Evolving Definition of Blue Economy

BLUE ECONOMY FORUM

Introduction

Blue Economy has emerged as an overarching framework for assessment, development and exploitation of ocean resources and ocean habitat for economic growth and development. The concept of Blue Economy assumed importance especially after the Rio 20+ conference held in Rio de Janeiro in 2012. Seas and oceans occupy three-fourth of the earth and have been the crucial sources of food, energy and a range of environmental and ecosystem services. Moreover, it has been the largest sink for all degradable and non-degradable waste. Human civilizations have benefitted enormously from the precious marine living and non-living resources and services for centuries. At the same time, human actions particularly unprecedented urbanization and industrialization has caused serious damage to ocean ecosystems and ecological imbalance.

The recent shift in the discourse on commercial exploitation, management and governance of marine economy through the Blue Economy framework is to develop systematic measurement of marine activities on oceans and ocean-related sectors in order to formulate suitable national and international policies and plans to harness full potential of ocean economy. Blue economy has gained considerable attention worldwide as an all-encompassing subject in the context of ocean-based economy. However, there are more disagreements than agreements among the coastal nations over the coverage of sectors, sub-sectors, actors and institutions.[1] Academic research and policy experiments in different countries conducted on various facets of blue economy have produced substantial volume of literature which has created awareness about the potential of blue economy globally for inclusive and sustainable development of economies especially in the coastal nations. Blue Economy is also seen as a crucial sector for expanding economic activity as land resource-based economic models of development has perhaps underestimated the contribution of marine resources to economic growth and prosperity of the nations.

Approaches of International Organizations and Literature

Although there is not a single universally accepted definition of blue economy a number of international organizations and scholars have captured various angles and dimensions of blue economy. This diversity not only provides multi-disciplinary perspectives about opportunities and challenges in the sector especially economic, social, environmental aspects but also yields relevant inputs for policy-making in the coastal nations.[2]

UN (2012) is of the view that "*Blue Economy paradigm constitutes a sustainable development framework for developing countries addressing equity in access to, development of and the sharing of benefits from marine resources; offering scope for re-investment in human development and the alleviation of crippling national debt burdens.*"

Further, "*the Blue Economy conceptualizes oceans as "Development Spaces" where spatial planning integrates conservation, sustainable use, oil and mineral wealth extraction,*

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bioprospecting, sustainable energy production and marine transport. The Blue Economy breaks the mould of the business as usual "brown" development model where the oceans have been perceived as a means of free resource extraction and waste dumping; with costs externalized from economic calculations."

OECD (2016) "*considers that any definition of the ocean economy is incomplete unless it also encompasses non-quantifiable natural stocks and non-market goods and services. In other words, the ocean economy can be defined as the sum of the economic activities of ocean-based industries, and the assets, goods and services of marine ecosystems."*

EIU (2015) defines blue economy "a sustainable ocean economy emerges when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy."

World Bank and UNDESA (2017) propagates that "a sustainable blue economy provides social and economic benefits for current and future generations by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity, and political stability. It restores, protects, and maintains the diversity, productivity, resilience, and intrinsic value of marine ecosystems, and based on clean technologies, renewable energy, and circular material flows."

Following the principles of blue economy, FAO has introduced the Blue Growth Initiative for sustainable development of fisheries and aquaculture that marks a major departure from the historical single-dimension focus on producing more fish or safeguarding the environment to include priorities of social benefits as well. It is an effort to break the 'business as usual' approach and adopt framework for a holistic treatment of fisheries and aquaculture sector for maximizing production and profits, maximize environmental sustainability, and addressing livelihood concerns (FAO, 2017).

The concept of blue economy is still at the devolving stage where there is yet to be any comprehensive definition which would be appropriate from the operational point of view. In the literature, blue economy has been used synonymous to 'marine economy', coastal economy', ocean economy', 'green economy' and so on. While the basic tenets and goals of these competing paradigms are more or less similar, there are basic differences in the approaches and treatment of various elements such as resource management, growth objectives, sustainability and social equality. At the United Nations Conference on Sustainable Development held in Rio de Janeiro in 2012, blue economy was viewed as ocean economy that aims at the "improvement of human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.

