BLUE ECONOMY ASSESMENT

Inception Workshop

PEMSEA Resource Facility
Quezon City, Philippines

29 – 30 July 2015

PROCEEDINGS OF THE
BLUE ECONOMY ASSESSMENT
INCEPTION WORKSHOP

28 – 30 July 2015
PEMSEA Resource Facility
Quezon City, Philippines

Executive Summary

The Inception Workshop on Blue Economy Assessment was held on 28-30 July 2015 at the PEMSEA Building in the Department of Environment and Natural Resources (DENR) Compound in Quezon City, Philippines.

Representatives from seven countries in the East Asian Seas (EAS) region participated, and presented ongoing efforts on blue economy in their respective countries. Group exercises focused on identifying key ocean economic activities and investment opportunities, and examining issues related to data availability and accessibility.

Experts on ocean economy, economic and environment accounting, and valuation of ecosystems and biodiversity were invited as resource persons. They also provided important insights during the discussions.

Based on the definition of blue economy (from the Changwon Declaration 2012), agreement was reached on ways to move forward with the assessment of ocean economy and innovative investments for blue economy development. Information that will be subsequently collected after the workshop will be packaged for presentation and distribution during the EAS Congress 2015.

What is blue economy?

"We understand the Blue Economy to be a practical ocean-based economic model using green infrastructure and technologies, innovative financing mechanisms, and proactive institutional arrangements for meeting the twin goals of protecting our oceans and coasts and enhancing its potential contribution to sustainable development, including improving human well-being, and reducing environmental risks and ecological scarcities." **(Changwon Declaration 2012)**

1. Workshop Venue, Schedule and Program

Venue: PEMSEA Resource Facility
         Department of Environment and Natural Resources (DENR) Compound
         Visayas Avenue, Quezon City, Philippines

Program:

Date	Agenda
28 July 2015	• Introduction • Approaches • Review of past and on-going efforts
29 July 2015	• Issues and challenges • Group Exercise 1: Data Concerns • Blue economy investment opportunities: Overview • Group Exercise 2: Investment opportunities
30 July 2015	• Consensus building on next steps (outputs and schedule) • East Asian Seas (EAS) Congress 2015 • Business Network: Overview

The complete program is shown in **Annex 1**.

2. Workshop Objectives and Expected Outputs

The workshop aims to:
- discuss the concept and components of a blue economy, and agree on a working definition;
- adopt a common approach for conducting the assessment of ocean economy and valuation of coastal and marine ecosystems;
- identify blue economy investment opportunities; and
- prepare a workplan to undertake the required activities.

The expected outputs of this workshop are shown in **Figure 1**.

Figure 1. Expected Outputs.
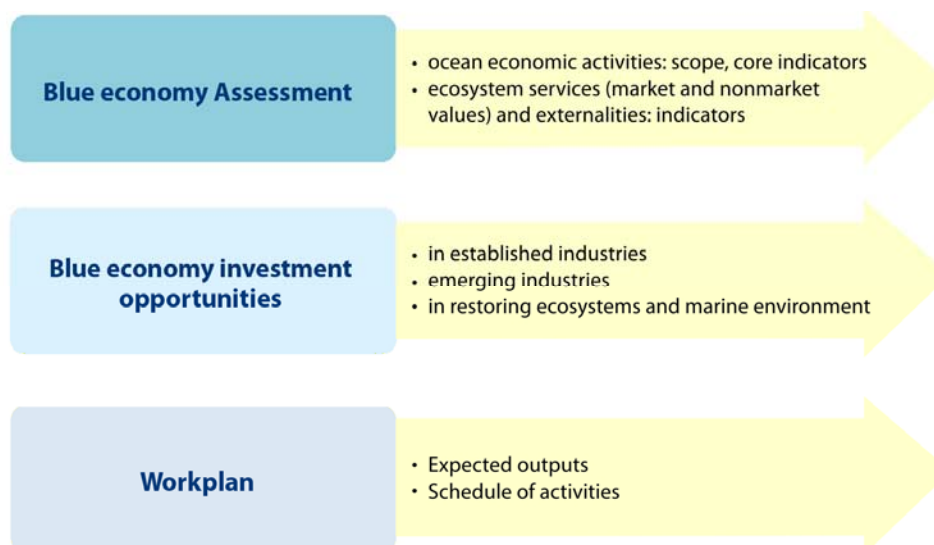
3. Participants

There were 15 participants from seven (7) countries: China, Indonesia, Malaysia, Philippines, Republic of Korea, Thailand, and Vietnam. However, the participants from the Philippines stayed only on the first day. The list of participants is shown in **Annex 2**.

4. Resource Persons

Three (3) resource persons shared their knowledge and experience on ocean economy, valuation of ecosystems and biodiversity, and integrating ecosystem valuation in national income accounts and policymaking.

Prof. **Alistair McIlgorm**, Ph.D.
Marine Economist and Capacity Development Coordinator
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Australian National Centre for Ocean Resources and Security (ANCORS)
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Dr. **Marian S. delos Angeles**, Ph.D.
Senior Advisor
Natural Resource and Environmental Economics and Policy Resources,
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Mr. **Norman Emmanuel C. Ramirez**
Capacity Development Specialist, and
Coordinator,
ASEAN Heritage Parks Programme
ASEAN Centre for Biodiversity
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5. Summary of Presentations and Discussion Points

5.1 Introduction to the workshop

Mr. S. Adrian Ross, Executive Director of PEMSEA, gave the welcome and opening remarks. He gave the background of PEMSEA, its vision and mission, as well as the adoption of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) in 2003, and the presentation of the updated SDS-SEA during the East Asian Seas (EAS) Congress 2015 in Danang, Vietnam in November 2015. He explained the need for a reporting system to measure progress towards the achievement of the objectives of the SDS-SEA by the participating countries in the region. In particular, Post-2015 Targets commit PEMSEA Country Partners to the development and

utilization of a scientifically sound Blue Economy State of Oceans and Coasts (SOC) reporting system, including agreed indicators and data requirements to monitor progress in SDS-SEA implementation. The Blue Economy SOC will: (a) show the critical role and contribution of ocean economic activities and coastal and marine ecosystems to national economies; (b) provide evidence base for region-wide ocean policy and decisionmaking; and (c) examine the benefits, costs and impacts at the regional and national levels. Mr. Ross also showed the phases of development of the regional Blue Economy SOC report, and the proposed schedule.

