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Stakeholders' Perceptions on Marine Spatial Planning in Bangladesh: Entwining Strategic Approach

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Abstract

Marine Spatial Planning (MSP) is a form of comprehensive planning that focuses on the management of marine space to achieve ecological, economic, and social objectives. Such kinds of objectives influence the adoption of the best practices that introduce the blue economy and other coastal and marine resources in the maritime boundaries of Bangladesh. This research was carried out to analyze the opportunities and challenges for the establishment and implementation of MSP in Bangladesh. Also, the study focused on a better strategic approach for adopting MSP in Bangladesh under the current scenario. The questionnaire, opinion survey, and focus group discussions were conducted to collect the data from the maritime professionals, stakeholders, academicians, planners, environmentalists, lawyers, policymakers, and marine/ oceanography students of the different universities. Among the participants, about 65% of respondents responded an independent authority would be good for developing MSP in Bangladesh. From the aftermath, it appeared that stakeholder involvement in the implementation of MSP was rather low due to a lack of adequate research facilities and knowledge. The research also identified insufficient financial support, competent human resources, geospatial data, and lack of coordination among the institutions as challenges to MSP development in Bangladesh. As a consequence of this study's findings, it has been proposed that strong legal frameworks should be used, existing institutions should be integrated, a dedicated financial budget should be allocated, stakeholders should be involved, and a single database might be developed. Finally, a strategic framework has been suggested for implementing MSP in Bangladesh based on the findings. Besides, the framework presents the notion regarding the way to establish MSP in Bangladesh.

Keywords: Marine Spatial Planning, Coastal and Ocean Management, Blue Economy, Geospatial Data, Stakeholder Engagement

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Introduction

Marine Spatial Planning (MSP) is a systematic and structured technique that coordinates the allocation of marine space (Shuva & Uddin, 2021). MSP is a public process of analyzing and distributing the geographical and temporal distribution of human activities in marine regions to satisfy ecological, economic, and social objectives that are generally specified through a political process (Douvere, 2008). MSP is a framework for improving decision-making on the use of maritime resources and space (GEF, 2012). The integrated management strategy analyzes the whole spectrum of interactions within an ecosystem including human uses rather than focusing on particular issues, species, or ecosystem services that have given rise to MSP (Katsanevakis et al., 2011). MSP is a planning framework that focuses on the marine ecosystem's distinctive and dynamic spatial planning requirements to conserve the commodities and services society requires or desires from these environments across time rather than a purpose in itself or a specific policy (CBD COP Decision, 2012). MSP's strongest quality is its integrated approach which allows planners to take into consideration various ocean users and environmental effects in ocean regions (Davies et al., 2014).

The Blue Economy (BE) has been considered an important component of global trade and business in the twenty-first century (Shahnaz et al., 2015). As a result, maritime nations are grown increasingly concerned about making the greatest possible use of marine resources inside their maritime boundaries in the ocean (Alam, 2018). Ocean comprises 72% of the blue planet's surface and makes up more than 95% of the biosphere. The seas give birth to life and continue to do by generating oxygen, absorbing carbon dioxide, recycling nutrients, and managing global climate and temperature. Oceans give food and livelihoods to a big part of the world's inhabitants, transporting 80% of international trade (Alam, 2014). Coastal governments throughout the globe have been seeking an effective instrument to get the most out of the BE for years. In several nations, MSP has lately been proven to be a helpful technique for long-term ecosystem-based management (Shuva & Uddin, 2021).

MSP has been proven to be a successful instrument in many nations for implementing an ecosystem-based approach to attain a long-term marine vision (Saha & Alam, 2018). It is presently being implemented in over 70 nations across six continents and four ocean basins (Santos et al., 2018). The Great Barrier Reef Marine Park (GBRMP) in Australia, one of the world's richest and most diversified marine ecosystems, is one of the earliest examples of MSP and the

best-known example of marine zoning. In terms of MSP, China is the most advanced country in Asia (Hasan & Alam, 2019; Santos et al., 2019). Marine Functional Zoning (MFZ) is China's primary system for managing marine usage that has recently been labeled as an MSP practice (Feng et al., 2016).

Bangladesh is one of the world's top freshwater fish-producing countries with its vast interior, coastal, and marine water resources (Ghose, 2014). Being a maritime country, Bangladesh is attempting to plan its coastal and marine regions to accomplish BE goals that will assist the United Nations (UN) in achieving its Sustainable Development Goals (SDGs). Bangladesh's coastline is part of the vast Bay of Bengal (BoB) marine environment which is rich in biodiversity (Mannan et al., 2020). Artisanal and commercial fishing, shipping, oil, and gas exploration, undersea cable, shipbreaking, and tourism are examples of BE growth (Islam & Shamsuddoha, 2018).

The government has lately begun discussions with stakeholders to incorporate the notion of the BE into critical policies and programs. The objective is to employ practical solutions and innovations to harness the maritime environment's latent potential to promote food security, poverty alleviation, nutrition and health, job creation, trade, industrial growth, regional security and peace, ecosystem health, and biodiversity. Maritime challenges such as international commerce expansion, the use of marine mineral resources for long-term energy security, efficient management of marine fisheries, and the marine environment and biodiversity conservation will undoubtedly influence Bangladesh's future development and economic progress (MOFA, 2014). Currently, sea transports contribute about 90% of the country's trade (Alam, 2014). The BoB's fish supplies and other inorganic resources have the potential to significantly boost the country's economy (Hussain et al., 2018).

Bangladesh's Ministry of Foreign Affairs (MoFA) has established a "Blue Economy Cell (BEC)" to implement MSP (Mannan, 2020). According to the BEC, there are now 26 economic sectors operating within Bangladesh's maritime boundaries (Alam, 2019). On the other hand, Bangladesh is still in the early stages of MSP and does not have a traditional MSP (Santos et al., 2019). The MSP process is divided into seven steps by the IOC-UNESCO, with the "pre-planning" and "plan analysis" phases presently ongoing in Bangladesh (Alam, 2020). The most challenging aspect of implementing MSP in Bangladesh is striking a balance between marine resource protection and growing blue growth in the ocean (Mannan, 2020). There are many conflicts between sectoral operations since all

sectors compete for area allocation (Hussain et al., 2018). Despite several challenges, Bangladesh needs to run for an effective MSP to ensure a stabilized and sustainable BE through policy and legal protection (Datta, 2014).

This study looks at the possibilities and obstacles to developing and implementing MSP in Bangladesh. Besides, this study attempts to suggest a few paths ahead to address these issues, assisting the government of Bangladesh strategically in implementing MSP for long-term economic growth in Bangladesh.

Materials and Methods

A. Study Area Profile

Figure 1 shows the 19 coastal districts along with the BoB area which is the study area of the present research. Bangladesh is a maritime nation with the BoB, around 1.5 times larger than the country's land size. The coastline zone covers around 36,000 sqr kilometers or about a quarter of the country's entire land area. The continental shelf spans around 37,000 sqr kilometers. The Exclusive Economic Zone (EEZ) covers about 1,64,000 sqr kilometers (Ashikur et al., 2020, Ashikur et al., 2021). Almost every aspect of the economy is intertwined with the marine sector. This research counts all the maritime areas focusing on the MSP.

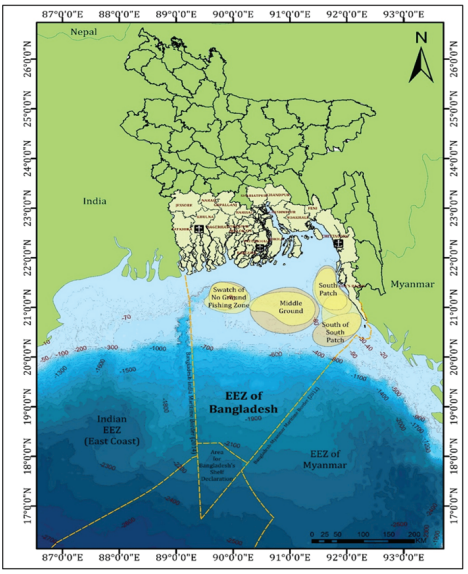

Figure 1: Bangladesh Coastal Region and the BOB Including 19 Coastal Districts and the EEZ of Bangladesh

B. Sources of Collected Data

Figure 2 elaborates the research framework for the present research work. The research data were collected from both primary and secondary sources related to MSP and BE in Bangladesh during 2000-2021. It is early exploratory research because there is inadequate data on Bangladesh's MSP.

Primary data for this research were collected through a self-administered questionnaire, focus group discussion, interview, and mailing feedback. Tools like MS Word, Google docs, and Google forms were used to develop the questionnaire.

