincial Directorate General Fisheries Departments (Figure 6). For such purposes, data sharing (with cooperation and science policy integration) and capacity building (through cooperation and ecosystem-based approach) shall be the main components of governance (Table 6, Figure 5) (Zulfiqar and Butt, 2021). More extensive engagement requires cooperation with environmental institutions at national and provincial levels. The Pakistan Environmental Protection Authority, Climate Change Division (under the Ministry of Climate Change), and Provincial Environmental Authorities are relevant institutions that shall coordinate with fisheries institutions for information sharing, which shall be adopted as a precautionary approach.

Further cooperation among Fisheries Training Centre/Deep Sea Fishing Vessel, Office for Promotion of Deep-Sea Fisheries Resources in Exclusive Economic Zone, Marine Fisheries Research Laboratory Karachi and provincial Directorates General Fisheries Department is necessary for the effective adoption of

'precautionary measures' (Table 6; Figure 5). Such measures are also based on an ecosystem-based approach, which requires cooperation and integration at various levels as required by SDG 17 (Table 6, Figure 5). Furthermore, the following section explored regional cooperation options available to Pakistan in fisheries governance. The following section also suggested the required strategy to address the challenges of achieving sustainable fisheries at national and regional levels.

5 Suggestion on the future of fisheries governance in Pakistan

Pakistan's rich coastline along the Arabian Sea offers significant potential for fisheries development. As discussed above, the fisheries sector has long struggled with challenges ranging from overfishing to inadequate regulatory frameworks (Mohsin et al., 2017). Therefore, Pakistan requires an innovative approach to equate its fisheries policies with SDG 14. Pakistan is suggested to adopt an outward sustainability policy to equate its role in fisheries' governance with SDG 14. The initiatives suitable for Pakistan to improve its national fisheries policy and external expansion in the regional and global fisheries governance shall align with SDG 14.

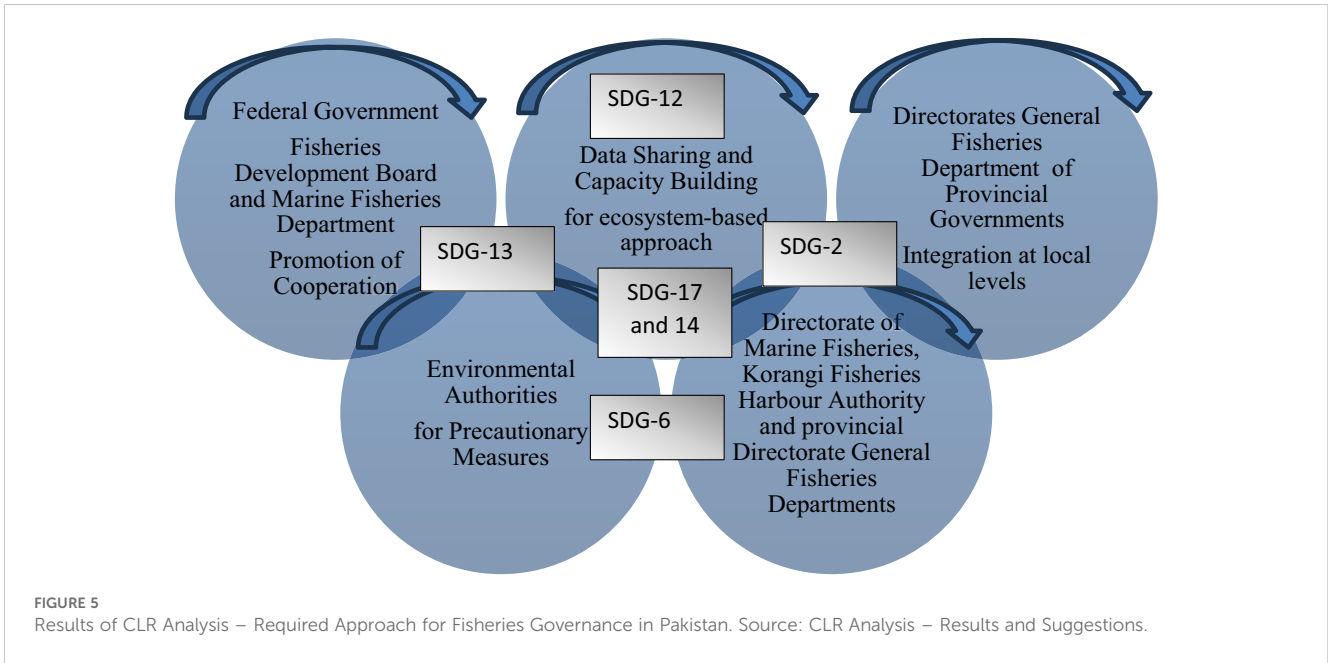
The development of ports and associated infrastructure under regional developments (for example, CPEC) can enhance Pakistan's capabilities for fishery-related activities such as processing, storage, and export (Panneerselvam, 2017). Improved port facilities can streamline logistics, reducing post-harvest losses and increasing the value of the fishery sector. Furthermore, investments in fisheries infrastructure and technology from (multinational) fisheries companies can modernise Pakistan's fishing industry. This may include the introduction of advanced fishing vessels, aquaculture technologies, and cold chain systems, thereby boosting productivity and efficiency (Dadwal and Purushothaman, 2017).