Ms. Maricor Ebarvia gave an overview of the workshop, pointed out the background and rationale for the project on blue economy assessment, and explained the workshop objectives, expected outputs, program, and the activities that will be undertaken for the duration of the workshop. She showed the definitions of ocean economy and coastal economy, and the scope of an ocean-based blue economy in various countries. At the end of the workshop, the participants are expected to adopt a common definition, scope and components of a blue economy. She also presented the points for discussion and matters of concern for the sessions on state of the blue economy (ocean economy assessment and valuation of ecosystems), investment opportunities, and contribution to policy and planning.

5.2 Approaches

The system of national accounts (SNA) provides measurement of economic growth, and reports the gross domestic product (GDP) of countries. However, economic and welfare losses resulting from unsustainable use of natural resources and environmental degradation are not usually captured in the GDP. Assessment of economic performance should be based on both measures of annual growth (such as GDP) and measures of the natural capital (e.g., coastal and marine ecosystems and resources), which indicate whether the economic growth is sustainable over the long term.

Dr. Marian delos Angeles pointed out the following issues, and the need for an alternative system of accounting:
- Externalities: These are not accounted for in the SNA. These are the unpriced environmental services, or hidden in "traditional" producing and consuming sectors.
- Millennium Ecosystem Assessment: The **undervaluation of natural capital** is a major cause of ecosystem degradation and biodiversity loss.
- Provision by the environmental goods industry to address an environmental problem increases GDP.
- Measurement problems with **informal** economies: These are not usually accounted for in the GDP.
- SNA mostly accounts for current flows. There are no environmental assets for most countries, unlike firms' statements of assets and liabilities. *Environmental assets* are defined as the naturally occurring living and non-

living components of the Earth, together comprising the biophysical environment, that are used in production, and that deliver ecosystem services to the benefit of current and future generations (SEEA).

Dr. delos Angeles discussed the UN Statistical Commission's System of Environmental and Economic Accounting (SEEA), which was approved in 2012, as a framework for integrating the ecosystems and environment in the national income accounts. The SEEA is intended to meet the needs of policymakers by providing indicators and descriptive statistics as well as serving as a tool for strategic planning and policy analysis to identify more sustainable development paths. **Figure 2** shows the linkage between the economy and nature/environment. The SEEA includes accounting for natural assets from which many natural resource-based goods are produced. However, difficulty in measuring fisheries stocks limits the estimation of fishery assets. Nonetheless, development of current accounts for activities based on fishery and coastal resources generate significant information for policy issues as shown in cases that she presented.

Figure 2. Economy – Environment Linkage.
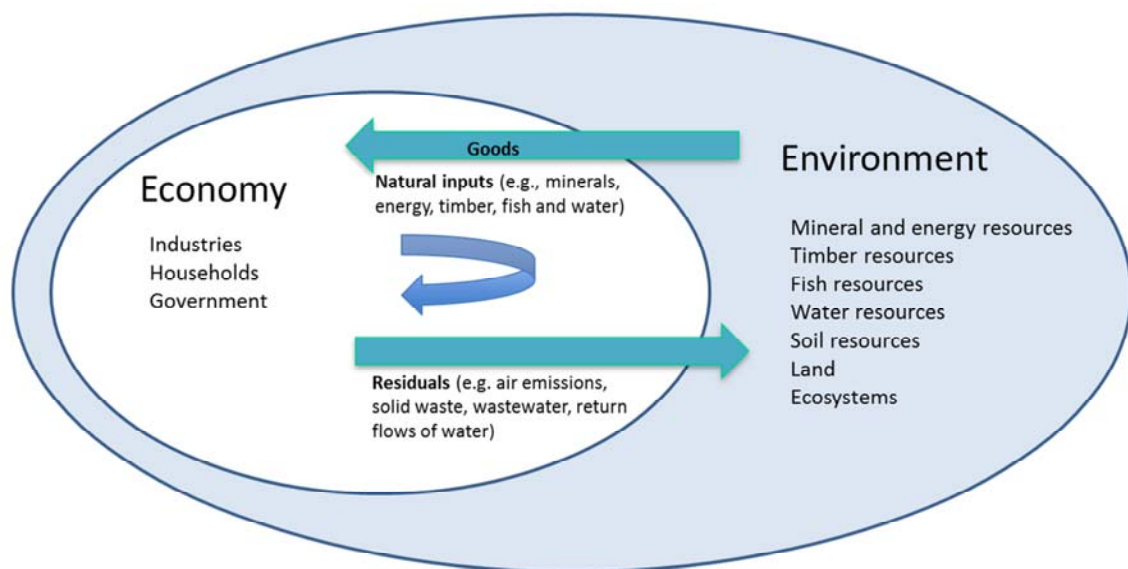
Dr. delos Angeles provided examples of assessing the 'blue economy', and contribution of coastal and marine ecosystems to GDP, income of local communities, shoreline protection, etc., for countries outside the PEMSEA region:

- *Zanzibar, Tanzania*: In Zanzibar, marine ecosystem services accounts for 30 percent of the GDP. But do they contribute to poverty reduction? The distribution of income and employment in Zanzibar shows that the value of *provisioning services* accrue to local communities, but for the value of cultural services — tourism, only 20 percent goes to the local communities, and a large percentage goes to non-Zanzibaris. Moreover, most government income

is from large-scale and club tourism that does not rely on healthy coastal and marine ecosystems.

- *Belize*: The value of coral reef- and mangrove-associated fisheries, tourism, and shoreline protection is US$ 395–US$559 million per year. This is 30 to 43 percent of the GDP of Belize in 2007. Around 70 percent of the coasts is protected by coral reefs.

- *Orissa, India*: Mangroves reduced human death, livestock loss and house damages during the T-7 Super cyclone of October 1999. Human death toll would have been nearly doubled in the absence of mangroves. Although engineering approaches saved more lives than mangroves (especially early warning), the presence of mangroves have complemented the benefits of both storm shelters and early warning. Annualized storm protection benefit of mangrove for reducing damages was found higher than the annual return from land, thus justifying mangrove conservation as a viable climate change adaptation strategy.

- *Australia*: This is the only country that has environmental asset accounts in the SNA (see **Figure 3**).

