tropical coasts

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Special Issue

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EAST ASIAN SEAS CONGRESS 2012

Building a Blue Economy: Strategy, Opportunities and Partnerships in the Seas of East Asia

The Road to a Sustainable East Asian Seas

- **Nurturing Sustainable and Inclusive Coastal and Ocean-based Blue Economy**
- **Investing in Our Future by Investing in a "New Breed" of Coastal Leaders**
- **Green Ports: Gateway to a Blue Economy**
- **Preparing for the Worst: Environmental Sensitivity Mapping for the Gulf of Thailand**

Good Practices. Better Seas.

This issue of *Tropical Coasts* focuses on building, strengthening and sustaining a blue economy for the EAS region. The breadth of discussions in this issue are taken from workshops and meetings during the East Asian Seas (EAS) Congress, "Building a Blue Economy: Strategy, Opportunities and Partnerships in the Seas of East Asia," held in Changwon, RO Korea, on 9–13 July 2012. The fourth triennial EAS Congress touched on various facets of sustainable development, specifically the dynamic aspects of coastal and ocean governance and an ocean-based blue economy. The Congress was hosted by the Ministry of Land, Transport and Maritime Affairs and the City Government of Changwon. More than 1,200 participants from 25 countries and 23 regional and international organizations participated in the Congress, which was organized and conducted in collaboration with 24 co-conveners and 4 sponsors.

The Fourth Ministerial Forum and the Special Meeting of the EAS Partnership Council also took place during the 2012 EAS Congress. During the Ministerial Forum, the "Changwon Declaration Toward an Ocean-based Blue Economy: Moving Ahead with the Sustainable Development Strategy for the Seas of East Asia" was signed (page 25). Governance requirements and sustainable financing for its transformation as a full-fledged self-sustaining organization were also adopted.

In this issue, the article titled *Nurturing Sustainable and Inclusive Coastal and Ocean-based Blue Economy* (page 4) explains the basics of a blue economy, considerations in transitioning to a blue economy, possible impediments, socioeconomic implications and significant achievements in its undertaking. Based on the outcomes of a Congress workshop entitled, "Nurturing the Coastal and Ocean Economies of the Seas of East Asia: Opportunities and Challenges," the article discusses the benefits of ecosystem valuation of coastal and marine resources and services and underscores efforts on the use of integrated land and sea use planning, protection of habitat and biodiversity, pollution reduction and waste management, and reduction of carbon footprints.

An article titled *Investing in Our Future by Investing in a "New Breed" of Coastal Leaders* (page 30) goes through the rationale of developing environmental leadership to promote and ensure sustainability. This article is based on a Congress workshop entitled, "Meeting Institutional and Individual Skills and Capacities for Integrated Coastal and Ocean Governance." The need to sustain current practitioners and boost their expertise for their own career growth and the region's further development is emphasized, as well as the demand for producing more leaders in marine-related sectors.

The *Investing in Our Future by Investing in a "New Breed" of Coastal Leaders* article also provides insights on the fundamentals of a leadership certification process, the qualifications of a potential candidate for certification, and current initiatives and activities for implementation, and various ICM-related certification schemes.

Special workshops on the "Green Ports: Gateway to a Blue Economy" and "Environmental Sensitivity Mapping for the Gulf of Thailand," were also held during the EAS Congress 2012.

We hope that this issue will provide a better appreciation of the wealth of opportunities provided by the people and resources of the East Asian region. What we know as threats to our oceans can actually become effective drivers of change. What we know as mere resources can actually engineer and serve as the foundation of an alternative economic paradigm. Acknowledging that natural and human resources are key elements to sustainable development brings us closer to streamlining stronger efforts directed toward protecting and preserving our East Asian seas.

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On Our Next Issue

The next EAS Congress 2012 Special issue will cover Accelerating Blue Innovations in Support of an Ocean-based Blue Economy; Securing Ecosystem Services through Integrated Coastal and Ocean Management; and Good Governance, Good Business.

The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Global Environment Facility (GEF), United Nations Development Programme (UNDP), and the United Nations Office for Project Services (UNOPS), publish Tropical Coasts Magazine biannually. This publication is geared towards stimulating an exchange of information and sharing of experiences and ideas with respect to environmental protection and the management of coastal and marine areas. Readers are strongly encouraged to send their contributions to:

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Nurturing Sustainable and Inclusive Coastal and Ocean-based Blue Economy

By Ms. Maria Corazon Ebarvia, PEMSEA Resource Facility and Dr. Cielito Habito, Ateneo de Manila University, Manila, Philippines

Our Coasts and Seas: Engines of the Blue Economy

Coastal populations and marine environments are characterized by a symbiotic relationship in which one relies on the other for sustenance and protection. The East Asian Seas (EAS) Congress in the past years has explored this relationship, recognizing the opportunities, options and incentives for a more robust actualization of an economy powered by coastal and marine resources.

The *blue economy*, as defined during the EAS Congress 2012, refers to a sustainable ocean-based economic model that is largely dependent on coastal and marine ecosystems, but one that employs green infrastructure, technologies and practices and innovative and proactive institutional and financing arrangements for meeting the goals of protecting our coasts and ocean while enhancing their contribution to sustainable development.

It is based on the conservation of coastal and marine ecosystems, water resources and cultural heritage for the purpose of: (1) ensuring environmentally sound and inclusive economic development; (2) protecting the health, livelihoods and welfare of the people in the coastal zone (and beyond); (3) addressing water, energy and food security; (4) reducing environmental risks and ecological scarcities; and (5) promoting an ecosystem-based climate change mitigation and adaptation.

An ocean-based blue economy therefore involves a dynamic functioning between the coastal population and ecosystems. Such economies may result from the direct utilization of coastal and marine resources or produced as a consequence of the geographic location of coastal communities. For example, fisheries, seafood processing, certain types of pharmaceutical and biotechnology industries, and offshore oil and gas production derive their inputs from the sea. Coastal livelihoods may relate to tourism, ports, shipping, marine-related construction and real estate development in the coastal zone.

During the discussions at the EAS Congress 2012 Subtheme 1 on "Nurturing Coastal and Ocean-based Blue Economies at the Local Level: Opportunities and Challenges," the following aspects of a blue economy were brought up:

a. It embraces sustainable development tools, such as sustainable fisheries, ecosystem-based management, habitat and biodiversity protection, integrated land and sea use planning, integrated watershed and coastal management, pollution reduction and waste management, sustainable tourism, etc.

b. It focuses on lowering the carbon footprint through the adoption of green, innovative technologies for more cost-effective production, efficient resource use and lower energy and water use, not only by big businesses but also by smaller enterprises and households.

c. It entails reforms in policies and institutional arrangements, introduction of new financing mechanisms, application of science, and most importantly, behavior change.

d. It is consistent with the principles of a green economy and applied in the coastal and marine areas.

The contribution of coastal and marine economies to the country's gross domestic product (GDP) shows that countries in the region depend on the seas and coastal resources in varying degrees. For several nations in the EAS region, the contribution of the marine economy to the national economy is in excess of 5 percent, and may reach 20 percent in some (e.g., preliminary estimates for Indonesia and Vietnam) (**Figure 1**). Although the ocean economy is less than 5 percent of the GDP of developed economies, their coastal economies account for a bigger percentage since most of the big cities are located along the coasts. This emphasizes the need to improve the national income accounting for the coastal and marine areas and sectors.

Valuation of Ecosystems: Contribution to the Local and National Economy

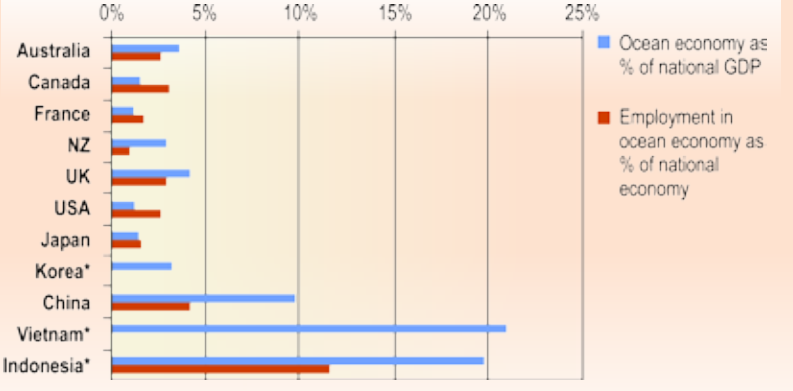
Covering more than 70 percent of our planet, oceans provide us with subsistence, source of food, energy, medicines and recreation, and means of transportation and commerce. Conserving and restoring natural capital and protecting water resources and the environment would boost livelihoods and create millions of jobs. The ocean not only supplies jobs, but also supports industries that sustain the GDP of countries in the EAS region (**Boxes 1** and **2**).

The integrity of coastal and marine resources must be ensured and kept intact, given the concentration of population, increasing urbanization, rapid infrastructure development and economic production in the coastal areas. The natural environment provides goods and services critical to communities, and many of these values need to be expressed in monetary terms. Environmental and natural resource valuation and accounting is one way to influence policymaking and decisionmaking in favor of conservation and environmental management. The dearth of valuation studies conducted for coastal and marine ecosystems shows the need for more robust research on ecological and economic linkages and the institutional arrangements that affect such relationships. Such studies can drumbeat the losses that are being incurred when planning and policymaking are not suited for conservation. If both the market and nonmarket value of the resources are incorporated in the way policymakers frame their decisions vis-à-vis development projects and programs, then the support for conservation, protection and restoration of habitats will be strengthened (Nabangbang, 2012).

Fisheries and Aquaculture

According to the Southeast Asian Fisheries Development Center (SEAFDEC), the Southeast Asian region accounts for over US$ 11 billion production value in fishery products, and earns around US$ 7 billion from

Figure 1. The Contribution of the Marine Economy as Percentage of Total GDP of Industrial and EAS Economies.



* Denotes preliminary results; n.b. employment estimates for Vietnam and Korea are not available.

Source: PEMSEA, 2009.

Box 1. Value of Coastal Ecosystem Services.

Ecosystem services have an enormous value in upholding economic productivity, safeguarding settlements and reducing vulnerability.

In parts of Indonesia, the traditional use of mangrove products has been valued at over US$ 3,000/ha/year, contributing up to a half of the income of the poorest households. In Southern Thailand, mangroves contribute more than a quarter of per capita GDP. On the Baluchistan coast of Pakistan, mangroves directly contribute around US$ 1,300/ha/year to onshore fisheries (about 95 percent of local income), and are responsible for providing the nursery and breeding habitat upon which up to a half of offshore commercial fish stocks depend (a value of some US$ 900/ha).

The value of coral reefs, including coastline protection, is gauged to be hundreds of thousands of dollars per square kilometer in Indonesia, and close to a million dollars in the Philippines.

In Sri Lanka, coastal wetlands have an economic value of US$ 2,500/ha – from the provision of critical flood protection and water treatment services to surrounding urban settlements.

Source: IUCN, 2007a.

Box 2. Healthy Aquatic Ecosystems Contribute to Food Security, Livelihoods, Carbon Sequestration and Shoreline Protection.