The data was collected through a questionnaire survey where the questions were developed by Likert Scale 1-5 and the questionnaire segments were Strongly Disagree, Disagree, Moderate, Agree & Strongly Agree. The whole questionnaire survey was handled both physical as well as in online from June-December, 2021. The survey questionnaire was sent to about 200 people randomly consisting of maritime professionals, planners, environmentalists, lawyers, policymakers, marine/ oceanography students of different universities in Bangladesh etc., and among them, 71 respondents' replies were recorded for the outcome.

Especially a focus group discussion was held amongst the final year BSc. students of the Department of Oceanography of Bangladesh Maritime University. The discussion was conducted on the topic "MSP future aspect."

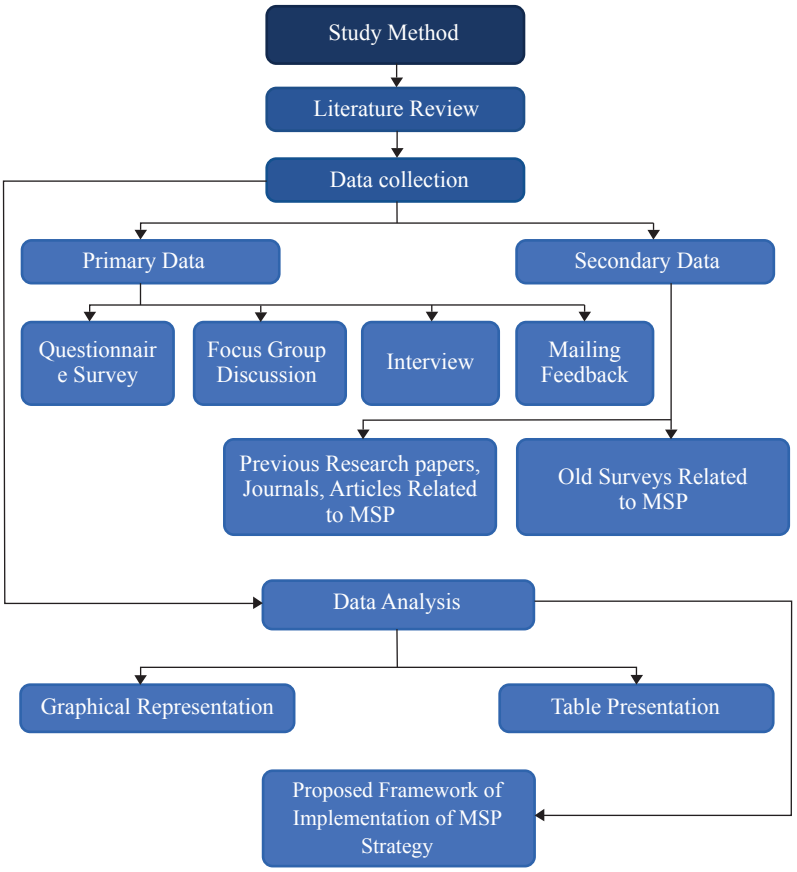

Figure 2: Research Framework

Data for this study were collected from secondary sources like related articles in Scopus, web of science, google scholar, PubMed, dimension, google, and other databases. Web of Science and Scopus were chosen since it was believed that they would index the vast majority of MSP-related articles. To meet the study's goals of analyzing scientific research on MSP and obtaining a reasonable number of sources, it was decided to concentrate on peer-reviewed scientific publications published in English between 2000 and 2021. There was also a body of literature covering different elements of MSP in conjunction with, for example, BE, coastal governance, ocean sustainability, marine natural resource management, and land-sea interactions, which consists of books and some grey literature. Course instructors, prominent professors, and other resource personnel carried out the other valuable suggestions and information.

Result and Discussion

A. Prospects of MSP in Bangladesh

Figure 3 indicates the characteristics of MSP in Bangladesh. Bangladesh's maritime territory is occupied by various ocean activities, including fishing, shipping, oil and gas exploration, ship construction, ship recycling, salt manufacturing, and many more. As a result, some management mechanisms must be implemented in Bangladesh's maritime domain to control these ocean uses. According to evaluations of actual MSP examples throughout the world, MSP may connect sectors to sectors, people to places, and development to biodiversity. Before entering the MSP, it is vital to assess the prospects for MSP development in Bangladesh.

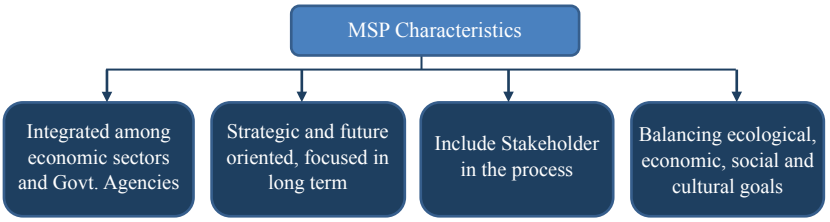

Figure 3: Characteristics of MSP

i. Institutional and Legal Arrangements

Table 1 shows Bangladesh's institutional framework for coastal and ocean management. Bangladesh's maritime area now has more opportunities to explore ocean resources. The Bangladesh government plans to seek resources to mainstream the BE potential. Without long-term management, exploration and exploitation of marine resources will stress the BoB due to human activities and operations, posing a significant threat to the marine ecosystem. Besides, Bangladesh needs to strengthen MSP to strike a balance between economic growth and environmental protection. MSP is also required for the integrated management of Bangladesh's maritime resources. Bangladesh has a large body of laws that could be useful in creating MSP. But these existing national policies, plans, and norms for ocean governance are fragmented that need integration and uniformity (Alamgir, 2017).

No.	Ministry of Bangladesh	MSP-Related Public Agencies
01.	Ministry of Shipping	• Chittagong Port Authority • Mongla Port Authority • Payra Port Authority • Mercantile Marine Department • Bangladesh Shipping Corporation • National Maritime Institution, • Government Shipping Office • Marine Academy • Seamen Welfare Directorate and Emigration Directorate
02.	Ministry of Land	• Land Reformation Board
03.	Ministry of Environment and Forest	• Department of Environment • Bangladesh Climate Change Trust
04.	Ministry of Civil Aviation and Tourism	• Bangladesh Tourism Board, • Bangladesh Porjoton Corporation, • National Hotel and Tourism Training Institute (NHTTI)
05.	Ministry of Fisheries and Livestock	• Fisheries and Livestock Information Office • Bangladesh Fisheries Research Institute • Department of Fisheries • Marine Fisheries Academy • Bangladesh Fisheries Development Corporation
06.	Ministry of Power, Energy, and Mineral Resources	• Sustainable and Renewable Energy Development Authority • Bangladesh Hydrocarbon Unit • Bureau of Mineral Development • Geological Survey of Bangladesh • Energy and Mineral Resources Division • Petro Bangla • Bangladesh Energy Regulatory Commission • Bangladesh Petroleum Corporation
07.	Ministry of Defense	• Bangladesh Navy • Survey of Bangladesh • Bangladesh Meteorological Department • Coast Guard • SPARRSO
08.	Ministry of Science and Technology	• National Institute of Biotechnology • Bangladesh Oceanographic Research Institute
09.	Ministry of Foreign Affairs	• Maritime Affairs Unit Bangladesh

No.	Ministry of Bangladesh	MSP-Related Public Agencies
10.	Ministry of Water Resources	• River Research Institute • Bangladesh Water Development Board
11.	Prime Minister Office	• SDG Cell, BEZA, BEC
12.	Ministry of Planning	• Planning Commission. IMED

Table 1: Bangladesh's Institutional Framework for Coastal and Ocean Management (Alam, 2020; Mannan, 2019)

Table 2 describes legal arrangements for MSP development and management in Bangladesh. It began establishing new laws, policies, and strategies after 1990 (Siddique, 2020). Following boundary disputes with neighboring countries, the country is striving to manage its marine living and nonliving resources in the maritime area. Bangladesh intends to make the most of its ocean resources to maintain its rapid economic growth.