At its core the ocean economy refers to the decoupling of socio-economic development from environmental degradation. In this regard, efficiency and optimization of natural marine resources within ecological limits becomes paramount" (UNCTAD, 2014). By that definition, ocean economy can be defined as the economic activity which directly or indirectly uses the sea as an input whereas the coastal economy represents all economic activity which takes place in a specific coastal region.

To understand the 'ocean economy', one has to understand its features as follows. Ocean economy (1) is a sub-set of the economy (2) dependent on oceans for inputs to invigorate its production process (3) based on industry and also geographical locations and (4) industries/activities are located in coastal and non-coastal areas. As per Colgan (2004), "the *ocean economy* is that proportion of the economy which relies on the ocean as an input to the production process or which, by virtue of geographical location, taking place on or under the ocean. It is a function of both industry and geography… while most of the ocean economy (for example, boat building, seafood retailers and many ocean instrumentation, equipment and surveying industries) may be located in non-coastal region."

In terms of coverage of activities, the 'costal economy' is larger than 'ocean economy'. The basic features of the coastal economy are: (1) a sub-set of the economy (2) concentration of activities on or around the coastal areas and (3) sum of all activities relating to output, employment and wages in the coastal region. Therefore, Colgan (2004) views coastal economy as "..... all economic activity in the coastal region, and is thus the sum of employment, wages, and output in the region. Some of the coastal economy is the ocean economy, but the coastal economy incorporates a broader set of economic activities."

On the other hand, 'marine economy' is a horizontally integrated cluster of industries which include sectors meant for a common market for the end products, using common technology or labour force skills, or require similar natural resources (University of Massachusetts, 2006). This sector comprises of five major sectors including commercial seafood, marine transportation, coastal tourism and recreation, marine science and technology, marine-related construction and infrastructure. The marine economy is a sub-set of the coastal economy. The Government of Australia (2013)[3] defines "a blue economy is one in which our ocean ecosystems bring economic and social benefits that are efficient, equitable and sustainable." Following same strand, EIU (2015) highlights that national ocean development strategies refer to blue economy as a guiding principle. And, blue economy is synonymous to "greening of the ocean economy". Extending this further, as per the UN (2012) the horizon of blue economy is much wider and inclusive. It has futuristic development implications by visualising certain patterns of production and consumption of ocean resources.

From the UN (2012) perspective of blue economy as development spaces, blue economy should break the mould of business-as-usual 'brown' development model where oceans are perceived as a means of free resource extraction and waste dumping without taking into account the costs of the negative externalities. This strand of thinking signals the inherent risks involved in indiscriminate exploitation of marine resources for economic growth. Further, resource accounting should take into cognizance the costs of environmental damage and ecological imbalance caused due to consumption-centric resource use (Pauli, 2010). The European Commission (2012) has defined the concept of blue economy as "all economic activities related to the oceans, seas and coasts. These include the closest direct and indirect supporting activities necessary for the functioning of these economic sectors, which can be located anywhere, including the landlocked countries." The growing competition among the nations for energy and resources focuses the need for regional cooperation to harness the endowments in a more sustainable manner. Adoption of a comprehensive definition of blue economy is therefore necessary to understand and to act jointly with other coastal nations to harness the existing potential of blue economy.

In nutshell, blue economy and its sister concepts may be defined as the following:

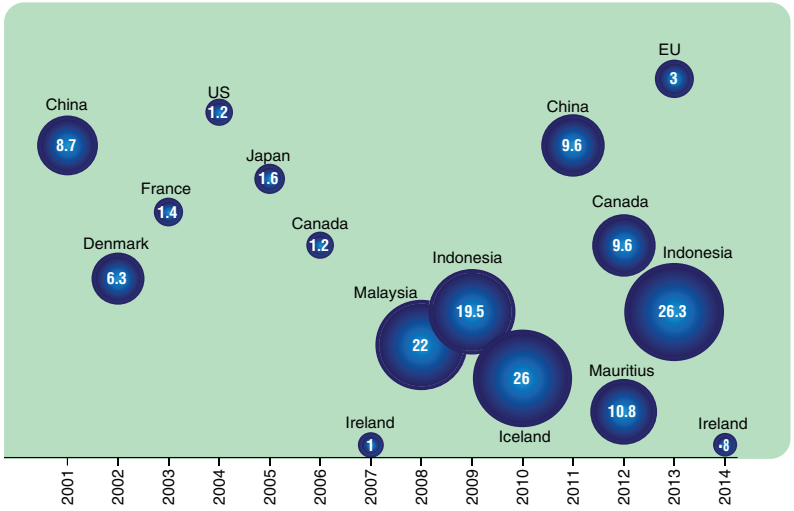
- As a segment of an economy, *Ocean Economy* is dependent on ocean for inputs to run certain production processes in the coastal and non-coastal regions, and these activities are identified by both industry and geographical location.
- As a sub-sector of an economy, *Coastal Economy* includes all economic activities including the sum of output, employment and wages, taking place on or near coast.
- As a sub-set of the economy, *Blue Economy* covers all ocean-related activities including direct and indirect supporting activities required for functioning of these economic sectors, while adjusting to the costs of environmental damage and ecological imbalance caused due to exploitation of ocean resources for consumption. Therefore, the scope of blue economy is much wider and inclusive relative to other similar concepts.

