

Contextualising Blue Economy in Asia-Pacific Region

Exploring Pathways for a Regional Cooperation Framework

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Executive Summary

- Blue economy promotes economic growth, social inclusion and improvement of livelihoods while at the same time ensuring environmental sustainability. With no single or universal definition, the concept of blue economy is gaining prominence due to the potential of the framework to form interlinkages. The Fluidity of Blue economy framework allows the creation of pathways for integrated strategies and actions for oceans with room to evolve in accordance with emerging challenges and opportunities.
- For the purpose of the policy brief, the Asia-Pacific region includes South Asia, South-East Asia, East Asia, Australia, New Zealand and the Small Island Developing countries. The region is home to developed, developing and least developing economies (LDCs). Around 13 countries in Asia are Least Developing with 9 of them being island or coastal economies.
- Ocean-based sectors contribute significantly to the economic growth of Asia-Pacific countries, additionally for some of the island nations — oceans are at the core of socio-economic functioning. The share of blue economy in the GDP of Asia-Pacific countries varies from as low as 1% to as high as 30% and in a few island nations the GDP contribution is as high as 87%.
- The Asia-pacific region is the backbone of Global Maritime trade with major Sea Lanes of Communication (SLOC) within its region. According to UNCTAD Review of Maritime Transport 2019, 64% of the container port traffic occurred in the Asian region alone. Among the top 50 global container ports, 9 of the 10 are located in Asia, and 7 of the top 10 are from China.
- Global ship production is dominated by the three Asian countries — Republic of Korea, China, and Japan — representing 90% of the global shipbuilding activities. In the ship-breaking sector, Asian countries like Bangladesh, India and Pakistan lead in the maritime supply chain where Bangladesh made 47.2% of this segment followed by India at 25.6% and Pakistan at 21.5%.
- Out of all the three sub-regions, East Asia-Pacific accounts for more than half of Asia-Pacific's international tourist arrivals and receipts. The region's strength lies in trade and globalization and thus the region provides excellent connectivity, thus attracting a lot of tourists. Similarly, the Southeast Asian countries' GDP has a high dependence on tourism because of the high influx of international tourists.
- The region contributes significantly to the global food basket through its fisheries sector. The Asia-Pacific region is a major world producer of fish and fisheries products, and Asia (excluding China) occupies around 34% of the global fishing and aquaculture market. The total fish production has almost doubled in Asia in the last 20 years. Fish farming is also dominated by the Asian countries that have produced 89% of the global total in volume terms in the last 20 years. China alone has produced more farmed aquatic food than the rest of the world since 1991.
- Around 85% of the total population employed in the fishing sector globally, is in Asia. Asia has the largest fishing fleet as well in the world, standing at 3.1 million vessels or 68% of the total in 2018. Almost 75% of the reported motorized fleet in 2018 was in Asia.
- Asia has consistently been accounting for almost two-thirds of the global inland water production since the mid-2000s and accounted for 57% of total inland water catches in 2018. The world's top six inland waters capture production is in Asian countries, out of which China produces almost 16% of

the world's inland water capture fisheries, followed by India (14%), Bangladesh (10%), Myanmar (7%), Cambodia (4%) and Indonesia (4%).

- ◆ Asia-Pacific region is known for its rich coastal and marine resources. Coastal tourism is expanding in the region as more than 8% of the world's mangrove areas are in this region. The Sundarban Delta is the world's largest continuous stretch of mangroves. The Great Barrier reef is also a key ecologically fragile zone in the region.
- ◆ The rich biodiversity and abundance of mineral and ocean-based resources has led to accelerated movement towards exploring and developing seabed mineral and marine resources for high technology sectors, pharmaceutical industry among others. Harnessing blue biotechnology is a rising technology and innovation area in the blue economy. In the Asia-Pacific, China, India, South Korea, Japan, Thailand, Vietnam and Australia are expected to become significant markets for marine biotechnology within a reasonable time-frame.
- ◆ The increasing need for mineral resources is leading countries to look towards ocean beds. Deep-sea mining is one of the emerging sectors of blue economy that requires significant R&D capacity and finance. China, India, Korea, Japan are the major players from Asia participating in the International Seabed Authority processes. Other Asian countries that are venturing into deep-sea mining include Singapore and few SIDS states.
- ◆ The ocean is a poorly-policed frontier with the ongoing COVID 19 pandemic exacerbating the offshore law enforcement gap as coast guards and navies look inward to manage and relieve domestic crises rather than police the open waters.
- ◆ Pirates, poachers and smugglers will continue operating and may have a greater incentive to resort to crime due to the global recession. This would include a probable increase in illicit fishing as well. In contrast, legal industrial fishing operations are likely to decline, especially over the near term, from a combination of the risk of being at sea in a pandemic and supply chain complications caused by market closures.
- ◆ Lack of up-to-date ocean science data will be problematic (due to reduction in operational research cruises) to assess stocks and management regimes especially in data-poor regions of the developing world. These market disruptions as a result of the pandemic will greatly affect the trade of fish which is the most widely traded food commodity.
- ◆ Beyond the fishing industry, ocean tourism will suffer as travel slows due to the pandemic. Coral reef tourism generates \$36 billion per year, a value that has been a key driver in marine conservation. Lost revenues may increase pressure for near-term exploitation. Small Island and lesser developed countries are particularly vulnerable to the downturn in tourism.
- ◆ With the highest concentration of global population with a majority of them socio-economically vulnerable, the impact of climate change is already visible in the region. Sea level rise, extreme weather events and natural disasters are on a rise. The rise of global health crises such as COVID 19, accentuates these vulnerabilities and the changing climate also aids the spread of diseases.
- ◆ While regional organisations like APEC are focusing on ocean health and blue economy sectors, regional level cooperation across the region is necessary to interlink blue economy initiatives that are being implemented at national or sub-regional level.

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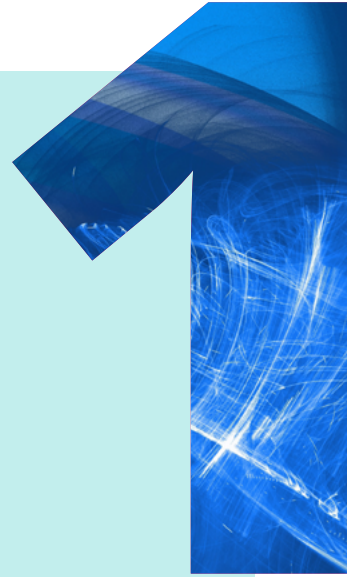
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Introduction



Oceans are an integral and essential component of the ecosystem as they cover around three-fourths of the Earth's surface. Billions of people worldwide and especially the developing and poor nations rely on oceans and seas for both livelihood and food. The ocean economy directly contributes to around US\$ 1.5 trillion in the gross value added to the world economy in 2010, which is more than 3% of the world gross domestic product (GDP) and provided direct employment to around 31 million people. By 2030 its contribution is projected to double in size to US\$ 3trillion (from 2010 levels), providing full-time employment for around 40 million people.¹ Moreover, oceans and seas are also a major source of food. Globally fish provides about 3.3 billion people with almost 20% of their average per capita intake of animal protein, reaching 50% or more in several small islands developing States (SIDS).² Thus, oceans have a strong interlinkage with livelihoods, sustainable development, economic growth and food security.

Oceans cannot be merely seen as an economic

good — the economic and trade activities arising out of the oceans are intrinsically linked with conservation and sustainability. The concept of 'Blue Economy' (BE) was promoted at the Rio+20 Conference as the marine dimension of the broader 'green economy' and encapsulates the economy and sustainability linkages. It was defined as an economy "that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities".³ This concept has been defined in multiple ways by different organizations and institutions (Table 1).

The scope of Blue Economy is viewed as a holistic development paradigm that aids economic growth and development while focusing on resource-efficient and sustainable utilization of marine resources. It is considered as a macroeconomic concept which is an integration of sustainable development and green growth. However the focus here is on the marine ecosystem, oceans and the coastal zone economic system. Though the Blue Economy is considered similar to 'marine economy' and 'ocean economy', what makes it different from

