Improving coastal and marine resources management through a co-management approach: a case study of Pakistan

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Abstract

Co-management is a system in which resource management responsibilities are shared between the state and user groups. Various national and provincial-level governments separately manage resources along the coastal and marine areas of Pakistan. The country’s existing policy framework is devoid of an integrated management approach, where the participation of real stakeholders in the decision-making process is either disregarded or missing. Therefore, the present study highlights the internal and external constraints of coastal and marine resources management issues in Pakistan and discourses the problems that halt the participation of stakeholders in the decision-making process. This research also confers the potential of a co-management framework through which the coastal and marine resources management structure can be organized to deliver local sustainability in the country. The adoption of a co-management approach in Pakistan’s coastal and marine areas would help to improve the protection and conservation of natural resources via share-based responsibility. Additionally, it provides a baseline to coastal and marine planners in the country to adopt share-based responsibility for resources management to mimic the conflicts amongst users to the environment, and those affected by the decisions can agree to understand or accept common intertwined resources.

1. Introduction

The oceans have become a new political economy center because they have evolved over the last few decades. The open access of property regime in the oceans has resulted in economic and environmental crises (Mansfield 2004), which include the installation of offshore wind energy, fishery resources, construction of hard structures, burgeoning human population settlement, and industrialization. Previously, the oceans have been used as a site for fishery. However, the current increase in economic needs and advancements in technological development have enabled humanity to extract resources found beneath the oceans. Therefore, the increase in human activities involved in exploiting natural resources and competing for space has resulted in conflicts amongst various user groups.

In most countries, resources along coastal and marine areas fall under the authority of the national or state-level governments (Kruse et al 1998); however, many arrangements exist for power sharing and user responsibilities. Numerous types of partnerships and cooperative environmental governance arrangements involve various actors on a single platform (Mikalsen et al, 2007, Berkes, 2009). According to Plummer and Fitzgibbon (2004) owing to significant changes in natural resources in the 1990s, managers have faced...
considerable pressure from the governments and local communities. However, various government agencies have experienced in reduction of funding for proper management of natural resource. Specifically, Ontario, Alberta, Newfoundland, and New Brunswick in Canada have faced budget reductions by 30% to 60% (Mckay 1997). Therefore, in numerous countries, government entities want to develop co-management mechanisms to manage natural resources (Mckay 1997, Plummer and Fitzgibbon 2004). According to Mikalsen et al (2007) and FAO (2009), 60 countries, specifically, developing nations, have adopted co-management mechanisms to decentralize power among various government agencies and local communities to protect and conserve natural resources. The Food and Agriculture Organization (FAO) defines co-management as a resource partnership arrangement in which the government, local communities, non-government organizations, and research institutions work together to share responsibilities and powers to manage resources (FAO 2009). Co-management is defined as a situation in which members of social actors agree, negotiate, and ensure a fair distribution of management roles, rights, and responsibilities for a specific territory, area, or conservation of the natural environment (Borrini et al 2007). In addition, the World Bank has defined co-management as ‘the sharing of responsibilities, rights and duties between the primary stakeholders, in particular, local communities and the nation state; a decentralized approach to decision-making that involves the local users in the decision-making process as equals with the nation-state’ (The World Bank, 1998. Pp, 11).

According to Sandström et al (2014) co-management enhances learning possibilities by efficiently resolving conflict issues. Petursson and Kristofersson (2021) stated that co-management in environmental protection governance can be achieved through political consultation. Although, co-management performance is adaptive, promote rural development, and share powers among various stakeholders. Islam et al (2019) stated that the introduction of co-management in marine protected areas enhances the participation of stakeholders, builds strong coordination, improves governance, and increases reiterative learning. Van Herk et al (2015) elaborated that physical and societal system is incorporated in co-management systems, where local community directly and indirectly linked themselves with the resources present in their vicinity. Indrawan et al (2014) itemized that effective co-management requires a strong collaborative process, it further provides ways for sustainable governance of the resources. Sekhar (2000) quantified that co-management rejects older blame where local people were considered as a threat to natural resources. This novel approach advocates the concept of decentralization of natural resources and introducing joint management policy.