No.	Acts and Policies	Years
01.	Bangladesh Shipping Corporation order	1972
02.	Territorial Waters and Maritime Zones Act	1974
03.	Bangladesh Petroleum Act	1974
04.	The Inland Shipping Ordinance	1976
05.	Mongla Port Authority Ordinance	1976
06.	Chittagong Port Authority Ordinance	1976
07.	Territorial Waters and Maritime Zones Rules	1977
08.	Navy (Amendment) Ordinance	1977
09.	Protection and Conservation of Fish (Amendment) Ordinance	1982
10.	Flag Ordinance Convention	1982
11.	Marine Fisheries Ordinance	1983
12.	Bangladesh Merchant Shipping Ordinance	1983
13.	Fisheries Research Institute Ordinance	1984
14.	Fisheries Research Institute Ordinance	1984
15.	Coast Guard Act	1994
16.	Bangladesh Environment Conservation Act	1995
17.	Provision of Ecologically Critical Area (ECA) Regulation	1995
18.	Chittagong Port Authority (Amendment) Act	1995
19.	Mongla Port Authority (Amendment) Act	1995
20.	Bangladesh Environment Conservation Rules	1997

No.	Acts and Policies	Years
21.	National Fisheries Policy	1998
22.	National Water Policy	1999
23.	National Shipping Policy	2000
24.	National Water Management Plan	2001
25.	Bangladesh Environment Conservation (Amendment) Act	2002
26.	Wild Conservation Act	2002
27.	National Energy Policy	2004
28.	Coastal Zone Policy	2005
29.	National Action Plan for Adaptation (NAPA)	2005
30.	Bangladesh National Conservation Strategy	2005
31.	Bangladesh National Conservation Strategy	2005
32.	Coastal Development Strategy	2006
33.	Renewable Energy Policy	2008
34.	National Tourism Policy	2009
35.	Fish Hatchery Act	2010
36.	Bangladesh Tourism Board Act	2010
37.	Bangladesh Tourism Protected Areas and Special Tourism Zone Act	2010
38.	Bangladesh Tourism Protected Areas and Special Tourism Zone Rules	2011
39.	Fish Hatchery Rules	2012
40.	National Biotechnology Policy	2012
41.	Action Plan for Energy Efficiency Conservation	2013
42.	National River Protection Commission Act	2013
43.	Bangladesh Water Act	2013
44.	Payra Port Authority Act	2013
45.	National Shrimp Policy	2014
46.	Bangladesh Oceanographic Research Institute Act	2015
47.	National Forest Policy	2016
48.	National Salt Policy	2016
49.	Biodiversity Act	2017
50.	Bangladesh Maritime Zones Act	2019

Table 2: Legal Arrangements for MSP Development and Management in Bangladesh (Alam, 2020)

ii. National Policy for the Development of MSP

A study was undertaken to find out the national policy of MSP of the Bangladesh government to develop BE. "National Policy of MSP" for establishing BE as a prospect? This question was asked to the interviewees. Figure 4 interprets the results that 45.10% of participants strongly agreed about the national policy in

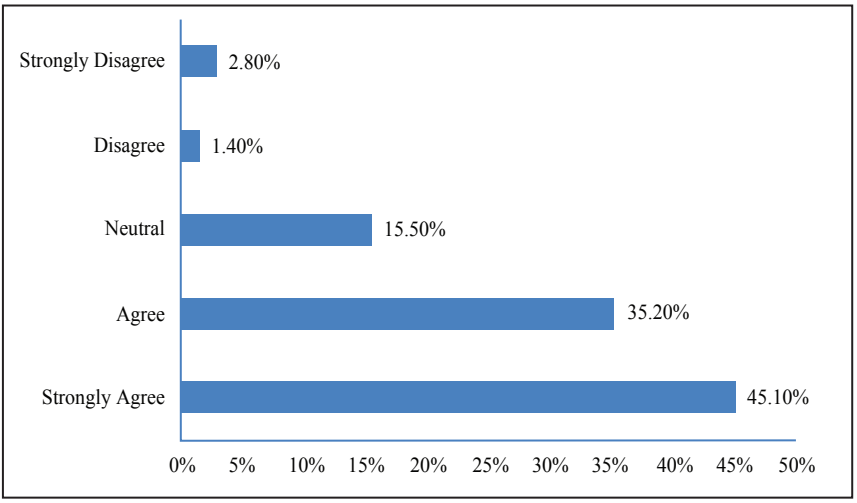

Figure 4: The Feedback of the Questionnaire Survey on "National Policy of MSP" for Establishing BE as a Prospect?

Bangladesh as a prospect for the development of MSP, 35.20% agreed and 4% of interviewees disagreed with the question. They think that the existing act about conserving the coast is enough for conducting MSP in Bangladesh.

iii. Significance of National Policies and Legal Regimes of Bangladesh

Zoning is a technique of applying MSP in specific maritime zones. Bangladesh has a wide spectrum of government initiatives and legislative instruments to help MSP's growth. Significant laws addressed the conservation of the marine environment in Bangladesh in several acts. Reservation zones (areas) in the economic zones are defined under the maritime environment regulations, the Territorial Waters and Maritime Zones Act 1974 mandates the implementation of conservation measures in the zones to safeguard the sea's living resources from indiscriminate exploitation, depletion, or annihilation.

The Environment Conservation Act of 1995 and the environment conservation provisions of 1997 attempt to minimize and control pollution.

However, there are no specific requirements for marine conservation under these acts. Regulatory systems in the MSP process successfully regulate polluting activities and dangers to marine biodiversity. The Department of Environment (DoE) in Bangladesh may be the driving force behind MSP development. The Biodiversity Act does not contain any rules that are particularly linked to marine biodiversity conservation; yet, it has various laws important to marine biodiversity protection and MSP development in Bangladesh.

The questionnaire survey had a section about building a strong legislative framework and coordination among the organizations as a prospect of developing MSP in Bangladesh. Figure 5 has showed the results that 84.6% of respondents agreed with the topic, only 5.6% remained silent, and 9.90% were neutral.

Most of the participants were optimistic about building a solid legislative framework. The literature review and other data sources related to this field survey showed that Bangladesh has enough legal structures, but none enforce MSP. There's also a lack of institutional arrangements for developing MSP in this country. Bangladesh is a signatory to several international conventions and regulations such as; UNCLOS, UNSDG, FAO's "Code of Conducts for Responsible Fisheries," Convention on Biological Diversity, UNEP Regional Seas Program, etc. All of these regulations render support for sustainable coastal and ocean management.

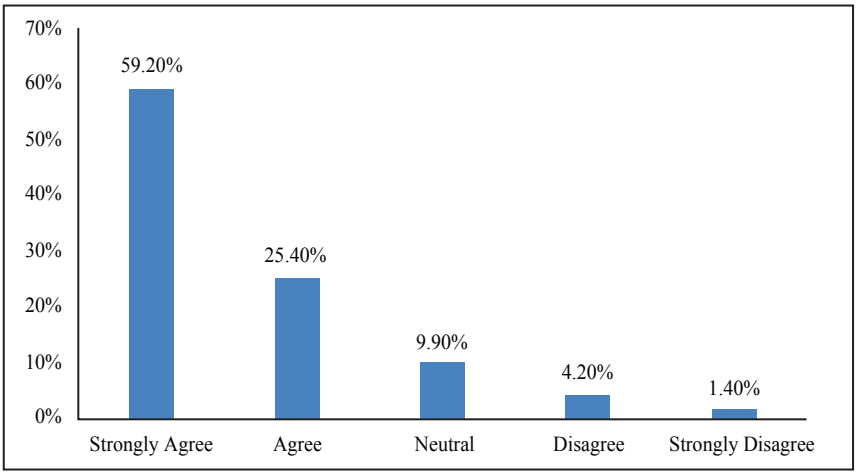

Figure 5: The Feedback of the Questionnaire Survey on "Strong Legislative Framework and Coordination Among the Organizations" as a Prospect of Developing MSP in Bangladesh?

The respondents were asked, "Do these goals and objectives have a significant prospect for the development of MSP in Bangladesh?" Figure 6 indicates the responses that 62% of respondents agreed with that topic, whereas 35% of the respondents strongly agreed with the questions, and only 7% disagreed. This type of response came because of the international conventions that worked to develop MSP worldwide. So, developing the MSP program for Bangladesh, it needs to involve these conventions because they have expertise in the program and provide the necessary support for making a strategic approach for conducting the MSP program. This is one of the significant advantages for underdeveloped countries like ours.

