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Towards “Blue Economy” Transformation in the NOWPAP Region

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**Regional
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List of Acronyms

APEC	Asia-Pacific Economic Cooperation Apec
APSN	APEC Port Services Network
CMEC	Chinese Marine Energy Center
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Green House Gases
GloMEEP	Global Maritime Energy Efficiency Partnership
GPAS	Green Port Award System
GVA	Gross Value Added
IMO	International Maritime Organization
IMTA	Integrated Multi-Trophic Aquaculture
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
MPAs	Marine Protected Areas
MTCCs	Maritime Technology Cooperation Centers
NOWPAP	Northwest Pacific Action Plan
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PIRSA	Primary Industries and Regions South Australia
PSHEMS	Port Safety, Health and Environmental Management System
R&D	Research and Development
RCU	Regional Coordination Unit
SMPA	Special Marine Protected Area
SNA	System of National Accounts
UNDP	United Nations Development Programme
WWF	World Wildlife Fund

TOWARDS “BLUE ECONOMY” TRANSFORMATION IN THE NOWPAP REGION¹

By Yuko Iemura, edited by Lev Neretin

1. The “blue economy” is relatively new concept that has emerged since the UN Conference on Sustainable Development in 2012². Although there is no globally shared definition, the term “blue economy” refers to the environmentally sustainable development of the ocean-related economic activities³. “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.”⁴
2. The concept of blue economy has emerged because the expansion of “traditional” ocean business resulted in excessive use, over-exploitation and loss of natural ocean assets, including marine biodiversity. In response to those negative impacts, society at large needs a new approach supporting responsible businesses that could maximize economic and social benefits while protecting and re-building environmental assets. Although global transformation towards blue economy would require enormous amount of effort in investments, new technologies, and innovative ideas, taking into account the scale of ocean economy, potential and long-term benefits for its growth and new employment could surpass these initial investments over time.
3. Which commercial activities are associated with the blue economy? The commonly cited sectors are renewable ocean energy, fisheries and aquaculture, marine tourism, and commercial activities associated with shipping and ports development. For three NOWPAP countries alone, the ocean economy value added is estimated conservatively at few percentages of each country’s GDP (Table 1 below). In recent years, NOWPAP region are striving for successful development to convert traditional ocean-based economy into the blue economy.
4. The ocean-based renewable energy is being developed to meet with the global goals of climate change⁵. Since the non-renewable energy sources like fossil fuels result in CO₂ and other greenhouse gases emissions, the global action is required to scale up the use of renewable energy to mitigate global warming. Some countries moved by adding marine renewable energy into their national energy mix. In the NOWPAP countries, new energy facilities and R&D center were established to research non-renewable energy.
5. In renewable ocean energy, China is competing to be a regional hub for ocean energy R&D (research and development) in Asia⁶. China has invested over \$15 million for R&D projects in 2016 and has built a Chinese Marine Energy Center (CMEC) in 2017, which worth US\$300 million laboratory campus to serve as a testing ground for tidal and wave energy. Moreover, China is installing a number of offshore wind farms to serve for their national demands of energy⁷. The

¹ This report is a part of the NOWPAP RCU project “Rapid assessment of emerging environmental issues of policy relevance in the NOWPAP region” (2018-2019)

² UN-Habitat(2018). “background paper on BLUE ECONOMY AND CITIES.” p.8

³ PEMSEA(2015). “Blue Economy for Business in East Asia: Towards an Integrated Understanding of Blue Economy.” p.28

⁴ Economist Intelligence Unit (2015). “The Blue Economy: Growth, Opportunity and a Sustainable Ocean Economy.” Briefing Paper for the World Ocean Summit 2015.