Few authors have also documented the role of co-management in fishery resource management. For example, Evans et al (2011) stated that co-management in fisheries provide benefits to end users and bring improvements in key management process. Trimble & Berkes (2013) stated that participatory research encourages the establishment of co-management approach in fisheries management. Hallwass and Silvano (2016) discussed that co-management provide a platform for stakeholder to collaborate and reduce accumulative impact on fishery resources. In many regions of the globe, communities, governments, civil society, and other organizations are increasingly working together to manage inshore marine resources. Wilson et al (2006) itemized that the adoption of co-management is motivated to safeguard the fishery resources from depletion.

Co-management has been considered as a panacea for legitimacy (Jentoft, 2000, Mikalsen et al, 2007, Berkes, 2009). Bene (2004) argued that co-management is ineffective in empowering marginalized communities and reducing poverty. Furthermore, Bene (2004) and Berkes (2009) added that the decentralization of co-management power either strengthens state control or enhances the reinforcement of elite stakeholders in decision making. For example, the exclusion of marginalized stakeholders in Bangladesh, Indonesia, the Philippines, and Cambodia from fishermen’s decision making had a negative impact on equity and community welfare (Wilson et al 2006). In a similar case in India, involving joint forest management, local community involvement degraded (Agarwal 2001, Nayak and Berkes 2006). Hence, in Pakistan, the increase in competition over resource utilization in specific areas through special economic zones has resulted in power resource conflicts between powerful stakeholders and local communities. Consequently, it has accelerated the involvement of powerful stakeholders, which causes conflicts within the local community, thereby subsequently leading to the mass destruction of coastal and marine natural resources. Pakistan has a vast coastline that extends to 1026 km and covers an area of 290,000 km² (Ullah et al 2017). The coastal area in Pakistan has been divided into two geographical locations, namely, Sindh Balochistan Coast. The Balochistan coast is situated in the Western part and Sindh coast in the Southern part of the country. The coastal length of Balochistan and Sindh are 776 km and 250 km, respectively (Ullah et al 2017). The two levels of the Pakistani government (i.e. federal and provincial) are involved in decision-making on the utilization of coastal and marine resources, but the roles of the local governments and communities are disregarded (Qureshi 2011).

The democratic system of Pakistan follows a top-down management approach to exploit natural resources available in coastal and marine regions, thereby resulting in a lack of public participation in decision-making processes. However, decisions regarding resources utilization in the country is inevitable for actors involve in decision making (Ullah et al 2016). Powers in Pakistan are exercised using a top-down approach, in which
stakeholders with limited powers have no roles in the planning process (Ullah et al 2016, Ullah et al 2017, Ullah et al 2021). The centralization of powers favors the decisions of dominant groups, thereby limiting stakeholder engagement in and resulting in confrontation amongst the user groups. The undefined policies on economic development and resource distribution in Pakistan have inflamed longstanding tension between the federal and provincial governments of Sindh and Balochistan, respectively (Ullah et al 2021). The Balochistan coastal areas have been limited developed and long been neglected by the federal government since the independence of Pakistan (Waldmüller et al, 2019).

Therefore, the present study highlights the internal and external constraints of coastal and marine resources management issues in Pakistan and discourses the problems that halt the participation of stakeholders in the decision-making process. This research also confers the potential of a co-management framework through which the coastal and marine resources management structure can be organized to deliver local sustainability in the country. Henceforth, the adoption of a co-management approach in Pakistan will help to develop organizational structure and improve the decision-making process. It will also reduce conflicts between local resources and the state in terms of co-management conflict resolution, different models and typologies can be employed in coastal and marine areas of Pakistan to weigh problems, such as the use of multidisciplinary knowledge with the assistance of scientists from different disciplines. Moreover, different user groups and managers can build satisfactory environments for such reflections. An important advantage of the co-management adoption in Pakistan would help coastal managers and developers to collect reliable information and knowledge of the existing resources of coastal and marine areas. The collection of scientific data and resource assessment through the community-based approach would be feasible for coastal planners and developers to make policies regarding the criterion need of an area. As a result, new political, practical, and theoretical approaches in the implementation of co-management in coastal and marine areas of Pakistan regarding resource utilization are vital to highlight the intricacy of management conditions.