The concept of blue economy is subject to multiple interpretations because of the coverage of activities, geographical locations and sectors. From the available literature, an indicative list of sectors and the broad categorization of sectors into traditional and emerging sectors are illustrated in Table 1. Likewise, Fig. 1 presents some estimates of the size of blue economy in select countries. Recent cross-country evidences show that blue economy is emerging as a dynamic component of some economies, thus generating interest for its comprehensive development through formulating national policies, evolving strategies at the national level and arousing debate in the global platform to highlight the importance of the issue and initiative global plan of action to focus on ocean and other related activities.

Blue Economy Accounting in Different Countries

As definitions of blue economy are guided by diverse perspectives, the same is reflected in the measurement and accounting of blue economy in different countries. The difference in estimates on blue economy across countries is mainly due to differences in inclusion of activities in different sectors and sub-sectors, data gaps and different statistical systems. Table 2 presents the

Figure 1: Contribution of Blue Economy: Country Experiences



Source: Mohanty, Dash and Gupta (2017)

Note: The size of the bubble represents the percentage contribution of blue economy to country's GDP

Table 1: Taxonomy of Blue Economy Sectors

Broad NAS Sector	Sub-sector	Industries	
		Traditional	Emerging
Agriculture	Fisheries	Capture fishery, Seafood processing	Multi-specie aquaculture, fish processing, marine aquatic products
Manufacturing	Deep-sea mining	Oil & gas exploration	Marine derived bio-products, seaweed harvesting, seaweed products
	Marine biotechnology		
	Boat & ship making		
	Ship repairing		
Services	Ports & Shipping		
	Tourism	Coastal tourism, Eco-tourism and yatching	
	Transportation & logistics		
	Marine construction	Short-sea shipping	
	Maine commerce		
	Marine ICT		High-tech marine products and services
	Banking & financial services		Marine legal services, Marine financial services, marine insurance
	Marine renewable energy	Offshore wind, offshore wave, tidal	

Source: Mohanty, Dash, Gupta and Gaur (2015).

Table 2: Coverage of Sectors by Country

Country	Coverage of Sectors
USA	The economic activity which is (a) an industry whose definition explicitly ties the activity to the ocean, or (b) which is partially related to the ocean and is located in a shore-adjacent zip code.
UK	Those activities which involve working on or in the sea. Also, those activities that are involved in the production of goods or the provision of services that will directly contribute to activities on or in the sea.
Australia	Ocean-based activity
Ireland	Economic activity which directly or indirectly uses the sea as an input
China	The sum of all kinds of activities associated with the development, utilization and protection of the marine resources
Canada	Those industries that are based in Canada's maritime zones and coastal communities adjoining these zones, or are dependent on activities in these areas for their income.
New Zealand	The economic activity that takes place in, or uses the marine environment, or produces goods and services necessary for those activities, or makes a direct contribution to the national economy
Japan	Industry exclusively responsible for the development, use and conservation of the ocean.
South Korea	The economic activity that takes place in the ocean, which also includes the economic activity which puts the goods and services into ocean activity, and uses the ocean resources as an input.

Source: Park (2014).

conception of blue economy and the whole range of sectors and sub-sectors that constitute blue economy in different countries. The definitions of blue economy vary across countries based on the approach the country adopts. Some definitions view blue economy as activities in ocean industries whereas some others are either heavily biased either in favour of economic use of ocean resources or conservation and management of ocean ecosystems. As a result, there is a greater likelihood of divergences in empirical estimates of the size of blue economy.