- Coastal ecosystem services are worth an estimated US$ 25,000 billion annually.
- Fisheries and aquaculture contribute significantly to food security and livelihoods, but those depend on healthy aquatic ecosystems.
- Over 500 million people in developing countries depend, directly or indirectly, on fisheries and aquaculture for their livelihoods. Fish (including shellfish) provides essential nutrition for 3 billion people and at least 50 percent of animal protein and essential minerals to 400 million people in the poorest countries.
- Aquaculture is the world's fastest growing food production system, growing at 7 percent annually — but the production of externally fed aquaculture (48 percent of total aquaculture production) is largely dependent upon marine fisheries for feed.
- Fish products are among the most widely traded foods, with more than 37 percent by volume of world production traded internationally.
- Natural barriers, such as sand dunes, mangrove forests and coral reefs dampen the impacts of a range of coastal hazards, including storm/cyclone surges and tsunami waves, helping to protect coastlines from their full impact.
- Blue carbon sinks (coastal ecosystems, such as mangroves, salt marsh and seagrass) store approximately 235–450 Tg C every year, the equivalent of up to half of the emissions from the entire global transport sector (1,000 Tg C yr) and 3%–7% of total anthropogenic emissions (7,200 Tg C yr).
- Blue carbon sinks, together with coral reefs, supply an estimated 50 percent of the world's fisheries, providing nutrition to close to 3 billion people, as well as 50 percent of animal protein and minerals to 400 million people in developing nations.

Source: PACFA, 2009 (as cited in Nellemann, et al., 2009).

fishery exports (as cited in Mulekom, 2008). The fishing and aquaculture industries, which are major economic players, have a critical role to play toward improving management and achieving sustainable fisheries.

Indeed, the long-term viability of these businesses depends on healthy and productive natural resources. Achieving rational, optimal, equitable and sustainable use of marine fishery resources is essential to ensure that the ecosystem's capacity will continue to support human life for our future generations (**Box 2**).

The small-scale fisheries sector contributes to domestic food security, provides employment, especially in rural areas, and generates export income. There are an estimated 12–20 million fisherfolks in Southeast Asia, and almost all are small-scale, artisanal fishers, with 1 million fishers connected to commercial fisheries. As shown in **Table 1**, Southeast Asia has been increasingly contributing to the world's trade of fishery commodities over the past few years. Over 14 percent of the world's export value of fishery products is from the Southeast Asian countries.

Coastal Tourism

Tourism largely impacts local coastal economies. Within the Asia-Pacific region, several countries depend, to a substantial extent, on tourism. It has become one of the most important sources of revenue for coastal communities, and much of this is directly related to healthy marine ecosystems — boating, fishing and water sports, to name a few. Many island nations rely heavily on tourism for income, and threats can negatively affect local economy (**Box 3**). Income from tourism can also provide incentives to establish marine protected areas and stop destructive fishing,

Table 1. Export Value of Fishery Products of Selected SEA Nations (2004–2006) (US$ '000).

Ranking	Country	2004	2005	2006
3	**Thailand**	4,034,590	4,465,767	5,236,272
8	**Vietnam**	2,443,850	2,756,139	3,356,960
12	**Indonesia**	1,702,742	1,797,948	1,957,068
32	**Malaysia**	583,736	634,370	637,590
40	**Philippines**	413,716	352,598	389,865
43	**Singapore**	393,075	402,130	381,064
45	**Myanmar**	318,514	460,057	362,951
Top 50 Southeast Asian countries – Percentage of World Total		13.81%	13.87%	14.35%

Source: FAO, 2007 (as cited in Nazery, et al., 2009).

especially of endangered and threatened species, such as marine turtles, whales and sharks. For example, Palau declared its waters a sanctuary free of shark fishing. The value to the tourism industry of an individual reef shark is estimated to be US$ 1.9 million over its lifetime compared to only US$ 108, which a single reef shark would bring in direct fishery revenue (IOC/UNESCO, et al., 2011).

Blue Carbon

According to Giesen, et al. (2006), Southeast Asia is home to approximately 4.9 million hectares (ha) of mangroves or 35 percent of the world's total (**Figure 2**). Studies conducted by the International Union for Conservation of Nature (IUCN) in Southeast Asia have shown that for each hectare of mangrove replanted, the CO_2 removal from the atmosphere is estimated to be between 1,500 and 2,000 tons (t). This is more than the same area of a tropical rainforest (Pidgeon, 2009). At an international carbon price of US$ 10 per ton CO_2, this stored carbon is worth as much as US$ 20,000/ha of mangrove. Based on this assumption, the total carbon value of the existing Southeast

Box 3. Tourism in the Asia-Pacific Region.

Tourism is the largest business sector of the world economy, accounting for 10 percent of global GDP, 1 in 12 jobs globally, and 35 percent of the world's export services. Since 1985, tourism has been growing an average of 9 percent per year.

Between 1995 and 2007, the Asia-Pacific region's share of total tourist arrivals increased from 18.7 percent to 25.7 percent. A double-digit increase in visitors was recorded in Cambodia, Indonesia, Malaysia and Vietnam. PR China's growth in arrivals (+9.6 percent) also contributed to the subregion's continuing high performance. The Philippines (+8.7 percent) and Thailand (+4.6 percent) had rather modest growth.

The growth in arrivals has been accompanied by a large growth in income. Between 1995 and 2007, worldwide receipts from international tourism more than doubled to US$ 1,028 billion. As in the previous years, Europe received almost half (US$ 466.9 billion) of the world revenue, while almost one-quarter (US$ 241.7 billion) went to Asia and the Pacific.

Over the period 2005–2007, tourism contributed on average 14.8 percent of Cambodia's GDP, increased from 6.9 to 8.4 percent of Thailand's GDP, and rose from 7.9 to 9.0 percent of Malaysia's GDP. In the Pacific Islands developing economies, as a group, the share of tourism in their GDP averaged 11.9 percent in 2006, ranging from around 20 percent in Fiji, French Polynesia and Samoa to 57.1 percent in Palau. Maldives is also another developing island destination, in which dependence is particularly high.

Source: UNESCAP, 2010.

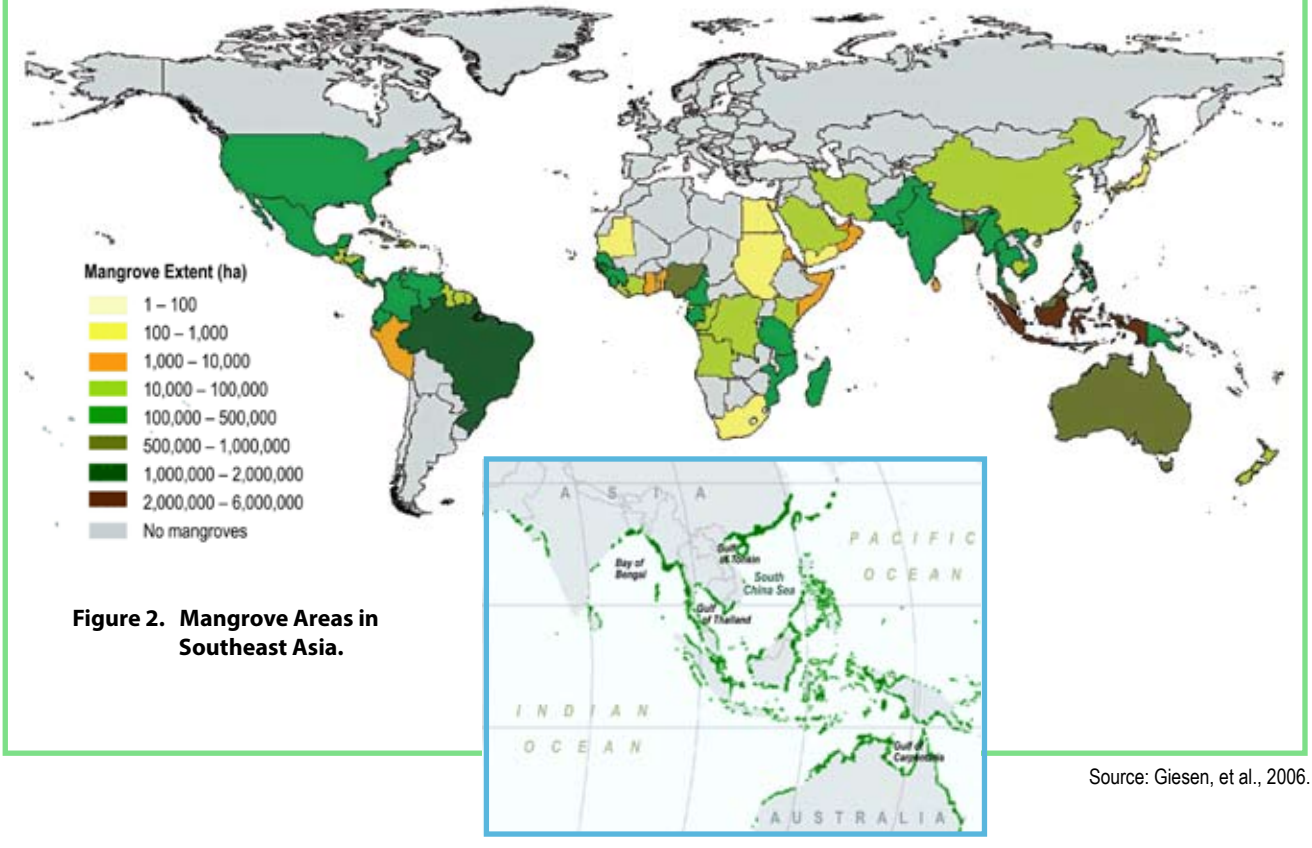


Figure 2. Mangrove Areas in Southeast Asia.

Source: Giesen, et al., 2006.

Asian mangrove ecosystems, in the context of climate change mitigation alone, could be as much as US$ 98 billion. The forecasted average international carbon price between 2012 and 2020 is US$ 16 per ton, raising the potential value of mangroves to around US$ 157 billion. The EAS region is likely to be an important supplier of blue carbon offsets in the coming years as the low-carbon economy matures.

Developing blue carbon offset projects could encompass a funding mechanism that underpins conservation efforts. It could also incentivize sustainable land use alternatives, thus slowing, halting and even reversing loss of mangroves, seagrass, salt marshes and tidal flat ecosystems (**Box 4**).

Ocean Energy

There is a large potential for ocean energy: it can meet a significant share of the world's renewable energy needs and is enough to supply local requirements. There are a number of benefits to be derived from harnessing coastal wave energy, such as its contribution to a lower carbon energy future by reducing pollution, greenhouse gas (GHG) emissions and consumption of fossil fuels. Moreover, wave power offers many advantages over other renewable sources like wind and solar power since the latter forms of energy require hundreds of square acres of useful open land for their installation and operation. In addition, wind farms are also sources of noise pollution, while solar energy is largely dependent on weather consistency. However, the marine environment is also providing challenges in terms of economics, sustainability and reliability of the energy converting systems. By accelerating ocean energy research and development, such systems can be further harmonized with the environmental and climate change issues (**Box 5**).

Ocean energy is one of the largest potential sources of energy in the EAS region and can be exploited from various methods, such as wave power, tidal barrage, hydrokinetic energy from tides and ocean currents, and ocean thermal

Box 4. A 25-percent Emission Reduction Could be Gained from Green and Blue Carbon.

The most recent estimates indicate that human activities are currently responsible for annual global carbon emissions of around 7,000–10,000 Tg C yr -1, of which around 1,500 Tg C or around 15–20 percent is the result of land use change. The remaining emissions are from fossil fuel use and cement production (Canadell, et al., 2007). This has led to an average annual rate of increase of CO_2 concentrations in the atmosphere of 1–2 ppm or up to 2,000 Tg C yr -1 for the years 1995–2005 compared with around 1.25 ppm for the years 1960–1995 (Houghton, 2007; IPCC, 2007b).

Green Carbon: Reducing deforestation rates by 50 percent by 2050 and then maintaining them at this level until 2100 would avoid the direct release of up to 50 Gt C this century or approximately 555 Tg C yr -1, which is equivalent to 12–15 percent of the emissions reductions needed to keep atmosphere concentrations of carbon dioxide below 450 ppm (Trumper, et al., 2009).

