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From science to action: Exploring the potentials of Blue Economy for enhancing economic sustainability in Bangladesh

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ABSTRACT

Proper utilization of marine resources towards achieving sustainable economic development has got worldwide attention in recent years. Likewise, the Bangladesh government has also emphasized Blue Growth after settling the permanent maritime boundary with neighboring countries. This study aims to identify the Blue Economy potentials of Bangladesh, evaluate the economic values of these potentials, identify challenges for Blue Growth and finally develop a management framework. To collect data, consultations with different stakeholders related to Blue Growth in Bangladesh were conducted. Secondary data were collected from the review of policy documents, newspaper reports and scholarly articles. Coastal and marine resources i.e. living, non-living and renewable are identified as the main components of Blue Economy in Bangladesh. Moreover, trades and commerce related to the sea and coast, and protection from natural disasters also have economic returns having potential for enhancing Blue Growth. Conversely, sea level rise, climate-driven extreme events, pollution, human interferences and lack of law enforcement are identified as the major challenges for the further development of Blue Economy. To achieve sustainable Blue Growth in Bangladesh, a strategic planning is required which should focus on potential sectors related to Blue Economy, research and ocean governance. The study argues that enhancing Blue Growth and achieving Sustainable Development Goals (SDGs) must go together to ensure that balance does not swing too far towards Blue Growth at the expense of environmental sustainability. Finally, this study submits a management framework for enhancing Blue Growth in Bangladesh.

1. Introduction

The Blue Economy (BE) is a concept of economic growth through the sustainable utilization of ocean resources with technological inputs to improve livelihoods and meet the growing demands for jobs without hampering the health of the ocean ecosystem. Blue Economy has great potential for boosting economic growth and employment. It supports food security, manages and protects the ocean environment, creates new job options and has diversification to add new resources for energy, drugs, chemicals, food and minerals for human welfare (Ninawe, 2017). Though BE is an emerging concept, economic contributions of the ocean and its resources are vast for mankind. The economic activities in the ocean are based on the rapid expansions of ocean industries like maritime and coastal tourism, offshore oil and gas, shipbuilding and maritime equipment transportations which are combined with overexploitation of resources (Ninawe, 2017). It is estimated that ocean-based businesses contribute more than 500 billion USD to the world's economy (Ocean, 2017). According to the OECD's Ocean Economy Database (OECD, 2016), the economic value of the ocean outputs in 2010 was 1.5 trillion USD, or in other words, approximately 2.5% of the world's gross economic value. Blue Economy also contributed around 31 million direct full-time jobs in 2010, which is around 1% of the global workforce (OECD, 2016).

Oceans contribute about 81.5 MT of global fisheries production annually (FAO, 2016). The marine fisheries sector contributes 230 billion USD to the global economy and directly or indirectly supports the livelihood of 8% of the world's population (Sumaila et al., 2011). The oceans also provide convenient routes of transportation for about

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80% of global trades i.e. goods are transported by sea routes (Corbett and Winebrake, 2017). Coastal tourism is also an essential driver of economic growth for many coastal and island countries. About 161 billion USD in revenues come annually from the global marine and coastal tourism (FAO, 2016). Further "ocean energy" (including aquatic bio-fuels and renewable energies), which is still in its early stage of development, could be an important source to meet the world's energy demands. There are a number of new and potentially valuable industrial products derived from the oceans. These include pharmaceuticals, antibiotics, antifreeze and antifouling paints (FAO, 2016). By the mid-century, enough food, jobs, energy, raw materials and economic growth will be required to sustain a likely world population level of between 9 and 10 billion people (OECD, 2016). To meet the growing demands for such a large population, the potentialities of the ocean are many. However, to make this idea fully functional, it will require substantial expansion of many ocean-based economic activities i.e. shipping, shipbuilding, capture fisheries and fish processing, maritime and coastal tourism, conventional offshore oil and gas exploration, and production and port facilities might be the options. These ocean-based economic activities for a sustainable economy are termed as "Blue Economy".

Bangladesh is located in the north-east corner of the Bay of Bengal (Fig. 1) and blessed with a large marine ecosystem (i.e. northern Bay of Bengal). Following the international verdicts on the disputed maritime areas with the neighboring countries India and Myanmar, the permanent coverage of Bangladesh's maritime areas is estimated as about 119,000 sq km, with an extended continental shelf of about 37,000 sq km with up to 50 m in depth (MoFA, 2016). Divided into three major coastal zones i.e. south-east, central and south-west part, Bangladesh coastline extends up to 710 km (Fig. 1). In both coastal and marine systems, Bangladesh endows a wealthy reserve of both living and non-living resources (Shamsuddoha and Islam, 2017).

