



A study on the development of marine functional zoning in China and its guiding principles for Pakistan



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ABSTRACT

Increasing demands for coastal and marine natural resources have led to an excessive degradation of marine habitats, nursery grounds, coastal erosion, and resources depletion, which threaten the marine environment. Currently, the Marine Spatial Planning (MSP) is attracting attention in coastal states worldwide; it is considered a management tool for conservation and rational utilization of marine resources. MSP generally refers to the Marine Functional Zoning (MFZ) in China, which is regarded as a strong management strategy to protect, conserve, manage, and maintain sustainable coastal and marine natural resources. This study analyzes the connotation, development, law enforcement, and management strategies of MFZ in China and guiding principles for Pakistan. Pakistan has a long coastline but still facing several problems due to a lack of strategic planning management. According to findings of this study, the guiding principles of the China's MFZ for Pakistan mainly include dividing the ocean into different functional units; involvement of the State and local agencies in the decision-making process; marine resource allocation based on natural carrying capacity; establishment of MFZ laws and legislation; promotion of marine science and technology development; and stakeholder participation in MFZ scheme. A SWOT (strengths, weaknesses, opportunities, and threats) analysis was carried out based on 3D MSP approach to ascertain Pakistan's current and future coastal and marine management practices and issues. This study will provide a baseline to coastal planners and developers in Pakistan for the allocation of coastal and marine resources on the basis of their natural carrying capacity and sustainable utilization.

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1. Introduction

Marine Spatial Planning (MSP) or Marine Functional Zoning (MFZ) is a cutting-edge concept for the preservation of the marine environment and the sustainable use of marine natural resources to meet human needs. Many developed and developing countries have initiated ecosystem-based MSP at the national level, in which coastal and marine areas have been designated on the basis of their social, economic, and ecological importance (UNESCO, 2006). Both the Integrated Coastal Zone Management (ICZM) and MSP share the common goals of resolving user conflicts, provides guiding management strategies at all levels of government, and examining the impacts of anthropogenic activities at the local and regional levels of coastal and marine areas (Papatheochari, 2008). MSP/MFZ and

ICZM aim to develop and protect coastal and marine areas. ICZM is most commonly used at the local level, whereas MSP is a special area planning approach usually applied at the national level by following a 3D MSP approach (Ehler and Douvère, 2009). MSP is the temporal and spatial distribution of human activities in coastal and marine areas to achieve the socially, economically, and ecologically objectives of the country that are usually confined in a good political system (Ehler and Charles, 2014). MSP is an active, unified, and inclusive decision-making process that defines how human activities can best be managed to sustain and maintain coastal and marine ecosystem health (Foley et al., 2010). MSP applies scientifically well-informed management practices and enables the development of special sea area use, such as marine protected areas and socio-economic development (Douvère, 2008; Halpern et al., 2010).

The MSP is generally being used under different names. There is no difference between Marine Spatial Planning, Maritime Spatial Planning and Marine Functional Zoning. In the European Union

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(EU) context, the word “marine” was used for the protection and conservation of marine environment and the word “maritime” was used for human activities along the coastal zones when the concept of the Marine Spatial Planning was new. However, the MSP is now widely used as an integrated sector approach for not only conserving the marine environment but also promoting maritime economic activities. MSP is most commonly used as MFZ in China, where marine areas have been divided into different basic functional areas in accordance with the requirements of environmental protection, marine ecological restoration and conservation, sustainable utilization and exploitation of natural resources, thus providing the basis for the protection, development and management of the ocean (Douvere, 2008; Lu et al., 2015). Overall, numerous coastal countries have already initiated MSP activities for conserving biological diversity and introduced long-term activities under their jurisdiction (Douvere et al., 2007). MSP helps to evaluate the existing and future human activities along the coastal and marine areas. In addition, it is considered as an integrated management tool for assessing the current and future economic and ecological conditions in particular coastal and marine areas. On the contrary, MSP fails to manage the human behavior in terms of resource utilization (UNESCO, 2006). Multiple barriers and constraints exist in comprehensive marine spatial planning, particularly in multi-jurisdictional regions. These restraints can be categorized into four different ways that includes: organizational barriers; ecological and environmental considerations; socio-economic; and trans-boundary constraints (GEF, 2012). The management of sea area use is an ongoing and adaptive process that comprises a set of functions, scientific research, planning, development, biological diversity conservation, and economic activity. Each function has to be managed successfully.