Multistakeholder partnerships in fisheries through investment opportunities come with significant challenges. A surge in fishing activities can exacerbate existing issues of overfishing and IUU fishing in Pakistan's seas. Due to regional developments (for example, CPEC and BRI), there will be an influx of foreign

TABLE 6 Results of CLR.

Sr no	Required Update in Legislation	Coordinating Department	Goal-Based Approach	Governance Principles
1	Fisheries Act for Fisheries Production and Sustainable Utilisation	Fisheries Development Board and Marine Fisheries Department with Maritime Affairs Division	SDG-2 for nutrition and SDG-14 for sustainable production of fisheries	Cooperation and Ecosystem-based approach
2	Environmental Protection Law and Fisheries Laws	Maritime Affairs Division, Provincial Directorate General Fisheries Department	SDG-6 for Waste and Sewerage mitigation and SDG-14 for protection of ocean ecosystems	Precautionary Measures and Science-policy Integration
3	Climate Change Laws and Fisheries Preservation Law	Maritime Affairs Division, Provincial Directorate General Fisheries Department and Climate Change Division	SDG-13 for Climate Change Mitigation and SDG-14 for Ocean Acidification and Sea Level Rise	Precautionary Measures, Ecosystem-Based Approach and Science-policy Integration
4	A Comprehensive Fisheries Policy	All relevant Institutions, as mentioned	SDG – 17 Policy Coherence for SDGs	All given principles

Source: CLR Analysis – Supplementary Data Available.

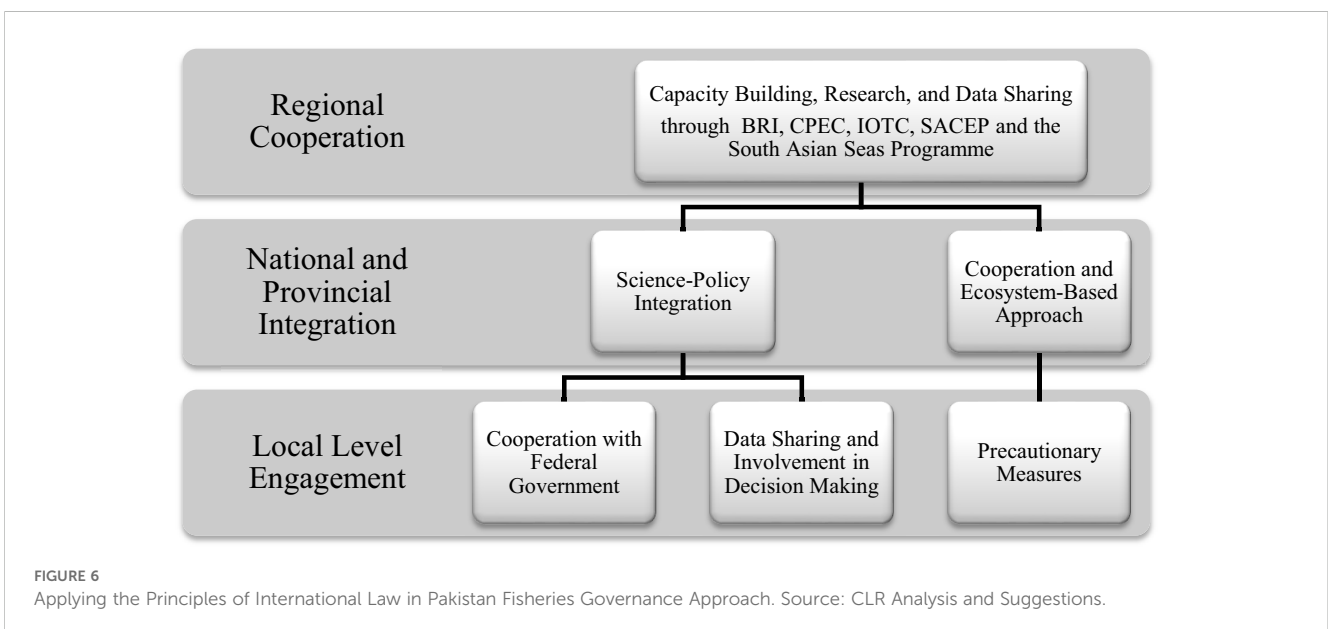


vessels. This will include Chinese fishing fleets that will challenge the fisheries governance mechanism of Pakistan (Hashmi, 2019). Moreover, the potential for environmental degradation due to the construction of port infrastructure and associated projects through such regional developments cannot be ignored. Habitat destruction, pollution, and disruption of marine ecosystems threaten fish stocks and the livelihoods of coastal communities dependent on fisheries.