Blue Carbon: According to this report, protection, improved management and restoration of the ocean's blue carbon sinks would result in preventing the annual loss of up to 450 Tg C yr -1, or equivalent to a corresponding 10 percent of the reductions needed.

Combined with the green carbon (Reducing Emissions from Deforestation and Forest Degradation or REDD), the effect would be at least 20–25 percent of the emissions reductions needed — with huge benefits to food security, water resources, biodiversity — and the creation of jobs and incomes. But this would require a similar REDD programme for oceans as has been established for rainforests — a blue carbon fund.

Source: Canadell, et al., 2007; Houghton, 2007; IPCC, 2007b; Trumper, et al., 2009, as cited in Nellemann, et al., 2009.

Box 5. Benefits of Ocean Energy.

In India, coastal wave energy has a lot of potential, particularly when associated with the development of new fishing harbors and breakwater systems. It is a cost-effective and viable option since the construction costs canbe shared between the breakwater wall and the power plant (Paimpillil and Baba, 2009).

In the Philippines, the ocean energy resource has been recognized as having significant potential contribution to the energy self-reliance program of the government. Due to the country's archipelagic nature, the ocean energy resource area is about 1,000 km^2 and the potential theoretical capacity for this resource is estimated to be about 170,000 MW (Marino, 2009).

The Sihwa Tidal Power Plant in RO Korea has ten 25.4-MW turbines with an annual generation of 552.7 GW. This output can supply energy to around 200,000 residents. The project was started in 2003, and cost about US$ 355 million. The Sihwa Tidal Power Plant will help boost the country's energy self-sufficiency and contribute to cutting down oil imports by 862,000 barrels per year and reducing the emission of carbon dioxide by 315,000 tons per year (Kim, 2009).

Source: Kim, et al., 2010.

energy conversion (Kim, et al., 2010). Tidal energy and offshore wind power are already commercially available while wave and current energy are being further researched and developed.

Ocean energy provides an alternative source of energy and reduces dependence on fossil fuels. Ocean thermal and marine biomass energy alternatives are just in the early stages of research.

Option Value

The concept of *option value* can be understood as the potential direct and indirect uses of a natural system. It is the additional amount that an individual would be willing to pay above the actual current price to maintain the natural resource and avoid irreversible damage that would inhibit possible future use of the resource. Biodiversity yields an option value to society. It includes plants, animals and microorganisms together with ecosystems and ecological processes to which they belong, and it even extends to the genetic information from which this diversity results (Magrath, et al., 1995). The current size of market for industries relying on genetic resources ranges from US$ 12 billion for personal care products to US$ 640 billion for pharmaceutical products (**Table 2**). These values could even go up as new markets develop due to discoveries of other genetic resources or innovative uses of coastal and marine resources.

Table 2. Market Sectors Dependent on Genetic Resources.

Sector	Size of Market	Comment
Pharmaceutical	US$ 640 billion (2006)	25–50% derived from genetic resources
Biotechnology	US$ 70 billion (2006) from public companies alone	Many products derived from genetic resources (enzymes, microorganisms)
Agricultural Seeds	US$ 30 billion (2006)	All derived from generic resources
Personal Care, Botanical and Food and Beverage Industries	US$ 22 billion (2006) for herbal supplements US$ 12 billion (2006) for personal care US$ 31 billion (2006) for food products	Some products derived from genetic resources; represents "natural" component of the market.

Source: SCBD, 2008 (cited in TEEB, 2009).

Unmasking Hidden Costs

Economic Growth at the Cost of Losing the Blue Diamond

The marine and coastal environment is regarded as a blue diamond in recognition of its significant value to society and the planet itself, and like a rare asset, which if invested properly, will return or repay itself over time (UNEP GPA, 2011, as cited in Gomez, et al., 2011). But the future of our oceans and coasts is in jeopardy.

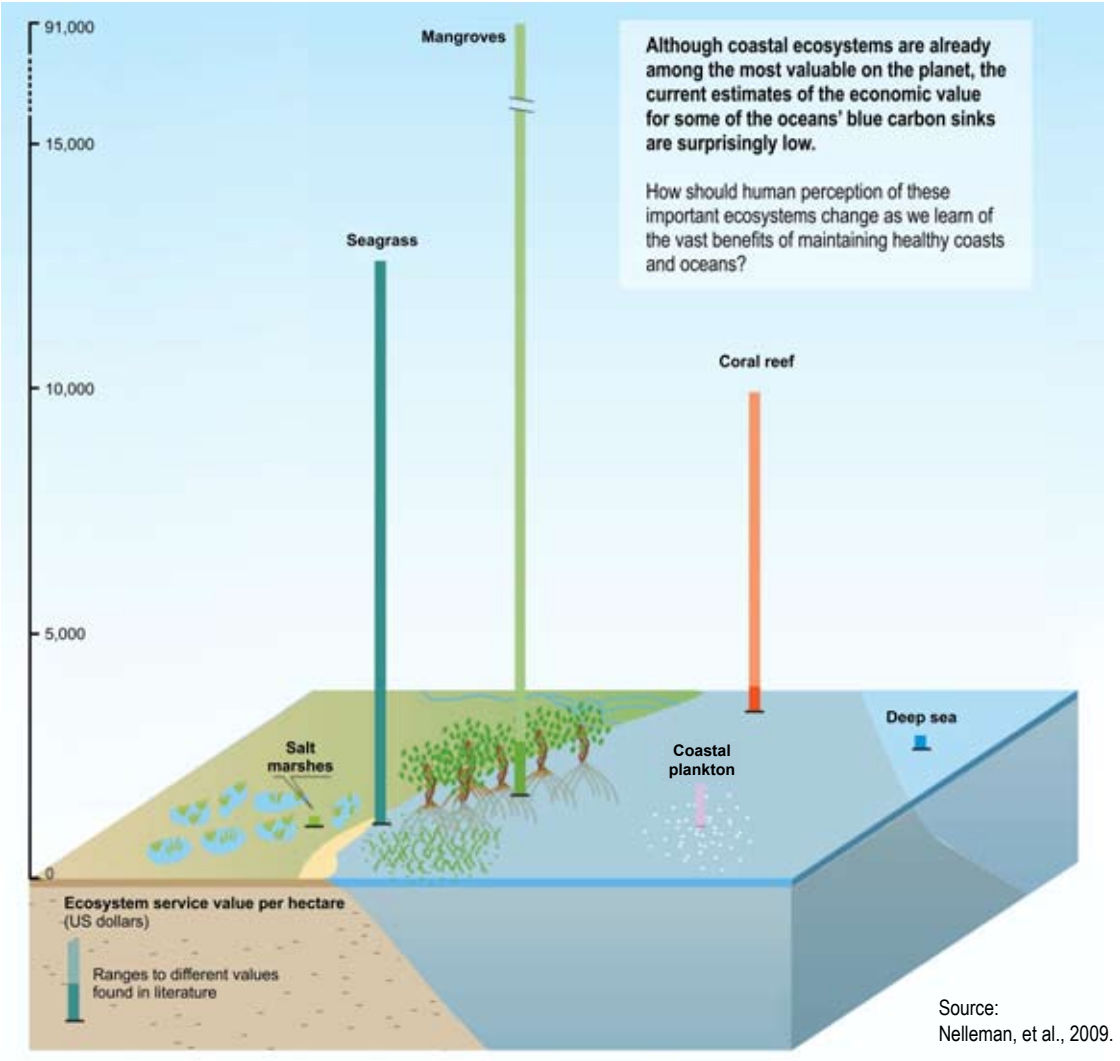
The world has experienced rapid economic growth in the last century, but this was accompanied by destruction of ecosystems, biodiversity loss and pollution. Eutrophication, dead zones, degraded habitats, invasive species, toxic and radioactive wastes, increasing temperatures and acidity, marine debris, oil spills and toxic anti-fouling systems are just a few of the more popular issues the marine and coastal environment faces. The long-term implications of these hazards and their associated risks to sustainable development of the region's seas and coasts are becoming more apparent. These issues have important social, economic and environmental consequences. The culture and lives of many people — their livelihood and way of life — are strongly influenced by the seas. Loss of ecosystems also contributes to climate change and affects water, food and energy security, and at the same time, results in loss of natural protection from impacts of natural hazards and climate change. **Figure 3** shows the values of coastal ecosystems as blue carbon sinks. Just as economic systems collapse without reinvestment, so will ecological systems if they are allowed to continue to depreciate, and be exploited without giving them time to renew. Such natural treasures can be lost forever if appropriate interventions are not undertaken.

Losses in the natural world and environmental damage have direct economic repercussions that are underestimated. Making the value of our natural capital, as well as the value of its damage to society and the economy more visible, creates an evidence base to pave the way for more targeted and cost-effective solutions.

Globally, the approximate worth of loss in ecosystem services is EUR 1.35–3.1 trillion/per year (approximately US$ 2-5 trillion/year), which is usually not properly reflected in national income accounts. The cost of these losses is felt on the ground, but can go unnoticed at the national and international levels because the true value of natural capital is missing from decisions, indicators, accounting systems and prices in the market. The first step to address this is further uptake and implementation of valuation tools, which support decisionmaking that integrates the economic and social value of ecosystem services. For now, such services are provided for free by nature (TEEB, 2010).

Rapid urbanization and increased demand for fish has resulted in conversion of large areas of mangroves for aquaculture use. For example, mangrove areas around Manila Bay in

Figure 3. Current Ranges of Total Valuation Estimates of Blue Carbon Sinks per Hectare.



Source: Nelleman, et al., 2009.

the Philippines have been reduced from 2,000 ha of mangroves in 1990 to just around 300 ha in 2005 (PEMSEA 2005b) resulting in huge economic losses in ecosystem services (**Box 6**). However, natural depreciation in ecosystem services is not properly accounted for in the national income accounts.

Natural disasters, such as tsunamis and supertyphoons, can also destroy coastal ecosystems. **Box 7** shows the impact of tsunami-related damage to Thailand's fisheries, coral reefs and mangroves. Keeping their physical and biological integrity would ensure their resiliency and recovery after such catastrophic events.

Cost of Reclamation

Rapid urbanization in PR China has resulted in reclamation of a total sea area of around 12,000 km^2, or an average of 200 km^2 annually since the 1950s. The cost of this reclamation to society in terms of loss in ecosystem services is estimated to be US$ 16 million/km^2 (Zhang, 2009).

Conversion of Coastal and Marine Habitats: Loss of Blue Carbon

Blue carbon refers to the important role that coastal habitats play in storing greenhouse gases (GHGs), thereby helping to mitigate climate change. What is underestimated is the capacity of the marine ecosystems to store more carbon compared

Box 6. Manila Bay: Substantial Loss of Mangroves.

The economic depreciation of mangrove resources in Manila Bay ranges from PHP 185.8 million (unmanaged) to 197.7 million (managed). The mangrove's yearly economic values are depreciating at an average rate of PhP 18.6-19.7 million from 1995 to 2005.

Source: PEMSEA, 2005a.

Box 7. Coastal Ecosystem Damages – Natural and Man-made Disasters.

A rapid assessment of coastal ecosystems in Thailand revealed that coastal ecosystems had been impacted by the tsunami to varying degrees of damage. Out of a total coral reef habitat of 4,622 ha, 15.5 percent (about 716 ha) were damaged; of a total seagrass habitat of 5,923 ha, 3.5 percent suffered damage from tsunami-related siltation and sand; and 395 ha of mangrove (only 3 percent of the total) were affected. However, in the last two decades, large-scale degradation of mangroves has been going on in Thailand, with devastating economic impacts.