⁵ PEMSEA(2018). “Policy Brief for the Blue Economy - Renewable Ocean Energy.” p.1

⁶ PEMSEA(2018). “Policy Brief for the Blue Economy - Renewable Ocean Energy.” p.3

⁷ PEMSEA(2018). “Policy Brief for the Blue Economy - Renewable Ocean Energy.” p.5

Republic of Korea, on the other hand, has developed tidal barrage in Sihwa Lake, which is the largest tidal energy plant in the world⁸. Japan has made an effort on researching various new renewable energy sources derived from the ocean, such as wave energy, tidal energy, ocean current energy, and ocean thermal energy. Japan also has operating small Ocean-derived Thermal energy plant with RO Korea⁹(Figure 1).

Table 1: Scale of Blue Economy Sectors in NOWPAP Countries

Scale of Blue Economy Sector in NOWPAP countries: China, RO Korea, and Japan			
	CHINA	RO KOREA	JAPAN
Ocean economy (Gross value added or GVA, in constant prices)	US\$1,041.9 billion (in 2015)	US\$43.53 billion or 3.3% of GDP (as of 2013)	1.48% of GDP in 2000
Employment in ocean economy	35.9 million people (in 2015)	656,303 (as of 2013)	1million (in 2000)
Estimated value of coastal and marine ecosystems	US\$150 billion	US\$42.4 billion – 44.5 billion	n.a.

Source : State of Oceans and Coasts of China / RO Korea / Japan, PEMSEA, December 5, 2018



Figure 1: Pilot Plant by Japan and RO Korea

6. Fisheries is the other blue economy sector that has great potential. Marine fisheries contribute to the livelihood of 300 million people and nutritious needs of 3 billion people worldwide¹⁰. Since Asian continent is the largest consumer of seafood from fisheries and aquaculture, the latter is an important blue economy sector in the NOWPAP region (ref: Fish consumption in Asia has doubled during the last three decades¹¹). Especially, the growth rate of capture fisheries in China is increasing with an average annual rate of 9% from 1990-2012 (Table 2).

⁸ PEMSEA(2018). “Policy Brief for the Blue Economy - Renewable Ocean Energy.” p.4

⁹ PEMSEA(2018). “Policy Brief for the Blue Economy - Renewable Ocean Energy.” p.5

¹⁰ World Bank (2017). “The Potential of the Blue Economy.” p.14

¹¹ PEMSEA (2015). “Blue Economy for Business in East Asia: Towards an Integrated Understanding of Blue Economy.” p.33

Table 2: Fisheries capture data in the NOWPAP countries (excl. Russia)

Fisheries Data in NOWPAP countries: China, RO Korea, and Japan			
	China	Japan	RO Korea
Total fisheries	70,368	4,817	3,187
Capture fisheries growth (avg. annual %, 1990-2012)	9.1	-4.3	-1.8
Aquaculture growth (avg. annual %, 1990-2012)	1.3	-1.1	3

Source : Economic Assessment of Oceans for Sustainable Blue Economy Development, PEMSEA, March 22, 2017

7. Market demand became a driver for over-fishing as well as resulted in the increased discards of fisheries products due to unsustainable fishing practices. A research shows that 31.4 percent of fish stocks were either overfished or fished in the unsustainable practice when analyzed the record of commercial fish stock from 1974 to 2013¹². To improve and maintain fish stocks and ensure food security, Asian countries increased aquaculture production, which now accounts for 80% of the global aquaculture production¹³. While aquaculture replaced collapsed fish stocks and improved food security, the sector is not without negative environmental impacts, including increased nutrient and litter pollution, introduction of invasive species and others¹⁴. To mitigate environmental impacts, countries explored new innovative practices such as multi-trophic aquaculture. China and RO Korea made a mutual effort to establish integrated multi-trophic aquaculture (IMTA)¹⁵. This is the new aquaculture practice using natural ecosystem, which co-culture complementing species like seaweed with shrimp so that one species can process the wastes from another.¹⁶

