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Initial Measures of the Economic Activity Linked to Bangladesh's Ocean Space, and Implications for the Country's Blue Economy Policy Objectives

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Pawan G. Patil, John Virdin, Charles S. Colgan, M Gulam Hussain, Pierre Failler, and Tibor Veigh

INTRODUCTION

With the resolution of maritime boundary disputes with Myanmar in 2012 and with India in 2014, the Government of Bangladesh has now fully defined the ocean space under its jurisdiction according to the United Nations Convention on the Law of the Sea (see Figure 1). That marine space is equivalent to 80 percent of the country's terrestrial area, and the Government prioritized its use as a key source of future economic growth (Hussain et al. 2017a, 2017b; Alam, 2014). To encourage the development of this ocean space and the resources it contains, the Government has embraced the concept of a “blue economy”, as a general framework for all activities related to ocean-linked economic growth that are environmentally and socially sustainable (Patil et al. 2018).

The blue economy concept features prominently as a policy objective in the Government of Bangladesh's Seventh Five Year Plan completed in 2015 to support the country's economic development (GED 2015), and in the recently completed Bangladesh Delta Plan 2100 (Bangladesh Delta Plan 2100 [Strategy], 2018). To help deliver on this objective the Government subsequently undertook a number of technical consultations, most recently in the Second International Blue Economy Dialogue hosted by the Ministry of Foreign Affairs in late 2017. That same year the Government established a new department titled the “Blue Economy Cell”, with a mandate to coordinate across sectoral ministries in order to better chart a path toward sustainable development of the ocean area, and to answer key questions about implementation of the five-year development plan (Patil et al. 2018).

However, as the Government has wrestled with implementation of its blue economy policy objectives, a number of questions have arisen, beginning with how to: (i) better measure the current economic uses of the ocean space as a baseline for decision-making, (ii) identify clear targets for sustainable growth of the use of this space, and (iii) set a policy pathway to get there. Bangladesh is not alone in facing these questions, nor in grappling with the complexities of the blue economy concept as an ocean-based economic growth model (Voyer and van Leeuwen, 2019; Voyer et al. 2018; Golden et al. 2017). In recent years, many of the world's coastal and island governments have prioritized ocean-linked growth through some form of this concept, and definitions and applications have differed significantly, often with the basic information requirements for any such approach lacking (Colgan 2017a).

To assist the Government of Bangladesh to answer these questions, the European Union (EU) provided a two-year technical assistance program in