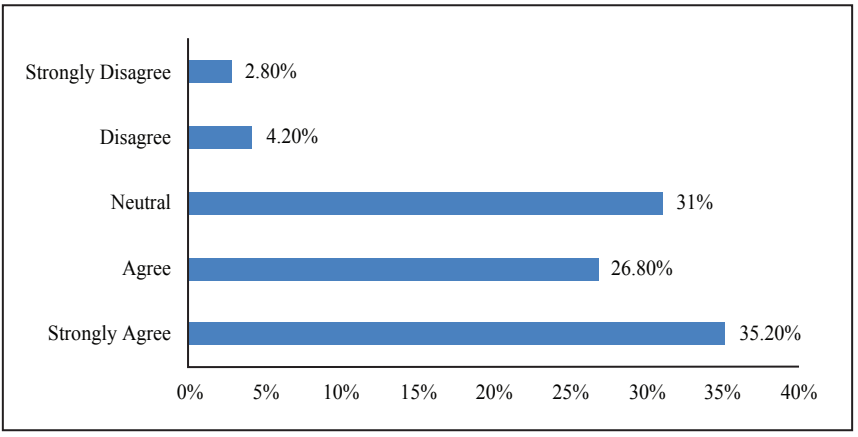

Figure 6: The Feedback of the Questionnaire Survey on "Do these Goals and Objectives have a Significant Prospect for the Development of MSP in Bangladesh?"

iv. Building Resilience over Climate Change

MSP has the potential to be a significant instrument for tackling climate change and adaptation. It creates a platform for MSP practitioners and experts on climate change and resilience to discuss, compare, and evaluate tools, techniques, and strategies for incorporating climate change and resiliency problems into their MSP activities. Besides, it identifies and examines the current examples of MSP that successfully includes climate and resilience concerns. Moreover, MSP has the potential to be used to address climate change and resilience. Since climate change and resilience are the major priorities for federal agencies, considerable funds and attention are available to enable/support states and regions to address this problem. If appropriately positioned, MSP might be the instrument that gets sponsored to address these challenges. The questionnaire survey also had a question about

building resilience over climate change. From the response, it was found that 72.1% of respondents agreed with the question, which was about building resilience over climate change as a prospect. 19.7% of respondents remained silent, and 7% of respondents didn't agree with the matter (Figure 7). As MSP's primary purpose is to secure environmental preservation and establish a sustainable model for extracting economic value from the environment, building resilience over climate change can provide great promise for the MSP program. Climate change may bring severe catastrophes to the environment. The infrastructures created might be harmed by disaster; therefore, advanced preventive measures will always offer extra protection for adopting MSP in a region. Most of the participants agreed for this reason.

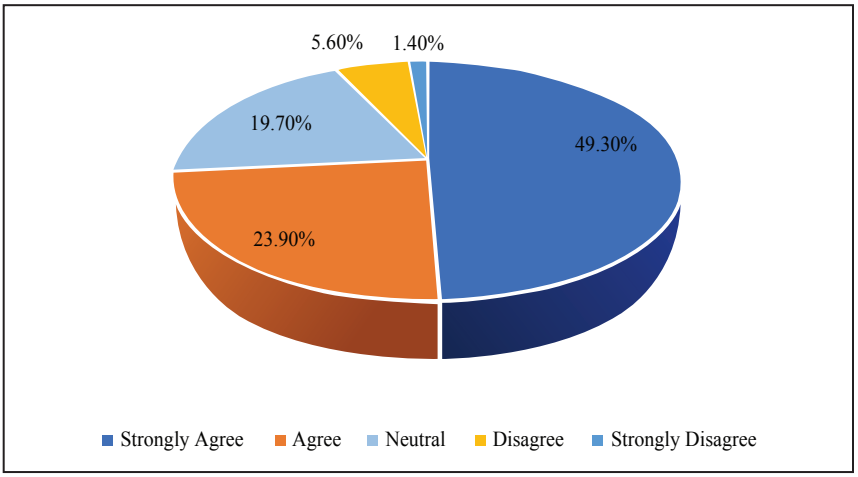

Figure 7: The Feedback of the Questionnaire Survey on "Building Resilience over Climate change" as a Prospect?

v. Effect of Ocean Zoning

Bangladesh's coast, a part of the BoB, is one of the world's sixty-four major marine ecosystems which estuaries and marine areas are home to a rich assortment of vegetation and wildlife. According to the IUCN Bangladesh Red data book, the shore is home to 442 marine fishes, 22 amphibians, 17 marine reptiles, 388 resident birds, 240 migratory birds, and three species of marine mammals, The coastline also boasts unique biological qualities, such as the world's longest sea beach and the world's most massive single-block mangrove forest, Sundarbans. Apart from ecological richness, offshore areas are key sources of petroleum deposits, including 24 offshore blocks, and marine tourism. Furthermore, dunes on coastal beaches are promising mineral extraction areas.

Wind and tidal waves may offer the potential to enhance Bangladesh's renewable energy economy. Artisanal and commercial fishing, shipping, oil, and gas exploration, undersea cable, shipbreaking, and tourism are major socioeconomic activities along the coast and maritime space (Faruque, 2012).

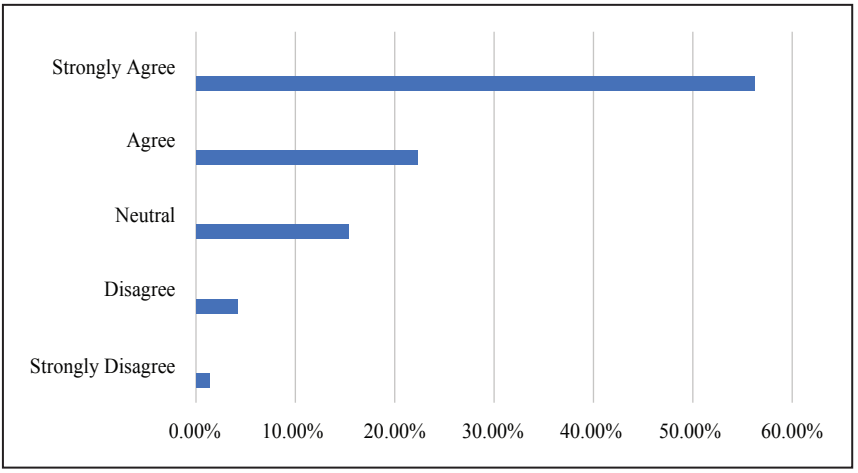

Figure 8: The Feedback of the Questionnaire Survey on "Defining Marine Protected Area" as a Prospect of MSP?

Zoning is a toolkit for putting the ecosystem idea into the impact for ensuring a healthy marine environment by segregating, perhaps competing for ocean usage. Zoning is a mechanism for implementing MSP in specific maritime zones. Figure 8 shows the result about ocean zoning where 56.3% of respondents strongly agreed that defining ocean zoning is a prospect of MSP. Also, only 5% of respondents disagreed that MSP relies significantly on zoning. It also has economic significance for the country where it is implemented. It may be an excellent source of constructing sustainable tourism and research works if carefully implemented. Bangladesh has already set aside ocean territory for maritime transportation, oil and gas exploration, fisheries, aquaculture, wind farms, MPAs, and ECAs, among other things. These sectorial zonings are vital for Bangladesh's MSP development. The survey results suggested that ocean zoning is vitally significant for expanding MSP in Bangladesh (Figure 9).

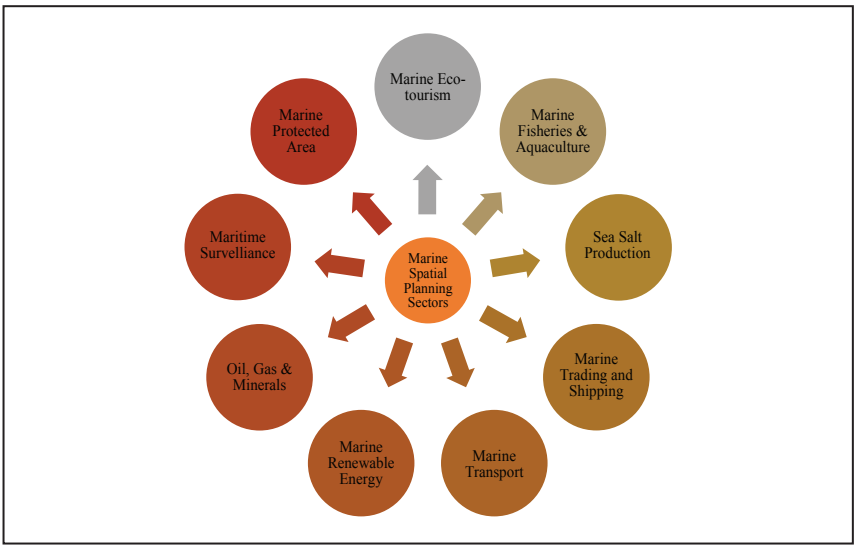

Figure 9: Influential Economic Sectors of MSP (Ehler & Douvere, 2009; Patil et al., 2019; Sarker et al., 2018)

The prospects were categorized using the UNESCO step-by-step approach for MSP toward ecosystem-based management, which has ten phases. The challenges shown on the table's right side are tied to the specific steps listed on the table's left (Table 3).