Pakistan is a developing country with a vast coastline that is not properly managed and experiencing several issues related to the management of coastal and marine areas. The learning experiences of MSP activities from other countries can be followed and implemented to enhance the coastal and marine planning approach in Pakistan. Therefore, the aim of this study is to understand the learning experiences of a developing country like China in the context of Pakistan. The MFZ learning experiences from China have theoretical and practical significance for future MFZ practices in Pakistan. The guiding principles will be helpful in establishing new MFZ laws, national-level marine functional zoning strategies, political and economic devolution, stakeholder involvement, and institutional reforms.

Furthermore, Section 1.1 gives a brief description about MFZ and its role in sustainable development of coastal and marine areas in China. Section 1.2 defines the MSP practices and learning experiences from other countries. Section 1.3 provides methodology of the study. Section 1.4 defines the sovereignty rights over the coast and marine areas of China and Pakistan according to the definition of *United Nations Convention on the Law of the Sea (UNCLOS 1982)*. Section 2 describes the MFZ development in China and Pakistan from various aspects, such as the overall status, legislative perspectives, administrative powers and national marine development plans. Meanwhile, it also confers a SWOT analysis (strengths, weaknesses, opportunities, and threats) of coastal and marine management practices in Pakistan. Section 3 offers major guiding principles of China's MFZ for Pakistan that are focusing on the integrated planning management of coastal and marine areas. Section 4 provides the conclusion of this study.

1.1. MFZ in China

In China, MFZ usually defines ecologically important marine zones and their carrying capacity of natural resources and limit

human activities in ecologically vulnerable areas. It prevents ecological degradation caused by point and non-point sources of pollution. MFZ in China denotes the division of sea areas into different functional units (Fang et al., 2011). Ocean zoning connotes dividing marine areas into different districts to provide a guideline for human use, the sustainable utilization of marine resources, and marine ecosystem conservation (Courtney, 2003). MFZ does not support sectoral-based management approaches; it systematically interconnects all stakeholders and defines their roles of involvement in any MFZ scheme (Cao and He, 2015). MFZ allocates an area of coast and sea for engaging human activities and uplifting the economy of a country while sustaining the ecology of an area (Dong et al., 2006). Hence, MFZ has emerged as a foundation for enhancing the marine development planning and conservation and management of marine natural resources in China (Lu and Ai, 2001; Guan and Wang, 2002). MFZ provides a 3D analysis of ecologically, economically, and socially important areas that can be controlled and operated through a good political system (Maes, 2008). It classifies and limits human activities to reduce the user-to-user and user-to-environment conflicts to meet the economic needs and ensure the prioritized safety and security of the country.

MFZ not only refers to the utilization of sea areas for human interests but also provides a holistic management approach to preserving MPAs. MFZ helps to establish good and friendly relationships with neighboring countries sharing common interests culturally, socially, and economically. This study proposes that the objectives of MFZ can be divided into four main and broad categories: (i) to categorize areas according to the geographical location; (ii) to create economic values of coastal and marine natural resources; (iii) to protect biologically important areas for conserving marine ecosystems and sustaining coastal and marine natural resources; and (iv) to reduce user conflicts (i.e., user-to-user and user-to-environment). MFZ in China is very effective and it involves the protection and rational utilization of marine natural resources, which will be analyzed in detail in the following Section 2.

1.2. Literature review

The major objectives of all developed and developing countries are to manage coastal and marine areas with ecological and socio-economic importance by applying intensive management measures. MSP was originally started as a management tool in Australia for conserving the Great Barrier Reef.¹ In recent years, the concept of MSP has gradually been spread to other parts of the world, particularly in Europe (e.g., the United Kingdom (UK), Belgium and Netherlands), the United States of America (USA), and Asian countries, including Vietnam and China (Ehler and Douvere, 2009). The initiatives of MSP activities in international society and EU countries have begun to classify and manage all marine activities in their marine waters under their jurisdiction. For instance, MSP is adopted for the protection of marine environment and socio-economic activities for sustainable use of marine resources in the USA and Australia. In the UK, the term Marine Planning Management (MPM) approach is used for the protection of coastal and marine natural resources. In Sri Lanka the Special Area Management (SAM) is incisively practiced to identify biological and ecologically endangered areas. India, Bangladesh, and Pakistan

¹ Great Barrier Reef Marine Park is the largest coral reef system in the world. Australia recently publicly published a 2050 year of plan under the *Great Barrier Reef Marine Park Act 1975*, to set out various guidance principles, functions and responsibilities to manage activities and implement policies for reef use. More information is available at <http://www.gbrmpa.gov.au/> (Accessed on 21/10/2016).

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