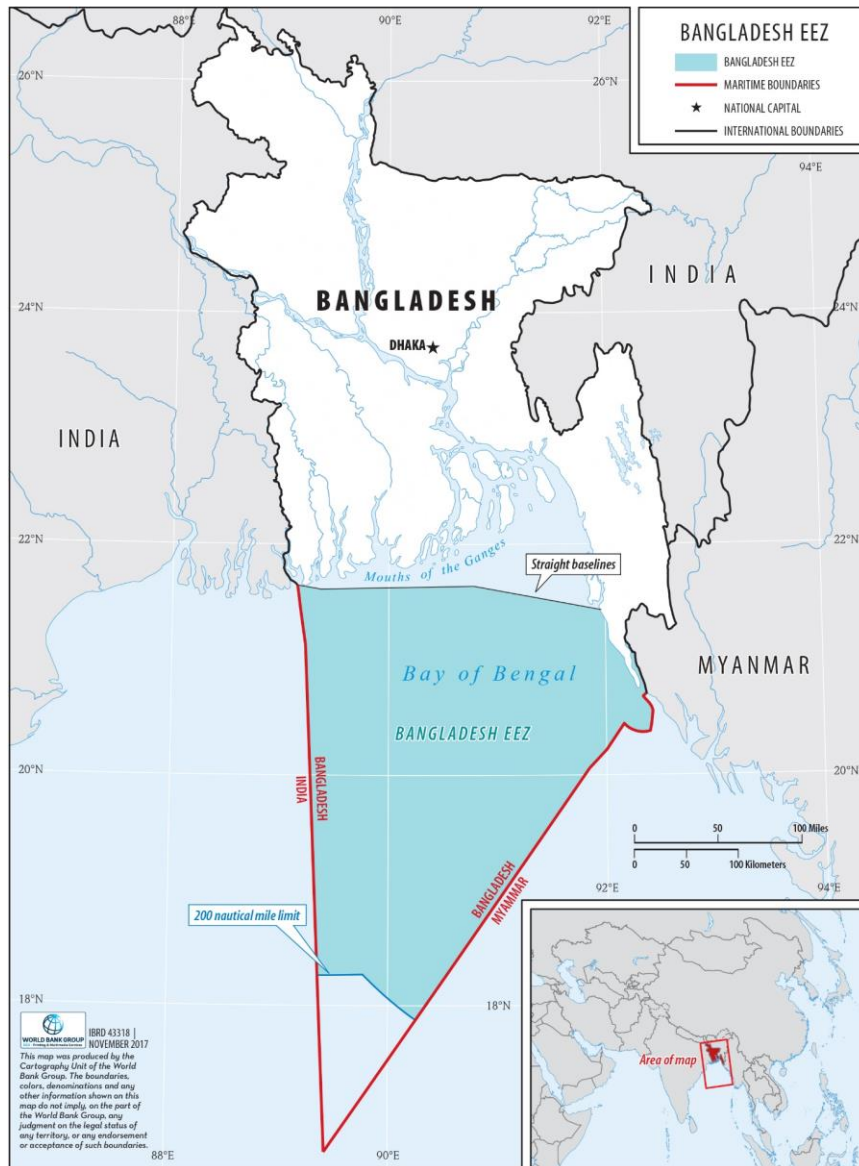


Figure 1 Exclusive Economic Zone of Bangladesh.

collaboration with the World Bank, from 2016 to 2018 (Patil et al. 2018). As part of that program, this study was conducted to help the Government generate initial measures of the ocean-linked economic activity in the country. These measures were known to be incomplete but were a necessary starting point. The economic

accounting exercise to estimate these measures led to the identification of information gaps and suggested methods for the government to fill them, including estimating the costs of environmental degradation in the ocean and the size and distribution of the economic costs and benefits of possible development pathways. The study thus provided the Government with a partial baseline on which policy and reform pathways can be assessed and growth measured, as the country pursues its blue economy objectives. The exercise for Bangladesh also point to both issues and strategies for developing countries with more limited economic and environmental data systems to begin the process of creating empirically grounded blue economy strategies.

METHODS

Key concepts underpinning the analysis: the ocean economy in Bangladesh. At the time that it was articulated as a policy objective, the blue economy concept was relatively vaguely defined in Bangladesh. This is consistent with discourse in international policy forums on the concept, where it has been used in very different terms (Silver et al. 2015) and characterized as a “buzzword” with general agreement in the abstract but not in practice (Voyer et al. 2017, Bueger, 2015). Just a few examples of countries promoting the blue economy in different terms as part of their economic development strategies include Australia (Voyer et al. 2017); China (Conathan and Moore 2015; Zhao et al. 2014), the European Union (Suris-Reguerio et al. 2013; European Commission, 2012), India (ANI, 2017), Indonesia (Salim, 2014; Sunoto, 2014), and a number of small island developing states such as Grenada and Mauritius (Cervigni and Scandizzo, 2017; Patil et al. 2016). For purposes of this study, the definition provided by the World Bank and United Nations (2017) was used, where the blue economy refers to “the range of economic sectors and related policies that together determine whether the use of oceanic resources is sustainable.”