Figure 3. Integrated Environmental and Economic Accounts in Australia.
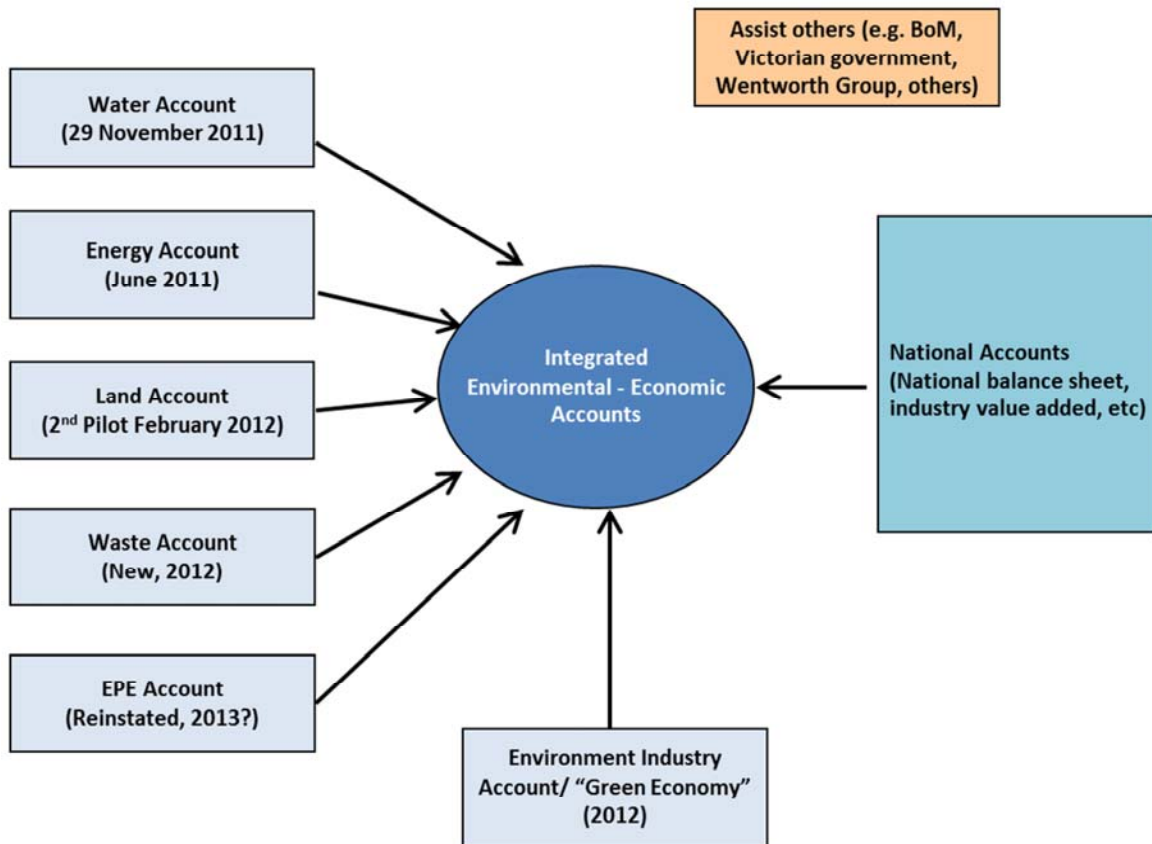
She also mentioned the previous initiatives in the Philippines on environment and natural resource accounting, and institutionalization of SEEA. The World Bank also supported a Country Environmental Assessment with the following key results: for coastal and marine resources, the net benefits amount to PhP24 billion in 2006 (approx. US$545.5 million), but the environmental costs (from unsustainable fishing, coastal development, pollution, and climate change) amount to PhP5.7 billion (US$129.5 million). Such figures indicate unsustainable practices that impact on the health of coastal and marine resources, and the benefits they generate.

Dr. delos Angeles also gave an overview of the World Bank's Wealth Accounting and Valuation of Ecosystem Services (WAVES), which adopts the SEEA framework, as well as UNEP's The Economics of Ecosystems and Biodiversity (TEEB) project.

Mr. Norman Ramirez of the ASEAN Centre for Biodiversity further explained the objectives and stepwise approach of TEEB, and the results of the ASEAN TEEB Scoping Study. TEEB, a global initiative focused on "making nature's values visible", was launched by Germany and the European Commission in 2007, and being carried out under the auspices of the United Nations Environment Program (UNEP). Its principal objective is to mainstream the values of biodiversity and ecosystem services into decisionmaking at all levels. TEEB focuses on drawing attention to the economic benefits of biodiversity, and highlighting the growing cost of biodiversity loss and ecosystem degradation. It presents an approach that can help decisionmakers *recognize, demonstrate and capture* the values of ecosystems and biodiversity for use in planning and management.

TEEB is a key step for mainstreaming green growth in development processes of the region. The ASEAN TEEB Scoping Study finds its rationale in the nexus between development, climate change and biodiversity in Southeast Asia. It builds on existing knowledge — 182 studies done in eight countries in the region. These studies have been reviewed and selected based on a set of criteria. In the scoping study, forests have been identified as the most studied ecosystem type, followed by wetlands, mangroves and coastal ecosystems. It has been found out that there are more studies being undertaken for provisioning ecosystem services since these are relatively easier to value as compared to other ecosystem services, such as regulating and supporting.

Mr. Ramirez presented the key results of the four case studies highlighted in the ASEAN TEEB Scoping Study: mangroves and coral reefs at the Southeast Asian regional level, forests at the provincial level (Leuser forest ecosystem, Indonesia), and marine protected areas (MPAs) at the local level (Hon Mun MPA, Vietnam). Southeast Asia is expected to lose one third of mangroves between 2000 and 2050 under a 'business as usual' scenario. The value of loss of mangroves was estimated at US$2 billion (annual value in 2050). For the coral reefs, the value of lost reef-related fisheries in Southeast Asia is US$5.6 billion (annual value in 2050), with the highest loss in Indonesia and the Philippines. The scoping study also showed possible outcomes on the trade-off between short-term gains and long-term losses,

and emphasized how information on the economic values of ecosystem services can be used as a tool to influence decisionmaking processes.

5.3 Review of past and ongoing efforts

Ongoing and past programs and projects related to measuring the coastal and ocean activities, valuation of coastal and ocean ecosystems, and contribution to national economies were presented during the workshop to provide a starting point for the initial ocean economy assessment studies. The following were the key points raised for discussion as they relate to having a common framework for the ocean economy assessment:

- Clear-cut definition;
- Scope and Boundaries in operational terms;
- Harmonization of statistical concepts and terms;
- Data concerns: availability; data sourcing; data disaggregation; measuring and integrating ecosystem services and environmental aspects;
- Appropriate estimation methodology;
- Development of indicators; and
- Measuring backward and forward linkages and spin-off effects.