8. In another aspect, sustainable fisheries rely on the increasing transparency of surveillance and reporting of the fish. These regulatory issues were improved by applying sophisticated technologies to comply with national, regional and global legal frameworks, including addressing illegal, unreported and unregulated fishing. China increased fish production from aquaculture and contributed to fish availability worldwide¹⁷. To control local fisheries, it created local rules and the system to apply to those who fish in 'Special Marine Protected Area' (SMPA)¹⁸. The countries like China, RO Korea, Japan participates on Blue Economy Assessment, which uses The System of National Accounts (SNA) that is the common global framework to monitor respective

¹² World Bank (2017). "The Potential of the Blue Economy." p.15

¹³ PEMSEA (2018). "Policy Brief for the Blue Economy Sustainable Fishing and Aquaculture." p.1

¹⁴ IPBES (2018). "The IPBES regional assessment report on biodiversity and ecosystem services for Asia and the Pacific." Karki, M., Senaratna Sellamuttu, S., Okayasu, S., and Suzuki, W. (eds). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. p.612

¹⁵ PEMSEA (2018). "Policy Brief for the Blue Economy Sustainable Fishing and Aquaculture." p.5

¹⁶ PIRSA (2015). "Feasibility study for integrated multitrophic aquaculture in southern Australia." Wiltshire, K. H., Tanner, J. E., Gurgel, C. F. D. and Deveney, M. R. p.4

¹⁷ PEMSEA (2015). "Blue Economy for Business in East Asia: Towards an Integrated Understanding of Blue Economy." p.33

¹⁸ PEMSEA (2018). "Policy Brief for the Blue Economy - Sustainable Fisheries and Aquaculture." p. 3

ocean economy¹⁹. In Japan, it increased highest Marine Protected Areas (MPAs) to conserve marine biodiversity and this accounts for 30% of their territorial waters²⁰.

9. In the demand side, on the other hand, there are a growing number of consumers who purchase fish from the environmentally-friendly enterprises. This trend is leading global supply chains and seafood restaurants to comply with the global standards of environmentally responsible practices²¹.

10. Sustainable fisheries have evolved its potential with the innovative practice of growing fish and other ocean commodities not only by exploiting them from the ocean but also by culturing them with new unique techniques. The high-level technology to comply with a national and regional legal framework is another key point to advance the transition of conventional fisheries into sustainable fisheries since the ocean is trans-boundary and difficult to control. Besides, diet changes and consumption at the market could also become a driver transforming fisheries and aquaculture sectors towards sustainability.

11. The dramatic expansion of the tourism sector in the region transformed both national and local economies. For example, 1 out of 11 persons are employed in tourism business worldwide, and tourism accounts for 9.8 % of world GDP in 2015. Small developing countries are more likely to receive greater influence by the foreign financial source²².

12. However, tourism and recreational activities also could bring negative environmental impacts such as pollution, waste, and water shortages. In addition, marine ecosystems and habitats are at the risk of degradation because of the over-development of hard infrastructures such as airports, marinas, resorts, and hotels²³. International tourism could generate positive impacts to local coastal communities by bringing employment opportunities and revenues. For example, coastal tourism in China had a value of US\$172.63 billion. Marine tourism and recreation in China constitute about 1/3 of their core ocean economy added value. The employment in coastal tourism has reached to 1,306,000, which is 3.7% of marine-related industries in China²⁴ (

13. Figure 2).

14. Tourism is a growing sector that has great potential of economic growth in Asia-Pacific²⁵. To make tourism sector sustainable, it is important to manage the development of tourism infrastructures and recreational facilities in such a way that they have minimum environmental costs while providing economic benefits for local economies.