Table 1: Definitions of 'Blue Economy' by different agencies

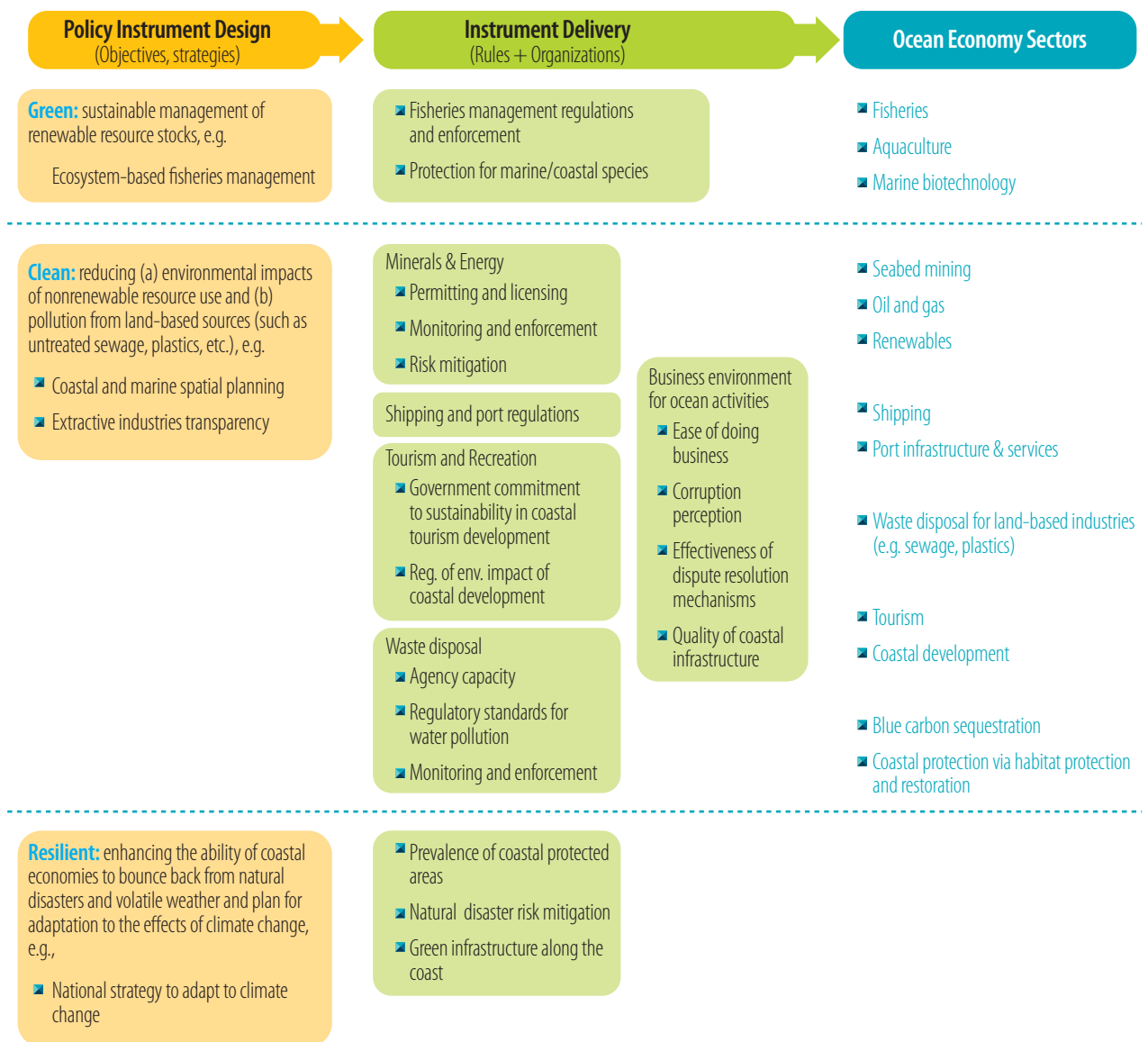
Concept	Definition	Agency
Blue Economy	All economic activities related to the oceans, seas and coasts. This includes the closest direct and indirect supporting activities necessary for the functioning of these economic sectors, which can be located anywhere, including in landlocked countries.	European Union
	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.	Economist Intelligence Unit
	The sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health.	World Bank
	An emerging concept which encourages better stewardship of our ocean or 'blue' resources	Commonwealth of Nations
	It is an ocean economy that aims at the improvement of human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.	United Nations

Source: Compiled by TERI

other concepts is the inherent aspect of sustainable development. It seeks to promote economic growth, social inclusion and preservation or improvement of livelihoods while at the same time ensuring environmental sustainability.

Therefore, blue economy as a concept is an intersection between economic growth and the environment which ensures the balance between the two and can be achieved by considering sustainable use of natural capital into various economic activities related to oceans. Figure 1 depicts this interlinkage between ocean resources, sustainability and economic growth.

Figure 1: Blue Economy Policy framework for aligning Ocean Health and Economic Growth



Source: World Bank (2016)⁴

The broad aspects of blue economy are supposed to focus on the following aspects:

- (i) Maritime trade
- (ii) Energy Infrastructure
- (iii) Fisheries
- (iv) Tourism
- (v) Deep-sea mining and
- (vi) Biodiversity.

Though these areas have been defined on the basis of some consensus over the scope of blue economy, at present there remains a lack of universally accepted definition and the taxonomy of blue economy. Additionally, the impacts of climate change are also altering all of the blue economy aspects creating vulnerabilities that require concerted sustainability efforts. Table 2 presents an indicative list of sectors and activities under the blue economy.

Table 2: Taxonomy of Blue Economy Sectors and Activities

Sector	Activity
Fishing	Capture fishery, Aquaculture, seafood processing
Marine Biotechnology	Pharmaceuticals, chemicals, seaweed harvesting, seaweed products, marine-derived bio-products
Minerals	Oil and gas, deep-sea mining (exploration of rare earth metals, hydrocarbon)
Marine Renewable Energy	Offshore wind energy production, wave energy production, tidal energy production
Marine Manufacturing	Boat manufacturing, sail making, net manufacturing, boat and ship repair, marine instrumentation, aquaculture technology, water construction, marine industrial engineering
Shipping, Port & Maritime Logistics	Ship-building and repairing, ship owners and operators, shipping agents and brokers, ship management, liner and port agents, port companies, ship suppliers, container shipping services, stevedores, roll-on roll-off operators, customs clearance, freight forwarders, safety and training
Marine Tourism & Leisure	Sea angling from boats, sea angling from the shore, sailing at sea, boating at sea, water skiing, jet skiing, surfing, sail-boarding, sea kayaking, scuba diving, swimming in the sea, bird watching in coastal areas, whale/dolphin watching, visiting coastal natural reserves, trips to the beach, seaside and islands
Marine Construction	Marine construction and engineering
Marine Commerce	Marine financial services, marine legal services, marine insurance, ship finance & related services, charterers, media & publishing
Marine ICT	Marine engineering consultancy, meteorological consultancy, environmental consultancy, hydro-survey consultancy, project management consultancy, ICT solutions, geo-informatics services, yacht design, submarine telecom,
Education and research	Education and training, R&D

Source: Research and Information System for Developing Countries (RIS) (2015) ⁵



Contextualising the role of oceans in Asia-Pacific region — The Blue Economy framework



The Asian Development Bank has 49 countries from the Asia-Pacific region as its members, with more than half of them being countries with a direct implication of oceans on their economic structure. A selected major coastal countries of the Asia-Pacific region will be examined for the brief. Asia-Pacific region is home to a number of highly developed and advanced countries with some of them falling under the purview of OECD. On the other hand, according to The United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLIS), out of the current global list of 47 Least developing Countries (LDC), 13 of them are from Asia (See table). Out of the below list of LDC countries, 4 are Landlocked and while the rest are island/coastal economies.

Many of the other Asia-Pacific countries figure in the developing Asia category of the Asian Development Bank including India, Indonesia, Malaysia, Thailand among others. This categorisation provides an overview of the socio-economic status of the countries and also highlights the vulnerabilities that they are facing. The Pandemic has further exacerbated these vulnerabilities as most of the coastal economies in Asia depend heavily on income generation, revenues and livelihoods from sectors such as fishing and tourism.

1	Afghanistan
2	Bangladesh
3	Bhutan
4	Cambodia
5	Kiribati
6	Lao People's Democratic Republic
7	Myanmar
8	Nepal
9	Solomon Islands
10	Timor-Leste
11	Tuvalu
12	Vanuatu
13	Yemen

Source: UN-OHRLIS

As the backbone of many of the Asia-Pacific economies, ocean-based sectors contribute significantly to the economic growth of these countries, additionally for some of the island nations — oceans are at the core of socio-economic functioning. Within this purview, the blue economy has been a major framework that is being adopted by Asia-Pacific countries albeit with different definitions or categorisations. This highlights the growing awareness and rising need of Asia-Pacific region countries to address ocean-based issues and challenges in a holistic manner. With Asia-Pacific countries committing to address the SDG and climate commitments, the role of oceans in achieving economic growth and sustainable development becomes a critical imperative. Below are a few country-level insights on how ocean economy or blue economy as a framework is being addressed in the region.

Indonesia

In the Asia-Pacific region, many countries have taken various initiatives towards promoting blue economy. For instance, **Indonesia** proposed the principles of developing marine and fishing industries based on their blue economy concept to: formulate comprehensive economy and environment protection policies; boost regional economic development; realize sustainable development by promoting clean production systems, and encourage creative and innovative investment. Indonesia also plans to set up blue economy demonstration zones in Lombok and Anamabs islands and Tomini bay, for exploring the blue economy model featured with marine industry, fishery, breeding, seaside tourism industries, small island collective, regional and bay development.⁶ Following the 2nd Blue Economy Ministerial Conference in Jakarta in 2017, it committed to prepare a Jakarta Declaration on blue economy to illustrate the commitment of IORA member states to further strengthen and deepen cooperation on BE priority areas.

China

As onset of developing blue economy, **China** approved the establishment of the Shandong Peninsula Blue Economic Zone as one of three pilots for the development of China's marine economy.

In 2012, the State Council approved zoning plans for eight major coastal regions with the goal of enhancing contributions of the maritime economy to economic and employment growth. In 2016, the 13th Five-Year Plan for Economic and Social Development of China became essential to widen the space for blue economy (China Marine Strategy 2016–2020).

Japan

During the G20 Summit in Osaka, **Japan** shared the 'Osaka Blue Ocean Vision' with its aim to reduce the pollution of marine plastic litter in the sea to zero by 2050. Further the "MARINE Initiative" was launched by the Japanese Government to develop and support the building of capacity and infrastructure in the area of waste management.⁷

Cambodia

Under its National Strategic Plan on Green Growth 2013–2030, **Cambodia** included a strategic focus area on Blue Economy Development and Sustainability. The plan focused on managing oceanic resources, conserving and using marine natural resources sustainably, studying and assessing impacts on marine resources, managing marine pollution and ensuring food security as well.

Australia

Australia has also taken various steps in blue economy and marine sciences. A 10-year marine science plan, National Marine Science Plan 2015-25 was developed to balance the economic benefits of the oceans with the need to safeguard their long-term health. The AIMS Index of Marine Industry developed by Australia is also a critical analysis of the marine assets and scientific and technological development in the sector.⁸

Bangladesh

Bangladesh hosted the 3rd IORA Blue Economy Ministerial Conference in 2019 which aimed at promoting smart, sustainable and inclusive growth and employment opportunities in the blue economy activities along the Indian Ocean belt.