1.1. Methodology

This critical examination is carried out using explanatory research. The type of explanatory analysis approach in this study used literature review. The practice of searching for documents, either online or in libraries, to assist identify the hypothesis of a phenomena is known as literature research. Examining articles from periodicals, newspapers, trade publications, and scholarly sources is part of this process. The present study examines: (1) the importance of co-management from previous literature published from peer-reviewed journals, and adaptive practices use for the management of coastal and marine natural resources; (2) this study also further goes to performs an analysis to determine the extent what the adoption of co-management helps to reduce conflicts amongst different user groups

2. Causes of failures of Pakistan’s coastal and marine resources management

Presently, in Pakistan the existing coastal and marine ecosystems conservation and protection measures are contradictory (Qureshi 2011, Ullah et al 2021). Where multitude organizations are separately involved in the management of coastal and marine areas of Pakistan, which has adversely affected the ecosystems services provided by the coastal and marine habitats. The undefined economic policies in the country have poorly threatened coastal and marine ecological niches, which has affected coastal dwellers’ social well-being. At present, the government adopts a sector-based management approach in governing its coastal and marine areas, whereas several federal and provincial entities have been given the authority to perform their economic and management activities separately. The repetition of the same activity by different actors and the overlap among undefined policies create conflicts among different user groups and degrade the ecological functions of coastal and marine areas, which, in turn, directly and indirectly affect the livelihoods of local coastal dwellers. This chaotic situation in Pakistan introduces several challenges related to the protection of coastal and marine environments and the conservation of natural resources.

2.1. Centralization of powers

In Pakistan, the considerable concentration of powers has resulted in the limited role of the local community in decision-making. Poor governance and the centralization of administrative and political powers have degraded participation legitimacy of Indigenous people in the decision-making process. The provincial resources of land and coastal and marine areas are exploited by the federal government without involving the local governments and real stakeholders (Hameed 2018), whilst resources are privatized amongst the dominant groups. Despite having a democratic system in Pakistan, the districts (including coastal areas) are governed and administratively controlled by senior administrators. The centralization of powers has likewise resulted in the decisions on social development being made by the provincial and federal level government rather than the local citizens. In
Pakistan, 95% of public finance is controlled by a district management group called deputy commissioner (DC), which is a source of centralization of powers (Salman 2012). The over-centralized organizational structure in Pakistan has eroded public and internal accountability, and the politicized civil service decision-making is the main crux of the country’s problems (Salman 2012). In 2000, the Pakistani government introduced a plan to devolve power called Local Government Ordinance (LGO) 2001, which was eventually adopted by provincial-level governments. LGO 2001 was based on five objectives: devolution of political powers, decentralization of administrative authority, integrated management approach, distribution of resources at the low levels and diffusion of the power–authority nexus (Hussain, 2001). Devolution plans decentralize the political powers in a country. However, the concentration of political power over resources remains unchanged in Pakistan. The devolution plan is used to strengthen the centralization of political powers (Cheema et al, 2011). The existing institutional arrangement in the country faces a lack of consultation and legitimacy by the federal and provincial governments. The federal governments have not devolved the institutional legitimacy at the low level, although the provincial government has devolved power at the local level. This situation exacerbates the conflict over power and resource use between the federal, provincial, and local governments and the local community. The inter-coordination mechanism within government entities and local citizens is weak, thereby resulting in conflicts amongst the various user groups.

Participation in the coastal and marine planning in Pakistan is supported by national-level governments. No pragmatic review is conducted at any government level to ensure the participation of coastal dwellers in achieving the targeted goals (Ullah et al 2016, Ullah et al 2021). Furthermore, no financial support and institutional arrangements are provided at the national level to organize and train professional cadres who can interact and deal with complex interdisciplinary issues (i.e., political and user groups conflicts). Coastal and marine planners and developers in the country have an uncertain role in the broad framework of planning and management. Sectoral-based management of coastal and marine resources in the country excludes the role of public participation in the decision-making process but strengthens the role of dominant groups. The role of favorable stakeholders and politicians in Pakistan is immovable in the decision-making process, whilst all dominant group stands together to protect their interests (Ullah et al 2016). The exclusion of poor and politically weak stakeholders in the decision-making process has a negative impact on equity and community welfare. Consequently, the country’s managers and developers focus on harnessing natural market-oriented behavior. That is, the property rights of resource utilization are connected to the neoliberal focus of the market and become the center of coastal and marine resources management. The issues on coastal and marine management in Pakistan clearly indicate that the participation of real stakeholders in the decision-making process is not considered part of sustainable coastal and marine development.