		Step		Task	Prospects
Planning	**Step 01**	Identifying needs and establishing authority	**Task 01**	Establishing appropriate authority for MSP	Independent authority should be established
	Step 02	Obtaining Financial Support	**Task 02**	Identifying alternative financial mechanisms	Managing adequate funding
	Step 03	Organizing the process through pre-planning	**Task 03**	Defining boundaries and timeframe	Maritime boundary would be delimited
			Task 04	Defining boundaries and timeframe	Maritime boundary would be delimited
	Step 05	Defining and analysing existing conditions	**Task 05**	Defining goals and objectives	Incompatible uses for satisfying BE
			Task 06	Collecting and mapping information about ecological, environmental, and oceanographic conditions	Ocean zoning should be developed

		Step		Task	Prospects
Planning	Step 05	Defining and analysing existing conditions	Task 07	Identifying current conflicts and compatibilities	Conflicts of uses should be removed
	Step 07	Preparing and approving the spatial management plan	Task 08	Developing the zoning plan	MPA would be established
Implementation	Step 08	Implementing and enforcing the spatial management plan	Task 09	Implementing the spatial management plan	Existing institutional arrangements should be developed

Table 3: Prospects of MSP in the Perspective of Bangladesh

B. Challenges to the Development of MSP in Bangladesh

MSP is being introduced internationally, from coastal to open-sea settings to support sustainable ocean management and governance. With its extensive acceptance and usage, MSP meets various conceptual and practical barriers in its development and execution. Bangladesh is still at the beginning of the MSP process. Bangladesh may experience obstacles in creating and implementing MSP (Table 4).

		Step		Task	Challenges
Planning	Step 01	Identifying need and establishing authority	Task 01	Action 01- Authority to plan for MSP	Absence of Authority for the development of MSP
		Identifying need and establishing authority		Action 01- Authority to plan for MSP	Absence of Authority for the development of MSP
	Step 02	Obtaining financial support	Task 01	Defining feasibility of alte-rnative financing mechanisms	Lack of financial support
	Step 03	Organizing the process through pre-planning	Task 01	Creating the MSP team	Lack of skilled human resources
	Step 04	Organizing stakeholder participation	Task 01	Defining who should be Involved in MSP	Lack of stakeholder engagement
			Task 02	Defining when to involve stakeholders	
			Task 03	Defining how to involve stakeholders	

		Step		Task	Challenges
Planning	**Step 05**	Defining and analysing existing conditions	**Task 01**	Collecting and mapping information about human activities	Lack of Data
	Step 07	Preparing and Approving the Spatial Management Plan	**Task 01**	Developing the Zoning Plan	Transboundary Issues with other countries
Implementation	**Step 08**	Implementing and enforcing the spatial management plan	**Task 01**	Implementing the spatial management plan	Lack of Coordination

Table 4: Challenges of MSP in the Perspective of Bangladesh

i. Establishing Independent Authority

"Establishing Authority" is the first stage in UNESCO's step-by-step approach for MSP toward ecosystem-based management. In most MSP projects worldwide, a new authority for MSP planning has been formed. So, in the survey, it was asked that determine whether an independent and integrated authority, Government has any negligence or not, the survey results showed that, 64% of participants agreed that Government has negligence in establishing independent authority for MSP. Only 7% of respondents disagreed with the question, and 28.20% of respondents remained neutral (Figure 10).

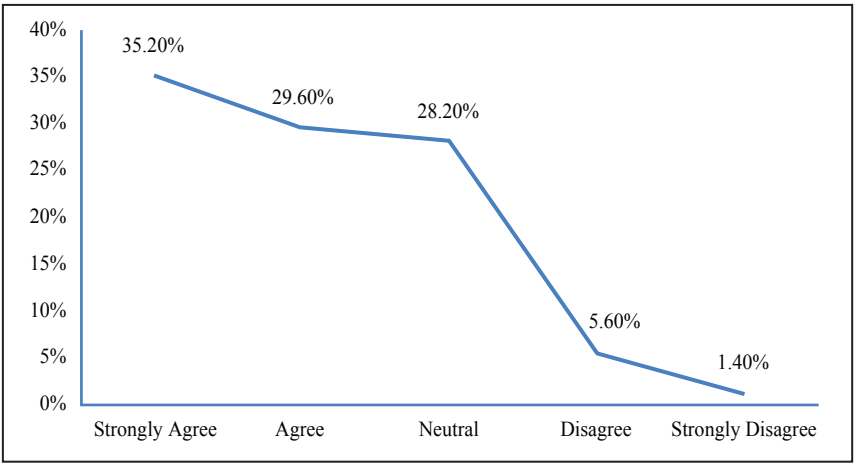

Figure 10: The Feedback of the Questionnaire Survey on "Government Negligence for Establishing Independent Authority" for MSP as a Challenge?

In Bangladesh, there is no independent authority in charge of establishing MSP. All ministries in Bangladesh must be managed by an independent organization for MSP to thrive. The lack of an impartial authority to create MSP has been a major roadblock in implementation of MSP.

ii. Inadequate Application of the Legislative and Institutional Framework of Bangladesh

The survey found that 78.9% of participants agreed with the statement, while 4.20% said Bangladesh's current legislative and institutional framework was enough for MSP development. This remark elicited a neutral response from 16.9% of participants (Figure 11). The development of MSP necessitates two forms of authority i.e., planning authority and implementation authority. MSP is achieved by employing existing authorities and institutions. The analysis demonstrated that the implementation process of any MSP requires the adoption and implementation of proper legal and policy underpinnings, coordination, and integration of complicated political and economic factors, including national, regional, and global organizations. There are specific plans and legislations in Bangladesh, although those are fragmented and based on the sector by sector or department by department. No existing policy and legislation have launched such an effort to unite all the required institutions under an umbrella for adopting MSP in the BoB. The inadequate application of legislative and institutional framework of Bangladesh has become a severe barrier to the growth of MSP.

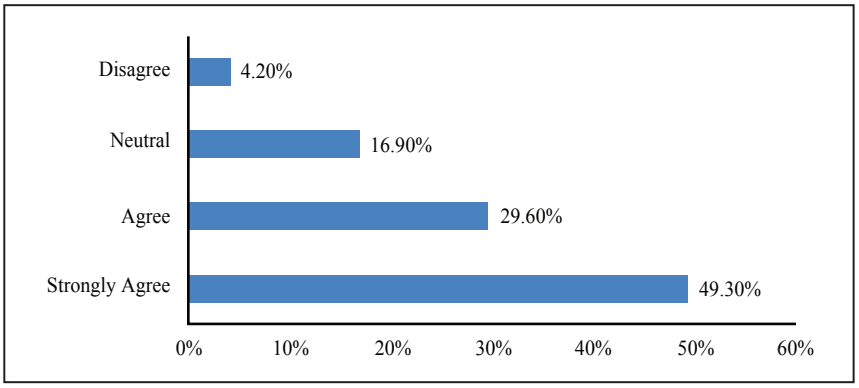

Figure 11: The Feedback of the Questionnaire Survey on "Lack of Proper Institutional Framework" in Developing MSP as a Challenge?

iii. Scarcity of Geospatial Data for Ocean Governance in Bangladesh

MSP's success depends on the quantity and quality of its data. A full MSP necessitates the availability and analysis of high-quality geospatial data from trustworthy sources. The survey study featured a component to assess the construction of a geospatial database on ocean governance in Bangladesh as a problem. Results revealed that 69% of respondents agreed with the fact, and just 4.20% of respondents disagreed (Figure 12). The geospatial data about ocean governance is not sufficiently developed in Bangladesh. Most of the sectoral data are maintained by that particular sector, and all these sectors are not ready to share their data. There was no conduct of adequate maritime research, and many researchers did not conduct their research on geospatial data appropriately. So, their efforts become of no use. In addition, the institutions associated with the research and higher studies on marine issues are either new or with regional cooperation, which are not enough to collect adequate information for MSP. The Institute of Marine Science and Fisheries (IMSF) has recently launched measures for obtaining all these data; however, the procedure is relatively slow. Moreover, in 2017, they issued a maritime area map, "Maritime Province of Bangladesh," which included some zonal data on the EEZ of the country.

Individual marine sectors are unwilling to share data they hold with other industries. This occurred due to a lack of understanding, trust, and teamwork. There is no central database to store all these data. A government-owned central database might be able to make data more accessible.

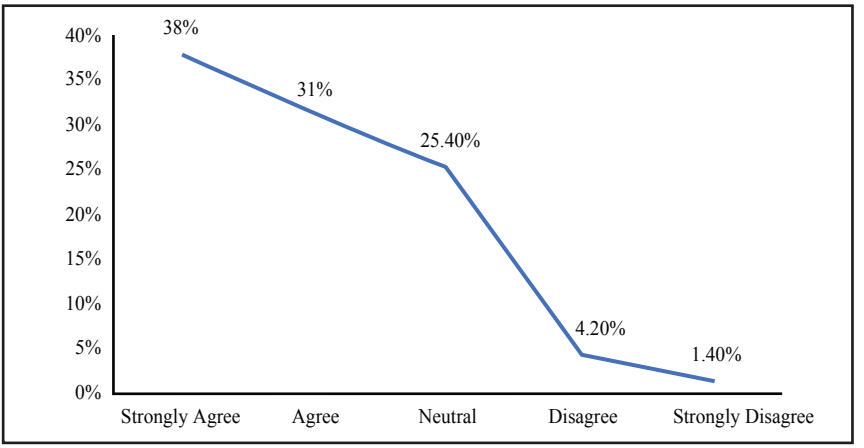

Figure 12: The Feedback of the Questionnaire Survey on Establishing "Geospatial Database for Ocean Governance" as a Challenge?

iv. Inadequate Resource Person for Creating the MSP Planning Team

"Creating the MSP Team" is the first stage in UNESCO's step-by-step approach for MSP toward ecosystem-based management. A multi-disciplinary team of biologists, ecologists, geographers, economists, and planners with disciplinary skills is necessary. At Chittagong University, the IMSF has been active since 1978, although they did not have an oceanographic department. IMSF is used to educate only marine biology. In 2011, they created the Oceanography Department. If they had founded this department in the 1980s, Bangladesh would have skilled human resources in this field.