Regarding governance, the rapid pace of development under CPEC and BRI may outstrip the capacity of regulatory institutions to manage and oversee fisheries activities effectively. Weak enforcement mechanisms and regulatory loopholes could facilitate unsustainable exploitation of marine resources and undermine efforts for conservation and sustainable management (Garlick,

2018). Addressing these challenges requires a holistic approach integrating environmental sustainability, social equity, and economic development objectives. In the given circumstances, the following suggestions are provided to Pakistan to strengthen its fisheries governance frameworks:

- i. A fisheries policy with a novel approach under SDG 14 that must include consultation with various stakeholders – provincial governments, local governments, fishermen, industrial fisheries corporations, national government and private stakeholders;
- ii. Cooperation among environmental and fisheries governance institutions;
- iii. Coordination in national, provincial and local governments;



- iv. Effective legislation on fisheries under a particular policy framework highlighting the importance of SDG 14 as mentioned above;
- v. institutional capacity for enforcement and implementation with regional collaboration and international coordination;
- vi. Cooperation of security forces in curbing IUU fishing;
- vii. Development of data-sharing mechanisms within its own governmental systems and at regional levels;
- viii. Scientific integration in policy making and implementation;
- ix. Precautionary approaches in the exploitation of fisheries as a resource

Such enhancement in policy mechanisms, institutional capacity and effective legislation under the given principles of governance will ensure that the benefits of CPEC and BRI are realised without compromising the long-term sustainability of fisheries.

6 The potential role of Pakistan in regional integration and international cooperation in fisheries governance

Collaboration with regional institutions can also be vital in promoting responsible fisheries practices (Fabinyi and Liu, 2014). Technology transfer and adoption, joint initiatives for capacity building, research, and data sharing can enhance transparency and cooperation in managing shared marine resources (including fisheries), as shown in Figure 6. While regional developments offer immense potential for transforming Pakistan's fisheries sector, careful planning and effective governance are essential to mitigate negative impacts and maximise sustainable development outcomes (Coll et al., 2013). By adopting a proactive and inclusive approach, Pakistan can harness the opportunities presented by these initiatives while safeguarding the integrity of its marine environment and securing the livelihoods of coastal communities.

To become a regional player, Pakistan requires a two-pronged approach: i) bottom-up and ii) top-down. The bottom-up approach involves policy measures at the local level and practical implementation at national, regional, and international levels (Ahsan and Khawaja, 2013). The top-down approach requires consultation with RFMOs for the long-term sustainability of regional fisheries. Consultation with RFMOs before policy and decision-making processes is mandatory under IFL (Soomai et al., 2013). In this scenario, RFMOs can also assist in the specific implementation of special laws, regulations and rules related to the conservation of endangered fish stocks (Hosch et al., 2011). These suggestions are made under SDG 17, which urges local and provincial integration and cooperation of national and regional institutions.

The top-down approach involves technology transfer and developing effective reporting and monitoring mechanisms. Regional convergence for fisheries governance will further explore Pakistan's potential in fisheries. Through sustainable fisheries policies and governance mechanisms, Pakistan can become a market player in marine fisheries. Moreover, Pakistan's capacity in the CPEC of BRI

can enhance its fisheries' market development venues. Under CPEC, Pakistan can learn from China in developing fisheries governance, sustainable catches and effective implementation of MSY and TAC.

Such transformation in fisheries governance requires 'cooperation' among governing institutions, including environmental and marine environmental institutions. Policymaking through local input at the national level and a regional policy is required to address the issues of 'sustainable fisheries' with 'scientific information', 'precautionary measures' and 'ecosystem-based approach'. This transformation will improve the technical capability of the institutions through marine technology transfer with regional arrangements and expand coordination for reporting and monitoring mechanisms (Figure 6).

7 Conclusions

This research paper contributed to the formation of policy under SDG 14 and IFL at the national level. For such purposes, this paper adopted the CLR methodology and suggested that a coordinated governance mechanism is required for effective fisheries governance. Effective fisheries governance means that there shall be means for the abolition of harmful fishing practices, IUU fishing, and overfishing. Furthermore, fisheries' governance mechanisms shall include policy frameworks for mitigating environmental pollution and climate change. Based on these arguments, this paper suggested that non-compliance with the IFL could negatively affect government initiatives to achieve SDGs connected with fisheries governance.