2.2. Lack of policy framework

Pakistan’s existing policy framework regarding coastal and marine resources management is ineffective. The country lacks a statutory arrangement that should support the integrated management approach to rationally utilize coastal and marine resources. However, national level organizations have statutory duties at the coast and marine environment that are driven by national legislation. Such duties are concentrated on natural resources and divert the priorities away from the real stakeholder in the utilization and management of resources. The coastal and marine related economic activities in Pakistan are managed by various government levels (Ullah et al 2017). However, plans and policies in Pakistan are drafted at the national level, whereas low-level governments implement the plan. These plans also achieve the sectoral objectives and emphasizes on marketization and privatization of resources, thereby resulting in a dominant mode of resource power or ocean governance.

No clear policies have been formulated yet on coastal and marine resources management, and the country’s existing policies, laws and legislation are confusing and complex (Ullah et al 2017). These factors have contributed to the uncertainty amongst organizations on the involvement of coastal dwellers in the planning and development process. The existing laws and legislation related to the governance of coastal and marine areas in Pakistan do not offer an integrated management framework and merely define environmentally friendly economic operational activities. The Government of Pakistan has not established any marine environment protection law in the country to improve the conservation of coastal and marine resources. Due to the Lack of marine environment protection law in the country, causes the failure in the implementation of marine-related plans or management of coastal and marine resources. Even though the Government of Pakistan has established numerous laws under Pakistan Environmental Protection Act (PEPA) 1997, aiming to protect the environment and ensure the efficient use of natural resources. There is not any legislation at a national and provincial level in the country to fully cover issues related to coastal and marine resources protection. According to Nie et al (2021) environmental regulations related to the conservation of the marine environment promote sustainable development in the country. Many maritime countries are adopting environmental regulations to control pollution effects and improve the quality of their marine environment.
Policy framework on the coastal and marine bases development does not create linkages with the local community that will make them understand their association and value of their dependence on natural resources. The Special Economic Zones (SEZ) Act 2012 of Pakistan enhances economic development without considering the environmental impacts related to coast and marine (Ullah et al. 2021). Therefore, the SEZ Act does not facilitate a democratic and equitable decision-making but further intensifies social inequality and favors the dominant groups. Hence, the allocation of specific areas under the SEZ Act has resulted in a new form of coastal and marine resources management. However, constitutional rules in Pakistan regarding resources of coastal and marine areas are unclear that has adversely affected the possibility of co-management agreement among parties. Policies on the management of coastal and marine areas are formulated at the national level and the role of the local citizens are disregarded (Ullah et al. 2016, Ullah et al. 2017, Ullah et al. 2021). Thus, the strategies on the property rights of resource utilization have yet to be established and controlled by federal-level organizations. Accordingly, the policy orientation on coastal and marine areas influences the development of a neoliberal approach on resources governance. Optimality change in resources used by target groups has specifically resulted in the neoliberal theme of market mechanisms, whilst the importance of privatization has become a central focus in Pakistan. By contrast, favorable decisions are made to support neoliberal thinking. Societies’ routine choice of institutions and policies that lead to the inept use of natural resources indicates (Ullah et al. 2016), that these benchmark conditions are not satisfied in the real world.

3. Discussion

Co-management is a process in which government level of institutions share responsibilities and powers among resources users and involve real stakeholders in decision making process. Consequently, based on the above-mentioned issues discussed in section 2, the study suggests following guiding principles in the context of Pakistan’s coastal and marine areas resources management.