Ms. Ebarvia presented the results of the marine economy assessments done in 2009, and pointed out the gaps in these studies:

- Indonesia, Japan, RO Korea: Used Input-Output tables
- Indonesia: presented the gross value added (GVA) of each marine economic activity, and contribution to GDP. However, total output and employment in each sector were not shown.
- Japan: no breakdown of output, employment and value-added of each sector
- RO Korea: showed the total output and GVA for key marine sectors, but did not present the employment data per sector. Also estimated the backward and forward linkages, and production- and employment-inducing effects.
- Philippines: Used the International System for Industry Classification (ISIC) and industry data, and presented the outputs, revenues, capital expenditures and employment in each marine industry. However, the GVA of marine economic activities and contribution to GDP were not shown.
- Malaysia, Thailand and Vietnam: Used various data sources and studies; Did not show the GVA of the marine sector and contribution to GDP

She also showed the data on fisheries, mangroves and coral reefs for the seven countries from the Green Data Book 2014 (**Table 1**).

Table 1. Ocean data (as of 2012).

	China	Indonesia	Japan	RO Korea	Malaysia	Philippines	Thailand	Vietnam
Total fisheries ('000 mT)	70,368	15,422	4,817	3,187	2,097	4,869	3,068	5,942
Capture fisheries growth (avg. annual %, 1990-2012)	4.1	3.7	-4.3	-1.8	2.0	1.1	-1.4	5.7
Aquaculture growth (avg. annual %, 1990-2012)	9.1	13.4	-1.1	3.0	11.8	6.2	6.8	14.7
Marine protected areas (% of territorial waters)	1.3	2.2	30.0	0.17	2.0	52.8	4.4	1.7
Coral reef area (km²)	1,510	51,020	2,900	--	3,600	25,060	2,130	1,270
Mangrove area (km²)	208	31,894	7.4	--	7,097	2,565	2,484	1,056

Source: The World Bank. 2014. *The Green Data Book.*

APEC and Australia. Professor Alistair McIlgorm discussed the conceptual framework and approach of APEC on marine economy assessment, key results, data gaps, and recommendations for using a common approach and data sources. He also presented Australia's marine economy — the key marine economic sectors, and their respective direct value added, indirect value and output multiplier. He also discussed the growth and changes in Australia's ocean economy in the past decade as well as the externalities. He pointed out the 'aid and trade' strategy of the current government, and the possibility of including a blue economy component in the Indian Ocean and Pacific Ocean.

Philippines. Ms. Jacqueline Miel from the National Economic and Development Authority's project management office for the Philippines Wealth Accounting and Valuation of Ecosystem Services project (Phil-WAVES) presented the SEEA framework, scope of Phil-WAVES, and ongoing activities. The project focuses on: (a) national satellite account for mineral resources (gold, copper, chromium, and nickel); (b) Laguna de Bay basin (water pollution and siltation — link to flooding and water uses); and (c) Southern Palawan (land use conflicts). A national satellite account for mangroves is being planned for the third year of implementation, and its contribution to policy on coastal zone protection, and disaster risk reduction. The coastal accounts in Phil-WAVES include coral reefs (percent cover), seagrass (species composition, percent cover, density and frequency), and mangroves (area, species diversity and number of species, density, total volume, and seedlings/saplings).

Indonesia. Dr. Fahrudin presented the ocean economic activities in Indonesia, and their gross value added and contribution to the country's GDP. The data for ocean activities are available for 2013 only, and are based on the ISIC and GDP accounts. The 2010 data on value added, input-output, and employment are available in raw data. Indonesia has adopted the ISIC code. He also pointed out the existing studies on valuation of coastal and marine ecosystems (mangroves, seagrass, and coral reefs) in selected sites (e.g., Barru Districts in South Sulawesi, Lombok Strait, Bontang District in East Kalimantan, and Bintan Islands). He showed the location of

oil and gas mining, and where the ecosystem valuation research has been done. He also identified the key policies on ocean and coastal management in Indonesia.

Malaysia. Ms. Cheryl Rita Kaur pointed out the importance of the seas in Malaysia, and the country as a strategic maritime hub. She presented information on the shipping industry, shipping traffic in the Straits of Malacca, ports, ship building and repair, oil and gas proven reserves, maritime services sector, trade and balance of payments. She also presented the location and area of ecosystems (mangroves, seagrass and coral reefs), and their contribution to the economy based on studies. She mentioned the data issues and other challenges in assessing the ocean economy in Malaysia.

Republic of Korea. Dr. Chang Jeong-In presented the ocean-related policies, the scope of ocean economy, the ocean economic activities, and their respective gross outputs and value added (from the 2010 Input-Output table), and total contribution to the country's GDP in 2008, 2010 and 2011. Regarding the coastal and marine resources, she presented the location, area and value of ecosystem services of estuaries, tidal flats, and coastal waters (beaches, national parks, food production, aggregates and natural gas).

PR China. Dr. Wei Bo presented the policies on blue economy in China, including the national strategy and development plan; capacity building on monitoring and evaluation system and marine economic statistics; transformation of marine economic development mode; protection and restoration of the marine environment; comprehensive marine management; and improving the marine science and technology level. He also presented the statistical system in China, the scope and components of the ocean economy, the gross ocean product and total number of people employed in the ocean-related sectors. He pointed out the breakthrough in marine infrastructure and the expansion of ports, shipping, ship building, and offshore oil and gas production. He also discussed the issues related to blue economy assessment, and the practices within the APEC framework.

Thailand. Dr. Nawarat Krairapanond discussed the: (a) national policy on blue economy or marine (ocean) economy; (b) studies done on valuation of coastal and marine resources and environment, and approach or methodology used; (c) importance of blue economy to policymaking, economic development plans, and coastal and marine management; (d) economic contribution of marine-related economic activities/sectors to national economy; and (e) issues and challenges in doing blue economy assessment.

China, Indonesia, and RO Korea presented data from the national income accounts and industry statistics while Malaysia and Thailand used sectoral studies.

5.4 Issues and challenges

Professor Alistair McIlgorm pointed out the blue economy drivers that have to be considered: (a) concerns for sustainability and environment, and (b) new marine industries and innovation (new and emerging industries, and growth of marine industries.

He discussed the following key issues: (a) definition of ocean economy and blue economy; (b) conceptualizing the ocean economy and economic value of ecosystems; and (c) consistency of measurement methodology of ocean economy across the countries.

His key recommendations were:
- Continue to develop a regionally consistent ocean/blue economy profile for each EAS country;
- Measure externalities (but where to fit in the frameworks?)
- Reconcile nonmarket valuations (e.g., TEEB) and EES with ocean economy framework… "*how to create predictable cash flows for investors behind the valuable ecosystem services offered by the ocean*" (The Economist).
- Promote uptake and use of ocean economy data in marine planning; and
- Pilot studies of the ocean and blue economy, assessing economic growth, ecological sustainability, and environmental impacts, and measuring externalities.

5.5 Group Exercise 1: Data Concerns

The participants were asked to assess the: (a) data availability for each ocean economic activity, GDP, ecosystem services (direct use or market values, and indirect uses and non-use or nonmarket values), and climate change; (b) data accessibility, and sources of data. **Table 2** shows the sectors where data are available and accessible in each country.