The “blue economy” is an evolution of the concept of an “ocean economy”. The ocean economy is defined as a discrete segment of national economies and more broadly the global economy as measured by conventional economic measures such as gross domestic product and gross value added. Measuring the share of national economies linked to the ocean emerged, as countries aimed to develop more

integrated ocean policies that captured economies of scale and reduced negative externalities, similar to other concepts for segments of the economy where industries are interlinked by some common feature such that they collectively function as a system rather than a fragmented list of individual sectors, e.g. the “bioeconomy” or the “information economy” (OECD, 2016; Park and Kildow, 2014). Though differently defined in many contexts, the OECD (2016) recently provided a widely used definition of the ocean economy as the sum of the economic activities of ocean-based industries,¹ and the assets, goods, and services of marine ecosystems (or simply ‘ecosystem assets’).²

This study considered the output from those economic activities using the OECD’s definition of the ocean economy, that depend upon four classes of assets (capital), following the framework used in Lange et al. (2018): natural capital, produced capital and urban land, human capital and net foreign assets (Figure 2). The four types of capital support an ocean economy comprised of several economic sectors, each including specific industries or services. Countries have included different sectors and industries based on the context, with 25 countries identifying 54 industries as part of the ocean economy for example. Despite differences, these efforts have typically identified a core group of sectors and industries in the ocean economy: living resources, marine construction, tourism and recreation, boat building and repair, marine transportation, and minerals (including oil and gas) (Colgan, 2017b).

Following Park and Kildow (2014), for operational purposes this study defined the ocean economy in Bangladesh as the sum of the economic activities of ocean-based industries that take place in areas under the Government’s jurisdiction, and the assets, goods and services of marine ecosystems in the country’s waters. As in past descriptions by the Government of Bangladesh (Alam 2014), this study characterized the country’s ocean economy as twenty-six industries and services defined in ways that align with categories defined in the United Nations International Standard Industrial Classification (ISIC) system, which is used by the Government of Bangladesh for its national income accounts. As discussed below,

¹ The term ‘industry’ embodies only market-based activities in the private and public sectors, while the term ‘economy’ captures both the values embodied in market based exchanges and the values placed on goods and services but not determined in markets (OECD 2016).

² The term ‘ecosystems’ is used here to characterize by the interaction of communities of living organisms with the abiotic environment. Ecosystems are varied both in size and, arguably, complexity, and may be nested within one another. In practice, use of the term is more intuitive than based on any distinct spatial configuration of interactions (TEEB 2010).

data availability also affected the definitions used. Seven sectors are identified: living resources, minerals, energy, transport and trade, tourism and recreation, carbon sequestration, and coastal protection.³

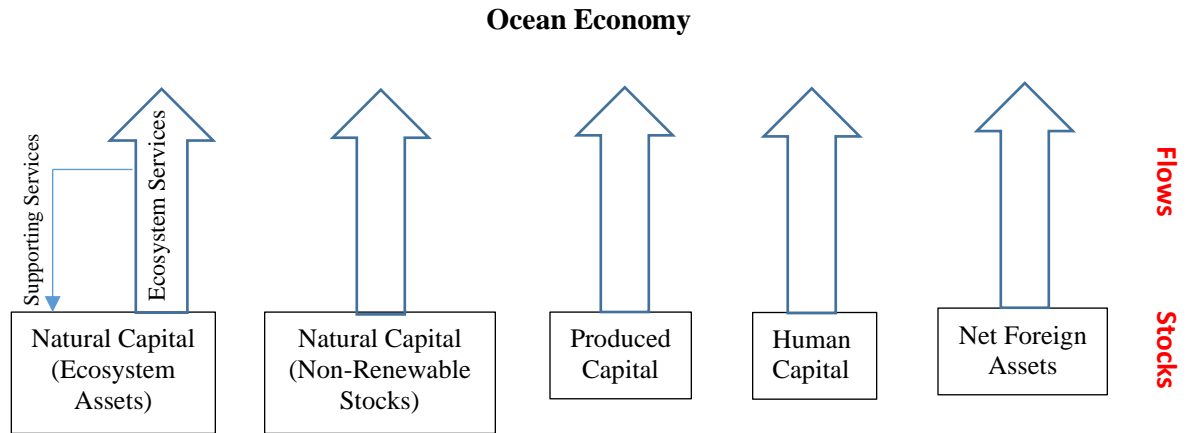


Figure 2 The Four Types of Capital Underpinning the Ocean Economy

Note that ambiguity remains of what is included in the definition of the ocean economy in the country and what is not. For example, given the similarities in production technology and supply chains, as well as the influence of marine ecosystems throughout the delta, fisheries and aquaculture categorized as ‘inland’ by the Bangladesh Department of Fisheries (DoF) could justifiably be included in the country’s definition of the ocean economy.