This paper first analysed the literature on new means of fisheries governance under SDG 14 and IFL. The results forwarded a novel approach to fisheries governance (governance principles) to be implemented at national levels. The primary motivation behind this paper was to analyse Pakistan's national fisheries governance framework. Therefore, the analysis of Pakistan's fisheries governance provided significant suggestions to be considered. Pakistan is required to address the fisheries issues with a policy development mechanism by integrating multiple and multilevel stakeholders.

Furthermore, Pakistan should also consider regional cooperation for institutional capacity building and developing data-sharing mechanisms. Regional stakeholders are crucial to developing effective fisheries policy and legislation in Pakistan. Pakistan should adopt principles of governance to achieve sustainable fisheries at national, provincial and local levels. The success of implementation shall be measured through assessment by the institutions involved in fisheries. The future research agenda in the field of fisheries governance in Pakistan shall be based on the practical implementation of given principles in policy mechanisms, legislative development and governance systems.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material. Further inquiries can be directed to the corresponding authors.

Author contributions

LL: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Visualization, Writing – original draft, Writing – review & editing. MZB: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Visualization, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. This fieldwork is supported by the China National Social Science Foundation Art Project: Research on Legal Issues in the Development of Cultural Products in Chinese Museums (Grant No 22EH217).

Acknowledgments

The authors acknowledge the resources provided through China National Social Science Foundation Art Project: Research on Legal Issues in the Development of Cultural Products in Chinese Museums (Grant No 22EH217).

References

- Achbari, A. (2015). Building networks for science: conflict and cooperation in nineteenth-century global marine studies. *Isis* 106, 257–282. doi: 10.1086/682020
- Agreement for the establishment of the Indian Ocean Tuna Commission 1993. (Enforced - 1996) (1927 UNTS). Available online at: <https://treaties.un.org/pages/showDetails.aspx?objid=08000002800a7f47> (Accessed January 22, 2024).
- Agreement for the implementation of the provisions of the United Nations convention on the law of the sea of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks. 01, UNTS 37924. (1995).
- Ahmed, S., Ali, A., Kumar, D., Malik, M. Z., and Memon, A. H. (2019). China Pakistan Economic Corridor and Pakistan's energy security: A meta-analytic review. *Energy Policy* 127, 147–154. doi: 10.1016/j.enpol.2018.12.003
- Ahsan, I., and Khawaja, S. A. (2013). *Development of Environmental Laws and Jurisprudence in Pakistan* (Islamabad, Pakistan: Asian Development Bank). Available at: <https://www.adb.org/sites/default/files/publication/31140/environmental-law-jurisprudence-Pakistan.pdf> (Accessed October 12, 2024).
- Al Arif, A. (2017). Legal status of maximum sustainable yield concept in international fisheries law and its adoption in the marine fisheries regime of Bangladesh: a critical analysis. *Int. J. Mar. Coast. Law* 32, 544–569. doi: 10.1163/15718085-12323054
- Alencar Mayer Feitosa Ventura, V. (2020a). “Brazilian legal framework applicable to the blue amazon's seabed: an assessment of consistency with international law,” in *Environmental Jurisdiction in the Law of the Sea: The Brazilian Blue Amazon*. Ed. V. Alencar Mayer Feitosa Ventura (Springer International Publishing, Cham), 297–351. doi: 10.1007/978-3-030-50543-1_10
- Alencar Mayer Feitosa Ventura, V. (2020b). “Jurisdictional intersections between the continental shelf and other maritime spaces: exclusive economic zone, high seas and the area,” in *Environmental Jurisdiction in the Law of the Sea: The Brazilian Blue Amazon*. Ed. V. Alencar Mayer Feitosa Ventura (Springer International Publishing, Cham), 109–139. doi: 10.1007/978-3-030-50543-1_5
- Ali, S. H. (2008). Water politics in South Asia: technocratic cooperation and lasting security in the Indus Basin and beyond. *J. Int. Aff.* 61, 167–182.
- Ali, M. R. (2018). Small-scale fisheries in Pakistan. *Small-Scale Fish. South Asia* 81, 763.
- Allison, E. H. (2001). Big laws, small catches: global ocean governance and the fisheries crisis. *J. Int. Dev.* 13, 933–950. doi: 10.1002/jid.834
- Allison, E. H., Perry, A. L., Badjeck, M., Neil Adger, W., Brown, K., Conway, D., et al. (2009). Vulnerability of national economies to the impacts of climate change on fisheries. *Fish Fish.* 10, 173–196. doi: 10.1111/j.1467-2979.2008.00310.x
- Andrew, N., and Lugten, G. (2008). Maximum sustainable yield of marine capture fisheries in developing archipelagic states—Balancing law, science, politics and practice. *Int. J. Mar. Coast. Law* 23, 1–37. doi: 10.1163/092735208X272229
- Anwar, A. (2020). *South Asia and China's Belt and Road Initiative: Security Implications and Ways Forward* (Daniel K. Inouye Asia-Pacific Center for Security Studies). Available online at: <https://www.jstor.org/stable/resrep26667.15> (Accessed February 16, 2022).
- Arlinghaus, R., Abbott, J. K., Fenichel, E. P., Carpenter, S. R., Hunt, L. M., Alós, J., et al. (2019). Governing the recreational dimension of global fisheries. *Proc. Natl. Acad. Sci.* 116, 5209–5213. doi: 10.1073/pnas.1902796116
- Atkins, J. P., Burdon, D., Elliott, M., and Gregory, A. J. (2011). Management of the marine environment: integrating ecosystem services and societal benefits with the DPSIR framework in a systems approach. *Mar. Pollut. Bull.* 62, 215–226. doi: 10.1016/j.marpolbul.2010.12.012
- Awais, M., Samin, T., Gulzar, M. A., and Hwang, J. (2019). The sustainable development of the China Pakistan economic corridor: synergy among economic, social, and environmental sustainability. *Sustainability* 11, 7044. doi: 10.3390/su11247044
- Beunen, R., Patterson, J., and Van Assche, K. (2017). Governing for resilience: the role of institutional work. *Curr. Opin. Environ. Sustain.* 28, 10–16. doi: 10.1016/j.cosust.2017.04.010
- Birnie, P. (1999). New approaches to ensuring compliance at sea: the FAO agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas. *Rev. Eur. Comp. Intl Envtl L* 8, 48. doi: 10.1111/reel.1999.8.issue-1
- Butt, M. J., and Chang, Y.-C. (2021). Regulation of Autonomous Maritime Weapon Systems under the Governance Framework of International Law. In: *Marine Scientific Research, New Marine Technologies and the Law of the Sea* (Brill Nijhoff). Available online at: <https://brill.com/view/book/edcoll/9789004469372/BP000008.xml> (Accessed January 30, 2022).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fmars.2025.1503748/full#supplementary-material>