Besides country-specific definitions, blue economy can be characterized based on the ways the oceans are perceived. In that sense, the scope of blue economy can be approximated by three different angles of thinking: (1) 'in the ocean', (2) 'from the ocean' and (3) 'to the ocean'. To Park (2014), "'*In the ocean' means the economic activity that takes place in the ocean to use, protect, research, and develop the ocean. 'From the ocean' means the economic activity that receives goods and services from an ocean activity to use, protect, research, and develop the ocean. Lastly, 'To the ocean' means the economic activity that provides inputs for an ocean activity.*" Along with other definitions mentioned above, this categorization probably captures the essence of blue economy reasonably well.

Further disaggregation of sectors into various sub-sectors and specific activities are enumerated in Table 3. While fishing, aquaculture, shipping, construction, tourism, ports, etc. are some of the common sectors for most of the countries, there are a good number of emerging sub-sectors which are specific to certain countries. Among the emerging sub-sectors, marine biotechnology, cruise tourism, marine services, marine IT, marine finance etc. are widely

Table 3: Scope of Blue Economy by Country

USA	UK	France	Australia	Ireland	China	Canada	Spain	New Zealand	South Korea
Construction-marine	Fish	Seafood products	Marine tourism	Shipping and maritime transport	Marine fishery	Seafood	Inland navigation	Offshore minerals	Fisheries
Living resources-Marine	Oil & gas	Extraction of marine aggregates	Refining of petroleum	Water-based tourism and leisure	Offshore oil and gas industry	Offshore oil & gas	Marine aggregates	Fisheries and aquaculture	Marine mining
Minerals-offshore	Aggregates	Energy	Fisheries and seafood	International cruise industry	Ocean mining industry	Marine transpor-tation	Marine equipment	Shipping	Ocean renewable energy
Ship & boat building	Ship and boat building and repairs	Ship building and repairs	Prioritize	Other marine services	Marine salt industry	Ocean-based recreation /leisure	Maritime services	Government and defense	Marine construction
Tourism & recreation-coastal	Marine equipment and materials	Marine and river civil engineering	Shipbuilding	Sea fisheries	Shipbuilding industry	Marine construction	Maritime works	Marine tourism and recreation	Shipping industry
Transportation-marine	Marine renewable energy	Submarine cables	Port-based industries	Aquaculture	Marine chemical industry	Manufac-turing	Navy and coastguard	Marine services	Marine equipment and materials industry
	Construction	Offshore oil and gas-related industry		Seafood processing	Marine biomedicine industry	Services	Offshore supply	Research and education	Ship and offshore plant building industry
	Shipping operations	Coastal tourism		Oil & gas exploration and production	Marine engineering building industry	Federal government	Recreational boating	Manufacturing	Marine technical services
	Ports	Maritime and river transport		Marine manufacturing	Marine electric power industry	Provincial/ territorial government	Seaports	Marine construction	Marine research and development
	Navigation & safety	Maritime insurance		High tech marine products and services	Seawater utilization industry	Universities and research	Shipbuilding		Marine public administration and education
	Cables	French navy		Marine commerce	Communi-cations & transportation industry	NGOs	Shipping		Seafood processing
	Business services	Public intervention		Marine biotechnology and bio-products	Coastal tourism		Coastal tourism		Marine bio industry
	License and rental	Coastal and marine environmental protection		Marine renewable energy			Cruise tourism		Port industry
	Research and development	Marine research					Fisheries		Marine tourism and leisure industry
	Marine environment								
	Defense								
	Leisure and recreation								
	Education and training								

Source: Park (2014).

discussed in the literature. In addition, it is clear that many sectors are common to both land-based economy and blue economy.