Measuring Bangladesh’s ocean economy. On the basis of the concepts described above, this study included an accounting exercise to generate common measures of an ocean economy for the case of Bangladesh: annual economic output (e.g. the value added of each industry as its contribution to Gross Domestic Product) and total employment. Unpublished government data on the contribution of specific industries to gross value added (GVA), together with information on employment, was accessed from the Bangladesh Bureau of Statistics (BBS), and supplemented

3. The Government of Bangladesh has characterized the industries/services of the country’s ocean economy as occurring within six sectors: fisheries, maritime trade and shipping, energy, tourism, coastal protection/artificial islands/greening coastal belts, and maritime monitoring, surveillance and spatial planning (Alam 2015; GED 2015).

as needed to fill gaps with (in sequential order): (i) peer-reviewed literature published before August 2017, and (ii) industry reports and other gray literature. More detailed measures of annual output might include the direct (within an industry), indirect (between industries, such as supplying industries), and induced (local spending linked to direct and indirect industries) contributions of the ocean economy. However, these data were not systematically available in disaggregated form in Bangladesh, though many industries of the ocean economy are measured in aggregate by the Bangladesh Bureau of Statistics BBS (Alam 2014).

Where available, data were provided by the BBS in disaggregated form, as value added by industry. Where data were not available, the data published according to the UN System of National Accounts was also checked. However, analysis of main aggregates contained useful data for the “fisheries” sector only. In addition, the United Nations International Yearbook of Industrial Statistics was reviewed, with relevant data on number of establishments, employees, and wages for three industries: “fish processing,” “ship and boat building,” and “ship building.” (United Nations Economic & Social Affairs 2016)

However, the most recent data available were from 2006, and were not utilized for this analysis. Subsequently, for remaining gaps the peer-reviewed literature was searched (for publications prior to August 2017) using the terms “Bangladesh” + “ocean”+ “economy”+ “GDP” generally, as well as searches for each ocean economy and related industry and service using the following format: “Bangladesh” + “[name of ocean economy industry/service]”+ “[GDP/income/value added]”. These searches did not yield additional data beyond government statistics referenced previously.

A number of gray literature sources proved useful, notably an economic valuation of the marine and coastal ecosystem services in the Bay of Bengal, produced as part of the Bay of Bengal Large Marine Ecosystem (BOBLME) project. (Emerton 2014) Similarly, industry reports and other gray literature sources provided data on fisheries, aquaculture, ship building, ship breaking, tourism, and recreational fisheries.

The resulting estimates of GVA are coarse and should be seen as indicative of only the order of magnitude of the annual output from Bangladesh’s ocean economy, given their reliance on heterogeneous data sources. Of note, these estimates of GVA provide only a partial baseline of the size of Bangladesh’s ocean economy, for several reasons: (i) the measures of economic output are incomplete in that they exclude (a) industries such as any marine-related construction,

recreational fisheries, coastal and maritime research and education, and maritime safety and security; and (b) a number of ecosystem services that lack market transactions but which may constitute a significant portion of the ocean economy ; (ii) the measures do not subtract the costs to the country from environmental degradation resulting from various activities in the ocean economy, that is, externalities to the ocean economy such as pollution from ship breaking; and (iii) the measures reflect a very ambiguous distinction between activities considered to be ocean-related and not ocean-related due to Bangladesh's geography, which is dominated in large part by the estuary and delta of the multiple rivers flowing south through Bangladesh.