Table 2. Data Availability and Accessibility.

1. OCEAN ECONOMIC ACTIVITIES	PR China	Indonesia	Malaysia	Philippines	RO Korea	Thailand	Vietnam
• Fisheries and Aquaculture	•	•	•	•	•	•	•
• Offshore Oil and Gas	•	•	•	•	•	•	•
• Mining (Minerals)	•	•	•	•	•	•	•
• Energy/electric supply (tidal and wave energy; renewables)	•	░	▓	•	░	•	░
• Water (desalination)	░	▓	▓	▓	▓	•	▓
• Manufacturing							
• Seafood processing	▓	•	•	•	•	•	•
• Ship building and repair	•	•	•	•	•	•	░
• Marine transport equipment	▓	•	•	•	░	•	░
• Marine biotechnology,	•	•	•	•	░	•	░
pharmaceuticals, chemicals	•	•	•	•		•	░
• Marine Construction	•	•	•	•	░	•	•
• Shipping (marine transportation, ports, warehouses)	•	•	•	•	•	•	•
• Marine tourism and recreation	░	•	•	•	░	•	•
• Defence/Government (navy, coast guard, etc.)	▓	•	░	•	•	•	•
• Marine research and education	•	░	•	•	•	•	•
• Marine services (mapping, monitoring, consulting, maritime insurance, etc.)	•	░	░	•	▓	•	•
2. GDP	•	•	•	•	░	•	•
3. ECOSYSTEM SERVICES							
• Direct use/market values	•	░	•	•	░	•	▓
• Indirect use and nonmarket values	•	░	•	•	░	•	▓
4. CLIMATE CHANGE	░	░	•	•	░	•	•

•   *Available, accessible (online; government statistics and published data; studies)*

░   *Partly available; accessible from separate statistics and studies*

▓   *No activity; not available; not accessible (not published)*

All the participants said that data on most of the ocean economic activities are available from published government statistics (industry data, GDP and national income accounts, input-output tables). Except for PR China, data on **public sector activities** like defense/navy, coast guard, and marine environment protection are available, and can be accessed from the GDP or national income accounts and government budget. Regarding **energy**, it was pointed out that RO Korea has a number of ocean energy (tidal, current or wave) projects — these were presented during the EAS Congress 2009 in Manila — thus, data would be available. China and RO Korea would need to disaggregate the data on **tourism** to get the marine tourism component. Prof. McIlgorm raised the issue of double counting — but this will be addressed when the gross value added data are used.

The participants have to also verify and check the data on valuation of ecosystem services, impacts of climate change, and activities related to improving ocean health (e.g., habitat restoration and protection, pollution reduction) and climate change mitigation and adaptation with the concerned government agencies. Studies on the ecosystem services and climate change can also be confirmed with the academe, and research institutions. The Indonesian participants suggested using network of friends in the different government agencies and institutions to get the required information.

5.6 Blue Economy Investment Opportunities

Blue economy investment opportunities, and development of blue economy policy and regulatory framework to support such investments were likewise examined. The blue economy paradigm (based on the Changwon Declaration 2012) involves using innovative and 'green' technologies and infrastructure, and environmentally sound practices. This offers opportunities for new investments to enable 'green' economic growth, and sustainable development of coasts and oceans.

The Economist (2015)[1] defined the blue economy investments as:
- Those where investments account for environmental, social and governance (ESG) risks in the planning and execution of activities in the ocean, and where ESG management is both good for business and good for the environment.
- Those where there is a strong business case for investing in the ocean, and where a side benefit of the investment is improving the health of the ocean.
- Those where investments are explicitly focused on ocean health and ecosystems.

The following are the key matters of concern in promoting, implementing and sustaining blue economy investments:
- How do we mainstream blue economy investments?

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[1]Economist Intelligence Unit briefing paper for the Economist Events World Ocean Summit 2015.

- How are innovative technologies revolutionizing the traditional ocean economy and stimulating blue economy?
- What are the barriers to investing in ways and activities consistent with the blue economy paradigm?
- What are the enabling conditions and mechanisms to make blue economy investments more attractive and viable? — policy, regulations, investment financing, cost recovery, targeted subsidies, incentives.
- What are the benefits: to investors, to poor coastal communities, to employment generation?
- How is climate change affecting the blue economy and oceans, and which economic activities will be most affected?
- What are the investment opportunities that address habitat restoration and climate change resiliency?

5.7 Group Exercise 2: Investment Opportunities

The participants identified investment opportunities in the different economic sectors. Some of these are currently happening in their countries, but there are investment opportunities due to demand, growing markets and exports. They also identified innovative and emerging areas, but some are still in the pilot stage. The investments can be made by private companies, government (and state-owned companies), and through partnerships between private and public sectors. **Table 3** shows the investment opportunities in current, established markets as well as potential investment opportunities in emerging markets, innovative technologies and infrastructure, and environmentally sound practices.

Table 3. Investment Opportunities.

OCEAN ECONOMIC ACTIVITIES	Philippines	PR China	Thailand	Vietnam
• Fisheries & Aquaculture	Marine culture (associated with OTEC); *Fish breeding farms, pearl farm; oyster and mussel farm; seaweed culture; ornamental (aquarium) fish*	Sustainable aquaculture and mariculture	Sea farming/cage culture (shellfish, crabs, fish)	Offshore fishing; aquaculture technology
• Offshore Oil and Gas	Exploration; joint ventures		Oil and gas exploration; Alternative: biomass	Oil and gas exploration
• Mining (Minerals)	Responsible small-scale mining		Sand mining (subject to EIA) and exporting to Malaysia and Singapore	New technology
• Energy/electric supply (tidal and wave energy; renewables)	Wind; Community-based fuelwood plantations Wave; OTEC	Renewable energy	Biomass power plant; wind power	New technology
• Water (desalination)		Desalination		
• Sewerage and wastewater	*Wastewater and septage management systems*	Wastewater treatment with nutrient reduction	*Wastewater management systems, treatment plants*	*Wastewater treatment*
• Manufacturing	Application of new technologies to meet international standards			New technology
• Seafood processing	*Fish and seafood processing*		Seafood processing (instant food, frozen food)	
• Ship building and repair	*Ship building; pleasure and sporting boats*		Ship building and repair(Yacht/ship)	
• Marine transport equipment	*Engines and turbines for marine propulsion*			
• Marine biotechnology, pharmaceuticals, chemicals	*Biotechnology, pharmaceuticals, personal care products*	Biotechnology, genetics, pharmaceuticals	Marine biotechnology, pharmaceuticals (seaweed, coral reef, seagrass sea cucumber and Nudibranch)	
• Marine Construction	Management of settlements along coasts; *construction of piers, waterfront promenade, dikes, shoreline defence, beach reconstruction, dredging*		Shoreline protection structures and design	New technology
• Shipping (marine transportation, ports, warehouses)	Improve port facilities and warehouses; more fish ports and storage facilities		Marine International port/ southern sea board	
• Marine tourism and recreation	More ecotourism; *underwater photography*		Scuba diving business, marine eco-tourism, adventure tourism, resort/ hotel	Marine tourism
• Defence/Government (navy, coast guard, etc.)	Need for local patrol of destructive practices; response, search and rescue boats and equipment		Sea search and rescue; National security	
• Marine research and education	Increase number and capacity; *technical and vocational post-secondary educ.*; assessment of fish stocks	Deep sea resources exploitation	Graduate Programs in: Marine technology; Maritime Transport and Logistics; Maritime Administration and Management	New technology
• Marine services (mapping, monitoring, consulting, maritime insurance, etc.)	Improve application of recent technologies; *mapping and monitoring of marine ecosystems and resources; marine spatial planning*		EIA consulting *Maritime insurance*	New technology