While each of these alternative definitions of blue economy has merits, the empirical estimation of the size and contribution of blue economy to the economies of the coastal nations and to the world as a whole including the land-locked countries is complicated. On the other extreme, the concept would lose its significance as a development paradigm in absence of any comparable measure of blue economy across countries. A scientific mapping of activities and services in different blue economy sectors is necessary to envisage plans and programmes for mainstreaming blue economy in national development policies. The United States and European countries have made systematic attempts towards accounting of blue economy. Some indicative estimates and projections on the size of blue economy and the people employed in different sectors are available. However, those estimates are not amenable to any comparative assessment thereby limiting their utility for policy-making. Two statistical frameworks such as the National Accounting System (NAS) and Input-Output (IO) table are widely referred to in the estimation of blue economy. For measuring blue economy the United States had initially used Standard Industrial Classification System (SIC) system in the beginning but later replaced it with the North American Industry Classification System (NAICS). The framework for the measurement of blue economy was further refined by the National Ocean Economy Programme (NOEP). Besides presenting data on output and employment at the national level, NOEP provides estimates for different coastal regions of the country. Likewise, the European Union has also developed a separate system of classification of ocean-based economic activity, Nomenclature Statistique des Activites Economiques dans la Communaute Europeenne (NACE). Apparently, this system is more comprehensive than NAICS in the United States. Other countries have broadly used similar statistical systems of classification of blue economy activities as per the sectors included in their definitions. Several studies have attempted to rebuild the classification system by using International Standard Industrial Classification (ISIC) as well.

Factors Shaping Conception and Operationalisation of Blue Economy

A number of interrelated dimensions broadly characterize the conceptualization and measurement of blue economy.

- ***Economic Dimension***: The economic dimension necessitates proper measurement of blue economy activities which would help yield useful information about the contribution of blue economy to national income of a country. This rationale inspires the governments to invest in frontier areas of ocean technologies, encourages innovation, incentives to private sector for expanding businesses, and exploring ways to diversify livelihood options.
- ***Sustainability Dimension***: Unlike brown economy that has historically relied on extraction of resources and their use in the quest for achieving high economic growth, the acceptance of blue economy is due to its emphasis on sustainability of ocean resources. Following that strand, it would require proper scientific assessment of stock, use and replenishment of ocean resources such as fisheries, oil & gas, deep-sea minerals, ocean health, marine biodiversity such as mangroves, coral reefs, sponges, etc.
- ***Valuation of Direct (Market) Use and Indirect (Non-Market) Use***: Apparently, it is clear that use of certain types of marine resources and services is not easily quantifiable. As a result, those activities and services are either excluded or underestimated in national estimates of blue economy. Direct use in ocean economy includes extractive and non-extractive uses whereas indirect use mostly covers ecosystem services. Valuation of direct uses such as fisheries, aquaculture, oil and gas production, tourism, shipping, ports, shipbuilding, marine construction, marine commerce, etc. is accepted as those are clearly reflected in national accounts.[4] Unlike those sectors, there are a whole range of cultural, regulating and other supporting services which are vital for the ocean habitat and human lives but lack proper valuation of their contribution.
- ***Incomplete Coverage of Blue Economy in National Accounts***: As per the System of National Accounts (SNA), some activities of blue economy sectors are already included. However, there is a greater likelihood of non-coverage of many blue economy goods and services because of non-availability of data and proper framework for measurement. In particular, SNA does not provide measurement of natural capital such as forests, mangroves, coral reefs, wetlands, water, minerals, and so on. As a result, the estimate of blue economy based on SNA may underestimate the contribution of blue economy to national income of a country. It can be addressed by mapping of goods and services in the blue economy sectors and regular reporting of data by the governments at all levels as per a well-defined global statistical system.
- ***Factoring Externalities in Estimation of Blue Economy Output***: Most of the ecosystem services provided by oceans are essentially public goods in nature. It is therefore difficult to measure the benefits accrued from those services to the people living in that region. Likewise, the negative externalities associated with overfishing, marine construction,

marine pollution, etc. are not factored into typical accounting of national income. It complicates scientific assessment of the potential of blue economy, hence creates uncertainty over planning and investment decisions.

- ***Legal and Geographic Jurisdictions***: Blue economy has a geographic dimension as the right of access of a sovereign nation in oceans is defined by the Exclusive Economic Zones (EEZs), continental shelf and so on. While preservation, conservation and commercial exploitation of ocean resources within the EEZ is the exclusive rights of the concerned nation, there are certain international conventions which may have conflicting provisions. Likewise, whether brackish water bodies and inland water bodies are to be included in the geographic domain of blue economy or not remains a controversial issue in many coastal nations of the world.
- ***Right of Access in High and Deep Seas***: Ocean space beyond the EEZs is rich in stock of precious marine resources including fisheries, minerals, rare earth metals, etc. No country has exclusive right over resources in the high seas and deep seas. It is mostly governed by the United Nations Convention on Law of Seas (UNCLOS) and a few other sectoral conventions e.g. Regional Fisheries Management Organizations (RFMOs) for fisheries. In case of disputes, for instance catch of migratory fish species there is no such binding obligations by the coastal states.

