

Marine Spatial Data Infrastructure - An Ocean Literacy Tool for Sustainable Development for Bangladesh

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Data is the foundation of knowledge. It provides the information, and information provides the knowledge. However, the availability of comprehensive and authoritative data is one of the major hindrances for deriving knowledge. In the maritime domain, different stakeholders collect data as required and store those data in their respective databases. Interoperability of those data is mostly impossible as those are not collected maintaining a uniform standard. So, data cannot be reused, and duplication of efforts is evident in the maritime domain. Considering this, a global initiative is visible among the maritime states to have their Marine Spatial Data Infrastructure (MSDI) to ensure the availability of data for different stakeholders of the maritime domain. Sometimes, these spatial data sets are also called blue data as they support the blue economy of the country. For a thriving and sustainable blue economy, the requirement of data is paramount. Presently, apart from the traditional blue economy sectors, maritime nations are also focusing on emerging blue economy sectors, which are mostly data-driven. As a maritime nation, Bangladesh

can also expect to have a thriving and sustainable blue economy, provided the required data can be made available. Considering this aspect MSDI for Bangladesh is a need for the time.

What is MSDI?

To understand MSDI, first, we need to know the spatial data. Spatial data provides the geographical location of different features on Earth. It is usually stored as coordinates and often accessed, manipulated, or analyzed through Geographic Information Systems (GIS) (International Hydrographic Organization, 2017). To facilitate the availability of spatial data, we need to have an arrangement so that it can be easily accessed when needed. Here comes the necessity of Spatial Data Infrastructure (SDI), SDI is the relevant base collection of technologies, policies, and institutional arrangements that facilitate the availability of and access to spatial data (Global Spatial Data Infrastructure Association, 2012). Marine Spatial Data Infrastructure or MSDI is the marine component of SDI. It is a framework of suggested best practices and guidance for

the management of marine geospatial data, underpinned by some key principles supporting interoperability, integration, institutional collaboration, and coordination (Huish, 2021).

Key Components of MSDI

A conceptual framework can be used to describe the key components of MSDI. As per that framework, there are four pillars of MSDI: (1) Policy and Governance (People); (2) Technical Standards (Standards); (3) Geographic Content (Data); and (4) Information Systems (ICT).

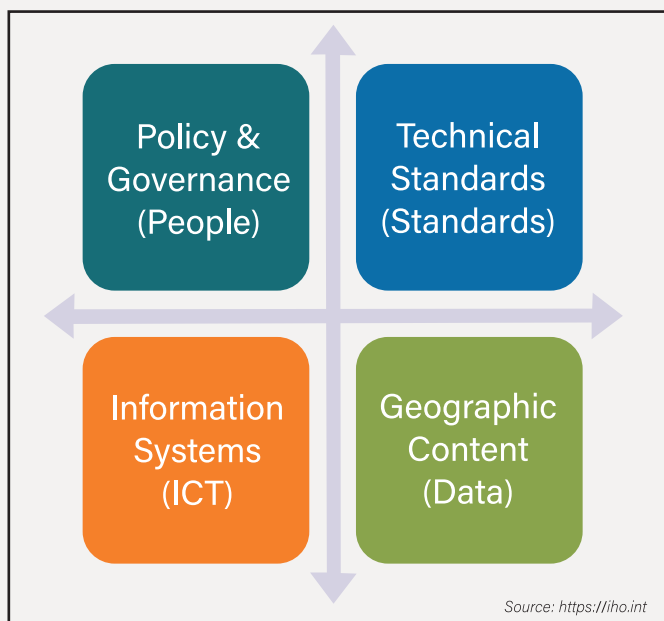


Figure 01: A Conceptual Framework of MSDI

The above framework is recommended by the International Hydrographic Organization (IHO). Other frameworks are also available for MSDI. However, in all such frameworks, the main focus is to make the spatial data available, maintaining specific standards through appropriate policy and governance using various innovations in all domains.

Motivational Factors for Having MSDI in Bangladesh

The importance of marine space for Bangladesh is ever-increasing. As a densely populated country, we have a scarcity of resources. With the depletion of land resources, we have no other option but to look towards the sea. Peaceful settlement of maritime boundaries with neighbors has facilitated this endeavor to venture at sea and extract the blue resources. However, considerable time has already elapsed, and we still lack a comprehensive approach in this field. MSDI for Bangladesh would facilitate the initiative of different stakeholders for a common goal of prosperity through blue resources. So, the main catalysts of having MSDI for Bangladesh can be summarized as below:

Socio-Economic Factor: Maritime sector is considered one of the new and prospective avenues of economic growth for

Bangladesh. Mentionable, about 3 million peoples in Bangladesh are directly or indirectly involved in harnessing sea fish only (Karim, 2021). There are many other traditional and emerging economic functions in the maritime domain. So, if all these economic functions can be activated within a reasonable time, it will have a tremendous socio-economic impact on the livelihood of the general population of the country. MSDI can act as a facilitator in this aspect.