Sri Lanka

The Government of **Sri Lanka** has also promoted blue economy under their initiative ‘Sri Lanka NEXT’ in 2016. However, a blue economy strategy is yet to be developed.⁹

India

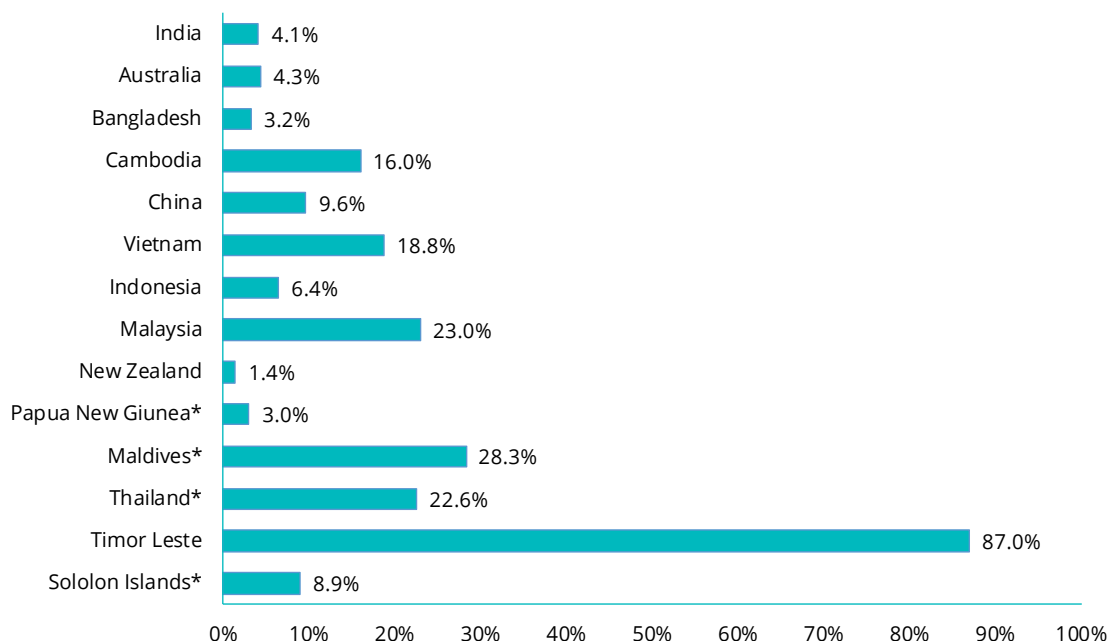
India has also been focusing on the promotion of blue economy for the past few years. Currently, the Government of India is in the process of developing the National Maritime Policy and the National Blue Economy Policy. In fact, several ministries relating to various sectors of blue economy and institutions have made significant headway with respect to technology development, surveys and resource mapping, identification of coastal economic corridors, and so on. Under the Prime Minister of India, an Economic Advisory Council was also formed that recently released seven Blue Economy Working Reports. These reports provide a comprehensive outline on various aspects ranging from accounting, fisheries, coastal tourism, marine spatial planning, shipping to strategic aspects of India’s oceans. Based on the working group reports, The Ministry of Earth Sciences pub-

lished a draft Blue economy Policy for comments in February 2020, pointing at India’s goal to have a blue economy policy at the earliest.¹⁰ India is also robustly engaging with Asia-Pacific countries in this area both at strategic and economic level.

Major Players in Blue economy

Out of all the continents, Asia-Pacific covers both a large portion of land and sea coastline of the world. The Asia-Pacific region includes East Asia, South Asia, South East Asia and Oceania. The area includes two oceans, the Indian Ocean (the third largest ocean) and the Pacific Ocean (the largest ocean) as well as several seas like Bay of Bengal and other water bodies. It possesses some of the most ecologically and economically important sea areas of the world which provide a rich array of services that directly and indirectly contribute to human survival and quality of life, supporting local coastal communities and their economies. The scope of blue economy is thus large in Asia as several states in this region have a significant share of marine economy in their Gross Domestic Product (GDP). Figure 2 shows the share of blue economy in respective GDP’s of the countries.

Figure 2: Share of blue economy in GDP



*includes fisheries and tourism sector only

Source: Compiled by TERI

The share of blue economy in the respective countries GDP varies from as low as 1% to as high as 30% and in few island nations, this is as high as 87%. However, many of these estimates do not account for the various sectors dependent on oceans indirectly and only major sectors like fisheries, aquaculture and tourism have been accounted for. Table 3 summarizes the size of blue economy (BE) and their share as a percentage of their economies. These figures are indicative as many countries do not have proper identification of the different sectors of the blue economy and their accounting and many sectors of BE are not even included. Table 3 shows the size and share of blue economy as well as the number of people employed. Globally there is significant debate on means and mechanism to develop an accounting framework for the blue economy. However, due to lack of data and empirical evidence to identify the deep rooted and invisible impacts of oceans on major land based economic sectors, the current evidence is not holistic and granular in nature.

While assessing the value added from the various sectors of blue economy in the Asia-Pacific countries, it has been observed that the major contribution is from shipping and ports, marine fishing and aquaculture, offshore energy and marine tourism but this varies in many countries. For instance, in Vietnam, out of the total estimated USD28.94 million value of blue economy, offshore oil and gas contributed USD12.09 million, which is 41%. This is followed by marine tourism (USD 5.4 million), manufacturing activities (seafood processing and shipbuilding and repair) (USD 5.2 million) and fisheries and aquaculture (USD 3.7 million).¹¹ In Malaysia, the share of offshore energy has been the maximum which includes crude petroleum and natural gas production and the petroleum refineries which is followed by fishing and aquaculture and marine transport and tourism.¹² However, in Cambodia, the shipping and port industry alone constitutes more than 50% of the ocean economy, followed by fisheries and aquaculture (46%) and coastal and marine tourism (3%).¹³

In Bangladesh, unlike the South East Asian Countries, the majority of the value added in blue economy is from the tourism and recreation sector

(25%), followed by marine fisheries and aquaculture (22%), marine transport (22%), ship and boat building/repair (9%) and minerals (3%).

In India, the largest contribution to the blue economy has been from the marine services sector (30%), followed by minerals (27.3%), industrial sector (21.3%) and fisheries (21.1%).¹⁴

In Australia's blue economy, the maximum share is of the marine tourism (more than 50%), followed by offshore oil and gas exploration and extraction (31%), marine fishing and aquaculture (9%), manufacturing (7%) and marine transport (3%).¹⁵ However, in Australia's neighbouring country New Zealand, offshore minerals made the maximum contribution to the country's blue economy till 2015, but since then it has been replaced by the port and shipping industry. In 2017, shipping made 37.3% of the blue economy in New Zealand, followed by fisheries and aquaculture (28.9%), offshore minerals (26.7%), marine services (4.8%) and marine tourism (2.2%). In Pacific island countries like the Solomon Islands, the services sector contributes the most to the national economy which includes marine tourism and transport, followed by the agricultural sector of which fishing and aquaculture are major contributors, and the industry that contributes the least includes offshore mining activities.¹⁶ But in Timor Leste, offshore oil and gas contributes around 76% to the total BE and 66% of the total GDP, followed by ocean-related government activities, shipping and ports (4%), tourism (1%) and fisheries and aquaculture (0.4%).¹⁷

In terms of share of employment, most people are employed in labour-intensive sectors like fishing and aquaculture, shipping and marine tourism and transport. Even at the global level, fishing employs the maximum number of people out of all the sectors of the blue economy and it is expected to employ more than 40 million people directly by 2030, i.e. 1% of the global workforce, followed by sectors like marine tourism, fish processing, port activities, marine equipment, shipbuilding and repair, offshore oil and gas and shipping.¹

Table 3: Size and share of Blue economy in Asia-Pacific countries and the estimated employment

Country	Year	Size of Blue Economy (in USD)	Share of Blue Economy in GDP	Year	Estimated Employment
India	2017	-	4.1%	2019	16 million*
Australia	2016	71.4 billion	4.3%	2016	0.4 million
Bangladesh	2015	6.19 trillion	3.2%	2015	7.35 million
Cambodia	2015	2.4 billion	16%	2018	3.2 million
China	2015	-	9.6%	2015	35.9 million
Vietnam	2015	28.94 million	18.8%	2015	3 million
Hong Kong SAR , China	2016	3.65 billion#	1.2%#	2016	85,720
Indonesia	2015	860 billion	14.85%	2012	5.3 million
Malaysia	2016	-	23%	2016	4 million
Myanmar	2018	-	3.5%*	2017	2.3 million*
New Zealand	2017	3.8 billion	1.4%	2013	0.1 million
Papua New Guinea	2014	197 million^	3%^	-	-
Sri Lanka	2017	-	1.3%*	2017	0.58 million
Thailand	2018	-	22.6%^	2016	2.95 million^
Timor Leste	2015	1.97 billion	87%	2015	16,077
Solomon Islands	2014	-	8.9%^	2016	36,952^

*this includes only fisheries and aquaculture

#this includes only maritime and port industry

^this includes only fisheries, aquaculture and marine tourism

Source: Compiled by TERI

Shipping and Port Connectivity

The Asia-Pacific countries are a significant part of the maritime trade globally. It was estimated that in 2018, 41% of the total goods loaded in 2018 originated in Asia and 61% of total goods unloaded were received in this same region. In terms of the international maritime trade, Asia has the largest share in the world tonnage (Figure 3).