Province	Damage to mangrove nontimber forest products*	Damage to reef fisheries*	Loss of coastal protection		Total economic cost in year 0*
			Coral reefs*	Mangroves*	
Trang	0.05	0	0	0.14	0.19
Krabi	0	1.19–4.31	67.07	0	68.26–71.38
Phang Nga	20.64	8.91–32.05	313.23	13.14	355.92–379.06
Ranong	2.51	1.66–6.00	99.94	3.81	107.92–112.26

* In net present value (million Baht).

Source: IUCN, 2007b.

Box 8. Overfishing and Poverty.

Resources in Southeast Asia have been fished down to 5–30 percent of their unexploited levels, which has caused increased poverty among already poor coastal fishers. Overfishing has also reduced the contribution of coastal fisheries to employment, export revenue, food security and rural social stability in these nations.

Source: Silvestre, et al., 2008.

to terrestrial ecosystems. Marine and coastal ecosystems are multi-trillion dollar assets linked to sectors such as tourism, shipping, fisheries, food and energy. Now it is emerging that they are natural allies against climate change. According to scientific analysis, coastal systems globally are being lost at an alarming rate, with approximately 2 percent removed or degraded each year. This is four times the estimate of annual tropical forest losses. The loss of mangroves is detrimental to our planet for many reasons: first, it results in the rapid emission of carbon stores that in many cases have built up over centuries, and the lost opportunity of future carbon sequestration from these areas; second, it destroys habitats that are critical for fisheries around the world; and third, it results in loss of shoreline protection against tidal waves and storm surges.

With increasing extreme weather events targeting vulnerable coastal communities to natural disaster-related damage, there is valid justification for investments in protecting and restoring mangrove forests and degraded coastal ecosystems.

Unsustainable Fisheries

The economic impact of illegal, unreported and unregulated (IUU) fishing on developing countries is the direct loss of the value of the fishery catch that could have otherwise been reaped by local fisherfolks. Available estimates place the economic loss attributed to illegal fishing at between US$ 10 billion and US$ 23 billion annually. In addition, there are indirect impacts in terms of loss in income and employment in related industries. Any loss in income impacts on consumer demands of families working in the fisheries industry. Moreover, hunting, overfishing and illegal fishing generally have the capacity to damage fragile marine ecosystems and vulnerable species, such as turtles, seabirds and coral reefs. This is likely to reduce productivity and biodiversity and create imbalances in the ecosystem. This, in turn, may lead to reduced food security in communities heavily dependent on fish as a source of protein (**Box 8**).

Impacts of Oil Spills

While the majority of marine environment pollutants are land-based, marine vessels also pollute waterways and oceans. For example, oil spills — from either operational or accidental causes — can have devastating effects. Offshore oil production can also cause oil pollution from spills, accidents and operational discharges.

Oceans suffer from far more than an occasional devastating oil spill. Disasters make headlines, but hundreds of millions of liters of oil quietly end up in the seas every year, mostly from nonaccidental and operational sources, both land-based and sea-based. Operationally, every year, bilge cleaning and other ship and port operations result in the release of millions of liters of oil into coastal waters.

While only a small percentage of oil pollution in oceans is due to major tanker accidents, one large spill can disrupt sea and shore life for hundreds of kilometers, affecting livelihoods, ecosystems and human health. Moreover, major oil spills from ships and oil tankers create images of oiled birds and marine mammals, damaged

mangroves and beaches, affected fisherfolks and huge environmental and economic impacts. Based on studies, it is evident that the frequency of major spills has declined due to prevention efforts by the government and industrial sector (Charlebois, et al., 2010). However, the costs of oil spills have increased, not only in terms of the response and cleanup costs, but also in economic losses and damage to ecosystems, which are already vulnerable due to other human activities and climate change.

The need for energy production must be balanced with the risks and consequences of activities taking place in sensitive coastal and ocean ecosystems. The catastrophe in the Gulf of Mexico showed the extent of devastation that can occur as a consequence of accidents. The Deepwater Horizon oil spill illustrated the harmful effects of oil and chemical spills to marine habitats and the associated living marine resources and cultural and economic impacts caused by such spills. As an approximation of the consequences, Costanza, et al. (2010) assumed that the Mississippi River Delta will be the most affected region and that there will be a 10–50 percent reduction in the ecosystem services provided by the delta. This amounted to a loss of US$ 1.2–23.5 billion per year into the indefinite future until ecological recovery.

Environments of the Poor in the Context of Climate Change, Habitat Degradation and Resource Loss: Implications on the Blue Economy

Poor populations in developing and underdeveloped countries depend directly on natural resources and engage in subsistence livelihoods. The livelihoods of many of the world's rural poor are also intricately linked with exploiting fragile environments and ecosystems (Barbier, 2005).

Poor households in rural areas face disproportionate losses from the depletion of natural capital due to their relatively high dependence on ecosystem services for income. It has been estimated that ecosystem services and other nonmarket goods account for around 47-89 percent of the so-called GDP of the poor (the effective GDP of total source of livelihood of rural and forest-dwelling poor households), whereas in national GDP, agriculture, forestry and fisheries account for only 6-17 percent (TEEB, 2010). Ecological scarcities are affecting the entire gamut of economic sectors that are the bedrock of human food supply (fisheries, agriculture, freshwater and forestry) and a critical source of livelihoods for the poor.
The world's poor are especially vulnerable to climate-driven risks posed by rising sea levels, coastal erosion and frequent weather extremes.

- Around 14 percent of the population and 21 percent of urban dwellers in developing countries live in low elevation coastal zones that are exposed to these risks (McGranahan, et al., 2007).

- Many of the 150 million urban inhabitants who are likely to be at risk from extreme coastal flooding events and sea level rise are likely to be the poor living in cities in developing countries (Nicholls, et al., 2007).

- The livelihoods of billions, from poor farmers and fisherfolks to urban slum dwellers, are threatened by a wide range of climate-induced risks that affect food security, water availability, natural disasters, ecosystem stability and human health (OECD, 2008; UNDP, 2008).

A key issue along coasts concerns small-scale fisheries (SSF), which provide crucial and substantial food supplies, sustain regional economies, and support the social and cultural values of the coastal areas in the region. This sector is threatened as pressures on coastal areas are growing. Today, only 20 percent of commercial fish stocks, primarily low-priced species, are underexploited; 52 percent are fully exploited with no further room for expansion; about 20 percent are overexploited; and 8 percent are depleted (FAO, 2009).

Water is also becoming scarce and water stress is projected to increase, with supplies satisfying only 60 percent of world demand in the next 20 years (Boccaletti, et al., 2009). For the world's poor, global water scarcity manifests itself as a poverty problem. One in five people in the developing world lacks access to sufficient clean water, and about half the developing world's population (2.6 billion people) does not have access to basic sanitation. More than 660 million of the people without sanitation live on less than US$ 2 a day, and more than 385 million on less than US$ 1 a day (UNDP, 2006).

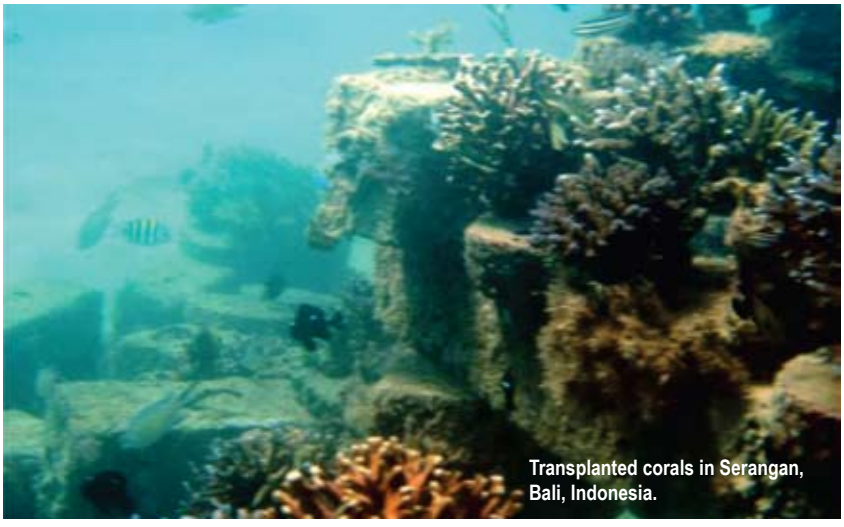
Poor sanitation results in economic losses amounting to about 2–6 percent of the GDP of countries in Southeast, East and South Asia (Hutton, et al., 2007). In addition, around 80-90 percent of wastewater in South and Southeast Asia is discharged without treatment, thereby polluting rivers and coasts. Poor water quality further aggravates the availability of clean and safe water supply needed by humans and ecosystems. Contaminated fish and seafood, incidence of hypoxia or dead zones and harmful algal blooms have affected the fisheries sector. Publicly accessible beaches are often closed when there are changes in water quality or spills of hazardous substances within the water. Although closing a beach is meant to prevent illness, it directly and indirectly translates to an economic loss for fisherfolks and other local businesses.

Challenging Conventional Paradigms of Economic Development

A *green economy* is one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2010). Finding ways to protect global ecosystems, reduce the risks of global climate change, improve food, water and energy security and

simultaneously improve the livelihoods of the poor are important challenges in the transition to a green economy, especially for developing countries (UNEP, 2011).

Similarly, in a blue economy, growth in income and employment in coastal and marine areas is driven by public and private consumption and investments that also prevent the loss of biodiversity and ecosystem services, reduce pollution and carbon emissions, and enhance water, energy and resource efficiency. Economic growth is balanced with resource conservation, environmental management and social inclusion.



Transplanted corals in Serangan, Bali, Indonesia.

Rethinking Our Options

The *Blueprint for a Green Economy* (Pearce, et al., 1989) pointed out that because today's economies are biased toward depleting natural capital to secure growth, sustainable development is unachievable. A green economy — one that values environmental assets, employs pricing policies and regulatory changes to translate these values into market incentives, and adjusts the economy's measure of GDP for environmental losses — is essential in ensuring the well-being of current and future generations.

Until recently, arguments in support of the conservation of species and habitats were based primarily on issues, such as their rarity, evolutionary uniqueness or threat of extinction. Today, arguments also include how maintaining biodiversity directly benefits people by contributing to economic well-being or quality of life. It is essential to rebuild natural capital as a critical economic asset and as a source of public benefits. This is especially important for poor people whose livelihoods and security depend on the coastal and marine resources.

Moving towards a blue economy, the same principles for green economy hold true for our coasts and oceans. Various interventions and mechanisms are available, but it is critical to be more innovative, and do things differently this time if full benefits of a blue economy are to be achieved. Some examples follow:

A. Scientific Inputs

Ecological modeling, ecosystem accounting, blue carbon accounting, sustainable fisheries modeling, etc. provide tools and information necessary for appropriate policies to be put in place, designing instruments, financing mechanisms and action plans and structuring cost-effective projects.

Placing values on ecosystem services (i.e. economic valuation) provides a sound basis in support of long-term protection of the environment. An update of valuation tools, which takes into consideration socioecologic values, must be initiated and translated into plausible strategies for implementation (TEEB, 2010).