Global and Domestic Agendas: The UN 2030 agenda comprises 17 Sustainable Development Goals (SDG). MSDI will have a direct or indirect impact on SDG-14 (Life below water), SDG-6 (Ensure availability and sustainable management of water and sanitation for all), SDG-13 (Climate action), SDG-11 (Sustainable Cities and Communities), and SDG-15 (Life on land). Other global agendas like the Paris Climate Agreement, UN Decade of Ocean Science 2030, and "Seabed 2030" projects of the General Bathymetric Chart of the Oceans (GEBCO) can be complemented through MSDI. Apart from these, the formulation of Bangladesh Delta Plan 2100 can also be complemented through MSDI.

Vision 2041: As per the Vision 2041, Bangladesh will be a developed nation by 2041 where all citizens will be guaranteed a minimum quality of life (General Economics Division [GED], 2020). However, this can only be possible if we are able to unlock the potential of the blue economy. Mentionable, national MSDI will facilitate the blue economic activities of the country as envisaged for 2021-2041 Perspective Plan of Bangladesh.

Climate Change Mitigation: Bangladesh is a low-lying, densely populated deltaic country. Climate change events like tidal surges and coastal inundation, cyclones, erosion, accretion, etc., are very common phenomena here. So, Bangladesh needs to have appropriate adaptation and mitigation strategies. MSDI can act as a foundation for an integrated knowledge-based approach to mitigate these extreme events.

Effective use of Public Funds: A national MSDI would ensure efficient organizational process among the stakeholders. It ensures inter-operability of data. At the same time, it avoids duplication of effort through improved co-operation and co-ordination. Thereby, effective use of public fund is ensured. Moreover, spatial data gets greater reach through MSDI, and reuse of data is ensured.

Suggestive Approach for MSDI Maneuver in Bangladesh

For establishing MSDI in Bangladesh, data sources need to be identified first. A partnership may be developed among the stakeholders who can provide data. Probably, the biggest challenge of establishing MSDI in Bangladesh will neither be the availability of data nor the technical issues. The challenge will be building partnerships as well as sharing common goals. In this aspect, Bangladesh Navy (BN) Hydrographic Services can play a central role in bringing the stakeholders together.

This can be done through the National Hydrographic Committee (NHC), as it has members from various ministries and maritime stakeholders. A steering committee may be formed by NHC who will act on policy decisions and provide operational guidance. Thereafter, a working committee may be formed to identify the steps to make MSDI happen. A necessary technical committee may also be formed to look after the technical issues related to MSDI.

Role of BN Hydrographic Services

Being the leading custodian of marine spatial data of Bangladesh waters, BN Hydrographic Services would play a pivotal role in realizing the MSDI initiative. The traditional role of BN Hydrographic Services is to conduct bathymetric surveys in the sea area, publish nautical charts, and Electronic Nautical Charts (ENC), and support the maritime defense of the country. But changing global scenario is serving as the motivational factor to expand its duties and responsibilities. By getting involved with the national MSDI, BN Hydrographic Services will gain a greater appreciation of the inherent value of data and information that is held in its archive.

Key Challenges

As a relatively new concept, the development of MSDI for Bangladesh will have many challenges. Considering the experience of other nations, the key challenges for developing MSDI in Bangladesh can be identified as follows:

Organizational Culture and Commitment: The stakeholders who can provide data for MSDI are mostly from the government sector. These stakeholders work relatively in a restrictive domain, and their responsibilities are tightly defined. Due to the organizational culture, people who work there are skeptical of changes. However, considering the benefits of MSDI for all, the Government may come forward to redefine its role and commitment to society without compromising the strategic interest of the organization.

Lack of Skilled Manpower and Technical Difficulties: As mentioned before, MSDI has four pillars and a fifth key element which underpins the four pillars: education and learning (GED, 2020). As such, trained and skilled manpower will be a leading requirement for materializing MSDI in Bangladesh. This can be a major difficulty for many partner organizations, especially during the implementation phase of MSDI.

Data Quality: Data held in MSDI should have required authoritativeness. Those data should also pass the required quality assessment test. So, careful assessment must be done before accepting some data in the MSDI. This might be a challenge for some of the organizations in Bangladesh as their data might not pass the required quality assessment test.

Data Sharing and Exchange: To make data accessible for all, it should be archived in a commonly recognized format. This might be a big issue while realizing MSDI in Bangladesh. However, this problem might not exist in future if concerned organizations of Bangladesh adhere to internationally recognized formats in time.