According to a survey study, 56.4% of participants felt Bangladesh lacked the personnel resources to form an MSP team, while 14.1% rejected it and 29.6% remained silent (Figure 13). The development of the MSP team involves the employment of professional human resources. Various maritime educational institutions, such as universities, marine academies, and maritime training institutions, can play a crucial role in developing skilled human resources by offering MSP courses. Only the Maritime University in Bangladesh offers MSP-related courses.

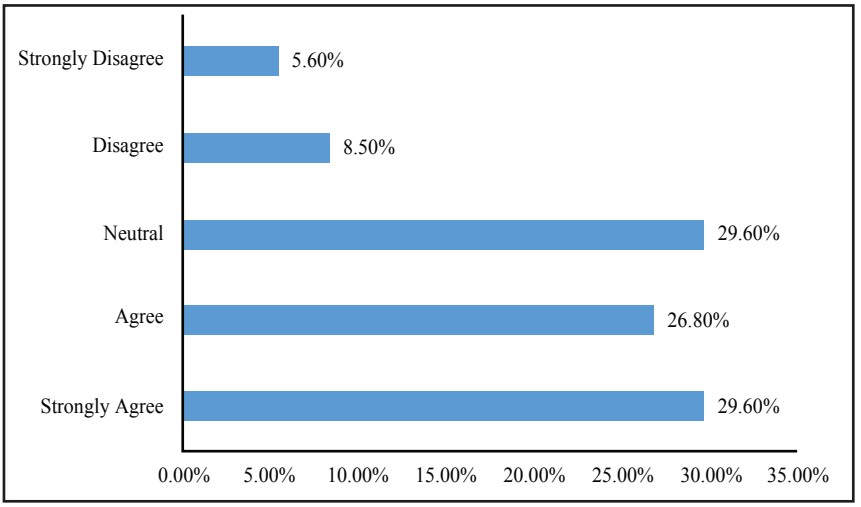

Figure 13: The Feedback of the Questionnaire Survey on "Lack of Skilled Human Resource" as a Challenge?

v. Low Stakeholder Engagement

MSP aims to meet many objectives; it is vital to incorporate significant stakeholders in the development process. Bangladesh has committed to building MSP for its maritime jurisdiction. However, it is still in the earliest stages of developing a blueprint for maritime planning and management and the sustainable use of natural marine resources. The BEC identified 26 industries that are currently working inside Bangladesh's maritime limits. There are more stakeholders in addition to these 26 sectors. The respondents were then questioned if the lack of knowledge and coordination are barriers to impacting the stakeholder engagement process for MSP. The results showed that 79% believed there is a lack of knowledge and coordination to handle the MSP stakeholder engagement process, while only 4% disagreed and 17% stayed silent (Figure 14).

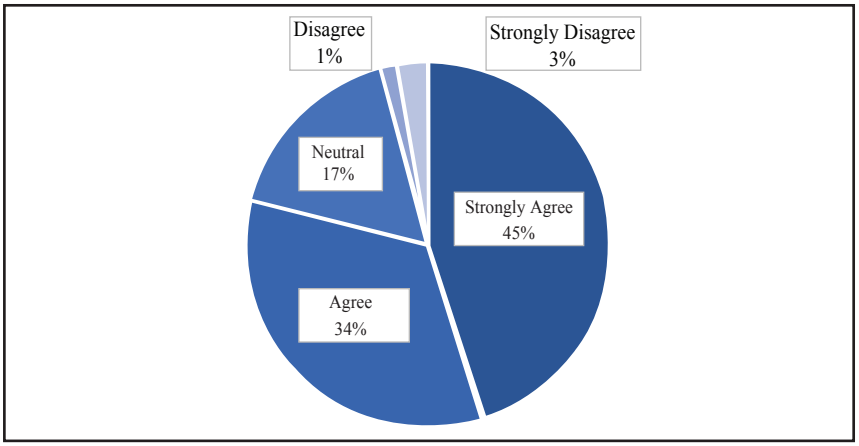

Figure 14: The Feedback of the Questionnaire Survey on "Lack of Knowledge and Co-ordinations" are Barriers to Influence Stakeholder Engagement; as a Challenge?

In Bangladesh, political and administrative institutions participate and show interest in any policy-making issues, whereas non-governmental groups and NGOs are less engaged. Furthermore, there is no active framework to bring all of these stakeholders together. Administrative authorities usually fail to incorporate stakeholders early in the process, which leads to a host of challenges throughout the implementation of any plan. Stakeholders in a given sector may not necessarily be aware of their exact position, stake, or role within that sector. This identity crisis of stakeholders produces enormous challenges later on within that industry. Stakeholder involvement analysis is crucial to do early in the MSP process.

Miscommunication among stakeholders, fragmented governance, limited choices, a lack of trust, and ignorance about other stakeholders are some challenges that stakeholders experience when engaging in the MSP process.

vi. Inadequate Funds for MSP Research and Development

Without sufficient financial resources, MSP is impossible. Even though MSP is primarily a governmental commitment, a recurrent difficulty arises when research funding is not available for other MSP tasks such as planning. Respondents were questioned on "raising adequate finances as a difficulty for the study and development of MSP?" to uncover the financial arrangements for MSP development in Bangladesh. According to the survey results, 64.8% have claimed that there is no financial framework for the growth of MSP in Bangladesh; hence raising funds is a barrier to establishing MSP in Bangladesh. While only 8.4% of respondents have stated that getting money isn't a serious barrier for MSP research in Bangladesh. 26% of respondents were confused about the fact (Figure 15).

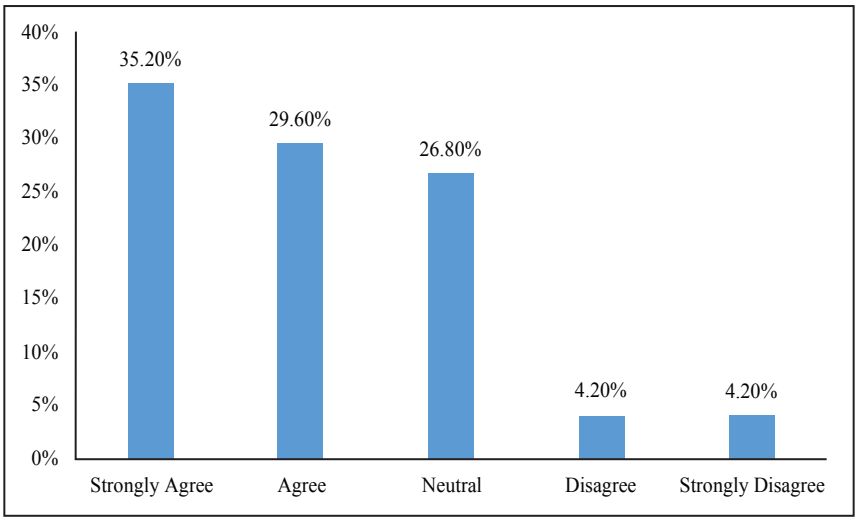

Figure 15: The Feedback of the Questionnaire Survey on "Raising Adequate Funds" as a Challenge for the Study and Development of MSP?

vii. Impacts of Climate Change on MSP Development

Bangladesh is particularly vulnerable to climate change, such as rising sea levels, the acidity of the oceans, and global warming. Marine living and nonliving resources are shifting their positions in the ocean space due to climate change. Within Bangladesh's EEZ, this reallocation of maritime resources is causing new

tensions. Furthermore, as a result of climate change, coastal areas are becoming increasingly disaster-prone, posing a threat to the present coastal economy.

From the Survey data, it was found that the question about "controlling climate as a challenge of MSP in Bangladesh?" had a fantastic response. 66% of the respondents were admitted to the questions, while only 10% were opposed, and 22.5% stayed indifferent (Figure 16). As Bangladesh is an impoverished country, it is hard to follow international standards and provide safety for those who live in the coastal areas. Also, the climate creates impacts on the organisms residing there. The resilience construction is costly, and for climate change, if the resources underlying the ocean bed are relocated, it will be a significant bloodbath and extremely expensive for us to extract these resources.