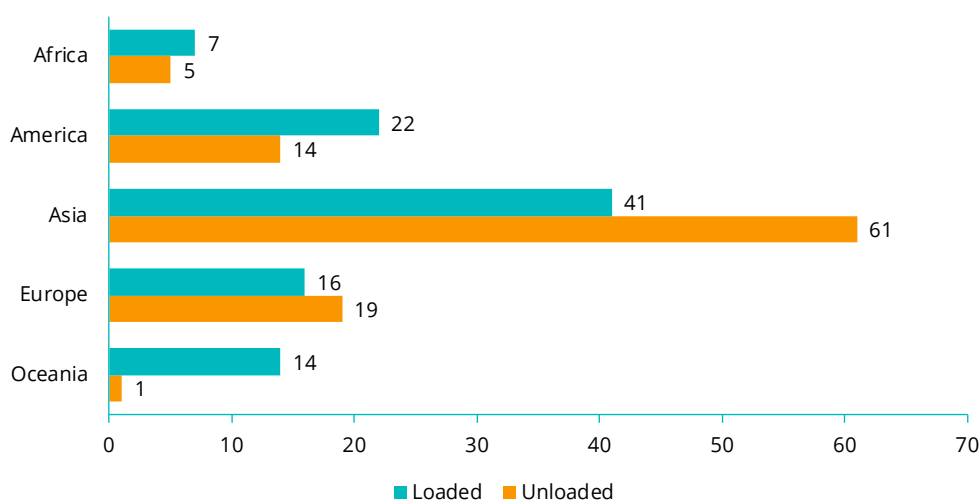
Asian countries have witnessed an increase in intraregional trade mostly based on the manufacturing sector and reflecting fragmented production processes. Parts are generally manufactured in multiple locations across Asia and assembled in another location. This industry is largely dependent on shipping for movement of goods. Global ship production is also dominated by the three Asian countries, Korea, China and Japan representing 90% of the global shipbuilding activities (Table 4). Shipbuilding, as a sector, is being encouraged in many Asian countries and governments have taken various initiatives to support the shipbuilding industry. In the shipbreaking sector, Asian countries like Bangladesh, India and Pakistan lead in the maritime supply chain where Bangladesh made 47.2% of this segment followed by India at 25.6% and Pakistan at 21.5%. Under the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009, which is still to come into force, the demolition industry intends to become more environmentally sound. India has already signed on to the convention and envisions to become a more sustainable industry preferred globally for its standards amongst its competitors.

In terms of ship ownership, Asian countries like Japan, China, Singapore alone owned more than 30% of the world fleet in 2018 (Figure 4). Moreover, the share of China, Singapore and Hong Kong has seen sustained growth in the last five years. Table 1 in Annexure details the ownership of fleet by dead-weight tonnage in 2019 in Asian countries.

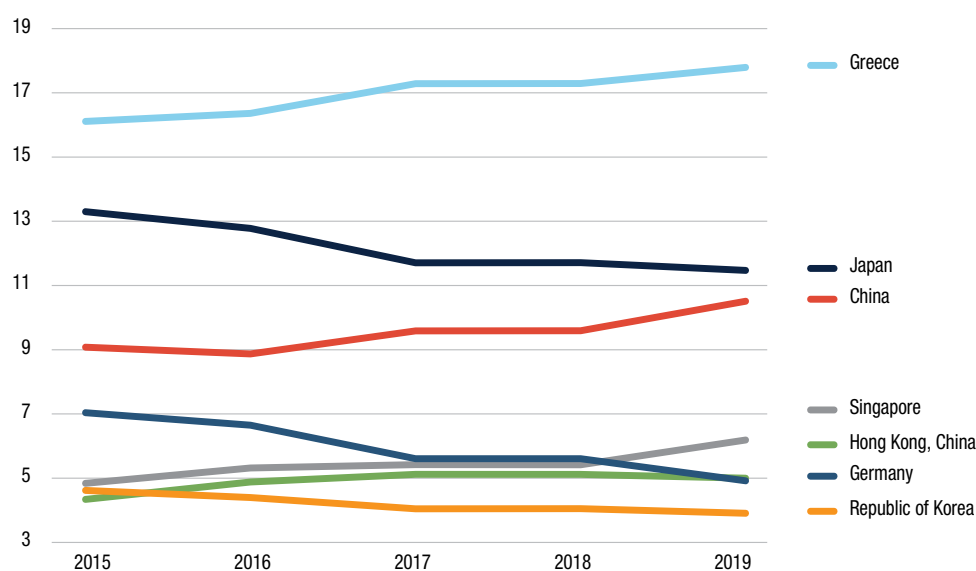
The Asia-Pacific region is also well connected through ports. Among the top 50 global container ports, 9 of the 10 are located in Asia, and 7 of the top 10 are from China. Table 2 in the Annexure shows the top 10 world container ports. According

to the liner shipping connectivity index developed by UNCTAD, 5 of the top 10 most connected economies are in Asia. Since 2006, the most connected country, China's index has improved by 51%.

The Ocean around the Asia-Pacific region is also home to some of the busiest maritime trade routes including the Malacca Strait, The Strait of Hormuz that opens to the Indian Ocean are key Sea Lanes of Communication (SLOC) with a majority of maritime trade occurring in the Asia-Pacific region.

Figure 3: International Maritime Trade by region, 2018 (% share in world tonnage)

 Source: UNCTAD (2019) ¹⁸
Table 4: Deliveries of new buildings by major vessel types and countries of construction, 2018 (Thousand gross tons)

Category	China	Japan	Philippines	Republic of Korea	Rest of World	World total	Percentage
Oil tankers	4505	2819	288	6046	865	14524	25
Bulk carriers	9274	5134	654	352	91	15505	26.7
General cargo ships	416	159		74	234	884	1.5
Container ships	6630	3020	992	2632	341	13614	23.5
Gas carriers	762	1754	52	4709	26	7302	12.6
Chemical tankers	466	647		274	64	1452	2.5
Offshore vessels	774	18		472	453	1718	3
Ferries and passenger ships	162	72	2	51	1573	1860	3.2
Other	270	816		24	76	1186	2
Total	23260	14440	1988	14633	3724	58045	100
Percentage	40.1	24.8	3.4	25.2	6.4	100	

 Source: UNCTAD (2019) ¹⁷
Figure 4: Percentage of world fleet ownership in selected countries (2015–19)

 Source: UNCTAD (2019) ¹⁷

Tourism

The travel and tourism sector plays a key role in the economies of the Asia-Pacific countries. Southeast Asia stands in the foreground with high dependence on the tourism sector. Thailand, Indonesia, Malaysia, Singapore and the Philippines receive huge contributions from this sector to their GDPs. Not only does the industry provide monetary value to many countries, but it has made a significant contribution to employment generation. In order to encourage and maintain their growing levels of tourism, many Asia-Pacific countries have initiated programs to keep the influx of both domestic and international tourists high. In the COVID 19 pandemic, tourism as a sector has been the most severely affected, leading many of these countries into a downward spiral in economic terms. Table 3 in the Annexure shows the contribution of travel and tourism to the country's GDP and its growth rate.

Out of all the three sub-regions, East Asia-Pacific accounts for more than half of Asia-Pacific's international tourist arrivals and receipts. The region's strength lies in trade and globalization and thus the region provides excellent connectivity, thus attracting a lot of tourists. Similarly, the South East Asian countries' GDP has a high dependence on tourism because of the high influx of international tourists. However, the South Asian countries including Bangladesh, Sri Lanka and India lag behind the other Asian countries in attracting tourists because of the inadequate infrastructure, underdeveloped tourist service infrastructure representing its greatest relative disadvantage.

The Travel and Tourism Competitive Index, measuring the factors that make it attractive to develop business in the travel and tourism industry in individual countries, scores the countries from 1 to 6. The overall index is made of three main sub-indexes: (1) regulatory framework; (2) business environment and infrastructure; and (3) human, cultural, and natural resources. The Asia-Pacific countries scored 4.2 in 2019 compared to America which scored 3.9 and Africa that had an average score of 3.7.

Overall, travel and tourism activities make an important part of the GDP of Asia-Pacific countries. In the future, it has been estimated that China's travel and tourism sector growth will overtake the USA's as the world's largest travel and tourism economy. Meanwhile, India's Travel & Tourism contribution to GDP will be more than double, enabling the country to climb from the eighth position in 2018 to third place by 2029.

Figure 5: Share of Travel and Tourism in GDP of the sub-regions

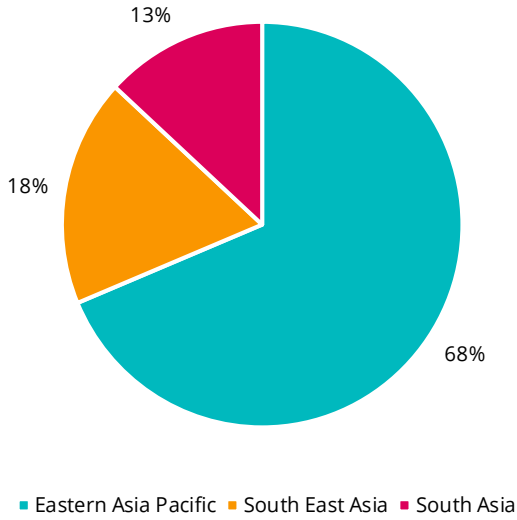
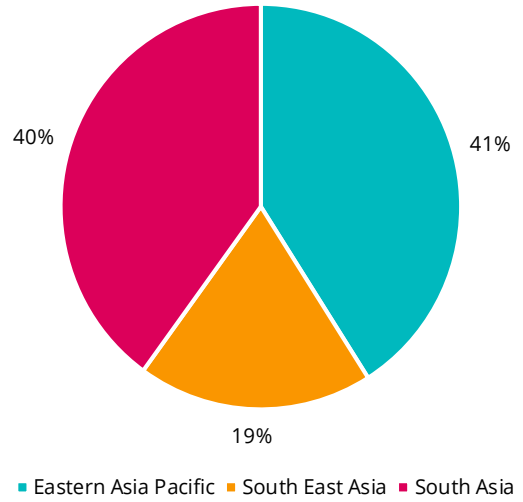
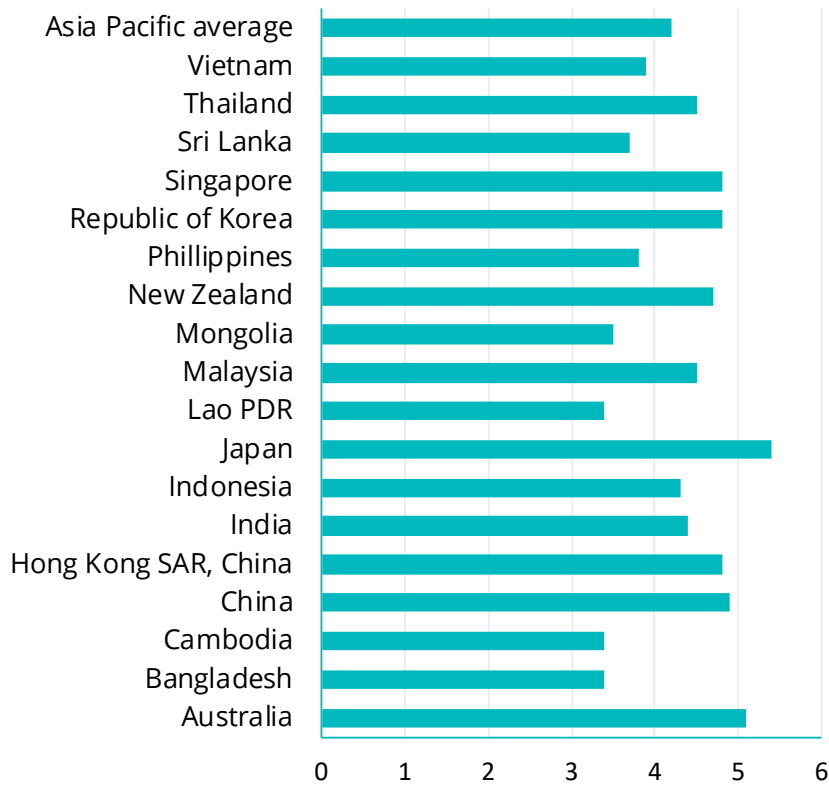