B. Habitat Restoration and Protection

Innovative restoration techniques and management approaches are essential for coral reef protection and restoration (Chou, 2012). Dr. Choong-Ki Kim of Stanford University focuses on seagrass and oyster reef restoration efforts in Mobile Bay, United States. He discusses that in most estuarine systems, more than 85 percent of oyster reef habitats have been lost due to diseases, overharvesting and deteriorated water quality. The decline has lowered filtration capacity, degraded water quality, decreased stable habitats and increased coastal vulnerability to extreme events. Due to this, urgent efforts are required to restore the strong, resilient natural communities that for centuries have protected people and wildlife from storms and provided the backbone of the regional economy. Restoring oyster reefs provides additional services, including habitat value, shoreline protection, water filtration, job creation and other socioeconomic benefits. When these services are combined, they generate more benefits to the local communities than lone harvest value. These findings can be used to create new funding opportunities for the restoration or conservation of ecosystems. **Table 3** summarizes the net benefits of habitat restoration. **Figure 4** compares the benefits of habitat conversion and conservation. Conserving habitats results in higher benefits compared to converting them to other uses.

Marine Protected Areas: A Second Look

The current economic debate pertains to how marine protected areas (MPAs) are somewhat polarized by the economic losses that may occur should reserves be established and commercial and

recreational fishing be displaced. Affected parties are putting forward a case for compensation. This is caused by a limited understanding in potential "win-win" outcomes. For example, a study, *The Economics of Marine Protected Areas: Application of Principles to Australia's South West Marine Region* (Allen Consulting Group, 2009), provides evidence about the economic value of MPAs and the ecological benefits they bring to the community. Annually, MPAs in this Australian region provide economic surplus gains ranging from US$ 2 million for commercial fisheries to US$ 5-10 million for ecotourism, and even as much as US$ 200 million for nonmarket values (**Table 4**).

Beach Protection for Sustainable Tourism

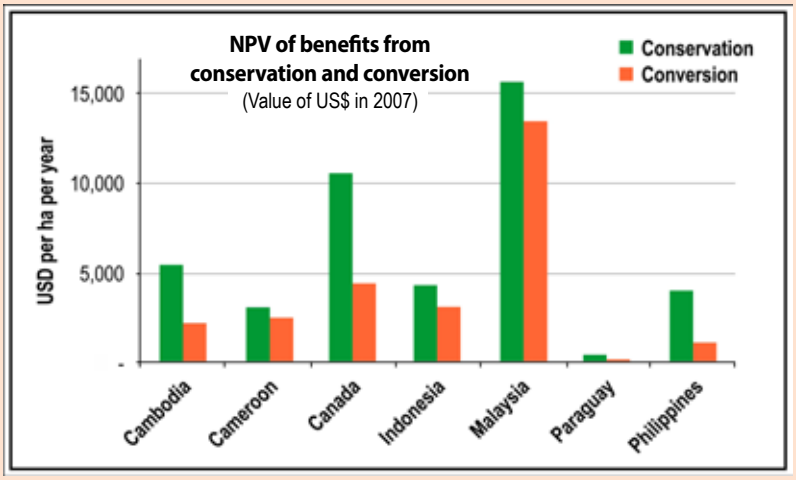
While coastal tourism has brought considerable economic benefits to the countries, the consequences of rapid and *ad hoc* coastal tourism development have not always been desirable (CESD, 2007). To illustrate, some of the most destructive elements of coastal resort tourism development are land clearance and habitat degradation, while the daily operations of resort facilities consume natural resources and pollute waterways. Among the other impacts, visitors to coastal tourism destinations spur a demand for fresh seafood that can generate tremendous strains on already-stressed fisheries, while unwieldy volumes of divers, snorkelers and cruise passengers can damage coral reefs and other sensitive coastal habitats. Coastal tourism needs to look "beyond the beach" and economic growth, and take a more holistic approach to sustainable tourism development that encompasses human and social capital within the context of governance. State intervention, in the form of monitoring and regulation of development, becomes necessary as coastal tourist destinations expand. **Box 9** shows the interventions adopted in Sihanoukville, Cambodia, to ensure sustainable coastal tourism.

Table 3. Net Benefits of Habitat Restoration.

Biome/ ecosystem	Typical cost of restoration (high-cost scenario)	Estimated annual benefits from restoration (average cost scenario)	Net present value of benefits over 40 years	Internal rate of return	Benefit/ cost ratio
	US$/ha	US$/ha	US$/ha	%	Ratio
Coastal	232,700	73,900	935,400	11%	4.4
Mangroves	2,880	4,290	86,900	40%	26.4
Inland wetlands	33,000	14,200	171,300	12%	5.4
Lake/rivers	4,000	3,800	69,700	27%	15.5

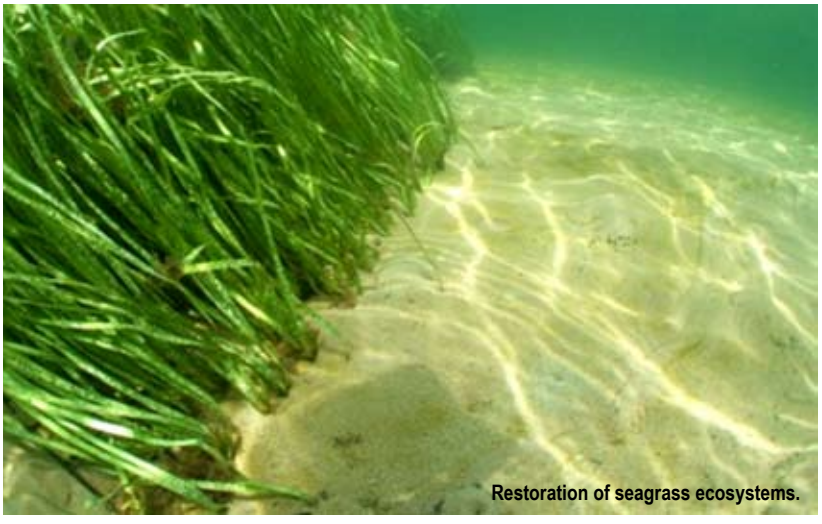
Source: TEEB, 2009b (as cited in UNEP, 2011).

Figure 4. Benefits of Conservation vs. Benefits from Habitat Conversion.*



* 'Conservation' includes sustainable production of market goods and services including timber, fish, nontimber forest products and tourism. 'Conversion' refers to replacement of the natural ecosystem with a system dedicated to agriculture, aquaculture or timber production.

Source: TEEB, 2009a.



Restoration of seagrass ecosystems.

Table 4. Indicative Scale of Benefits of MPAs in Australia's Southwest Marine Region.

Impact	Gain in economic surplus (US$ million per annum)
Spillovers to commercial fisheries These will vary from fishery to fishery and be highly dependent on design of the protected area. A 5% increase in catch per unit effort in the Rock Lobster Fishery is estimated to increase economic rent by US$ 2.4 million.	Up to US$ 2.4 million
Fishery buffer benefits These likely result in more stable catches and provide insurance against stock depletion. Improved catch stability would give professional fisherfolks better planning certainty for their business and possibly reduce the need for overdraft finance in low catch years. The buffer effect of MPAs could leave greater room for management error and buffer against adverse environmental events.	Not estimated
Ecotourism direct benefits Currently these cost US$ 45 million in commercial revenues, with perhaps a net value of US$ 10 million. Protected areas would support continued growth of the industry (relative to a scenario of a ceiling in visitor numbers).	US$ 5 million to US$ 10 million
Biodiscovery Marine sanctuaries protect genetic material for possible future screening and subsequent development of commercially valuable products. The value of preserving this future option is likely to be significant, but is difficult to estimate.	Not estimated
Environmental and nonmarket values A recent choice modelling study (McCartney) estimated that respondents were willing to pay, on average, US$ 140 per year for a modest set of ecological improvements in Ningaloo Marine Park. When extrapolated to the state population aged 19 years and over, this equates to US$ 222 million.	US$ 100 million to US$ 200 million

Source: Allen Consulting Group, 2009.

Box 9. Beach Zoning in Sihanoukville, Cambodia.

Preah Sihanouk is considered to be one of the three economic centers in Cambodia. While the increasing number of tourists in Occheauteal Beach has increased local income, it has also brought with it the challenge of uncontrolled development. In 2004, a project on Tourism Development and Management for Occheauteal Beach commenced under the ICM program. The project included six components: (1) project planning and community preparation; (2) beach maintenance landscape improvement, environment monitoring and waste management; (3) beach zoning; (4) improvement of sanitation facilities; (5) sustainability and replication measures; and (6) monitoring, evaluation and documentation. Zoning is an essential component of the plan since this forms the basis of infrastructure development. It entailed determining the setback zone, preparing a beach development design, getting the design approved by stall owners and encouraging the stall owners to conform to the design of individual stalls. A revolving fund was set up from the collection of user fees for the use of the beach. The fund supported the beach protection initiatives.

Source: Prak and Nay, 2012.

The report, *A Blueprint for Ocean and Coastal Sustainability* (IOC/UNESCO, et al., 2011), states that:

> "For tourism, greening the Blue Economy implies that switching from nonsustainable tourism to ecotourism and other sustainable tourism practices goes along with the generation of other forms of revenues... The greening of the tourism sector, within an integrated coastal development context, is expected to reinforce the employment potential of the sector with increased local hiring and sourcing. In greening the tourism sector, increasing the involvement of local communities, especially the poor, in the ocean and coastal tourism value chain is essential to developing the local economy and reducing poverty."

C. Marine Biosafety

Several issues on marine biosafety have been surfacing in the past years. Recommended approaches to enhance marine biosafety target measures including: the translocation of invasive species and the use of non-toxic antifouling substances; the promulgation of environmental instruments; adoption and application of standards; research; technology; and the promotion of public awareness and capacity building.

D. Innovative Financing Mechanisms

Market mechanisms, such as payments for ecosystem services, user fees, carbon credits, nutrient trading, charges for environmental damage, fishing quotas and product certification, can complement existing strategies for conserving ecosystems. Some examples of successful initiatives include eco-compensation in PR China, fishing quotas in New Zealand, nutrient trading in Chesapeake Bay, United States, and fish product certification in Australia.

Eco-compensation

Under the watershed ecological compensation system, communities in the downstream and more economically developed areas provide financial support to communities in the upstream for their environmental protection activities. It offers an effective solution to motivate people in the upstream to undertake environmental protection activities without sacrificing their welfare. However, the system needs to be improved by: (a) applying the optimal abatement cost as the eco-compensation value; (b) clarifying responsibilities; (c) having a common understanding between the upstream and downstream communities; and (d) putting in place an effective monitoring system.

User fees to ensure sustainable wastewater treatment

In Muntinlupa City, Philippines, wastewater treatment facilities were put in place by the local government in the public market and two schools. User fees are collected to ensure cost recovery and sustainable operations and maintenance. The treated wastewater is also being reused for cleaning the market, flushing toilets, street washing, etc., resulting in savings in the monthly water bill (Pabilonia, 2012).

Payment for environmental and ecological damages

The concept of Marine Ecological Damage Compensation (MEDC), ensures that the responsible party pays for its damage to the marine ecosystem (Rao, 2012, Xiamen University, PR China). The rapid growth of population and economics in coastal zones bring intense sea area use, which has caused ecological damage and the diminishing productive capacity of the marine ecosystem. Although an Environmental Impact Assessment (EIA) is in place in PR China, EIAs are focused on the capacity of an environment and how to reduce the impacts of damage, paying less attention to the compensation after the wrought damage. Estimates of different MEDC values for various areas of Xiamen Bay, reflecting the various ecosystems and their respective uses and services, are presented in **Table 5**. The MEDC system has the potential to further enhance the marine zoning and sea use scheme and user fee system in Xiamen.

Blue carbon market

The need for an innovative financing mechanism is critical in developing a blue economy. An opportunity lies in emerging global carbon markets (**Box 10**). These markets pertain to the sale and purchase of carbon offset credits from projects that may reduce or sequester GHG emissions, e.g., avoided

Table 5. Ecosystem Services and Their Value (RMB Yuan/m²/y).