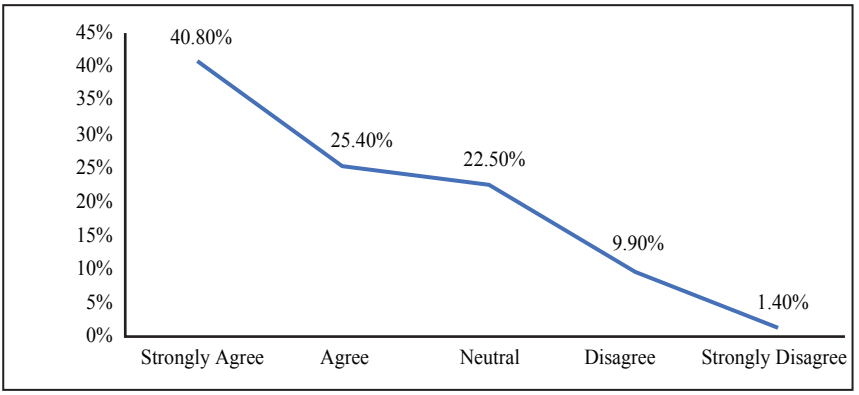

Figure 16: The Feedback of the Questionnaire Survey on "Control over Climate" as a Challenge for the Study and Development of MSP in Bangladesh?

viii. Transboundary Issues

Another critical hurdle in adopting MSP is tackling transboundary concerns such as Illegal, Unreported, and Unregulated (IUU) fishing, mining, gas extraction, and ecological interdependence. RADAR surveillance in the EEZ and a Fishing Vessel Monitoring System (FVMS) are two new methods implemented by the Department of Fisheries and the Coastguard to combat IUU fishing. There are a few gas blocks at the edge of the BOB. As a result, Bangladesh and Myanmar compete to collect gas from the gas blocks along the borderline. In addition, migratory species such as tuna and Irawati dolphins have nesting grounds in Bangladesh's EEZ. There is no regional collaboration or coordination in the BOB region to support this connection issue. The study features a segment about these

topics. According to Figure 17, 47.4% of respondents thought that transboundary issues with Myanmar and India are a significant challenge for developing MSP in Bangladesh. Only 15% of respondents thought that this boundary issue has no connection with developing MSP in Bangladesh, and 25.4% remained silent.

Bangladesh lacks the technology to detect the presence of invasive species. Invasive species may represent a hazard to the ecosystem's current balance. As a result, monitoring and avoiding invasive species encroachment has become a new concern for implementing MSP in Bangladesh.

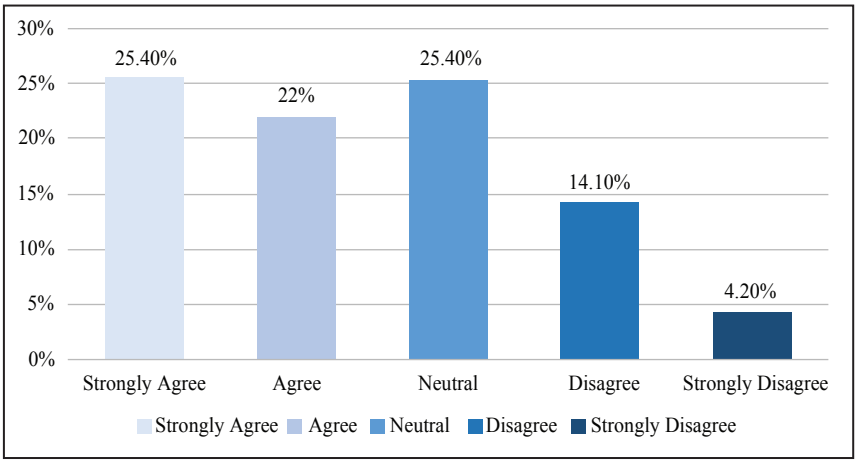

Figure 17: The Feedback of the Questionnaire Survey on "Transboundary Issues" with Myanmar and India as a Challenge for Developing MSP in Bangladesh?

Figure 18 shows the MSP prospects and challenges in Bangladesh. From the overall result analysis, it is evident that implementing a strategic approach for MSP in Bangladesh is rather challenging if not maintained effectively and take the appropriate decision for developing it. A lot of opportunities have been uncovered and also the challenges towards it. A framework has been designed for describing all chances and obstacles to be faced for applying the strategic approach of MSP in Bangladesh. The framework shows specific steps and points derived from the survey developed for the study. Implementing MSP, ocean zoning, MPA formation, and coordination of the maritime industry are vital. MSP creates a balance between sustainable economic growth and maintaining the ecology as well. The shipping industry, energy commissions, fishing industry, and tourism industries all be benefited from MSP. Bangladesh has a great possibility from MSP as it is the largest Delta Island worldwide.

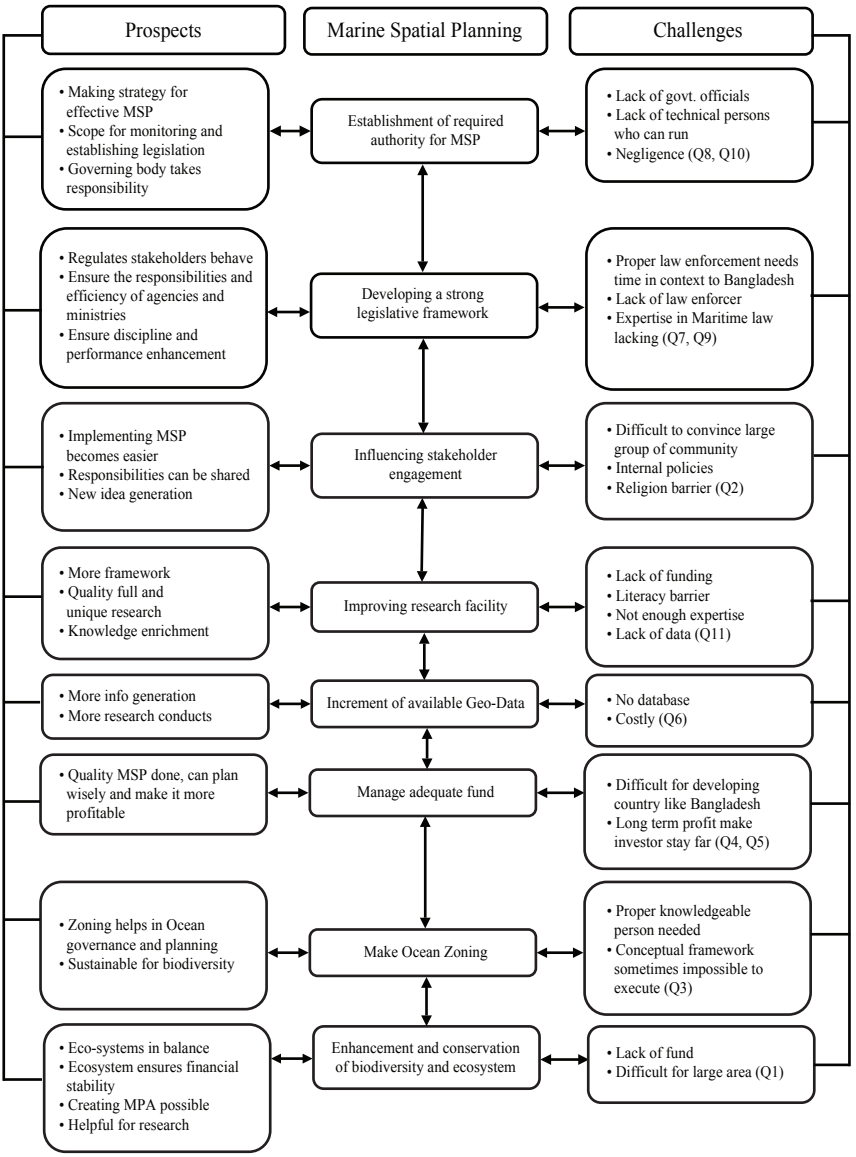

Figure 18: MSP Prospects and Challenges in Bangladesh

C. Gap Findings of MSP in Bangladesh and Recommendation of Strategic Approach for Implementation of MSP in Bangladesh

i. Gap Findings of MSP in Bangladesh

• There is no independent authority for MSP which will be responsible for maintaining and building coordination among all the departments.

• There is a lack of integrated policy for MSP development in Bangladesh.

• In several ways, there is a lack of strong legislative protection and a necessary framework.

• There is also a lack of adequate funding.

• Low stakeholder engagement. As a result, most stakeholders don't know about MSP and refuse to learn about the planning.

• There is a lack of an ocean database platform where stakeholders can easily access those data for analyzing the process.

• There's always a lack of institutional capacity for any research in Bangladesh.