Figure 6: Share of Travel and Tourism in employment



Source: World Economic Forum (2019)¹⁹

Figure 7: Travel and Tourism Competitive Index 2019



Source: World Economic Forum (2019)¹⁸

Fishing

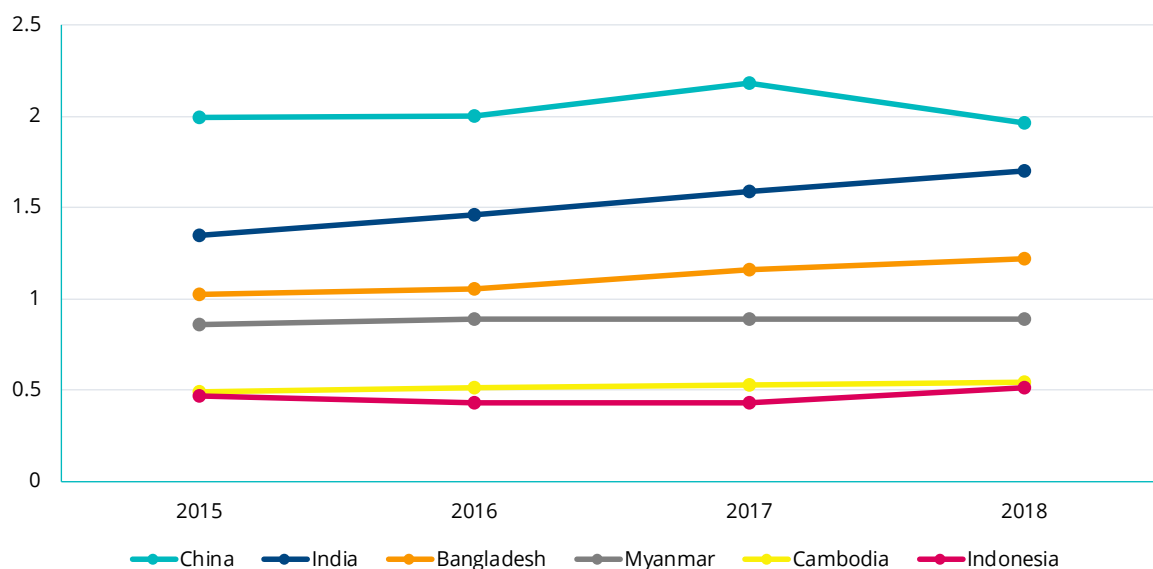
The Asia-Pacific region is a major world producer of fish and fisheries products, and Asia (excluding China) occupies around 34% of the global fishing and aquaculture market. The total fish production has almost doubled in Asia in the last 20 years. The share of aquaculture in Asian fish production (excluding China) reached 42% in 2018, up from 19.3% in 2000². Fish farming is also dominated by the Asian countries that have produced 89% of the global total in volume terms in the last 20 years. China alone has produced more farmed aquatic food than the rest of the world since 1991. Around 85% of the total population employed in the fishing sector globally, is in Asia. Asia has the largest fishing fleet as well in the world, standing at 3.1 million vessels or 68% of the total in 2018. Almost 75% of the reported motorized fleet in 2018 was in Asia i.e. 2.1 million vessels as well as the largest number of non-motorized vessels which was around 947,000 in 2018.

Asia has consistently been accounting for almost two-thirds of the global inland water production since the mid-2000s and accounted for 57% of total inland water catches in 2018. The world's top six inland waters capture production is in Asian countries, out of which China produces almost 16% of the world's inland water capture fisheries, followed by India (14%), Bangladesh (10%), Myanmar (7%), Cambodia (4%) and Indonesia (4%).

Among the top 10 countries with the largest total farmed and wild production in 2018, four of them exceed the 50% mark of aquaculture production as a percentage of total fish production and all of them are in Asia (i.e. China 76.5%, India 57%, Vietnam 55.3% and Bangladesh 56.2%). The share of aquaculture in Asian fish production (excluding China) rose to 42% in 2018, up from 19.3% in 2000. Even among the top 10 countries with the largest total farmed and wild production in 2018, four are in Asia and they exceed the 50% mark of aquaculture production as a percentage of total fish production (i.e. China 76.5%, India 57%, Vietnam 55.3% and Bangladesh 56.2%). Table 4 in the Annexure shows the aquaculture production of main species groups in 2018 in Asia.

Asia is the food basket for the world in terms of fishing. However, the countries apply varied fishing skills from fully mechanised trawlers and systems to artisanal fishing. South Asia largely encompasses artisanal or non-mechanised fishing, while East Asian countries are proficient in mechanised systems. This increasing fishing is also reducing fresh catch at sea leading fishermen farther into deep waters. Mechanised systems gain an advantage in this situation and are able to undertake deep-sea fishing away from coastal waters. This movement of fishing fleets across Asia has also emerged as a cause of concern with many countries objecting to fishing fleets from distant countries undertaking fishing in their economic zones. Increasing unsustainable fishing due to overfishing and unsustainable fishing practices, the region will be facing a shortage of fresh catch over a period of time. Additionally, Illegal, Unregulated and Unreported fishing (IUU) is a major challenge for the region that relies on the oceans as a major food source.

Figure 8: Top six Inland water capture production: Major producing countries



Source: FAO (2020) ²



Blue economy in the context of resource security, R&D and SDGs



Need for Resource Security and Role of Blue Economy

The Asia-Pacific region is known for its rich coastal and marine resources. It is home to the world's largest region of coral reefs, and mangroves and is of importance to fisheries and coastal tourism for livelihoods and urban areas. It accommodates two-thirds of the world's human population and its economic activities have the highest growth rate in the world. For several states in the region, marine economy as a percentage of national GDP is significant with fisheries historically being one of the most important sectors in the region. Two of the region's developing countries, Thailand and Vietnam, are among the top three leading seafood exporters in Southeast Asia. This region also contains six of the top 25 busiest container ports in the world and two of the top 10 shipbuilding economies in the world. At a more comprehensive level, the South China Sea is recognised as a significant source of petroleum deposits, with several Southeast Asian nations (including Indonesia, Malaysia, Thailand, Brunei, Vietnam, Myanmar and East Timor) located on the Sunda Shelf — a massive continental shelf known to have rich subsea hydrocarbon deposits. The governments in these countries are exploring opportunities to harness marine energy — Indonesia has developed plants for wave energy in Yogyakarta, gas resources in Natuna Islands, tidal current energy in East Lombok, and ocean thermal energy conversion in Bali; and the Philippines planned to open its first ocean energy plant in 2018.

Both on land and at seas, Asia-Pacific is one of the most dynamic economic regions in the world, enjoying generally high economic growth and almost two-thirds of global trade taking place within the region. Resource security has recently emerged as a major policy concern in the Asia-Pacific as soaring world prices for minerals and energy are threatening the economic security of many countries in the region, whose governments are now seeking solutions to secure supplies of natural resources. Given deep patterns of interdependence between resource — poor consumers in Asia and resource-rich producers on the Pacific Rim, one of the strategies is to attempt to region-

alise resource cooperation. During the last decade, all four intergovernmental bodies in the Asia-Pacific — the Association of Southeast Asian Nations (ASEAN), ASEAN Plus Three, Asia-Pacific Economic Cooperation (APEC) and the East Asia Summit — have launched resource cooperation initiatives to promote the marine economy.²⁰

While traditional ocean industries tend to comprise the fisheries sector, tourism and maritime transport, within the blue economy new and emerging activities, such as offshore renewable energy, aquaculture, marine biotechnology and bioprospecting, and seabed extractive activities are also included. It also incorporates services provided by water ecosystems for which markets do not exist, such as carbon sequestration, coastal protection, waste disposal and the existence of biodiversity. On a global scale, the economic value of the oceans is quite large. The World Wide Fund for Nature (WWF) has estimated the range of goods and services that flow from coastal and marine environments and valued it conservatively at US\$ 2.5 trillion annually, with the overall value of the oceans as an asset being tenfold this amount. As a result of encompassing all marine-based and marine-related activities, the blue economy is not only relevant to island countries and coastal economies, but also to landlocked developing countries. In considering the oceans as the principal space of economic activity in the 21st century, three primary issues are identified.