Sea Areas	Subzones	Climate regulation	Flood control/ shoreline stabilization	Nutrient regulation	Waste treatment/ control	Ecological control/ habitats	Fisheries	Biodiversity	Tourism	Scenery	Scientific research/ education	Agriculture
Western Sea	Dayu Island and surrounding waters	1.098	0.8	2.703	0.6	1.477	0.096	2.844	0.417	3.5	0.05	0
	Shihushan-Gaoqi coast	1.098	0.8	2.703	0.6	1.477	0.096	2.111	0.417	3.5	0.05	0
	Dongyu Bay	1.098	0.8	2.703	0.6	1.477	0.096	2.111	0.417	3.5	0.05	0
	Gaopu Coast	1.098	0.8	2.703	0.6	1.477		2.111	0.417	3.5	0.05	0
	Wuguan Coast	1.098	0.8	2.703	0.6	1.477		2.111	0.417	3.5	0.05	0
	West Coast	1.098	0.8	2.703	0.6	1.477		2.111	0.417	3.5	0.05	0
	Huoshao Island and surrounding waters	1.098	0.8	2.703	0.6	1.477	0.096	2.111	0.417	3.5	0.05	0
	Maluan Bay	0.134		2.703	0.6	1.477	0	1.118	0.417	3.5	0.05	0.94
	Yuandang Lake	0.134		2.703	0.6	1.477	0	1.118	0.417	3.5	0.05	0
	others	0.134	0.8	2.703	0.6	1.477	0.096	2.111	0.417	3.5	0.05	0
Estuary Sea	Jiyu Islet and surrounding waters	1.098	0.8	4.677	0.6	1.137	0.126	2.607	0.427	3.5	0.05	0.94
	Qingjiao Coast	1.098	0.8	4.677	0.6	1.137	0.126	2.199	0.417	3.5	0.05	0.94
	others	0.103	0.8	4.677	0.6	1.137	0.126	2.199	0.427	3.5	0.05	0.94
Tongan Sea	Inlet of Tongan Bay	0.134	0.8	2.237	0.6	1.477	0.09	1.876	0.417	3.5	0.05	0.94
	Eyu Islet and surrounding waters	1.098	0.8	2.237	0.6	1.477	0.09	2.745	0.417	3.5	0.05	0.94
	Fenglin Coast	1.098	0.8	2.237	0.6	1.477	0.09	1.715	0.417	3.5	0.05	0.94
	Pantu Coast	0.134	0.8	2.237	0.6	1.477	0.09	1.715	0.417	3.5	0.05	0.94
	Xiatanwei Coast	1.098	0.8	2.237	0.6	1.477	0.09	1.715	0.417	3.5	0.05	0.94

Source: Rao, 2012

Box 10. Challenges in a Blue Carbon Market.

Under the UN's Kyoto Protocol and various independent standards, the major suppliers of carbon offset credits tend to be developing countries, with demand coming from companies based in industrialized countries that need to comply with national climate change legislation or who wish to progress their corporate social responsibility agenda.

By 2015, it is expected that emissions trading schemes (ETS) will be operating in many of the world's major economies including Australia, PR China, the European Union (EU), Japan, California, USA and RO Korea. Global carbon markets are currently worth around US$ 176 billion; however, this is forecast to expand rapidly.

Challenges

- While carbon markets present an emerging financing opportunity for the blue economy, a number of challenges exist in the implementation and scaling up. In the first instance, the challenge is to make blue carbon work on-the-ground; there is currently a lack of case studies and economic data, which is hindering private and government investment.
- Second, while emissions from the degradation and clearance of mangroves can be calculated with some confidence, existing international standards as approved by the United Nation's Framework Convention on Climate Change (UNFCC) do not allow the estimation of emissions "removals" by marine ecosystems; therefore, the accounting for carbon revenue streams is not financially feasible beyond the local scale. Likewise, an effective mechanism to monitor, ensure and enforce long-term carbon stocks is yet to be established.
- Third, the global carbon price has been somewhat volatile in recent years due mainly to Euro-zone economic issues and the associated suppressed demand for carbon permits from EU Emission Trading Scheme.
- While the international carbon price is likely to stabilize in the lead-up to 2015, improving the economics of blue carbon against high-value alternative land uses (e.g., coastal residential development) will require successful valuation of other ecosystem services that are not climate related and the implementation of Payments for Ecosystem Services schemes.
- Lastly, and importantly, the potential for blue carbon is not widely understood by the government and private sector. There is a need to increase understanding of this opportunity through targeted research on economics and on-the-ground implementation issues.

Source: Ward, 2012

deforestation, reforestation, energy efficiency and renewable energy. Emissions trading is one of the principal mechanisms of the United Nations to slow global GHG emissions and mitigate climate change. Developing blue carbon offset projects could provide a funding mechanism to underpin conservation efforts and incentivize more sustainable land-use alternatives, thus, for example, slowing and even reversing mangrove loss. The same principles also apply to seagrass habitats, salt marshes and tidal flat ecosystems. Through a process of accounting and verification under internationally accepted standards, carbon offset project developers (including landholders or local government) may be awarded carbon offset credits for two types of activities: (1) replanting a degraded marine ecosystem; or (2) avoiding the clearance of an existing marine ecosystem.

E. Technological Innovations: Solving Today's Problems and Emerging Issues

Water and wastewater management and pollution reduction

Most environmental infrastructure projects are still based on conventional systems for treating water, wastewater and sludge. There is a need to evaluate conventional systems. Other options may be more appropriate in certain situations.

New and emerging technology options are not widely known to planners and decisionmakers. Insufficient knowledge of solution options has hampered project design and procurement process. The lack of capacity to select and apply them to local conditions has resulted in many failed projects.

Although conventional systems could significantly improve the socioeconomic and public health situation in localities that could afford to install and operate them, it is essential that the benefits and economic and ecological sustainability be assessed. Clearly, there is a need to develop alternative approaches and solutions particularly in the context of a blue economy.

It is critical to move away from the high-energy solution or no treatment at all toward something affordable and doable. Moreover, there should be recognition of the contribution that wastewater management can play in addressing water security as well as food, energy and environment issues. The mindset that water and wastewater management is only a cost burden and an investment deadend is not consistent with the larger picture of sustainable development. Wastewater should be seen as a resource with potential

financial returns — from augmenting water supply for irrigation, power cooling, industrial and nonpotable uses, to producing fertilizer, fuel and energy — and creating new opportunities for carbon credits and green employment. Wastewater treatment also protects valuable water resources and contributes to ensuring integrity of coastal and marine ecosystems as well as safe fisheries and clean coastal waters for recreation and tourism.

Clean energy

Countries cannot develop without widespread access to reliable and affordable electricity. The projected growth rate of GDP in Asia and the Pacific is the highest in the world at 3.5 percent per year through 2030, driving an increasing demand for energy. Asia and the Pacific's growth in energy demand is estimated at 2.4 percent annually through 2030, compared with the global rate of 1.5 percent for the same period (ADB, 2009). In the face of rising concerns over global climate change, the challenge is how to source this energy sustainably. Reliable energy supply is vital to improving living conditions, yet studies show that 1.5 billion people — more than 20 percent of the global population — live without access to electricity, and far more live with expensive, unreliable power supplies. Up to 3 billion more people rely on burning wood and other solid fuels for heating and cooking.

In the energy sector, 30 percent (and growing) of global oil and gas supplies are from offshore production (IOC/UNESCO, et al., 2011). Technological advances allow deeper oil and gas exploration and drilling. The impact on climate change from the fossil fuel energy sector will put increasing pressure on the sector to invest in alternative renewable technologies in the future. Proper pricing of carbon emitted by fossil fuels is essential to level the playing field and make many renewable marine energy technologies more economically competitive with fossil fuels.

Increased use of clean energy is especially in the direct interest of poor countries. It can provide clean, cheap and reliable access to electricity. It also provides emerging economies with the opportunity to plan for their future more efficiently by selecting a less carbon-intensive path to growth. A range of renewable energy technologies exists, taking advantage of the various natural resources that may exist in any given location: solar, biomass, geothermal, hydro, wind and tidal power can each be harnessed in a cost-effective and sustainable way when the right conditions exist and the right approach is taken. Septage and wastewater treatment also generate biogas for lighting and cooking and biofuel to run buses and trains, further contributing to alternative sources of clean energy.

Water-energy-food-environment nexus

Both water and energy are essential to all the aspects of life. As such, water, energy and ecological footprints cannot be addressed in isolation. Nevertheless, there is still a significant gap in knowledge management and policymaking that addresses the linkages at global, regional and local scales. Water resource managers need to understand energy and ecosystem linkages better; energy producers also need to do the same. Innovations in technologies should focus on the following: (a) efficiency (and reducing footprint) in energy, water and food sectors; (b) treating wastewater and sludge for reuse (to provide alternative water supply for irrigation, industry, power cooling, etc.; alternative energy source for electricity and transportation; and biofertilizer); and (c) reducing impacts to habitats, fish and coastal/marine resources.

Fisheries and aquaculture
(IOC/UNESCO, et al., 2011)

Future green practices in the ocean will see major changes in the nature, location and intensity of fishing and aquaculture. This will likely include the development of offshore large-scale aquaculture and the better management of fisheries, including foreign fishing activities in domestic waters, through improved monitoring, control and surveillance and the realization of a greater share of net benefits from fishery resources. Green practices in aquaculture should promote the growth of certain extractive species (seaweeds and filter-feeding shellfish) and lower trophic level farming, which converts food to fish protein more efficiently than carnivorous species.

Ports and shipping

Safety and emissions regulation and higher energy prices are leading factors changing the shipping industry. New technologies, new fuels (e.g., methanol, liquefied natural gas), new engines and new designs are becoming available. The difficulty for ship owners, builders, equipment makers and financiers is not only what technology to support but when to invest. Decisionmaking will be driven by a combination of price and performance, and there are many different and competing agendas at play.

F. Alternative and Supplemental Livelihood
(Mendoza, 2012)

The pressure on coasts and oceans comes from the community's dependence on the resources as sources of income and livelihood. Alternative sources of income help in the efforts to decrease pressures on the coastal and marine resources. Providing the coastal communities with other sources of income enables the reduction of fishing effort and other coastal resource extractions and enhances income diversification, employment generation and microenterprise development, facilitated by community-based organizations and supported by training programs. To be successful, viable and sustainable, the livelihood components of the coastal resource management programs have to be community-based, participatory and technology-aided, with support and active involvement of local governments, nongovernmental organizations (NGOs), development agencies and other stakeholders. The capacity-building component

of livelihood programs needs to be strengthened, as well as the need to empower communities to support and sustain the projects on their own. Ownership, self-determination, organizational and management capacity and access to sustainable financing mechanisms and markets are also essential.

Ways Forward

Good governance, institutional capacity and businesses should partner with policymakers, legislators, researchers and others to help achieve solution options. Given the scale and the pace of global environmental social and economic change, "business as usual" is no longer an option. Crises can, however, provide the context and justification for new kinds of transformative actions and innovations, and history shows many examples of innovative responses.

1. **Mainstream valuation of ecosystem services and ecosystem depreciation (damage) in national income accounts to provide evidence-based policies, influence decisionmakers, planners, investors, etc., and to improve the design of projects, regulations, economic instruments and financing mechanisms.**

   This involves:

   a. regular physical accounting (monitoring, remote sensing, ground-truthing surveys and measurements, information management, etc.) and monetary accounting (economic valuation) of the natural capital;

   b. multimedia reporting to ensure sustained public/media interest and allow ecosystems and environment to be taken into account in the policy agenda, economic development plans, project impact assessments and designs, etc.;

   c. budgetary/financing support and programs for research, field work and scientific studies by the academe and concerned government agencies to support the environmental monitoring and ecosystem valuation; and

   d. engaging stakeholders and communities as active partners.