Operational Sustainability: Operational sustainability is another challenge a country may face while maintaining national MSDI. For this operational sustainability, funding is an important issue. However, considering the cost-benefit ratio, this would not be a problem for Bangladesh. Moreover, data, being the currency of MSDI, has value, and MSDI could become a source of revenue, too. Mentionable, a study conducted by (Griffin et al., 2019) in New Zealand found that the direct cost of MSDI could result in a net benefit; for every US dollar invested, it is predicted that 2 to 18 US dollars would be returned.

How MSDI Can Unlock the Potentials of Blue Economy in Bangladesh?

Oceans are critical to many aspects of our daily life, and we are growing increasingly reliant on ocean resources. Presently, the blue economy is experiencing a series of transformations. Established blue economic sectors are being disrupted, and new sectors are emerging, paving the way to a smart, sustainable, and resilient use of the ocean. For example, offshore renewables are helping the world combat climate change by reducing our dependency on fossil fuels and giving communities around the world access to more sustainable sources of energy. The maritime transport sector is going through a transformation towards autonomy. Ocean monitoring and surveillance sectors are getting wider scope and improved visualization. The maritime insurance sector is getting more mature with accurate prediction and risk assessment. All these emerging sectors are mostly data-driven. Comprehensive, reliable, and insightful data are needed to capture opportunities and mitigate the risks in these new sectors. A national MSDI should be able to serve all existing and emerging blue economy sectors of the country.

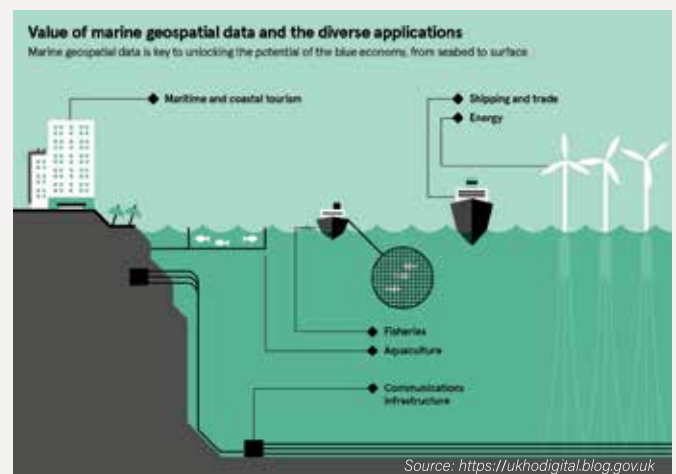


Figure 02: Marine Geospatial Data Can Help to Support a Number of Activities Within the Blue Economy

Way Forward

A national MSDI for Bangladesh is a need of the time, considering its' huge benefits and various motivational factors mentioned above. The following action points may be considered in this regard:

a. Developing partnership among the stakeholders is one of the major tasks for establishing national MSDI. As the government is willing to engage itself to the thriving blue economic sector of the country, strategic directives may be sought from the government. NHC may engage itself with the government to get this directive.

b. A national-level steering committee may be formed to identify funding requirements, provide policy decisions, and make a perspective plan for 3 to 5 years to implement the MSDI.

c. Required number of working committee and technical committee may be formed to perform different steps of setting up the MSDI. They will survey and identify the data availability from different organizations, its' interoperability and suitability considering standard, and accuracy.

d. Developing necessary human capital is another major task for realizing national MSDI, considering the technical nature of the project. So, the required number of skilled manpower may be developed from different stakeholders through proper training.

e. As a prime mover, BN Hydrographic Services has to take the lead in all aspects of realizing the national MSDI. In addition, BNHOC may house the server, and provide the necessary space for organizing and managing MSDI.

From the above discussion, it is evident that MSDI can serve as the backbone of the blue economy for a maritime nation. There are many motivational factors to have a national MSDI in the context of Bangladesh. Bangladesh has to fulfill its' SDG by 2030. It also has some mega national agendas like "Vision 2041" and 100 years long integrated techno-economic mega plan "BDP2100," etc. MSDI can help Bangladesh in materializing these international and national agendas in time and in the most appropriate manner. MSDI can also help Bangladesh extract blue economic resources, and benefits in a sustainable manner. Apart from these, there are also many challenges for Bangladesh while establishing this MSDI. Organizational cultures, lack of skilled manpower, and technological hindrances are some of the challenges which Bangladesh may face while materializing MSDI. Being the custodian of major marine spatial data, BN Hydrographic Services will have to take the

leading role in establishing MSDI in Bangladesh. In this regard, NHC can pursue government willingness, funding arrangements, and other strategic decisions.

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