First, over 80% of global trade is conducted via the seas; maritime transport is the backbone of international trade and, by extension, the global economy. This sector is also a key enabler for other economic sectors, such as marine economic manufacturing, marine auxiliary services, and other marine-based industries such as shipbuilding. Second, the oceans are a vital source of **global food security** — with fisheries providing approximately 4.3 billion people with more than 15% of their annual consumption of animal protein and is the fastest-growing animal-food producing sector since 2011. Third, the oceans have within them vast untapped resources of **energy and minerals**. This includes both non-renewable (with over 30% of global oil and gas being extracted from offshore

sites) and renewable energy sources (including wind-driven waves, gravitation-induced tidal energy, marine salinity gradients and ocean thermal energy conversion), the latter being particularly indispensable against a backdrop of increasing global energy demands. Equally, 5% of the world's minerals are expected to be extracted annually from the oceans by 2020.²¹ Blue economy essentially is a strategy to explore the ocean's potential as a source of resources, livelihood and services.

For a region so highly dependent on its coastal and marine resources, governments are increasingly aware of the importance of their sustainable exploitation in order to secure long-term national interests. Countries in the region particularly Small Island Developing States have large exclusive economic zones. The abundance of ocean resources, as a result, should be leveraged more effectively based on the blue economy concept to support sustainable development. Using these resources can also help them overcome a narrow, land-based resource base. The Fisheries sector can be categorized as: offshore (foreign and local), coastal (subsistence and commercial), aquaculture and freshwater. The value of the fish caught offshore by locally-based vessels is only about one third that of foreign-based vessels. Moreover the total value from other categories of fisheries (coastal, aquaculture and freshwater) is much lesser in comparison despite their importance to the local population in terms of food and income generation. Most offshore catch is exported out of the region. Five coastal countries (Bangladesh, India, the Maldives, Pakistan, and Sri Lanka) account for less than 2% of the world's total coastline. The coastal zones also contain about 40% of the economic activities in the region and most of its critical economic infrastructure. Coastal tourism is expanding in the region as more than 8% of the world's mangrove areas are in this region. The Sundarban Delta is the world's largest continuous stretch of mangroves. These as well as the coral reefs of the Maldives, India, and Sri Lanka, and the dry land mangroves of Pakistan support thousands of floral and faunal species. At a time when the world is grappling with climate change impacts, the role of Nature-Based Solutions such as Mangroves is significant to ensure the health of oceans. Tourists to the region are

attracted by its climates, biodiversity, clear water and long sandy beaches. However, the tourism economy in the region is not as good as developed countries except Maldives, India and Australia.

Marine resources are being overexploited with the Southeast Asian region demonstrating increasing signs of overfishing. Many developing countries lack the capacity and resources to ensure adequate law enforcement to prevent overfishing. Deterioration of conditions is also seen in coastal waters, especially in areas close to large population centres, and for fishery products that are in demand from rapidly growing Asian economies. Its coastal areas have also been recognised as among the most vulnerable to climate change and environmental degradation. Ocean warming which facilitates more frequent and more extreme hydro-meteorological events such as rising sea levels, decrease in seawater pH (ocean acidification) decrease in oxygen levels exacerbate the vulnerabilities of communities that depend on coastal fisheries for food and employment. The warmer air and sea surface temperatures and greater rainfall are also expected to cause significant losses to coral reefs, mangroves, seagrass and intertidal habitats that provide shelter and food for coastal fish and shellfish.

The Economics of Ecosystems and Biodiversity for Southeast Asia (ASEAN TEEB) reported that Southeast Asia is expected to lose one-third of its mangroves from 2000 to 2015, under a "business as usual" scenario, at an estimated cost of US\$2 billion (annual value in 2050). The cost of lost reef-related fisheries in the region was estimated at US\$5.6 billion (annual value in 2050), with the highest loss in Indonesia and the Philippines. Meanwhile, overall environmental costs from unsustainable fishing, coastal development, pollution and climate change impacts in the Philippines amounted to US\$129.5 million, and around US\$2.62 billion in Thailand.

Linkages of ocean economy, emerging industries and innovations

The ocean economy has forward and backward linkages with various sectors of the economy. These linkages can indicate the connectedness of ocean industries with land-based industries, and quantify the benefits of investment in the ocean industries for the whole economy. The fishery industry provides more than just a source of protein and food. It has generated many resource-based ocean economic activities, such as mariculture, seafood processing, and marine biotechnology. The Philippines is tapping the rich marine biodiversity and it is focused on bioactives from marine organisms, including pain killers using marine snails, and anti-infectives from sponges.²²

Blue Economy in deep ocean stewardship initiative

A potential and topical sector for the promotion of the Blue Economy in deep oceans in this region is that of deep seabed mining for marine minerals and trace metals. The demand for minerals is increasing owing to reserves in land-based mines dwindling, as well as the potentially extensive environmental and social consequences of mining on land. Minerals have the potential for diverse industrial applications, including green technologies, hence there is increasing attention to their extraction from the deep sea. Consequently, significant investments have already been made by some countries in terms of exploration for deep seabed mineral resources, developing sophisticated technology and conducting feasibility studies. Deep-sea mining is rapidly approaching the commercial mining phase in multiple oceans, both in areas within and beyond national jurisdiction. There is an urgent need to identify and develop comprehensive, ecosystem-based management practices for deep-ocean environments subject to mineral extraction.^{23 24}

Currently, only a handful Asia countries are investing in R&D and implementation of deep sea-mining. China, India, Korea, Japan are the major players from Asia participating in the International Seabed Authority processes. Other Asian countries

that are venturing into deep-sea mining include Singapore and few SIDS states.

Blue biotechnology

It is the utilization of marine bioresources as the source of biotechnological applications, to develop products or services. The major opportunities to the utilisation of marine bioresources in business sectors are modern chemical compounds or enzymes, pharmaceuticals, foods, beautifiers, farming items, etc. However, the emerging applications include bioprocessing, ecological remediation and monitoring, genetics, marine bioactive substances, marine biomaterials, mariculture, fermentation engineering and enzyme engineering. Marine fish, sponges, tunicates, molluscs and bacteria are the main sources of potent bioactive compounds that show various anti-tumor, anti-inflammatory, analgesia, immunomodulation, allergy, and anti-viral properties.²⁵ These research innovations are key to empowering the growth of blue economy in a country. In the Asia-Pacific, China, India, South Korea, Japan, Thailand, Vietnam and Australia are expected to become significant markets for marine biotechnology within a reasonable time-frame.

Impacts of the Covid-19 Pandemic on Ocean Security, Sustainability and Blue economy

The ocean is a poorly-policed frontier with the ongoing pandemic exacerbating the offshore law enforcement gap as coast guards and navies look inward to manage and relieve domestic crises rather than police the open waters. Pirates, poachers and smugglers continue operating and may have greater incentive to resort to crime due to the global recession. This would include a probable increase in illicit fishing as well. In contrast, legal industrial fishing operations are likely to decline, especially over the near term, from a combination of the risk of being at sea in a pandemic and supply chain complications caused by market closures. Moreover, lack of up-to-date ocean science data will be problematic (due to reduction in operational research cruises) to assess stocks and management regimes especially in data-poor regions of the developing world. These market disruptions

as a result of the pandemic will greatly affect the trade of fish which is the most widely traded food commodity. Small-scale, near-shore industrial fisheries and artisanal fisheries which are more common in the Asia-Pacific region rely on tightly linked shore-side networks (through local markets, commercial buyers, families, communities) including catch as food security. In these situations, social distancing is impractical with outbreaks highly disruptive. Besides, many artisanal communities are poorly served by health infrastructure, human rights violations in the seafood supply chain and are at high risk from a global pandemic.

Large Fishing vessels that transship catch and are at sea for months to years at a time are relatively few in number but are common in the Pacific and Indian Oceans. Transshipment which is the practice of transferring catch from one vessel to another at sea — limits their risk of exposure to Covid-19. Beyond the fishing industry, ocean tourism will suffer as travel slows. Coral reef tourism generates \$36 billion per year, a value that has been a key driver in marine conservation. Lost revenues may increase pressure for near-term exploitation. Small Island and lesser developed countries are particularly vulnerable due to their low level of socioeconomic development, low and unequally distributed income and scarcity of domestic financial resources.²⁶ Countries reliant on tourism have also suffered greatly due to COVID-19 through a sharp decline in the number of international inbound visitors to countries in the region due to quarantine measures, travel bans and border closures both in tourist source countries and destinations

Role of scientific and technological advancements for boosting Blue economy

Role of science and understanding the impact of climate change on oceans especially in the context of pandemics and diseases

The Asia-Pacific is globally among those regions most susceptible to disaster. The impacts of human activities and climate change have cumulatively increased the unpredictability of disasters and lack of ease of response actions to a significant level.²⁷

Climate change can impact human health, especially in the context of infectious diseases: the instability of the climate and global warming are playing an expanding role in the emergence, comeback, and redistribution of infectious diseases on a world-wide scale.²⁶

- 💧 Temperature may impact the life cycles of pathogens and thus affect disease
- 💧 The dissemination of water-borne pathogens may become altered due to shifts in precipitation arising from climate change.
- 💧 Pathogens of air-borne diseases may also be more responsive under humid conditions
- 💧 Sunshine is a more important climate variable that may also affect infectious pathogens by creating favourable conditions for multiplication.
- 💧 Wind is a critical factor in the spread of wind-borne diseases. It has been indicated that a positive correlation may exist between dust particle association/attachment and virus survival/transporting. Wind may also facilitate disease transmission between remote hosts

Extreme weather events are also known to be positively associated with the spread of infectious diseases. It, therefore, becomes necessary to know the extent and frequency of change in climate variables that should be expected with an extreme weather event so as to make valid decisions based on prediction of impacts (Table 5). Climate change may have contrasting effects on pathogen, vector, thus disease outcomes would be at different spatial and temporal scales. This indicates that the

development of early-warning systems for infectious diseases via long term collaborations are required to initiate timely anticipatory mitigative action.²⁶

Some have brought focus to some critical implications to health systems of climate change that can be utilised as the basis in planning for research and action: (1) the surveillance of disease and developing and maintaining mechanisms for early warning of climate change will be necessary to allow for forecasting and adequate preparation to face changing patterns of disease and health requirements. However, the capacity to express complex and specialised scientific data into goals and plans for implementation is often unsteady.²⁸ Thus, it becomes necessary to have adapted governance for the protection of health.