OCEAN ECONOMIC ACTIVITIES	RO Korea	Indonesia	Malaysia
• Fisheries and Aquaculture	Aquaculture - new technology	Mariculture: rabbit fish, pearl, oyster, clam, seaweeds, micro-algae	Mariculture, environmentally sound and best practices
• Offshore Oil and Gas			Deep water exploration
• Mining (Minerals)	*Sustainable seabed mining*	Sustainable seabed mining	Seabed mining
• Energy/electric supply (tidal and wave energy; renewables)	Tidal and wave energy; Energy self-supporting islands	Marine biomass: microalgae Marine energy: wind Long-term: wave, tidal, OTEC	Ocean energy exploration
• Water (desalination)	Desalination for islands	Long-term: desalination - for some islands	
• Manufacturing			
• Seafood processing		Seafood processing	
• Ship building and repair	Eco-ships (fuel efficient)		Ship building and repair
• Marine transport equipment			
• Marine biotechnology, pharmaceuticals, chemicals	Medicines or health food from marine algae, genetic resources	Carrageenan, Seaweed soap	Biotechnology, pharmaceuticals
• Marine Construction	Coastal restoration, coastal erosion prevention, port revitalization	Beach/shoreline fence	Green infrastructure
• Shipping (marine transportation, ports, warehouses)	Eco-ships (fuel efficiency); low carbon port management system	Eco-ports	Green ports, green shipping
• Marine tourism and recreation	Marine ecotourism, island tourism with community support projects	Ecotourism, educational tourism	Ecotourism
• Defence/Government (navy, coast guard, etc.)			
• Marine research and education	Marine ecosystem education		Capacity development
• Marine services (mapping, monitoring, consulting, maritime insurance, etc.)	Coastal erosion monitoring technology; marine spatial management technology; weather observation; EIA technology		Better monitoring and assessment technology, Marine spatial planning

▢ *Investment opportunities in established industries*

▢ *Investment opportunities in new industries, and emerging markets, and innovative and sustainable practices*

For Philippines, those in italics were from the National Statistics Coordination Board (Philippine Statistics Authority).

For Thailand and RO Korea, those in italics were post-workshop comments sent by Dr. Narawat Krairapanond, and Dr. Chang Jeong-In, respectively.

For Vietnam, the participants indicated that new technologies are needed in all sectors.

The Chinese participants identified the following investments that are needed to ensure sustainable development:

- Sustainable fisheries (rebuilding fish stocks)
- Sustainable aquaculture
- Pollution reduction, remediation, waste recycling
- Habitat restoration and protection: regeneration, reducing impacts
- Climate change: mitigation, adaptation, resilience
- Disaster risk reduction and resiliency infrastructure

Innovations are in the following areas:
- Science: biochemicals, genetics, ecosystem, water dynamics
- Technology: satellite/remote sensing, information technology, underwater drones, deep sea construction

Blue growth in the next 50 years will likely be in the following ocean economic activities:
- Tourism
- Fish and seafood processing
- Biotechnology and pharmaceuticals
- Ecological engineering and restoration
- Ecologically friendly mariculture
- Blue bonds/insurance
- Renewable energy (tidal, wave, offshore wind, etc.)

The major challenges to developing blue economy investments are: enabling conditions; 'right' regulatory framework (not over- and under-regulated); lack of property rights; available and access to financing; financial stability; affordability and access to innovative technologies; and cost of adopting sustainable practices.

There was also discussion on inclusive growth and socially sound economic development — which have not been addressed in the examination of ocean economy and investment opportunities. This can be an area for future work on the SOC. The case study in Zanzibar, Tanzania, is a good example as it shows the income and employment distribution, and indicates who therefore benefits from the fishing, seaweed farming and tourism industries.

Dr. delos Angeles suggested assembling an inter-agency and cross-sector national steering committee that will coordinate the work on SOC and blue economy assessment, and identifying a strong 'champion' within a country to lead such national steering committee. It is important to link science, economics and policy at the earliest stage.

5.8 Consensus-building on the blue economy assessment studies and preparation for the EAS Congress 2015 in Danang, Vietnam

The project, "Oceans and Coasts Economic Assessment for Sustainable Blue Economy Development" was presented by Ms. Maricor Ebarvia during the last day of the workshop. Her presentation covered the rationale for the blue economy assessment and State of Oceans and Coasts reporting, and the project Terms of Reference (TOR). The activities, expected outputs, and schedule were also discussed.

The definition and scope of blue economy, boundaries in operational terms, and the approach for measuring the economic activities and including values of coastal and marine ecosystem services were examined and agreed upon. A set of core indicators, required information, data sources, and other considerations were also taken up.

The participants deliberated the definition of blue economy based on the Changwon Declaration 2012. Based on this definition, the assessment studies will cover: (a) ocean economy; (b) coastal and marine ecosystems and externalities (if available); and (c) investment opportunities for blue economy development, including innovative and green technologies, infrastructure and practices.