- Butt, M. J., Chang, Y. C., and Zulfiqar, K. (2021a). A comparative analysis of the environmental policies in China and Pakistan: developing a legal regime for sustainable China-Pakistan economic corridor (CPEC) under the belt and road initiative (BRI). *IPRI J.* 21, 83–122. doi: 10.31945/iprij.210104
- Butt, M. J., Chang, Y.-C., and Zulfiqar, K. (2021b). “Applicability of international law in development of sustainable port policy: an analysis of good practices and future policy of Gwadar Port,” in *International Association of Maritime Universities (IAMU) Conference* (A Publication of International Association of Maritime Universities, Alexandria, Egypt). Available at: https://www.researchgate.net/publication/355718582_Applicability_of_International_Law_in_Development_of_Sustainable_Port_Policy_An_Analysis_of_Good_Practices_and_Future_Policy_of_Gwadar_Port (Accessed March 23, 2022).
- Butt, M. J., Zulfiqar, K., Chang, Y.-C., and Iqtaish, A. M. A. (2022). Maritime Dispute Settlement Law towards Sustainable Fishery Governance: The Politics over Marine Spaces vs. Audacity of Applicable International Law. *Fishes* 7, 81. doi: 10.3390/fishes7020081
- Carlisle, K. M., and Gruby, R. L. (2018). Why the path to polycentricity matters: evidence from fisheries governance in Palau. *Environ. Policy Gov.* 28, 223–235. doi: 10.1002/eet.1811
- Chircop, A. (2010). Regional cooperation in marine environmental protection in the South China Sea: A reflection on new directions for marine conservation. *Ocean Dev. Int. Law* 41, 334–356. doi: 10.1080/00908320.2010.499300
- Cicin-Sain, B., and Knecht, R. W. (1993). Implications of the earth summit for ocean and coastal governance. *Ocean Dev. Int. Law* 24, 323–353. doi: 10.1080/00908329309546016
- Coll, M., Libralato, S., Pitcher, T. J., Solidoro, C., and Tudela, S. (2013). Sustainability implications of honouring the Code of Conduct for Responsible Fisheries. *Glob. Environ. Change* 23, 157–166. doi: 10.1016/j.gloenvcha.2012.10.017
- Constitution of the Islamic republic of Pakistan 1973: as amended up-to-date. Lahore: all Pakistan legal decision 2015.
- Convention on international trade in endangered species of wild fauna and flora 1973 (Enforced 1975).
- Convention for cooperation in the protection and sustainable development of the marine and coastal environment of the northeast Pacific. (E-XE4161 - UNEP; F-XF4234) Convention on Biological Diversity came i3. (2002).
- Convention on biological diversity. (1992).
- Cormier, R., and Elliott, M. (2017). SMART marine goals, targets and management – Is SDG 14 operational or aspirational, is ‘Life Below Water’ sinking or swimming? *Mar. pollut. Bull.* 123, 28–33. doi: 10.1016/j.marpolbul.2017.07.060
- Dadwal, S. R., and Purushothaman, C. (2017). CPEC in Pakistan’s quest for energy security. *Strateg. Anal.* 41, 515–524. doi: 10.1080/09700161.2017.1343270
- Deep Sea Fishing Policy of Pakistan (Islamabad, Pakistan: Ministry of National Food Security and Research). (1995). Available at: <https://faolex.fao.org/docs/pdf/pak18969.pdf> (Accessed April 12, 2024).
- (2018). *Deep Sea Fishing Licensing Policy*. Available online at: <https://moma.gov.pk/SiteImage/Misc/files/DSFL%20Policy-2018%20notified.pdf> (Accessed July 1, 2024).
- Dereynier, Y. L. (1998). Evolving principles of international fisheries law and the North Pacific Anadromous Fish Commission. *Ocean Dev. Int. Law* 29, 147–178. doi: 10.1080/00908329809546121
- Fabbri, K. P. (1998). A methodology for supporting decision making in integrated coastal zone management. *Ocean Coast. Manage.* 39, 51–62. doi: 10.1016/S0964-5691(98)00013-1
- Fabinyi, M., and Liu, N. (2014). The Chinese policy and governance context for global fisheries. *Ocean Coast. Manage.* 96, 198–202. doi: 10.1016/j.ocecoaman.2014.03.022