RESULTS: BASELINE MEASURES OF BANGLADESH'S OCEAN ECONOMY

Table 1. Annual Gross Value Added from Bangladesh’s Ocean Economy (Nominal US\$ mm)

Ocean Economy Sector	Ocean Economy Industry/Service	ISIC Code [1]	2009-10 [2]	2010-11	2011-12	2012-13	2013-14	2014-15	Employment
Living Resources	Marine capture fisheries	311	664	777	786.23	907.49	1,037.49	1,167.79	1.35 mm [3]
	Marine aquaculture	322	78.65	92.48	99.76	122.05	144.99	163.2	
	Shellfish Aquaculture								
	Fish processing and retailing	311	0.19	0.22	0.21	0.19	0.18	0.17	
Minerals	Sea salt production	893	123.2	124.11	145.51	184.35	195.45	197.88	5.00 mm [4]
Energy	Offshore gas and oil:	0610, 0620	993.55:	972.26:	943.63:	1,011.41:	1,068.27:	1,205.14:	
	Crude petroleum		22.42	23.65	23.69	25.16	26.4	30.55	
	Natural gas		971.13	948.62	919.94	986.25	1,041.87	1,174.58	
Transport and Trade	Transport	5222	1,030.46:	1,082.11:	1,038.04:	1,108.79:	1,220.21:	1,366.10:	
	Maritime freight transportation		307.90	319.55	295.81	300.33	327.15	375.58	

Ocean Economy Sector	Ocean Economy Industry/Service	ISIC Code [1]	2009-10 [2]	2010-11	2011-12	2012-13	2013-14	2014-15	Employment
	Maritime passenger transportation		617.61	659.27	606.66	663.14	720.69	788.35	
	Port and harbor operations		104.95	103.29	135.57	145.32	172.37	202.17	
	Ship and boat building/breaking	3011,	237.71:	245.57:	240.95:	246.41:	246.90:	525.27:	
	Ship building and repair	3315, 3830	110.32	114.77	106.68	109.58	108.59	387.06	
	Ship breaking[5]		127.39	130.80	134.27	136.83	138.31	138.21	1.00 mm
Tourism and Recreation	Coastal and maritime tourism [6]		901.39	819.16	967.76	1,038.64	1,379.96	1,567.43	
<i>Carbon Sequestration</i>	<i>Blue carbon</i>	<i>N/A</i>	<i>A market does not exist for the flow of benefits generated from sequestration of additional stocks of carbon.</i>						
<i>Coastal Protection</i>	<i>Habitat protection, restoration</i>	<i>N/A</i>	<i>A market does not exist for the flow of protection benefits provided by natural habitats as resource stocks. US\$663 million has been estimated using benefit transfer and proxy estimates for the storm protection defenses of a hectare of mangrove forest in the Bay of Bengal region.</i>						
Total Ocean Economy GVA [7]			4,751.41	4,084.34	4,222.09	4,619.33	5,293.45	6,192.98	
Bangladesh GVA [8]			110,046.00	122,120.00	126,250.00	142,783.00	164,758.00	186,042.00	

Ocean Economy Sector	Ocean Economy Industry/Service	ISIC Code [1]	2009-10 [2]	2010-11	2011-12	2012-13	2013-14	2014-15	Employment
Taxes-Subsidies			5,239.00	6,561.00	7,152.00	7,214.00	8,128.00	9,117.00	
Bangladesh GDP			115,285.00	128,681.00	133,402.00	149,997.00	172,886.00	195,159.00	
Ocean Economy GVA as a % of Bangladesh GVA			4.31%	3.35%	3.34%	3.24%	3.21%	3.33%	

NOTES

[1] International Standard Industrial Classification

[2] Gross Value Added by industry available for fiscal years

[3] Data is often aggregated with inland fisheries and aquaculture. Total estimates range as high as 17.8 million in 2014, of which marine capture fisheries and aquaculture were 1.35 million.

[4] Direct employment; 25 million indirect estimated

[5] Data on ship breaking is not available at BBS. Based on Hossain (2015), estimates assume average gross value added of US\$0.92 million, multiplied by 150 large ships dismantled per year.