2. **Give priority to the protection of remaining mangrove forests, seagrass meadows, salt marshes, coral reefs and other coastal and marine ecosystems, with supporting innovative planning, management, financing, scientific and technical approaches, and intersectoral collaboration and partnership for more effective management.**

   This involves:

   a. developing and implementing ICM policy and programs which facilitate ecosystem-based management of marine and coastal resources;

   b. establishing MPA and network systems and promoting ecotourism and sustainable fisheries;

   c. rehabilitating and protecting ecosystems as government priority (at both national and local levels), with supporting government budget, community participation, scientific inputs, and active participation of private sector and NGOs;

   d. conducting integrated land and sea use zoning, with urban, transport and environmental planning, and enforcing zoning regulations and related laws;

Sihanoukville Autonomous Port, Preah Sihanouk, Cambodia.

e. applying market-based or economic instruments (e.g., user fees, payment for ecosystem services, eco-compensation, compensation for sea use and damages, blue carbon financing, etc.) to complement regulations, provide incentives and further influence behavior; and

f. sharing: knowledge, including good practices and working models, as well as technology, financing and delivery options, which show impacts and benefits.

Protecting ecosystems is not a cost, but an investment with actual monetary returns in addition to intangible environmental and socioeconomic outcomes (continuous source of food and livelihood, bioprospecting, carbon credits, shoreline protection, climate change mitigation, etc.). Coastal and marine resources need to be seen as blue diamonds.

3. Ensure continued provision of ecosystem services for sustainable and inclusive blue economy through management practices that reduce and remove threats, support the robust recovery of ecosystems and contribute to integrated climate change and disaster risk management.

This involves:

a. supporting the development, commercialization and adoption of innovative technologies and systems for more efficient production and improved management of the following: energy; habitats and resources; fisheries and aquaculture; water resources and supply; and wastes and byproducts from the domestic, industrial, agricultural and port and ship sectors;

b. more focus on integrated water resource management, marine biosafety and pollution reduction to mitigate impacts on health and ecosystems;

c. promoting water and energy conservation, water reclamation (reuse of treated wastewater for agriculture, industry, power and other uses) and harvesting nutrients and energy from waste management;

d. improving energy efficiency in manufacturing processes, water supply and wastewater management, marine transport, fishing and aquaculture sectors as well as marine-based tourism;

e. encouraging sustainable, environmentally sound, ocean-based energy generation, such as tidal and wind power, and including algae and seaweed;

f. identifying and curtailing activities that negatively impact the ocean's ability to absorb carbon;

g. developing ecosystem-based climate change mitigation and adaptation programs and strategies;

h. improving monitoring and enforcement of laws to address the following: waste discharges and illegal dumping; IUU fishing; and encroachment of businesses and informal settlements into critical habitats and vulnerable areas;

i. encouraging development of community-based business plans and livelihood programs for viable and sustainable coastal resource and waste management; and

j. introducing incentives and innovative financing mechanisms, such as eco-compensation and blue carbon markets.

4. Maintain food and livelihood security from the oceans.

This involves:

a. ensuring that investment for restoring and protecting the capacity of the ocean to bind carbon and provide resources, food and income is prioritized in a manner that also promotes business, livelihood, coastal development and opportunities, especially for the poor communities;

b. enhancing mandatory fish catch documentation and product certification as an extension of normal monitoring and enforcement in fisheries, and as a means of excluding IUU fishing products from consumer markets and therefore rewarding responsible fishing with protected markets;

c. applying science and innovative and cost-effective technologies to ensure sustainable and safe fisheries and aquaculture and take into account environmental and health implications;

d. improving monitoring and enforcement of laws to address IUU fishing and habitat conversion;

e. developing alternative and supplemental livelihood programs, with supporting skills development, extension services and access to financing and markets; and

f. facilitating the inclusion of the poor households, women and other marginalized sectors, and involving communities in the design of marine protected areas, and micro and small-scale enterprises as part of coastal ecosystem conservation and coastal cleanup to ensure "ownership."

5. Ensure marine biosafety is considered a top priority in the policy agenda.

Ballast water and invasive alien species management

a. There is an urgent need to recognize and address the economic and societal costs of marine bio-invasions in the EAS region, due to the potential impact on biodiversity and the intensity of shipping activities.

b. Countries are encouraged to ratify the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) on an urgent basis. Implementation of the convention should be supported through regional cooperation efforts and agreements.

c. To remove barriers for early and effective implementation of existing instruments, capacity-building will be of outmost importance. This should also include compliance monitoring and enforcement–related capacity-building aspects.

d. The regional efforts to address biosafety issues should be assisted by the development of a (regional) database on invasive species, distribution and prior invasion history, and environmental and ecological requirements.

e. Countries and key stakeholders are encouraged to make use of existing tools and guidelines developed by programs such as the Global Environment Facility-United Nations Development Programme-International Maritime Organization (GEF-UNDP-IMO) GloBallast.

f. It is strongly recommended to reestablish the Regional Task Force, which was initiated during the first phase of GloBallast.

Antifouling system

a. There is an urgent need for governments to ratify the International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS), in order to drive technology development to address fouling in nonhull areas of vessels. New R&D is needed to prevent fouling under low flow/static conditions (e.g., when vessels are moored, at berth or at anchor).

b. There is a need for coating standards (e.g., ISO standard) that will be useful in enhancing development and business competition on antifouling technology and products, including market entry into an otherwise very conservative market.

c. Biofouling should be addressed from a perspective of biosafety, and countries should be encouraged to contribute to the ongoing discussion on the development of a global framework for biofouling.

Scientific support

a. Regional and port-specific risk assessment (qualitative) should be carried out using existing information on shipping patterns and port environmental conditions.

b. Regional and national efforts should be supported with the establishment of a regional network (correspondence group) of biosafety experts, from various organizations active in the biosafety field.

Small-scale fish drying industry.

6. **Make the blue economy an explicit object of development planning and a priority in the policy agenda.**

This involves:

a. consolidating and harmonizing policies, development plans, programs and projects in the coastal and marine areas toward a comprehensive plan for a sustainable, viable and inclusive blue economy;

b. assessing and valuing the blue economy and ecosystem services to reflect more correctly the social and environmental interactions of economic development;

c. social networking and multimedia reporting to ensure wider advocacy and sustained public awareness and media interest; and

d. capacity development of local governments, including wider and deeper knowledge sharing on good practices, delivery mechanisms and options on financing, technologies, management approaches and alternative livelihood and income generation programs.

References

Presentations during the EAS Congress (2012)

Subtheme 1: Nurturing the Coastal and Ocean Economies of the Seas of East Asia: Opportunities and Challenges

Workshop 1: Our Coasts and Seas: The Engine of a Blue Economy

Cao, L. Q. "Sustainable Aquaculture/Polyculture Development in Vietnam."

Pabilonia, J. E. T. "Lake and River Rehabilitation in Muntinlupa City, Philippines."

Prak, V. and S. Nay. "Zoning and Beach Protection for Sustainable Tourism in Sihanoukville, Cambodia."

Ratna Dewi, A. A. I. "Sustainable Water Supply and Waste Management in Bali, Indonesia."

Ward, A. "Blue Carbon in Mangrove Forests: Principles, Markets and Economics."

Wei B., Z. Liu, X. Yu, F. Cai and J. Yao. "Keeping the Marine Economy Blue: Blue Economy Development in the Pilot Coastal Areas of China."

Wen, Q. "PR China's National Policy Regarding Promoting Green Growth in the Coastal and Marine Sectors and Developing and Sustaining a Blue Economy."

Workshop 2: Unmasking Hidden Costs: Accounting for Natural Resource Depreciation and Environmental Damages

Chou, L. M. "Ecosystem Services of Coral Reefs: The Implications of Management, Degradation and Restoration."

Kim, C. K. "Nature's Benefits: Getting More for Restoration Dollars."

Kusumastanto, T. "Economic Valuation of Coastal Resources Degradation in Seribu Islands: Is Blue Economy a Solution for Reversing the Degradation?"

Mendoza, M. "Alternative/Supplemental Livelihood Programs in the Philippines."

Nabangchang, O. "Mangroves and Coastal Ecosystems Losses and Disaster-related Damages."

Peng, B. "Eco-compensation Policy in Fujian Province."

Rao, H. "Marine Ecosystem Services Damage and Compensation of Sea Area Use: Case Study of Xiamen, China."

Shin, C. O. "Research on Investigating the Possibility of Whale Watching Tourism in Korea: Economic Valuation Perspective."

Bibliography

ADB (Asian Development Bank). 2009. *Energy Outlook for Asia and the Pacific*. Mandaluyong City, Philippines.

Allen Consulting Group. 2009. "The economics of marine protected areas: Application of principles to Australia's South West Marine Region." Report to the Conservation Council of Western Australia. Available from: www.saveourmarinelife.org.au/Media/The_Economics_of_Marine_Protected_Areas_Allen_Consulting.pdf [Accessed 2012].

Barbier, E. B. 2005. *Natural resources and economic development*. Cambridge, UK: Cambridge University Press.

Boccaletti, G., M. Grobbel and M. R. Stuchtey. 2009. "The business opportunity in water conservation." *McKinsey Quarterly*. Available from www.mckinsey.com/insights/energy_resources_materials/the_business_opportunity_in_water_conservation [Accessed 2012].

CESD (Center on Ecotourism and Sustainable Development). 2007. "Global trends in coastal tourism." Available from www.responsibletravel.org/resources/documents/reports/Global_Trends_in_Coastal_Tourism_by_CESD_Jan_08_LR.pdf [Accessed 2012].

Charlebois, P., R. Sykes, J. Matheickal, F. Haag, C. L. Agustin, H. E. Miole, S. Haruyama, C. Virapat, D. Factuar, K. Wakita and M. C. Ebarvia. "Steering the course toward safer shipping and cleaner seas." *Tropical Coasts*, 2010 December, 16 (2): 4–24.

Costanza, R., D. Batker, J. Day, R. A. Feagin, M. L. Martinez and J. Roman. 2010. "The perfect spill: solutions for averting the next deepwater horizon." Available from www.thesolutionsjournal.com/node/629 [Accessed 2012].

FAO (Food and Agriculture Organization of the United Nations). 2009. "The state of world fisheries and aquaculture." Available from ftp://ftp.fao.org/docrep/fao/011/i0250e [Accessed 7 January 2014].

Giesen, W., S. Wulffraat, M. Zieren and L. Scholten. 2006. "Mangrove guidebook for Southeast Asia." *FAO and Wetlands International*. Available from ftp://ftp.fao.org/docrep/fao/010/ag132e/ag132e00.pdf [Accessed 2012].

Gomez, E. D., R. U. Fuentes, O. Matsuda, T. M. S. Lim, T. Yanagi, A. McDonald, A. Uychiaoco, M. Aguinaldo and M. C. Ebarvia. 2011 July. "Treasuring our heritage; banking in our future." *Tropical Coasts*, 17 (1): 4–29.

Hutton G., U. E. Rodriguez, L. Napitupulu, P. Thang and P. Kov. 2007. "Economic impacts of sanitation in Southeast Asia: Summary report." World Bank, Water and Sanitation Program. Available from www.wsp.org/sites/wsp.org/files/publications/411200810059_EAP_ESI_summary.pdf [Accessed 2012].

IOC / UNESCO (Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization), IMO (International Maritime Organization), FAO (Food and Agriculture Organization of the United Nations) and UNDP (United Nations Development Programme). 2011. *A Blueprint for Ocean and Coastal Sustainability.* Paris: IOC/UNESCO.