3.1. Adopting a Co-management approach

Carlsson & Berkes (2005) have defined four ways of co-management adoption as illustrated in figure 1 whereas, C represent the variety of private and government organizational units and S signifies local, regional, and central public authorities.

First image of figure 1, describes co-management as an exchange system, defines some form of fraternize relationship between different sectors. This form of relationship exchanges variety of information regarding goods and services of the natural resources. In addition, this kind of relationship also shows local users direct and indirect dependency on services of natural resources. The second image of figure 1, indicates co-management as joint organization, where representatives of government and resource users form cooperative units, and they participate in joint decision-making process. The third subsequent image in figure 1, labeled as ‘nested’ called co-management as state nested system where national or provincial level of entities are de facto holder and have right to manage state owned property for example, national parks, fishery resources, mangrove forests, and coral reef systems. In this process individual unit might can have responsibilities to manage appropriate resources. The
second form of nested system shown in image four of figure 1, called co-management as community nested system, where state might have right to operate individual or community owned resources for example, forest lands, grazing lands, or fishing grounds for management. Therefore, it is emphasizing that these four types of co-management examples can combinedly be implemented in Pakistan. For instance, exchange of information may simply be integrated with nested form of co-management to reduce pressures on resources. Even though sectors that overlap, can form collaborative group on a broader level to reduce their conflicts. In particular, the Pakistan federal and provincial governments should take the responsibilities for the policy implementation and coordination, whilst the local community also plays a significant role in the daily management. Policies on the resource management of the coastal and marine areas will be ineffective without the legitimacy of participants and the cooperation of local stakeholders. In addition, adoption of these four ways co-management would actively involve Indigenous people to promote sustainable management of coastal and marine resources.

Through the implementation of the co-management approach in Pakistan the governmental institutions would be able to provide enabling legislation, implementation, conflict resolutions and other assistance.

3.2. Establishing a boundary organization
A constant monitoring and mediation are required to play the role of catalyst (e.g., sole institution). Moreover, the existence of a boundary organization strengthens the relationship through contestation, building trust and dialogue, establishing, enforcing, and reforming new rules on resource management through complex interaction. Additionally, the institution should take the responsibility to form an integrated network, which comprise on various actors connected to one another, thereby strengthening the existing relationship. For example, the Belgium Government follows the top-down management approach and has established a strong coordination mechanism among various government levels. Furthermore, to robust a good coordination among sectors each government level has formed an advisory community responsible to involve real stakeholder in decisions making process (Olsen et al. 2014). Most of the country’s natural resources have not been managed properly owing to a huge gap in coordination amongst organizations involved in resource management. In Pakistan, a participatory process is required to ensure that all sectors with interest in coastal and marine resources should collaborate horizontally (i.e., across sectors) and vertically (i.e., between institutional levels) to achieve sustainable management practices. The boundary organization should oversee creating a collaborative framework in the country with pertinent departments, such as forestry, fisheries, and the environment, to cooperatively deliver sustainable programs. However, the management of many resources in a particular area, such as fishery resources, forests, wildlife conservation and protection, wetland areas and others, requires a participated approach by involving various parties. Additionally, institutional coherence would shift traditional knowledge-based development into scientific research.

Moreover, substantial potential exists in Pakistan coastal planners and developers to immediately highlight conflicts as well as their primary causes in a reasonable and sustainable manner. Thus, the boundary organization under established policy mechanisms regarding conflict resolution should work effectively and provide means for dealing with natural resource-based conflicts. Such collaborative agreements on natural resource management would foster a sense of empowerment among local communities in terms of decision making and benefit-sharing. However, the co-management agreements can set new conflicts in motion or cause old ones to escalate (Bene 2004).

3.3. Understanding the socio-ecological systems
Socio-ecological systems highlight individuals interaction with surrounding environment, and how such connections affects society and the environment whole (Escalera-Reyes 2020). However, in Pakistan all coastal communities are directly and indirectly dependent on the resources of coastal and marine areas for their livelihood. Therefore, the governmental institutions with the help of exerts group need to identify the community interaction and their dependency on the resources (fishery resources). Based on socio-ecological systems outcomes, the long- and short-term management decisions should be made for appropriate use of resources. In Practice, the state expert employees should work with resource users to address problems more effectively. In shortly, it will faster the flow of information among different level and types of government. This link would imply the recognition of the rights of decentralized communities over resources in their territories as well as the distribution of management rights and power from the central government to legitimate and decentralize representative communities (e.g., territorial authorities, civil societies, local populations, etc.). In this way the researcher should communicate their findings to the relevant groups so that knowledge can be contributed to general process of policy making and problem solving.