19 PEMSEA (2017). "Economic Assessment of Oceans for Sustainable Blue Economy Development." p.4

20 PEMSEA (2017). "Economic Assessment of Oceans for Sustainable Blue Economy Development." p.19

21 PEMSEA (2015). "Blue Economy for Business in East Asia: Towards an Integrated Understanding of Blue Economy." p.34

22 World Bank (2017). "The potential of the Blue Economy." p.16

23 PEMSEA (2018). "Policy Brief for the Blue Economy - Sustainable Tourism." p. 1

24 PEMSEA (2018). "State of Oceans and Coasts China."

25 PEMSEA (2015). "Blue Economy for Business in East Asia: Towards an Integrated Understanding of Blue Economy." p.37

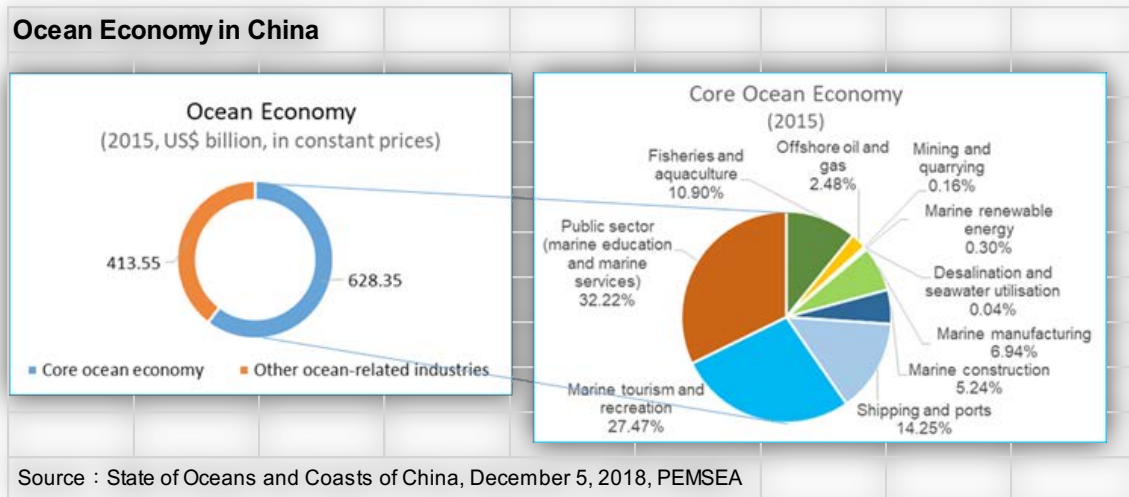


Figure 2: Ocean Economy in China

15. Global shipping and port developments are important blue economy sector. For example, more than 80% of the international trading commodities in 2015 were transported through shipping by the sea. While global business and supply chains continues spreading across the world in the future, there is few estimates for the seaborne trade volume to be doubled by 2030 and port volumes to be quadrupled by 2050²⁶.

16. Shipping and ports sector are noticeable in Asia where 7 out of 9 world's biggest seaports are located, including Shanghai, Shenzhen, and Hong Kong²⁷. With the growing globalized economy, shipments between countries are expected to triple in the next 25 years²⁸. NOWPAP countries have the world biggest seaports; one of them is in Busan, RO Korea. In Korea, the ship-building sector accounts for 42% of the national ocean economy. Besides, marine transportation is used for almost all (99%) of Korean cargo in importing raw materials and exporting finished goods (Table 3).

17. Shipping and ports development could have negative impacts on the coastal areas, including chemical and noise pollution from the construction of port facilities, shipping operations, and accidental oil spills. In addition, discharge of ballast waters could transfer invasive species and compromise the health of coastal ecosystems. Shipping sector also contributes to emissions of greenhouse gases which escalates global warming²⁹.

²⁶ World Bank (2017). "The potential of the Blue Economy." p.21

²⁷ PEMSEA (2015). "Blue Economy for Business in East Asia: Towards an Integrated Understanding of Blue Economy." p.35

²⁸ PEMSEA (2018). "Policy Brief for the Blue Economy - Sustainable Shipping and Ports." p. 1

²⁹ PEMSEA (2018). "Policy Brief for the Blue Economy - Sustainable Shipping and Ports." p. 2