• There's a lack of pre-planned preparation for climate change impact or disaster management.

ii. Recommendation of Strategic Approach for Implementation of MSP in Bangladesh

• The government should create an independent government-facilitated agency within the Prime Minister's office to monitor MSP implementation.

• The independent authority should develop a unified policy for MSP rather than a sector-by-sector approach. Workshops, training sessions, and projects involving all MSP-related institutions and sharing the same platform can be organized to accomplish this.

• There should be robust legislation that codifies all aspects of MSP. When it comes to an integrated policy such as MSP, fragmented forms of legislation are ineffective.

• The government may establish a dedicated fund to provide necessary funding for the development and implementation of MSP through direct allocations from general tax revenues or through alternative financing mechanisms such as grants and donations from international and multinational organizations, foundation grants, collaborations with non-governmental organizations, private sector funds, and user fees, among others.

• The MSP program assists the government in implementing ecosystem-based management by locating space in marine regions for biodiversity, conservation, and long-term economic growth.

• Before beginning the MSP, the government may do a stakeholder analysis to identify all stakeholders and engage them early through meetings, dialogues, workshops, seminars, and symposiums, among other methods.

• It is essential to have proper resource management for conducting the MSP program. Resources are the critical factors for MSP.

• For the development of MSP, it is necessary to have data that is up-to-date, objective, trustworthy, relevant, and comparable (IOC-UNESCO, 2018).

• Fisheries is one of the leading economic sectors in Bangladesh. The ultimate goal of MSP is to conserve the coast and extract financial possibilities for prospering the nation. So, it is one of the main parts or factors while implementing MSP.

• For ecosystem conservation, establishing MPA is a must. A good MSP needs an ocean zoning plan and a defined proper MPA system.

• Mangrove is important for coastal conservation. It creates a green belt as it shields the coast and coastal areas. So, for implementing MSP, it is a must to have a plan for Mangrove.

• Marine sustainable tourism can be a great source of income for Bangladesh.

• A solid agreement among the state governing departments, universities, and institutes is required. Research funding in the field of maritime affairs should be enhanced. Maritime education and training are provided by 58 departments at 16 public institutions, 13 ministries, and 42 government entities in Bangladesh. Bangladesh's government has created MU, a specialist institution dedicated to developing qualified human resources for the marine industry.

• Implementing MSP is a must-needed factor of having skilled human resources who know about MSP. They'll take the necessary steps on the field to complete the whole MSP process.

• MSP is required for the growth of the BE. Traditional marine businesses such as fishing and shipbuilding are no longer dominant in many maritime sectors. Some sectors are less apparent in addition to these and the various component businesses (e.g., fittings makers, engine builders, and other suppliers) that are part of the visible marine industry.

So, Figure 19 indicates the main summary of strategic approaches for MSP in

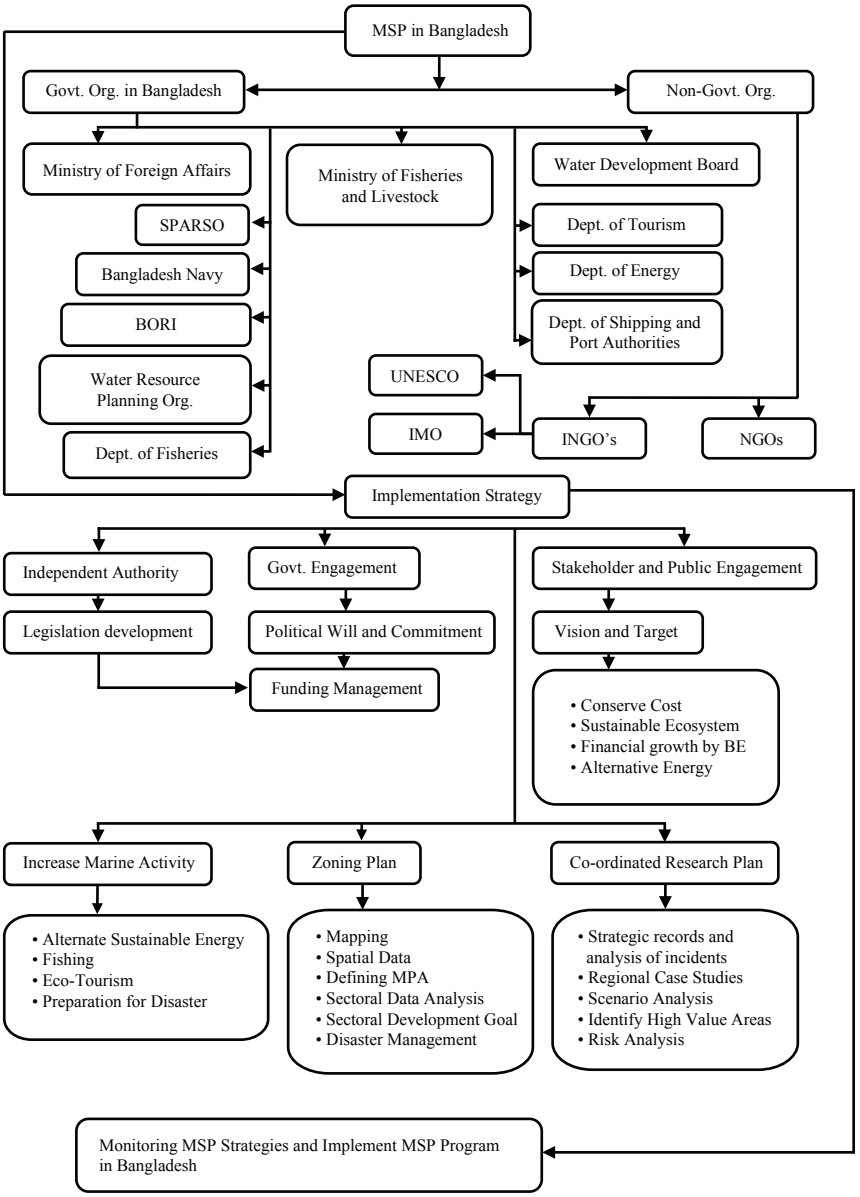

Figure 19: A Proposed Framework of Strategic Approach for Implementation of MSP in Bangladesh

Bangladesh. Actually, it is a proposed MSP implementation framework. The government can take this framework as a standard, assess the advantages and challenges of MSP in the Bangladesh scenario, and gain knowledge about implementing it. According to this framework, there's shown a step-by-step approach for implementing a full MSP for the coastal region of Bangladesh.

Conclusion

Long-term monitoring is essential to correctly manage the ocean resources to understand and anticipate biophysical and biological interactions and forecast future changes for implementing MSP in Bangladesh. Bangladesh is in critical need of an ocean management tool accompanied by a long-term planning strategy. In Bangladesh, the pre-planning phase of MSP is ongoing, but no formal MSP has been established. The major goal of this research is to determine the MSP's potentiality and challenges and suggest strategic approaches to gain the goals.

The current study used a self-administered questionnaire survey for primary data collecting and the content analysis approach to comprehend the underlying meaning of secondary data to answer the research questions. By evaluating the data, 86% of respondents agreed that there's no existing independent authority for MSP in Bangladesh, and 64% stated that the reason for it is the Government's negligence towards it. Almost 64 percent of respondents have stated that there's no legislative framework, and 80% have thought that the national strategy for MSP signifies a substantial promise for establishing BE. Besides, 69% of respondents have claimed that it is challenging to construct a central Ocean database, and 78.5% of respondents have perceived the chances of MSP in establishing MPA zoning. Moreover, 66% of respondents have said that building resilience is challenging, but it is also vital for advanced preventative strategies. 47.4% of respondents think that transboundary concerns against Myanmar and India might be an issue for growing MSP in Bangladesh. Additionally, 64.8% of respondents think it is not easy to raise appropriate funds to improve MSP in Bangladesh. The fund is also needed for performing additional research, running awareness campaigns, and informing the stakeholders about the MSP program. 56.4% of respondents have said that there's a shortage of competent human resources, which is crucial for growing MSP in Bangladesh. For building an MSP program, many measures should be taken.

As the study was conducted during the COVID-19 period, it wasn't able to acquire physical data or execute the survey physically and the responses are not richer in numbers.

Unless the government of Bangladesh can create an efficient MSP, the nation will suffer greatly in terms of attaining sustainable development and safeguarding the maritime environment. It is now feasible for Bangladesh's marine environment to benefit the nation from different statutory. Moreover, a legally enforced MSP project can be established on scientific knowledge and cooperation with stakeholders, and it can now be executed. Finally, the study must focus on establishing an independent and integrated authority, amending the legal and policy framework, establishing a central database, engaging stakeholders, raising funds, and harmonizing the curriculum of MSP-related courses in different maritime education and training institutions. Last but not least, the aforementioned measures are critical for Bangladesh to build a successful MSP for long-term ocean governance and maritime development.

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