Need for Country-Specific Definition of Blue Economy

Each country has different endowment of marine resources which is uniquely placed in terms of its spatial distribution. Some countries have long coastlines compared to others whereas some others have distinct advantage of having abundance in certain ocean resources even though the length of their coastlines is relatively shorter. Very often, demographic composition and developmental priorities do influence the approaches towards promotion of blue economy in many countries. As highlighted above, the complication in accounting of blue economy activities arising from ambiguities in definitions has affected policy decisions and undermines the lives of the people dependent on oceans and ocean-based industries for their livelihood. However, it has high opportunity costs for the countries to wait for the evolution of a universally accepted and global consensus-based definition and measurement of blue economy. Diversity in knowledge creation should be respected for the time being with focus shifting to benefits from the opportunities unleashed in different sectors of blue economy.

Some developed countries such as Norway and Ireland which are small in country size but have well-developed ocean economy. Systematic efforts have been made by the governments of these two countries to develop fishing, port & shipping, tourism and a number of other marine sectors. Among other countries, the United States, China, Australia, Canada, EU etc. are at relatively advanced stages of conception and operationalisation of blue economy. Interestingly, blue economy which has been the lifelines for the Small Island Developing States (SIDS) including the Pacific Islands, Islands in the Caribbean, Island countries such as Seychelles, Mauritius, Kenya, Oman, etc. along the coast of Indian Ocean. SIDS have taken number of steps to popularize the concept of blue economy as a paradigm for the future for the world which so far was heavily biased towards the 'green economy' philosophy. Oceans and the resources in and on oceans are economically equally important for creating livelihood opportunities for poor people and native coastal communities as it is for conservation of marine resources and controlling environmental pollution. This trade-off is not easy to resolve but will remain a major policy puzzle in the coming years as well. Hence, it is imperative to develop country-specific definition of blue economy that takes into account the national interests and evolve frameworks for best utilization of country's marine resources. However, this does not imply to encourage a 'race-to-the bottom' paradigm in the context of utilization of ocean resources. Coastal nations can depend on blue economy for enhancing welfare of their citizens without compromising the ecological and environmental parameters.

Conclusion

Blue Economy is emerging as a powerful concept worldwide in the domain of marine resource assessment, utilization and regeneration. The extent of sensitization about blue economy after the Rio+20 Summit in 2012 has been remarkable. Blue economy paradigm not only provides an alternative framework for defining the boundaries of marine economy but also exposes the risks and threats that are building up in the ocean space. Moreover, this concept juxtaposes maximization of utility from use of marine resources and sustainability aspects with focus on three parameters-restocking, rejuvenation and regeneration. Oceans and ocean-related activities have been integral parts of the ordinary lives of the people in many nations of the world. Oceans are sources of food, nutrition, energy, medicine and minerals. This vast natural treasure has been the prime source of livelihood for millions all over the world especially the poor and the native aborigines.

As the scope and potential of blue economy has not been fully exploited, the current knowledge about the size of blue economy at national and local levels, and comparison of blue economy is incomplete and lopsided. Since the universe of blue economy is

multi-dimensional in nature, the room for alternative conceptions and definitions is quite natural. As a result, different countries have different coverage of sectors and sub-sectors. This has been reflected in the definitions of blue economy that countries have adopted in the past decade. Moreover, accounting of blue economy is not flawless as different countries adopt different systems of statistical classifications. While plurality of definitions and accounting methodologies is respected, it is imperative to harness the potential of blue economy sector for benefits of the people at large. In operational sense, country-specific definition is the medium-term solution to the trade-off between maximization of utility from blue resources and conservation of ocean resources and habitat.

Endnotes

1 For more details, see Mohanty, Dash and Gupta (2017) and Mohanty (2018).

2 Voyer et al. (2017) present an interesting review of literature on concepts and perspectives of blue economy across continents. The evolution of the concept is centered on four themes: (1) oceans as natural capital, (2) oceans as livelihoods, (3) oceans as good business, and (4) oceans as driver of innovation.

3 See '*Marine Nation 2025: Marine Science to Support Australia's Blue Economy*' for more information.

4 See Ebvaria (2016) for more details.

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