The assessment studies will be completed in time for the workshop during the EAS Congress 2015 in Danang, Vietnam. The workshop is titled **"Blue Economy Development: Where are we now? Where are we headed?"**, and it will be held on 19 November 2015. The workshop will involve three parts:

- The first part will focus on "Where are we now?" and will involve presentations on the ocean economy assessment (scope and contribution to national economy), including coastal and marine ecosystems.
- The second part will focus on "Where are we headed?". This part of the workshop will direct attention to key investment opportunities for blue economy development.
- The third part will be a moderated panel discussion focusing on developing a road map for formulating a blue economy approach. The road map will:
  - encourage institutional support for developing evidence base to show the contribution of ocean economic activities and healthy coastal and marine ecosystems to national economy and welfare of coastal communities; and
  - support a policy agenda on: institutionalizing ocean economy-environment accounting; integrating ocean economy assessment in national and local economic development plans; providing ways and means towards sustainable development and management of the ocean economic sectors and coastal and marine ecosystems; and providing the enabling conditions for implementation of blue economy investment projects that protect, rehabilitate and sustain coastal and ocean ecosystem services, while also contributing to sustainable economic growth, livelihoods, and social benefits.

The ocean economic activities to be assessed are:
- Fisheries and Aquaculture
- Offshore Oil and Gas
- Mining (e.g., minerals)
- Energy/electric supply (tidal and wave energy; coastal and offshore wind energy; other renewables)
- Water (desalination)
- Manufacturing:
  o Fish and seafood processing
  o Ship building and repair
  o Marine transport equipment
  o Marine biotechnology, pharmaceuticals, chemicals
- Marine construction
- Shipping (marine transportation, ports, warehouses)
- Marine tourism and recreation
- Defence/Government (navy, coast guard, etc.)
- Marine research and education
- Marine services (mapping, monitoring, consulting, maritime insurance, etc.)

For the ocean economic activities, the core indicators are:
- Outputs (e.g., in metric tons)
- Revenues (in US dollars)
- Employment (number of people)
- Gross value added (in US dollars)

The participants can get information on outputs, revenues and employment from the industry accounts. They have to check if their countries follow the International System for Industry Classification (ISIC) system, or have an equivalent industrial classification system. The data on gross value added of each economic activity can be derived from the GDP or national income accounts. Data should be for the year 2012. Thus, the national statistics agency in each country will be the primary source of data. In case input-output tables are available (e.g., RO Korea, Indonesia, Philippines), backward and forward linkages may also be included to show the spinoff impacts.

For coastal and marine ecosystems, the indicators are:
- area (in hectares) – as of 2012
- values of ecosystem services (in US dollars)

It was also agreed upon that information on the values of ecosystem services have to be gathered in order to show policymakers and decisionmakers the important contribution of coastal and marine ecosystems not only to the economy, but also to shoreline protection, carbon sequestration, habitat for marine life, etc. The sustainability of the ocean economic activities relies on healthy ecosystems. As shown in the study, "Total Economic Value of the Malacca Straits", the indirect and non-use values of the coastal and marine ecosystems can be greater than the direct use value. Moreover, the cost of environmental damages and unsustainable practices

could far outweigh the cost involved in protection and conservation as shown in several studies and projects.

The participants will get data on the following values of key ecosystem services, if available:

- Provisioning services or direct use values (e.g., fisheries and aquaculture, fuelwood, etc.) – usually already indicated in the ocean economic activities
- Cultural services (e.g., tourism and recreation) – also indicated in the ocean economic activities
- Indirect uses and nonmarket values – regulating and supporting services (e.g., carbon sequestration, shoreline protection, nursery for fisheries, etc.) – where available
- Externalities: resource depletion, habitat loss, damages from pollution – where available

Figure 4 shows the different ecosystem services and types of values (direct use, indirect use, option value, and non-use and existence value), and how they contribute to overall human well-being, in terms of water, energy and food security, health, basic materials for good life, and good social relations.

Figure 4. Ecosystem Services
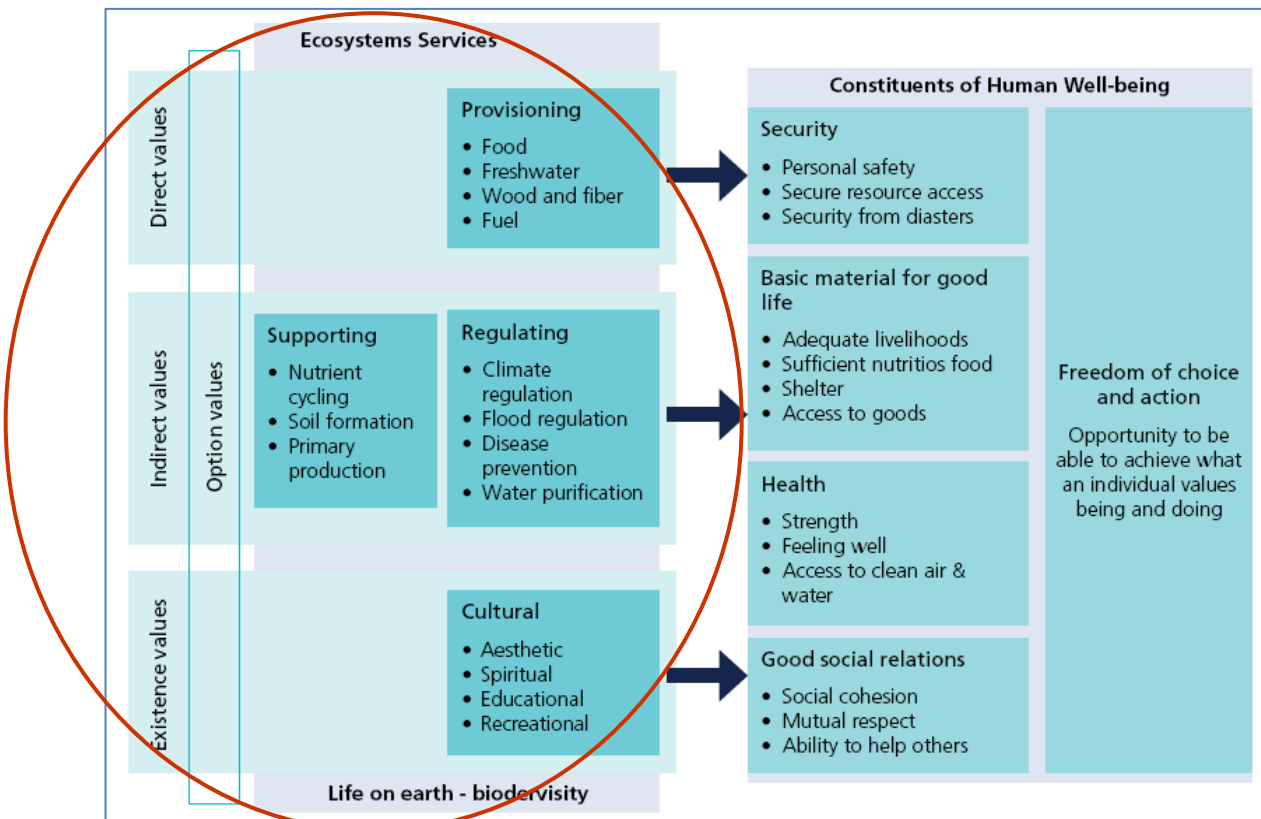
Source: UNEP. 2010. The Economics of Ecosystems and Biodiversity (TEEB).