According to Thakadu (2005), there are three key assumptions through which resources are conserved: firstly, Indigenous people can better conserve natural resources; Secondly, local people have direct and indirect connection with natural resources that help them to improve their quality of life; Thirdly, People will only
conserve a resource if the benefits exceed the costs. The improvement in local people’s quality of life ensures the efforts and commitment of resources enhancement. For example, the Australian Government has recognized Indigenous communities’ ability to maintain natural resources through the Caring for Country Program. Caring for our Country is a collaborative effort of the Australian Government’s Departments of Agriculture, Fisheries and Forestry and Environment, Water, Heritage, and the Arts. These Departments are jointly responsible for delivering the Australian Government’s environment and sustainable agricultural initiatives, which have previously been referred to as ‘natural resource management.’ These projects have been implemented locally through 56 State government entities, allowing regional communities to determine their own natural resource priorities (Natural Resources Commission 2010). As result the Government of Pakistan must begin a Caring for our Country initiative in the country with the help of entities to visualize coastal and marine region safety.

Furthermore, according to Sandström et al. (2014), Indigenous people have intimate interaction with resources and acquires substantial knowledge of dealing with them under different conditions. Hence, adopting their knowledge enhances the quality of decision making and facilitates the introduction of additional adaptive changes in planning the use of resources. This will allow researchers to collaborate with resource users to obtain complete knowledge on resources and to implement conservation and restoration measures for overexploited resources. Resource users and dependents communicate among themselves regarding their behavior, with the aid of monitoring and enforcement mechanisms, to enhance transparency and build trust. Latterly, the boundary organization with the help of related entities can help reduce pressures on indigenous people regarding targeted activities (e.g., fishing) by engaging them in other economic endeavors (e.g., promoting sustainable tourism and recreational activities). Furthermore, the federal government can provide financial support to local communities as compensation for restricting their access to protected resources.

3.4. Resources governing rules

The existing coastal and marine resource management mechanism in Pakistan is contradictory (Ullah et al. 2021). That is, the responsibility for managing coastal and marine resources lies within various sectors. In addition, the creation of a boundary organization would play a significant role in resource supervision by linking the scientific knowledge in resource management and ensuring conflict resolution in times of uncertainty. Therefore, the institutional capability of natural resource management depends on the existence of an interaction model between levels of governments (federal, provincial, and county) and local communities.

Kiser and Ostrom (1982) identified three layers of resources governing rules including, constitutional rules, collective choice rules, and operational rules. These rules shape the functioning of resources governing in a country. Kiser and Ostrom (1982) further emphasize that constitutional rule defines resources governance terms and conditions. It further defines authority of an institution to make decision regarding access and utilization of a resource and to an extent what benefits can be get from its use. Collective choice rules define how decision are made regarding resource and decide their level of harvesting and technology input. And operational rule identifies intensity of daily resources harvesting and their method of cultivation for example, type of nets uses during fishing. These three layers of rules decides degree of freedom of the resource’s utilization and governance. In addition, constitutional rule decision in Pakistan will help to form an institutional arrangement in-order to specify the terms and conditions of resources governance, while governance itself include ‘setting of rules, adjudication and enforcement of rules’ (Feeny 1993). Furthermore, constitutional rules will help to establish a framework for co-management exercise in the country. The Government of Pakistan need to set a constitutional rule where institutional arrangements are built to specify the terms and conditions of resources governance. Furthermore, constitutional rule will also identify rights of resources governance of coastal and marine areas. While collective choice rule will decide level to extent what resources can be harvested. For example, for fishery resources management a collective choice rule can be implemented by introducing a fishery quota system is also known as total allow able catch (TAC). Where, a specific time and precise catch limit is given to fisherman in the sea. Operation rules will examine resources harvesting on daily basis and methods that are being used e.g., types of gear and time allow for catch at sea during fishing season.