Maintaining health of oceans and boosting R&D for blue economy in the Asia-Pacific region — Case of APEC

21 countries in the Asia-Pacific region that are affiliated with the Asia-Pacific Economic Cooperation (APEC) have comprehended the importance of the oceans for the services provided in terms of food security, sustainable economic benefits, and maintaining the integrity of coastal communities and the environment. Initiatives undertaken by APEC to advance sustainable marine development include the convening of three ocean-related ministerial meetings (AOMMs), establishing the Ocean and Fisheries Working Group (OFWG), and establishing the APEC Marine Sustainable Development Center.²⁹

Table 5: Correlation of extreme weather events and infectious diseases

Extreme weather events	Disease type	Authors, year	Main findings
El Nino	Vector-borne disease	Epstein (1999) Haines and Patz (2004) Lindsay et al. (2000) Hjelle and Glass (2000)	Increasing outbreaks of emerging diseases were linked to El Nino event. Outbreaks and epidemic of malaria were positively connected with El Nino events in many regions. Strikingly less malaria were found in the El Nino year than in the preceding year in the Usambara Mountains, Tanzania. Record of hantavirus cardiopulmonary syndrome has been found to be related to El Nino events in the Colorado Plateau.
	Water-borne disease	Dwight et al. (2004)	The risk of symptoms associated with diarrhea is twice the previous when exposed to southern California coastal waters during an El Nino winter.
La Nina	Vector-borne disease	Chretien et al. (2007) Nicholls (1993)	Chikungunya fever epidemic was connected with the drought incurred by La Nina. La Nina year produced an epidemic of West Nile fever and Japanese encephalitis.
Quasi-Biennial Oscillation (QBO)	Water-borne disease	Bunyavanich et al. (2003)	Risk increased across diarrhea symptom during a La Nina winter.
	Vector-borne disease	Dwight et al. (2004)	QBO has been found to be linked to the incidence of Ross River virus in south-eastern Queensland.
Heatwaves	Vector-borne disease	Paz (2006)	Heatwave was associated with outbreak of West Nile fever in Israel in 2000.
	Air-borne disease	Kan (2011)	Heatwave contributes to the increased morbidity and mortality from infectious respiratory diseases.
Drought	Water-borne disease	Epstein (2001a)	Diarrheal diseases are frequent during drought especially in refugee camps.
	Vector-borne disease	Khasnis and Nettleman (2005) Wang et al. (2010) Shaman et al. (2002)	Drought has been found to be associated with hantavirus pulmonary syndrome (HPS). Increased West Nile virus risks follow the drought. The risk for transmission of St. Louis Encephalitis virus would increase, during the droughts.
Flood	Water-borne disease	Chretien et al. (2007) MacKenzie et al. (1994) Reacher et al. (2004)	The Chikungunya fever epidemic may be associated with droughts. Flood favors water-borne disease transmission such as <i>Cryptosporidium</i> infection. A significant increase in risk of gastroenteritis was associated with depth of flooding in the town of Lewes in Southern England.
	Vector-borne disease	Epstein (1999) Mackenzie et al. (2000) Ahern et al. (2005) Woodruff et al. (1990) Nielsen et al. (2002) Cordova et al. (2000) Chen (1999) CDC (2000) Leal-Castellanos et al. (2003)	Floods in Mozambique led to spread of malaria, typhoid and cholera. Strong rain or flood can lead to outbreak of Ross River fever. After a flood, such diarrheal disease cases as cholera may grow. Increases in diarrhea and malaria incidences were observed after floods in 1988 in Khartoum, Sudan. There have been reported increases in lymphatic filariasis in different areas. There have also been reported increases in arbovirus disease after flood. Hemorrhagic Fever with Renal Syndrome diseases may increase during flooding. HPS diseases may also increase during flooding. Leptospirosis diseases may also increase during flooding in different areas.
Hurricane Cyclone	Vector-borne disease	Epstein (2000)	Following the hurricane, malaria and dengue fever occurred in Honduras and in Venezuela.
	Water/food-borne disease	Sanders et al. (1999) Shultz et al. (2005)	A cyclone tends to increase the incidence of leptospirosis. A cyclone tends to increase the incidence of cholera.

^a The table includes empirical findings published after the 1990s.

Source: Wu et al (2016) ²⁶

APEC has developed comprehensive policies and measures to aid the APEC economies in the implementation of SDGs, such as the Food Security and Climate Change Multi-Year Action Plan (2018–2020). APEC has also established the Steering Council of Mainstreaming Ocean-related Issues for strengthening the addressing of cross-cutting issues of ocean cooperation between relevant APEC fora. The APEC Virtual Working Group on Marine Debris (VWGMD) was established to further the development of innovative solutions to marine debris. The VWGMD also compiled a report entitled *Facilitating Trade and Investment in Sustainable Materials Management Solutions in the APEC Region: Promoting an Enabling Regulatory*, which has been supported by the Committee on Trade and Investment in 2017 and welcomed by APEC Ministers.²⁹

Over the course of the three AOMMs that provided a platform for discussion of marine-related issues and establishing key working areas for marine sustainable development in the APEC region, the commitments adopted were:²⁹

- 1 The Seoul Oceans Declaration as to domestic and regional action for the sustainable development of oceans, seas and coasts, including their resources in the APEC region.
- 2 The Bali Plan of Action, “Towards Healthy Oceans and Coasts for Sustainable Growth and Prosperity of the Asia-Pacific Community”, stressed the determination, in a collective manner, for tangible actions at the domestic and regional levels to ensure that the marine environment and its resources are sustainably managed, the sustainability of the economic benefits received from the oceans, and enabling the development of coastal communities in a sustainable manner.
- 3 The Paracas Declaration addressed the theme of Healthy Oceans and Fisheries Management towards Food Security, with a focus on the protection of the marine environment and its sustainable development, impacts of climate change on the oceans, promotion of trade and investment that is free and open, and the role of the oceans in food security. The Paracas Action Agenda endorses

a set of actions that further the implementation of the Seoul Ocean Declaration, the Bali Plan of Action and the Paracas Declaration.

Marine pollution: At the regional level, programmes and actions have been initiated to combat marine pollution in the APEC Pacific areas, such as: the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP); the Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas Region (EASAP); the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA); and the Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand in the Southwest Pacific Region; the Pacific Regional Environment Program (SPREP); and the Southeast Pacific Action Plan (SPAP) in the Southeast Pacific region.³⁰

Health of ocean and coastal habitats: Special efforts have also been made to maintain the health of ocean and coastal habitats among APEC economies like the Coral Triangle Initiative (CTI), and progress has been made towards their better management and conservation. Under the multi-lateral partnership of the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF), six APEC members are working together for the sustenance of exceptional marine and coastal resources through addressing vital issues like food security, climate change, and marine biodiversity.²⁹

The CTI has made competent regional plans including the CTI Regional Plan of Action, the CTI Regional Framework for the Coral Triangle Marine Protected Area System and the Region-wide Early Action Plan for Climate Change Adaptation to ratify regional goals and actions. At the economic level, each CTI economy has nominated a site for MPA learning and integration for the promotion of local efforts, and a protocol to develop an evaluation system for domestic MPA management.²⁹

Fisheries: The OFWG has aided APEC economies by lending support to the development and regional implementation of practices for global fisheries and aquaculture across the seafood value chain. Efforts have also been made to combat IUU fishing, such as the Regional Plan of Action to Promote Responsible Fishing Practices including combating illegal, unreported, and unregulated (IUU) fishing in the South East Asia Region, jointly chaired by Australia and Indonesia. Compliance has been made by Chinese Taipei with relevant regulations as stipulated by Regional Fisheries Management Organizations for the implementation of effective measures to combat IUU fishing. The Thailand cabinet has also approved a Master Plan for Management of Thai Marine Capture Fisheries.²⁹

Understanding impacts of climate change on the oceans: An information base is provided by ocean observation to deal with the impacts of climate change. Japan announced its Japanese Marine Development Strategy in the 21st Century, with the aim of strengthening marine monitoring of waters around Japan.²⁹

Mitigation & adaptation to climate change: Some APEC economies have developed individual plans for adaptation to climate change. Korea's Comprehensive Plan on Climate Change Adaptation, lays stress on oceanographic observation, long-term based prediction model on ocean climate change, and assessing the impacts of climate change. Peru's National Climate Change Strategy aims to predict the impacts of climate change on the marine ecosystem and promote the adoption of adaptation measures at an early stage. Thailand has developed a master plan, the Thailand Climate Change Master Plan, involving all sectors. An international plan, the Northwestern Pacific Ocean Circulation and Climate Experiment (NPOCE) was initiated by Chinese scientists and provides a firm base for improving the ability of climate prediction. Many APEC economies have also actively participated in the initiative of the Blue Carbon Plan, which seeks the protection and recovery of blue ocean carbon sinks.²⁹

Marine sustainable development: The Motu Motiro Hiva Marine Park around Salas y Gómez Island, Chile, is the sixth largest protected area in the world, and its creation was an important achievement in the protection of marine biodiversity on the national and global scale, as this is among the last environments on the planet to remain untouched by man.²⁹