The World Bank Green Data Book shows the area of mangroves and coral reefs, and growth of capture fisheries and aquaculture in the seven countries (**see Table 1**). The ASEAN Center for Biodiversity has a database of studies on valuation of ecosystem services conducted in ASEAN member countries (**http://bim.aseanbiodiversity.org/elib/eliblist.php**). The participants have identified sources of information during the group exercises. For example, RO Korea has websites on economic valuation studies and climate change.

For the investment opportunities, the participants/countries were assigned with specific sectors:
- China: biotechnology
- Indonesia: blue carbon
- Malaysia: green ports and shipping
- Philippines: wastewater management systems or climate change resiliency infrastructure (to be confirmed)
- RO Korea: ocean energy
- Thailand: ecotourism
- Vietnam: aquaculture

They will get more information on current outputs and revenues, growth of the sector/industry, demand and market trend, innovations being introduced, existing enabling environment (e.g., supporting policies, regulatory framework, governance, incentives, supporting financing arrangements, business climate, etc.), benefits, and the industry's contribution to blue economy development, ocean health and sustainable management of coastal and marine ecosystems.

The participants agreed on the workplan and schedule shown in Table 4.

Table 4. Schedule of Activities.

Activity	Schedule
Preliminary data gathering	May to July 2015
Inception Workshop	28-30 July 2015
- *List of data available/gathered*	28 July 2015
Drafting of the ocean economy assessment and investment opportunity studies	August to November 2015
- *First draft*	15 September 2015
- *Final draft*	15 October 2015
- *Country briefs*	5 November 2015
Workshop on Blue Economy Development (during the EAS Congress 2015)	19 November 2015
- *Submission of MS PowerPoint presentations*	6 November 2015

Ms. Ebarvia will develop a template for the assessment of the ocean economy and ecosystems services as well as for the investment opportunities, and send this to the participants.

The formation of a Technical Working Group (TWG) in each country was raised during the workshop, and the participants were asked to look at the key agencies they have to work with. The TOR for the TWG will also be sent to the participants.

All PowerPoint presentations and outputs of the group exercises, list of participants and resource persons, and compilation of references were copied into USB flash drives, which were distributed to the participants. Copies of the *Tropical Coasts* 2009 and 2015 were also given to the participants. It was again pointed out that the ocean economy assessment studies done in 2009 already provide important sources of information, and can even be used to compare changes since 2009. The data collected and presented during this Inception Workshop are also good starting points for the assessment studies.

5.9 Business network

Mr. Ryan Whisnant discussed the efforts of PEMSEA in promoting blue economy to the business sector, and networking with major companies committed to sustainable practices in ocean-related industries.

Group photo taken on 30 July 2015.

Annex 1
Program

Date/Time	Agenda	Speaker
28 July, Tuesday		
9:00 – 10:00	Opening remarks Objectives and expected outputs Introduction of participants	Adrian Ross (PEMSEA) Maricor Ebarvia Participants
10:00 – 10:20	*Coffee/tea break*	
10:20 – 11:00	Approaches • Environment and natural resource accounting and valuation of ecosystem services • UN: SEEA framework • World Bank: WAVES, SEEA	Marian delos Angeles (Resources, Environment and Economics Center for Studies, Inc.)
11:00 – 11:30	• UNEP: The Economics of Ecosystems and Biodiversity (TEEB) – The ASEAN case	Norman Emmanuel Ramirez (ASEAN Centre for Biodiversity)
11:30 – 12:00	• Q&A	
12:00 – 1:00	*Lunch break*	
1:00 – 1:20	Review of past and on-going efforts • Overview	• Maricor Ebarvia
1:20 – 1:50	• Australia and APEC	• Alistair McIlgorm (University of Wollongong)
1:50 – 2:20	• WAVES: Philippines	• Jacqueline Miel (NEDA)
2:20 – 2:35	• Q&A	
2:35 – 3:00	• Indonesia	• Achmad Fahrudin (IPB)
3:00 – 3:30	*Coffee/tea break*	
3:30 – 3:55 3:55 – 4:20 4:20 – 4:45 4:45 – 5:10	• Malaysia • RO Korea • China • Thailand	• Cheryl Rita Kaur (MIMA) • Chang Jeong-In (KMI) • Wei Bo (SOA) • Nawarat Krairapanond (MONRE)
5:10 – 5:20	• Vietnam	• Dam Duc Tien (VAST)
5:20– 5:40	Q&A	
29 July, Wednesday		
9:00 – 9:30	Key Issues in blue economy assessment	Alistair McIlgorm (University of Wollongong)
9:30 – 12:00	Group exercise 1 • Data availability and accessibility – Economic activities and contribution to	Participants

	GDP
	− Coastal and marine ecosystems: areal
	  extent; goods and services
	• Inclusion of indirect and non-market
	  values of ecosystems
	• Impact of climate change	

12:00 – 1:00	*Lunch break*	
1:00 – 2:30	Presentation of group outputs	
2:30 – 3:00	Blue economy investment opportunities: Overview	Maricor Ebarvia
3:00 – 3:20	*Coffee/tea break*	
3:20 – 4:20	Group exercise 2: Blue economy investment opportunities	
4:20 – 5:20	Presentation of group outputs	
5:20 – 5:30	Discussion: • Enabling conditions (policy, regulatory framework, financing, etc.)	
30 July, Thursday		
9:00 – 9:15	Recap	Maricor Ebarvia
9:10 – 9:20	Regional TWG: TOR and Workplan	Maricor Ebarvia

9:20 – 10:20	Consensus on the scope of the blue
	economy assessment
	• Definition of blue economy
	• Scope and boundaries of studies
	• Framework/approach to be used
	• Economic sectors/activities to be included
	  in the studies
	• Valuation of coastal and marine
	  ecosystems
	• Core indicators	

10:20 – 11:00	*Coffee/tea break* *Earthquake drill*	
11:00 – 12:00	Consensus on the assessment of blue economy investment opportunities	
12:00 – 1:00	*Lunch break*	
1:00 – 1:30	Discussion: EAS Congress 2015 Session on Blue Economy: Where are we now? Where are we headed?	
1:30 – 2:00	Sustainable business for blue economy	Ryan Whisnant (PEMSEA)
2:30 – 2:40	Closing remarks	S. Adrian Ross (PEMSEA)

Annex 2
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