[6] Satellite accounts for tourism are not available at BBS, so data is aggregated for the entire country. The estimate assumes that 16% of gross value added from tourism for is coastal and marine-related.

[7] Exchange rates used: 2009/2010 – 69.18 Taka per US\$; 2010/2011 – 71.17 Taka per US\$; 2011/2012 – 79.1 Taka/US\$; 2012/2013 – 79.93 Taka/US\$; 2013/2014 – 77.72 Taka per US\$; 2014/2015 – 77.67 Taka per US\$

[8] GVA and GDP amounts given for second year in the period, e.g. for “2009-2010”, the GVA given is for 2010, as GVA and GDP are recorded annually by calendar year.

Sources: unpublished BBS statistics, World Bank; supplemented with: DoF (2017); Failler et al. (2017); UNSNA (2017); EIA (2017); Shamsuzzaman et al. (2017); Dausendschoen (2016); Meisner et al. (2016) Hossain (2015); WTTTC (2016); FAO (2014, 2016); Al Mamum et al. (2014); Kabir (2016); Sea Around Us Project (2017); Emerton (2014); Alam (2014)

Table 1 summarizes the GVA to the Bangladesh economy from ocean activity in recent years. GVA is used as a measure here for an entity smaller than the whole economy, rather than GDP (for reference, GDP is calculated as GVA plus taxes minus subsidies in a given sector). These measures indicate only the order of magnitude of the output from the ocean economy, given their reliance on heterogeneous data sources. Each industry's value added does not equate to its contribution to GDP, since the latter includes the gross value added plus product taxes minus subsidies not already included.

The gross value added shown in Table 1 is derived relatively evenly from tourism and recreation, marine capture fisheries and marine aquaculture, transport and energy (Figure 3).

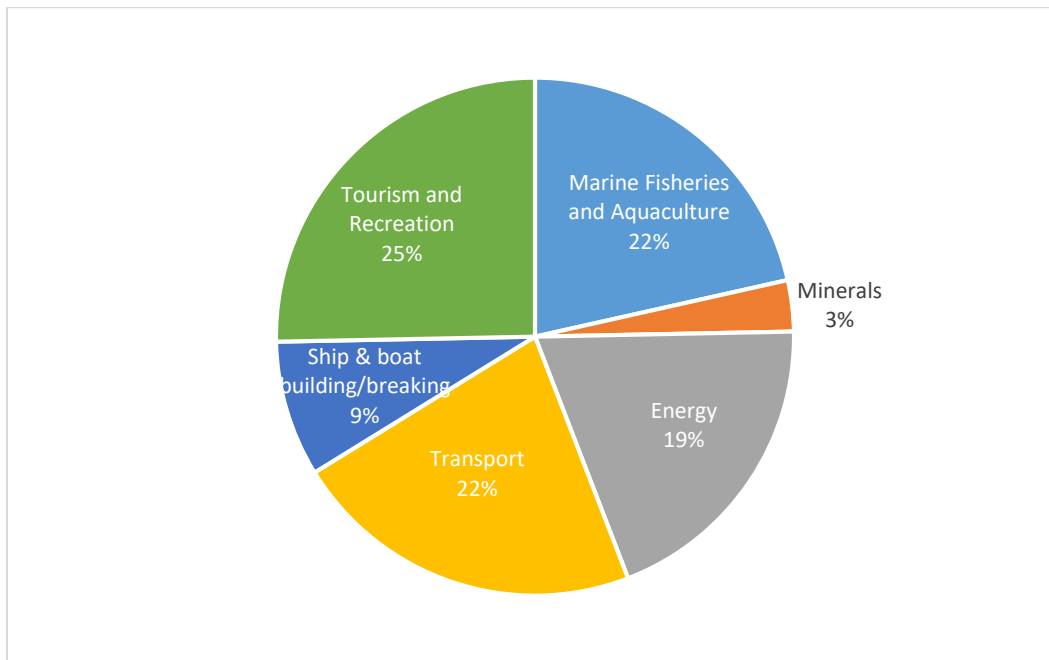


Figure 3. Composition of Ocean Economy in Bangladesh, % of gross value added (2014-2015)