Incorporating SDG 14 into domestic development framework


Some APEC economies have mainstreamed the SDGs into their domestic plans and strategies for development, including the approach to implement the 2030 Agenda, to ensure that the pertinent domestic strategies, plans for action, and initiatives align with the goals of the SDGs.²⁸

For the protection and restoration of marine and coastal ecosystems, APEC economies have made commitments and put policy measures in place (Table 6). For example, Australia has committed 6 million AUD to the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security to conserve the hyper-biodiversity of the ocean in this region. The Coastal Restoration Fund, accounting for 75 million CAD, was established by Canada for addressing historically degraded areas and provides support to projects that contribute to the plans for coastal restoration. Chile's National Biodiversity Strategy 2017–2030 establishes the principal strategic guidelines and national goals for the conservation and sustainable use of biodiversity up to 2030. China's Blue Bay Restoration Action aims to restore, from 2016 – 2018, threatened ecosystems in coastal and marine areas with ecological importance. Other action plans include Biodiversity Strategy and Action Plan (2016–2021) (Hong Kong and China); Strategic Action Program of the Gulf of Mexico Large Marine Ecosystem with 12.9 million USD from 2017 to 2021 (Mexico); National Coastal and Marine Ecosystems Management (The Philippines); Marine and Coastal Resources Management Resources Act and establishment of a National Committee on Marine and Coastal Resources Management, and committed to restore 17,000 hectares of marine and coastal habitats (Thailand); New Zealand's National Plan of

Action for Sharks will be reviewed and revised in 2020 as will the updated National Plan of Action for Seabirds in early 2020 and continue to implement the Threat Management Plan for the New Zealand Sea Lion 2017–2022 and the associated Squid 6T Operational Plan to help mitigate the threat to sea lions in commercial fisheries operations.²⁸

With regard to the minimisation of ocean acidification, APEC economies are also contributing to international efforts for studying and monitoring the oceans, including the Integrated Marine Observing System and the Global Ocean Acidification Observing Network.²⁸

APEC Blue Economy Forums: Five APEC Blue Economy Forums have been organized since 2011 that focuses on the themes of:²⁸

-  Promoting the Green Growth of Marine Economy;
-  Achieving Blue Economy in the Context of Sustainable Development;
-  Public and Private Sector Dialogue; and
-  Pathways and Practices for Cooperation

The aim of these forums has been to advance the understanding of the Blue Economy, facilitate its mainstreaming and develop unanimity in establishing regional cooperation.²⁸

APEC has undertaken a significant amount of work in the area of ocean health and blue economy. The member countries of this cooperation do not include much of South Asia and span across Atlantic to include the USA and Canada. APEC provides a good framework that could be emulated by the Asia-Pacific countries including South Asia through regional organisations of ASEAN, Bay of Bengal Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) and Indian Ocean Rim Association (IORA) among others. Regional fisheries Management Organisations (RFMOs) could also be engaged to enhance and promote marine health and blue economy.

Table 6: Conservation of marine and coastal areas

Sr. No.	APEC Economy	Committed MPA establishment in territorial waters / Exclusive Economic Zone
1	Australia	40% of its waters included in marine parks
2	Canada	7.75% of its marine and coastal areas protected
3	Chile	43% of its exclusive economic zone as MPA
4	China	committed to increase the proportion of marine reserves to 5% (with 35% of its coastline as natural coastline)
5	Indonesia	20 million hectares of MPAs to be established by 2020
6	Thailand	15.68% of its total marine areas are already under ecosystem management measures
7	Singapore	Establishment of Sisters' Island Marine Park which spans 40 hectares

Source: APEC (2019) ²⁸



Way Ahead



- ❖ Asia-Pacific countries should focus on framing a regional Blue Economy framework that would synergise and harmonise the various national level Blue Economy initiatives. It is imperative to create a regional mechanism comprising of the key regional organisations such as ASEAN, BIMSTEC and IORA together for critical discussion.
- ❖ A composite study on the Blue Economy aspects will reduce data gaps, coordinate efforts and provide concrete evidence to enable Blue Economy in the region.
- ❖ Skill development and capacity building are essential components required especially for sectors such as fisheries, tourism among others.
- ❖ The livelihoods in the emerging sectors would encompass highly-skilled labour force highlighting the need to focus on enabling capacities both for traditional and emerging sectors.
- ❖ A regional Blue Economy forum could be an essential step to engage, encourage and collectively work with regional partners. The forum could provide the platform to the regional countries to share good practices, knowledge and technological advice.
- ❖ The Asia-Pacific region could collectively address the concerns of small island countries by coming together to fund their initiatives for ocean health and growth.
- ❖ Preserving marine biodiversity and addressing climate change are two key areas that the region could cooperate and work together. Joint initiatives to nurture nature-based solutions such as mangroves and coral reefs could be the first step in this direction.
- ❖ Science and technological innovation could be a major area for collaboration and the region could set an example for enhancing knowledge sharing and creating scientific synergies.
- ❖ The case of APEC provides a good practice that could be followed by Asia-Pacific countries including South Asia. While the APEC is focused on Economic cooperation, a Coalition for Blue Economy for Asia-Pacific could be envisaged with regional organisations, think tanks, research organisations, businesses and civil society engaging and collaborating under the initiative.
- ❖ Asia-Pacific Blue Economy consortium for Science and technology collaboration and for regional cooperation that includes all coastal and ocean-based economies in the Asia-Pacific region would be a starting point. A Track II and III level dialogues in these areas to integrate ideas and knowledge would be an essential value addition for all countries.

5. Annexure

Table 1: Ownership of fleet by dead-weight tonnage, 2019

Country or territory of ownership	Number of vessels	Dead-weight tonnage	Foreign flag as a percentage of total	Total as a percentage of total in world
Japan	3822	225,121,215	84.22	11.47
China	6125	206,301,032	55.92	10.51
Singapore	2727	121,485,648	41.32	6.19
Hong Kong SAR, China	1628	98,128,318	26.31	5.00
Republic of Korea	1647	76,701,517	83.81	3.91
Taiwan Province of China	1005	51,091,107	88.94	2.60
India	1019	24,859,163	33.21	1.27

Source: UNCTAD (2019) ¹⁷

Table 2: Top 10 World Container Ports in the world

Rank	Port	Volume 2018 (Million TEU)
1	Shanghai, China	42.01
2	Singapore	36.60
3	Shenzhen, China	27.74
4	Ningbo-Zhoushan, China	26.35
5	Guangzhou Harbor, China	21.87
6	Busan, South Korea	21.66
7	Hong Kong SAR, China	19.60
8	Qingdao, China	18.26
9	Tianjin, China	16.00
10	Jebel Ali, Dubai, United Arab Emirates	14.95

Source: World Shipping Council (2019) ³¹

Table 3: Travel and Tourism as a % of GDP and growth rate in 2018

Country	T&T as a % of Country GDP	T%T GDP Growth (%)
China	11.0	7.3
Japan	7.4	3.6
India	9.2	6.7
Australia	10.8	3.2
Thailand	21.6	6.0
Philippines	24.7	8.9
Hong Kong SAR, China	17.4	7.5

Source: World Travel and Tourism Council (2019) ³²

Table 4: Aquaculture Production of Main Species Groups In 2018 (in thousand tonnes, live weight)

Category	Asia (-Cyprus)	World
Inland Capture		
Finfish	43,046	46,951
Crustacea	3,579	3,653
Molluscs	207	207
Other aquatic animals	528	528
Subtotal	47,719	51,339
Marine and coastal aquaculture		
Finfish	3,995	7,328
Crustacea	4,834	5,734
Molluscs	15,876	17,304
Other aquatic animals	387	390
Subtotal	25,093	30,756
All aquaculture		
Finfish	47,400	54,279
Crustacea	8,414	9,387
Molluscs	16,083	17,511
Other aquatic animals	915	919
Total	72,812	82,095

Source: FAO (2020) ²

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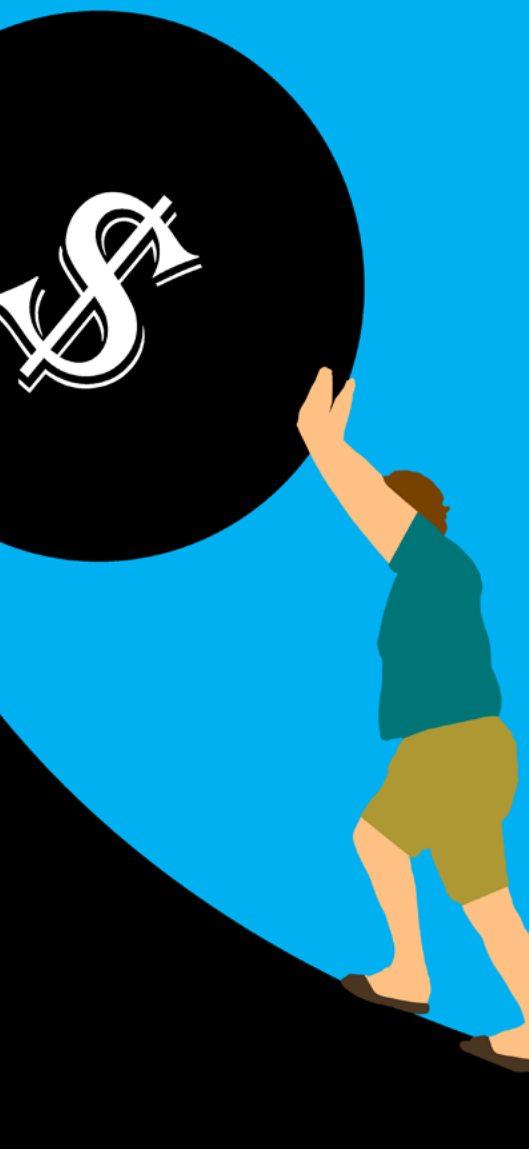
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