- (2016). *Final list of proposed Sustainable Development Goal indicators*. Available online at: <https://sustainabledevelopment.un.org/content/documents/11803Official-List-of-Proposed-SDG-Indicators.pdf> (Accessed May 29, 2024).
- Fousteris, A. E., Didaskalou, E. A., Tsogas, M.-M. H., and Georgakellos, D. A. (2018). The environmental strategy of businesses as an option under recession in Greece. *Sustainability* 10, 4399. doi: 10.3390/su10124399
- Friess, D. A., Aung, T. T., Huxham, M., Lovelock, C., Mukherjee, N., and Sasmito, S. (2019). SDG 14: life below water—impacts on mangroves. *Sustain. Dev. Goals* 445, 445–481.
- Garlick, J. (2018). Deconstructing the China–Pakistan economic corridor: pipe dreams versus geopolitical realities. *J. Contemp. China* 27, 519–533. doi: 10.1080/10670564.2018.1433483
- Hashmi, S. D. (2019). China and central Asian republics’ Connectivity through CPEC. Available online at: <https://modern diplomacy.eu/2019/01/01/China-and-central-asian-republics-connectivity-through-cpec/> (Accessed January 6, 2020).
- Hosch, G., Ferraro, G., and Failler, P. (2011). The 1995 FAO Code of Conduct for Responsible Fisheries: Adopting, implementing or scoring results? *Mar. Policy* 35, 189–200. doi: 10.1016/j.marpol.2010.09.005
- Hunt, A., and Watkiss, P. (2011). Climate change impacts and adaptation in cities: a review of the literature. *Clim. Change* 104, 13–49. doi: 10.1007/s10584-010-9975-6
- Hussain, M., and Bhatti, S. H. (2023). A review article on an appraisal of maritime laws as a mechanism of community governance for sustainable development goals. *Pak. J. Humanit. Soc. Sci.* 11, 1–10. doi: 10.52131/pjhs.2023.1101.0325
- Ibrahimi, K. (2017). A theoretical framework for conceptualizing seaports as institutional and operational clusters. *Transp. Res. Proc.* 25, 261–278. doi: 10.1016/j.trpro.2017.05.393
- Kaczan, D. J., and Patil, P. G. (2020). Potential development contribution of fisheries reform: evidence from Pakistan. *J. Environ. Dev.* 29, 275–305. doi: 10.1177/1070496520925878
- Kaebnick, G. E., Heitman, E., Collins, J. P., Delborne, J. A., Landis, W. G., Sawyer, K., et al. (2016). Precaution and governance of emerging technologies. *Science* 354, 710–711. doi: 10.1126/science.aah5125
- Khan, S. R., and Khan, S. R. (2011). Fishery degradation in Pakistan: a poverty–environment nexus? *Can. J. Dev. Stud. Can. D tudes D v.* 32, 32–47. doi: 10.1080/02255189.2011.576140
- Khan, S. R., and Khan, S. R. (2021). “Reversing unsustainable policies and practices in the fisheries sector: A chronology of collective action by the Pakistan fisheries forum,” in *Social Capital and Collective Action in Pakistani Rural Development* (Springer International Publishing, Cham), 187–222. doi: 10.1007/978-3-030-71450-5_7
- Khawaja, M. A., Saeed, S., and Urooj, M. (2018). *Preliminary Environmental Impact Assessment, Study of China-Pakistan Economic Corridor, Northern Route Road Construction Activities in Khyber Pakhtunkhwa, Pakistan* (Islamabad, Pakistan: Sustainable Development Policy Institute). Available at: [https://www.sdpi.org/publications/files/Preliminary-Environmental-Impact-Assessment-Study-of-CPEC-NRRC-Activities-in-KPK-Pakistan\(PB-59\).pdf](https://www.sdpi.org/publications/files/Preliminary-Environmental-Impact-Assessment-Study-of-CPEC-NRRC-Activities-in-KPK-Pakistan(PB-59).pdf) (Accessed August 23, 2024).
- Kim, S. (2023). Adaptive capacity and local-level fisheries co-management activities: A case of South Korea. *Mar. Policy* 154, 105665. doi: 10.1016/j.marpol.2023.105665
- Kumar, S., S. (2021). Applicability of UNCLOS for Landlocked states: The case of Chabahar port and Afghanistan. *Marit. Aff. J. Natl. Marit. Found. India* 17, 58–72. doi: 10.1080/09733159.2021.1939869