Table 3: Ocean economy in RO Korea

Total Gross Output and Gross Value Added of the Ocean Economy in RO Korea, 2010.					
Sector		Total gross output		Value added	
		million USD	(%)	million USD	(%)
Entire Industry		3,124,037.40	100	1,152,580.80	100
Ocean Industry		133,846.80	4.3	37,822.60	3.3
Ocean-based Sectors	Fisheries and aquaculture	7,515.30	5.6	3,226.40	8.5
	Marine chemical and salt	563.7	0.4	363.1	1
	Marine electric power				
	Marine construction	2,835.00	2.1	1,272.30	3.4
	Shipping	34,555.50	25.8	3,287.80	8.7
Ocean-related Sectors	Machine equipment	10,120.10	7.6	2,641.70	7
	Ship building	53,008.40	39.6	15,919.20	42.1
	Marine services (mapping, surveying, consulting)	1,448.60	1.1	935.6	2.5
	Research and development (R&D)	601.9	0.4	404.7	1.1
	Government, education	4,294.60	3.2	2,805.70	7.4
	Seafood processing and retails	8,926.40	6.7	2,312.20	6.1
	Pharmaceuticals, Biotechnology, etc.	7	-	3.1	0
	Port	3,522.60	2.6	1,747.00	4.6
	Marine tourism	6,447.80	4.8	2,903.70	7.7

Source : Economic Assessment of Oceans for Sustainable Blue Economy Development, PEMSEA, March 22, 2017

18. In NOWPAP region, China participates to Green Port Award System (GPAS) that is established by the APEC Port Services Network (APSN). APSN encourages blue shipping business and its eco-friendly performance that enables improved shipping and ports environment. Besides, China is the pilot country for the project called Global Maritime Energy Efficiency Partnership (GloMEEP) initiated by GEF, UNDP, IMO. This project is aimed to reduce industry's GHG emissions. Moreover, China works with Maritime Technology Cooperation Centers (MTCCs) to promote technology and improve the shipping efficiency with low-carbon, and Shanghai Maritime University has become one of the host institutions³⁰. RO Korea made collaboration with PEMSA, GEF, UNDP to create the legal framework that is called PSHEMS, the Ports Safety, Health, and Environmental Management Code and System. It sets standards and performance to improve the environment and safety of the port industry³¹. Japan developed clean technology of onshore power in Kitakyushu Port, and it is used to recharge the ships with renewable energy alongside the port³².

³⁰ PEMSEA (2018). "Policy Brief for the Blue Economy - Sustainable Shipping and Ports." p. 2

³¹ PEMSEA (2018). "Policy Brief for the Blue Economy - Sustainable Shipping and Ports." p. 4

³² PEMSEA (2018). "Policy Brief for the Blue Economy - Sustainable Shipping and Ports." p. 5

19. Since shipping and ports operation involve a variety of stakeholders and businesses, partnerships and networking are the important enabling factors in transitioning this sector towards blue economy. Technology development is another key factor to minimize environmental damages caused by shipping without affecting the performance of businesses.

20. To harness the blue economy, it is imperative to have multi-level cooperation and partnerships among public and private sector, academia and civil society. International cooperation can contribute to a large-scale global reform towards building sustainable blue economy. It should foster the development of integrated strategic action plans and effective ocean management frameworks using a holistic approach³³. The networking and collaboration between technology developers and users could accelerate the sharing of knowledge and solutions that can be particularly useful in the field of research and development and technology transfer³⁴.

21. Large scale investment is urgently needed in “greening” ocean economy sectors. Supporting transformation towards blue economy would require unprecedented level of international cooperation and collaboration at multiple levels and with various sectors connected directly and indirectly to the ocean. For NOWPAP countries whose economies are closely connected to coasts and the ocean, transforming towards sustainable blue economy will be critical for making their societies, economies and shared environment sustainable and resilient.

³³ WWF (2015). “Reviving the Oceans Economy: The Case for Action—2015.” p. 44

³⁴ WWF (2015). “Reviving the Oceans Economy: The Case for Action—2015.” p. 48