In addition, for the conservation and sustainable promotion of the technological innovation activities along with the coastal areas of the country, the Government of Pakistan needs to establish a marine environmental regulation for the conservation and sustainable utilization of coastal and marine natural resources. Likewise, the Chinese government has established and enacted marine environmental regulations in its underdeveloped coastal cities in 2013, aiming to envision safety and healthy ecological development and to promote sustainable technological innovation in the marine environment (Nie et al. 2021). The policies regarding marine

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6 ‘Caring for Country Department of the Environment, Water, Heritage and the Arts’. Australian Government. Archived from the original on 28 September 2011. Retrieved 06 December 2021.
environmental protection should be drafted according to the coastal cities’ demographic conditions in both Sindh and Balochistan provinces.

3.5. Decentralization of powers

State to decentralized authorities under boundary organization would enhance the effectiveness of rare resource allocation and planning for the development of an area. Where, a central government constitutionally transfers natural resource management powers to institutions and individuals at a lower level using share-based responsibility. Sandström et al., 2014 explained three network governance strategies in co-management: network structures, network substance and network process. In the first category leaders deliberatively denote powers to certain actors and resources users, attempt to stabilize the network, initiate new interactions, and form coalitions (Klijn 2005). To control conflicts amongst the actors involved, the ‘network manager’ ensures that necessary resources users are mobilized and that all relevant perspectives and interests are considered (Sandström et al., 2014). For network substance strategies, joint efforts are made about resources use to accommodate the goals and agreements that are jointly accepted by the actors. Thus, the Pakistani Government should formulate a new network substance strategy on the China Pakistan Economic Corridor (CPEC)’ coastal and marine areas to create an appropriate condition to lodge the CPEC goals and form new agreements that should jointly be accepted by the actors (local people and politicians). In substance network strategies, the Government of Pakistan need to disclose goals and objectives of the resource’s utilization to the public; ideas from the local communities should be welcomed and agreements should cooperatively be accepted by the actors involved in the decision-making process. Network process strategy includes the establishment of a new institutional arrangement (Sandström et al., 2014). In this process, the Government of Pakistan need to follow the existing common managerial process or build a new process of managerial system by assigning a task to make coordination with the involved actors. The network process strategy in resource’s management would play a vital role in assigning various tasks through different managers to mimic emerging conflicts of an area, reform and establish a strong coordination process.

4. Conclusion

This paper emphasizes the significance of the co-management implementation in the context of Pakistan’s coastal and marine natural resources. Co-management involves a power-sharing decision regarding the utilization of an area’s resources, which is jointly made by the government and the community. Individuals are involved in decisions to reduce the amount of time required for consultation, negotiation, and conformation. The Pakistani coastline is rich in living and non-living resources. The existing policy framework on the utilization of coastal and marine natural resources is contradictory and has adversely affected the ecological functions of coast and marine. The centralization of powers at the national, provincial, and local governments enhances the technocratic managerial arrangement in the country. As a result, decisions on resource utilization favor the dominant group. Therefore, the Pakistani Government should adopt co-management as an integrated management approach to envision a safety and healthy coastal and marine environment. The statutory measure should involve the participation of stakeholders in decision-making and concerned entities should welcome their ideas in sustainable development. The policy regarding the protection and conservation of marine natural resources should be established according to the need of an area. Furthermore, the Government of Pakistan needs to establish marine environmental regulations for its coastal cities to promote sustainable development. The boundary organization in the country should form a strong coordination mechanism among all stakeholders involved in the management of coastal and marine natural resources. The ideas from the local dweller regarding resources management should be welcomed. Therefore, multiple knowledge inputs (e.g., social, and scientific) in co-management can help generate successful outcomes.

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7 China-Pakistan economic corridor is a billion-dollar project to regionally connect all countries via Gwadar deep seaport located in Balochistan, Pakistan. The CPEC project aim to enhance the geographical linkages via sea route, rail, road and air transport, to promote people to people contact.
Data availability statement

All data that support the findings of this study are included within the article (and any supplementary files).

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