DISCUSSION

Although incomplete, the estimates in Table 1 provide a baseline measure of the ocean economy in Bangladesh, equivalent to just over 3% of the economy in the 2014-2015 fiscal year, as a starting point for the Government to set targets for the country's blue economy aspirations. However, this baseline is incomplete because: (i) the measures of output do not include a number of ecosystem services that are not traded in markets but which may be significant (e.g. the carbon sequestration and coastal protection services of the country's mangroves); and (ii) the measures do not subtract the costs to the country from environmental degradation resulting from various activities in the ocean economy, for example pollution from ship-breaking. Quantitative measurement of marine ecosystem services as an economic value is a relatively new research field, however without such estimates, measures of output from the ocean economy will always be incomplete (OECD 2016). Finally, it should be noted that these measures of annual economic output provide a snapshot in time, but do not reflect sustainability or the status of the underlying capital stocks, e.g. natural capital assets such as fish stocks (Lange et al., 2018).

With these caveats in mind, the benefits of beginning to measure the economic activity connected to the ocean space and ecosystems under Bangladesh's jurisdiction is that these industries and ecosystem services do not develop in isolation. Rather, they interact as a system with a common denominator: the fluid, buoyant, three-dimensional environment of the ocean (OECD 2016). Analyses such as those conducted in this study can raise the awareness of policy-makers to the relative importance of ocean industries and services and shape a coherent approach to their development and use. Resulting benefits include lower costs from shared common infrastructure, cross-fertilization of technologies and innovation, reduced impact on the ocean environment, and more effective use of ocean space (Colgan, 2017a; OECD 2016)

Despite the potential benefits for Bangladesh to develop a more coherent and strategic approach to sustainable development of its ocean economy, an overarching policy framework and integrated planning process are not yet in place, nor measurable targets and consistent monitoring of progress. Even collecting basic data on economic output from industries included in the definition of the ocean economy is labor intensive and difficult. Hence a first step in the policy process

would be to enhance measurement of the ocean economy to feed into policy-making, beginning with regular collection of basic output measures such as shown in Table 1. Currently in Bangladesh, the data on the gross value added of ocean industries/services with markets is not disaggregated in the national accounts (constructed by collecting administrative data from different public and private agencies and BBS census surveys), and hence only available through significant effort. This could be achieved by developing an “ocean account” at BBS, beginning with steps to: (i) identify the country’s ocean economy industries at appropriate levels of precision (in some cases in more detail than the ISIC codes as shown in Table 1); and (ii) include a geographic measure of proximity to the ocean and coast for these industries.

A second step in the process could be to articulate a range of policy scenarios for development of the country’s ocean economy, building upon the initial assessment of the size and scope of this segment of the national economy provided in Table 1 as a baseline, together with the summary of information available on the status of the underlying natural capital assets. On this basis, various scenarios of growth in Bangladesh’s ocean economy could be analyzed through use of existing forecasting models (at least for selected sectors), taking into account what is known about the various external drivers. The output from modeling these scenarios would be estimates of the costs and benefits to Bangladesh from different development pathways for the ocean economy (e.g. including one or more ‘blue economy pathways’), from which to prepare specific policies needed to get there. As a starting point, priority sectors in a ‘blue economy’ pathway such as capture fisheries may be a priority for such scenario modeling, estimating the economic benefits and upside to investment in resource management and rebuilding depleted fish stocks (accompanying benefits from enhanced food security).

With these steps, it is possible to begin to operationalize its blue economy aspirations, by clearing measuring where this segment of the economy is today, and targets for where it feasibly could be over time, given a number of policy reforms and investment. Bangladesh could become one of the first countries to make concrete progress from broad aspirations to tangible policies and measurable outcomes of progress in the transition to a blue economy.

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