- Mamun, A. A., Brook, R. K., and Dyck, T. (2016). Multilevel governance and fisheries commons: Investigating performance and local capacities in rural Bangladesh. *Int. J. Commons* 10, 45–70. doi: 10.18352/ijc.568
- Matz-L ck, N., and Al-Hajjaji, S. (2024). “The international legal framework for area-based marine management tools,” in *Area-Based Management of Shipping: Canadian and Comparative Perspectives*. Eds. A. Chircop, F. Goerlandt, R. Pelot and C. Aporta (Springer Nature Switzerland, Cham), 69–90. doi: 10.1007/978-3-031-60053-1_4
- Mehmood, A., Sial, M. H., Sharif, S., Hussain, A., Riaz, M., and Shaheen, N. (2020). Forecasting the fisheries production in Pakistan for the year 2017–2026, using box-jenkin’s methodology. *Pak. J. Agric. Res.* 33, 140–145. doi: 10.17582/journal.pjar/2020/33.1.140.145
- Mohammed, E. Y., Steinbach, D., and Steele, P. (2018). Fiscal reforms for sustainable marine fisheries governance: Delivering the SDGs and ensuring no one is left behind. *Mar. Policy* 93, 262–270. doi: 10.1016/j.marpol.2017.05.017
- Mohsin, M., and Mu, Y. T. (2019). An economic analysis of fisheries and molluscan fisheries nexus in Pakistan 1950–2014. *J. Anim. Plant Sci.* 29, 1455–1465.
- Mohsin, M., Mu, Y., Memon, A. M., Mehak, A., Shah, S. B. H., Kalhor, M. T., et al. (2017). Capture fisheries production and its economic role in Pakistan. Available online at: <https://nopr.niscpr.res.in/handle/123456789/42015> (Accessed December 10, 2023).
- Mustafa, K., and Ahmad, S. (2003). Barriers against agricultural exports from Pakistan: the role of WTO sanitary and phytosanitary agreement [with comments]. *Pak. Dev. Rev.* 42 (4), 487–510.
- National Policy and Strategy for Fisheries and Aquaculture Development in Pakistan - Part - I (Islamabad, Pakistan: Ministry of Food, Agriculture and Livestock, Government of Pakistan, Islamabad, Pakistan). (2007). Available at: <https://faolex.fao.org/docs/pdf/pak150786.pdf> (Accessed June 13, 2024).
- Nazir, K., Yongtong, M., Kalhor, M., Memon, K., Mohsin, N., and Kartika, S. A preliminary study on fisheries economy of Pakistan: plan of actions for fisheries management in Pakistan. *Can. J. Basic Appl. Sci.* 03, 7–17.
- Noman, M., Mu, Y. T., Nisar, U., Mohsin, M., and Memon, A. M. (2022). Constraint analysis of major problems facing the marine fisheries sector in accordance with the national fisheries policy of Pakistan. *Indian J. Geo-Mar. Sci. IJMS* 51, 94–103.
- Pakistan and Cabinet Division. (1973). *Rules of Business (As amended up to 3rd March 2017)* (Islamabad, Pakistan: Government of Pakistan). Available at: <http://cabinet.gov.pk/cabinet/userfiles1/file/ROB-amended-03-03-2017.pdf> (Accessed October 1, 2024).
- Pakistan Environmental Protection Agency, Archives (2012). *Brief on Pakistan Environmental Protection Act 1997* (Islamabad, Pakistan: Ministry of Climate Change, Pakistan). Available online at: <http://www.environment.gov.pk/images/webcontent/brf-act1997.pdf> (Accessed February 1, 2020).
- Panneerselvam, P. (2017). Maritime component of China–Pakistan economic corridor (CPEC): India–China competition in the Arabian Sea. *Marit. Aff. J. Natl. Marit. Found. India* 13, 37–49. doi: 10.1080/09733159.2017.1412577
- Papaioannou, D., Sutton, A., Carroll, C., Booth, A., and Wong, R. (2010). Literature searching for social science systematic reviews: consideration of a range of search techniques. *Health Inf. Libr. J.* 27, 114–122. doi: 10.1111/j.1471-1842.2009.00863.x
- Programme, S. A. C. E., and Programme, U. N. E. (1997). *South Asia Handbook of Treaties and other Legal Instruments in the Field of Environmental Law - SACEP/UNEP/NORAD Publication Series on Environmental Law and Policy No. 1*. Available online at: <https://stg-wedocs.unep.org/xmlui/handle/20.500.11822/30488> (Accessed January 18, 2022).