United Nations agenda on Sustainable Development (Projected SDG Goal-14 to be achieved by 2030) is on conservation, sustainability and use of oceans, seas and marine resources for increasing economic benefits. This is especially stimulated for Small Island Developing States and least developed countries for sustainable use of marine resources, including sustainable management of fisheries, aquaculture and tourism (Ninawe, 2017). In the context of the recent development in the maritime boundary, BE concept recently became a buzzword and attracted much attention from policymakers for a sustainable development, particularly in drafting the post-2015 development goals for Bangladesh (Islam et al., 2017). However, this in turns will require significant progress in innovation and new thinking in many areas of science, technology, manufacturing, infrastructural design, consultation, decision-making processes and institutional co-operations. Currently a clear overview of BE with potentials, challenges and most importantly a management framework integrating all potential sectors are missing in Bangladesh. Therefore, this study attempts to provide a comprehensive view on Blue Growth (BG) potentials towards policy implications in the context of Bangladesh. Here, we reviewed the available documents related to BE of Bangladesh. In this study, we aim to understand BE potentials for Bangladesh to accelerate BG for national socio-economic development.

Therefore, this paper aims to answer the following questions:

(i) What are the potentials of BE for Bangladesh?
(ii) What are the economic values of different sectors related to BG?
(iii) What are the challenges for realizing BE potentials in Bangladesh?
(iv) How does enhancing BG relate to achieving the Sustainable Development Goals (SDGs)?
(v) What should be the framework for BE management in Bangladesh?

2. Materials and methods

This study was based on both syntheses of secondary information and primary data. To collect secondary data, an intensive literature review related to the coastal and marine resources and their management issues and constraints in Bangladesh context were conducted through an online search. In addition, relevant policy documents and government reports were also collected from the governmental agencies through personal contacts.

Primary data were collected through consultations with stakeholders from the three coastal zones of Bangladesh. Stakeholder consultation provides an opportunity to bring together diverse views and experiences of multiple stakeholders from various backgrounds and groups (Baran, 2004; Borsuk et al., 2001). This data collection method is particularly helpful in the present study since quantitative data in different sectors related to BE are rarely available in Bangladesh. In such case, expert knowledge is the best possible resource. In this study, the stakeholder consultation method involved consulting with a diverse range of stakeholders who represent a cross section of issues of interest. The issues of interest for this study include marine and coastal resources, their economic values, problems in coastal areas and the needs to overcome these problems. In the present study, one to one meetings with pre-selected stakeholders were conducted. Stakeholders were selected based on experience, knowledge, involvement and interest in the specific issues related to BE. Different stakeholders were consulted during 2016. Stakeholders included local people, government officials, academics, NGOs officials, as well as key informants (e.g. fishers, fish trader, port officials, tour operators etc.). At the beginning of the survey, interviewees were given an idea of BE to facilitate a better conversation. During the survey, interviewees were asked about the existing activities and resources in the coastal and marine waters of Bangladesh which have economic returns. They were also asked about the economic value of coastal resources. For example, information on the price of oyster shells, meat, seaweeds and turtle eggs were collected from the interviewees. In addition, what type of problems they are now facing to utilize coastal resources and what types of supports they need from the government to overcome the stated problems were also asked during the survey. Economic evaluation of fisheries, mangroves, salt production, shipbuilding, tourism, cyst production and wind energy were conducted based on literature survey.

For data analyses, the "content analysis" method was used. This method is a research tool for interpreting and coding textual material (e.g. documents, books, oral communication, interviews, and graphics) to elicit meaningful information over different themes. In this process, the textual materials were coded and separated into different themes and then examined through a conceptual lens (Krippendorf, 1980).

3. Results and discussion

3.1. Overview of living and non-living resources related to the Blue Economy for Bangladesh

Economically important coastal and marine resources (Table 1) are the main components of the BE for Bangladesh. These resources are categorized into living, non-living and renewable resources. In addition, trade and commerce related to the sea and coast, and protection from natural disasters also have economic returns. Marine living resources in the maritime zone of Bangladesh include fisheries, mangrove forests, coral ecosystems, plankton, seagrass and seaweeds. About 475 bony fish species belonging to 133 families (Rahman, 1997), 50 cartilaginous fishes, 50 crab species (11 purely marine and 3 commercially important species) (Quader, 1994), 7 turtles species of 6 genera (of which 3 are commercially important), 36 shrimp and 5 lobster species, 3 starfish and 11 dolphin species (Quader, 1994) have been reported in the coastal and marine waters of Bangladesh. A total 301 species of marine mollusks (i.e. bivalves, snails and slugs, cuttlefish, squids and octopuses) are reported (Islam, 2003) from the marine water of Bangladesh. Among the mollusks, oysters have great economic value and 3 types of oysters (i.e. edible, pearl and windowpane) occur in the coastal