- Rahman, M. A. (2023). Global marine governance and oceans management for the achievement of sustainable development goals and blue growth. *Int. J. BioLife Sci. IJBLS* 2, 59–61. doi: 10.22034/jbs.2023.178661
- Riskas, K. A., Tobin, R. C., Fuentes, M. M. P. B., and Hamann, M. (2018). Evaluating the threat of IUU fishing to sea turtles in the Indian Ocean and Southeast Asia using expert elicitation. *Biol. Conserv.* 217, 232–239. doi: 10.1016/j.biocon.2017.10.011
- Rotenberg, M., and Jacobs, D. (2013). Updating the law of information privacy: the new framework of the European Union. *Harv. J. Law Public Policy* 36, 605.
- Schubert, S., and Gupta, J. (2013). Comparing global coordination mechanisms on energy, environment, and water. Available online at: <https://www.jstor.org/stable/26269303> (Accessed June 16, 2021).
- Shafique, F., and Mahmood, K. (2008). Indicators of the emerging information society in Pakistan. *Inf. Dev.* 24, 66–78. doi: 10.1177/0266666907087698
- Shahzad, S. M., and Gillani, A. (2022). Maritime security: A case study of Pakistan. *J. Naut. Eye Strateg. Stud.* 2, 25–32.
- Siddiqi, A. H. (1992). Fishery resources and development policy in Pakistan. *GeoJournal* 26, 395–411. doi: 10.1007/BF02629820
- Sinan, H., and Bailey, M. (2020). Understanding barriers in Indian Ocean tuna commission allocation negotiations on fishing opportunities. *Sustainability* 12(16), 6665. doi: 10.3390/su12166665
- Somai, S. S., MacDonald, B. H., and Wells, P. G. (2013). Communicating environmental information to the stakeholders in coastal and marine policy-making: Case studies from Nova Scotia and the Gulf of Maine/Bay of Fundy region. *Mar. Policy* 40, 176–186. doi: 10.1016/j.marpol.2013.01.017
- Spijkers, J., Mackay, M., Turner, J., McNeill, A., Travaile, K., and Wilcox, C. (2023). Diversity of global fisheries governance: Types and contexts. *Fish Fish.* 24, 111–125. doi: 10.1111/faf.12713
- Territorial Waters and Maritime Zones Act 1976. (1976).
- United Nations Conference on Environment and Development/Rio Declaration on Environment and Development. (1992).
- United Nations Convention on Law of the Sea. (1982).
- United Nations Framework Convention on Climate Change. (1992).
- Wyns, A. (2022). Disaster diplomacy in the wake of the 2022 Pakistan floods. *Lancet Planet. Health* 6, e855–e856. doi: 10.1016/S2542-5196(22)00240-6
- Zhang, S., Butt, M. J., Iqatish, A., and Zulfiqar, K. (2023a). China's belt and road initiative (BRI) under the vision of maritime community with a shared future and its impacts on global fisheries governance. *Heliyon*. 9 (4). doi: 10.1016/j.heliyon.2023.e15398
- Zhang, S., Butt, M. J., and Zulfiqar, K. (2023b). Interconnected principles of ocean governance through science-policy integration under the judgements of the international dispute settlement bodies. *Sci. Prog.* 106, 368504231205395. doi: 10.1177/00368504231205395
- Zhang, S., Wu, Q., Butt, M. M. Z., Lv, (Y.-M.), and Yan-E-Wang, (Judge), (2024). International legal framework for joint governance of oceans and fisheries: challenges and prospects in governing large marine ecosystems (LMEs) under sustainable development goal 14. *Sustainability* 16, 2566. doi: 10.3390/su16062566
- Zulfiqar, K., and Butt, M. J. (2021). Preserving community's environmental interests in a meta-ocean governance framework towards sustainable development goal 14: A mechanism of promoting coordination between institutions responsible for curbing marine pollution. *Sustainability* 13, 9983. doi: 10.3390/su13179983