IUCN (International Union for Conservation of Nature). 2007a. "Counting coastal ecosystems as development assets." *Coastal Ecosystems*, No. 5. Available from http://cmsdata.iucn.org/downloads/coastal_ecosystems_newsletter_july2007.pdf [Accessed 2012].

IUCN (International Union for Conservation of Nature). 2007b. "Counting the costs of tsunami-related damages to coastal ecosystems in Thailand." *Coastal Ecosystems*, No. 4. Available from http://cmsdata.iucn.org/downloads/4th_newsletter.pdf [Accessed 2012]; http://cmsdata.iucn.org/downloads/counting_the_environmental_costs_of_natural_disasters.pdf [Accessed April 2013].

Kim, K. D., A. S. W. Retraubun, R. C. Sabularse, S. K. Choi, V. Tuddao, W. T. Shin, K. Wakita and M. C. Ebarvia. 2010 December. "The nexus of water, energy, food and environment: Creating a ripple effect." *Tropical Coasts,* 16 (2): 46–77.

Kim, S. "Shihwa Tidal Power Plant Project, RO Korea." *Theme 4: Water Use and Supply Management, Workshop 1: Alternative Energy: A Solution for Energy Security for Islands and Remote Areas*. Paper presented at the East Asian Seas Congress 2009. Manila, Philippines.

Magrath, W. B., C. Peters, N. Kishor and P. Kishor. 1995. *The Economic Supply of Biodiversity in West Kalimantan: Preliminary Results*. Asia Technical Department, World Bank.

Mariño, A. "Philippine Initiative in Harnessing Marine Current Energy Resource." *Theme 4: Water Use and Supply Management, Workshop 1: Alternative Energy: A Solution for Energy Security for Islands and Remote Areas*. Paper presented at the East Asian Seas Congress 2009. Manila, Philippines.

McGranahan, G., D. Balk and B. Anderson. 2007. "The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones." Environ Urban, 19:26.

Mulekom, L. 2008. "Reflections on community based coastal resources management (CB-CRM) in the Philippines and South-East Asia." *From Poverty to Power: How Active Citizens and Effective States Can Change the World*. Oxfam International.

Nazery, K., M. Ang and M. J. Zuliatini. 2009. "The importance of the maritime sector in socioeconomic development: A Southeast Asian perspective." *Tropical Coasts*, 16 (1): 4–15.

Nellemann, C., E. Corcoran, C. M. Duarte, L. Valdés, C. De Young, L. Fonseca and G. Grimsditch, eds. 2009. Blue Carbon. *A Rapid Response Assessment*. United Nations Environment Programme, GRID-Arendal (www.grida.no) from PaCFA. 2009. Fisheries and Aquaculture in our Changing Climate: A Policy Brief. The Global Partnership on Climate, Fisheries and Aquaculture. (Also available from www.fao.org/climatechange/17792-0d5738fda3c03582617e6008210ab1e3a.pdf)(www.grida.no/files/publications/blue-carbon/BlueCarbon_screen.pdf).

Nicholls, R. J., S. Hanson, C. Herweijer, N. Patmore, S. Hallegatte, J. Corfee-Morlot, J. Château and R. Muir-Wood. 2007. *Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes.* Organisation for Economic Co-operation and Development, Paris.

OECD (Organisation for Economic Co-operation and Development). 2008. *Costs of Inaction on Key Environmental Challenges*. Organisation for Economic Co-operation and Development, Paris.

Paimpillil, S.J. and M. Baba. "Variety of alternative energies and viability: Coastal wave energy utilization coupled with coastal protection." *Theme 4: Water Use and Supply Management, Workshop 1: Alternative Energy: A Solution for Energy Security for Islands and Remote Areas.* Paper presented at the East Asian Seas Congress 2009. Manila, Philippines.

Pearce, D. W., A. Markandya and E.B. Barbier. 1989. *Blueprint for a green economy*. Earthscan, London.

PEMSEA (Partnerships in Environmental Management for the Seas of East Asia). 2005a. *Initial Valuation of Selected Uses and Habitats and Damage Assessment of Manila Bay*. Manila Bay Environmental Management Project. 166 p.

PEMSEA. 2005b. Integrated Environmental Monitoring Plan for Manila Bay. Manila Bay Environmental Management Project. 125 p.

PEMSEA. 2009. "The economic contribution of the marine economy: Southeast Asia leads the way." *Tropical Coasts*, 16 (1): 80, The Marine Economy in Times of Change.

Pidgeon, E. 2009. "Carbon Sequestration by Coastal Marine Habitats: Important Missing Sinks." In Laffoley, D. d'A and G. Grimsditch (eds.) *The management of natural carbon sinks*. IUCN, Gland, Switzerland. 53 p.

Silvestre, G., L. R. Garces, I. Stobutzki, M. Ahmed, R. A. Valmonte-Santos, C. Luna, L. Lachica-Aliño, P. Munro, V. Christensen and D. Pauly, eds. 2008. *Assessment, management and future directions for coastal fisheries in Asian countries*. WorldFish Center Conference Proceedings 67. Penang, Malaysia.

TEEB (The Economics of Ecosystems and Biodiversity). 2009a. *The Economics of Ecosystems and Biodiversity for National and International Policy Makers*. *Summary: Responding to the Value of Nature*. TEEB, Geneva, Switzerland.

TEEB (The Economics of Ecosystems and Biodiversity). 2009b September. *TEEB Climate Issues Update.*

TEEB (The Economics of Ecosystems and Biodiversity). 2010. *Mainstreaming the Economics of Nature: A Synthesis of the Approach, Conclusions and Recommendations of TEEB*.

UNDP (United Nations Development Programme). 2006. *Human Development Report 2006. Beyond Scarcity: Power, Poverty and the Global Water Crisis*. UNDP, New York.

UNDP (United Nations Development Programme). 2008. *Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World*. UNDP, New York.

UNEP (United Nations Environment Programme). 2010. *Green Economy Developing Countries Success Stories*. UNEP, Geneva, Switzerland.

UNEP (United Nations Environment Programme. 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. www.unep.org/greeneconomy; http://www.unep.org/greeneconomy/Portals/88/documents/ger/ger_final_dec_2011/Green%20EconomyReport_Final_Dec2011.pdf [Accessed April 2013].

UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific). 2010. "Chapter 25: Tourism." *In Statistical Yearbook for Asia and the Pacific 2009.* Available from www.unescap.org/stat/data/syb2009/25-Tourism.asp [Accessed 2012].

WorldFish Center. n.d. *Ecosystem Services for Poverty Alleviation: Marine and Coastal Situational Analysis*. WorldFish Center, Penang, Malaysia.

Zhang, Z. 2009. "Impacts of Sea Reclamation on the Coastal Ecosystem." *Theme 1: Coastal and Ocean Governance, Workshop 6: Pollution Reduction and Waste Management*. Paper presented at the East Asian Seas Congress 2009. Manila, Philippines.

Building an Ocean-based Blue Economy

Changwon City, RO Korea – The Fourth Ministerial Forum, held on 12 July 2012, gathered ministers and senior government officials from East Asian countries to help strengthen regional efforts in promoting an ocean-based blue economy across the East Asian Seas (EAS) region.

Recognizing the need to enhance partnerships to support the implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA), representatives from PEMSEA Country and Non-Country Partners, EAS Partnership Council, Global Environment Facility (GEF), United Nations Development Programme (UNDP), the World Bank, local governments and private institutions also participated in the forum.

The highlight of the forum was the signing of the *Changwon Declaration Toward an Ocean-based Blue Economy: Moving Ahead with the Sustainable Development Strategy for the Seas of East Asia*. The Declaration builds upon the progress and achievements of PEMSEA over the years and adopts a blue economy approach in strengthening the SDS-SEA implementation.

The Ministers were welcomed by the host and Forum Chair, Hon. Kwon Do-Youp, Minister of Land, Transport and Maritime Affairs (MLTM) of RO Korea, and Dr. Chua Thia-Eng, Chair of the EAS Partnership Council. Minister Kwon spoke on the potential of a blue economy in addressing the challenges and threats in the region's oceans and coasts. Dr. Chua emphasized the crucial role of the triennial Ministerial Forum and the implementation of the SDS-SEA in achieving the region's global sustainable development commitments, including the Rio+20 commitments.

Hon. Jung Jay Joh, Former Minister of the Maritime Affairs and Fisheries (MOMAF) of RO Korea, delivered the keynote speech, where he underscored the need for cooperation at national and international levels, urging the countries to foster a synergistic collaboration to achieve the region's shared vision for sustainable oceans and coasts. He also emphasized that the discussions raised during the international conference reflect the region's commitment in integrating an ocean-based blue economy.

Representatives from the local government, business sector and international organizations shared their respective views on the benefits and challenges of SDS-SEA implementation in the region. Governor Felipe Hilan A. Nava of Guimaras province, Philippines, Mr. Declan O'Driscoll, Regional Director of the Oil Spill Response Ltd. (OSRL) and Mr. Ivan Zavadsky of the GEF each explained how PEMSEA responds to the needs of the region's stakeholders and provides an effective partnership mechanism for sustainable marine and coastal governance in the region.

Ministers and senior government officials from Cambodia, PR China, Indonesia, Japan, Lao PDR, the Philippines, RO Korea, Singapore, Timor-Leste and Vietnam also adopted the Five-Year Regional Implementation Plan for SDS-SEA from 2012 to 2016, a medium-term road map contributing toward the achievement of SDS-SEA vision and targets. The Ministers emphasized the value of PEMSEA's partnership in bringing about substantial change across the region through implementing activities at different levels and across sectors. They also expressed their commitment in sustaining their partnership by responding more proactively in the SDS-SEA implementation.

PEMSEA partners and collaborators expressing their gratitude and support to PEMSEA as it leads regional efforts for effective marine and coastal governance. Clockwise from left: Hon. Kwon Do-Youp, Minister, MLTM, RO Korea; Mr. Ivan Zavadsky, International Waters Focal Area Coordinator, Global Environment Facility (GEF); Hon. Jung Jay Joh, Former Minister of MOMAF, RO Korea; and Dr. Felipe Nava, Governor, Guimaras Province, Philippines.

Ministers and senior government officials from East Asia pledging their commitment to scale up SDS-SEA implementation to support the realization of an ocean-based blue economy in the region.

Changwon Declaration
Toward an Ocean-based Blue Economy: Moving Ahead with the Sustainable Development Strategy for the Seas of East Asia

The Fourth Ministerial Forum on
the Sustainable Development Strategy
for the Seas of East Asia
Changwon City, RO Korea
12 July 2012

1. We, the representatives of the countries of the Seas of East Asia region, have gathered this day in Changwon City to reflect on the progress made over the past three years, individually and collectively, with the implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA), and to ensure continued progress towards a sustainable future, including the development of an ocean-based blue economy.

2. 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.

3. We recall the goals set in Rio 20 years ago, especially those detailed in Chapter 17 of Agenda 21 covering oceans and coasts, as well as the decisions made via a number of other modalities including the Millennium Development Goals and the Johannesburg Plan of Implementation of the World Summit for Sustainable Development. In 2003, we adopted the SDS-SEA as the region's response to these goals. Now, in the same spirit that UNCED in its 20th year has revisited the global objectives and targets, we have assessed our progress with regard to the implementation of the SDS-SEA and its relevance to the sustainability of an ocean-based blue economy in the region.

4. We have reviewed the targets identified in the 2006 Haikou Declaration, specifically: forging a long-term stakeholder partnership for implementation of the SDS-SEA; the implementation of integrated coastal management (ICM) in at least 20 percent of the region's coastline, as well as the development and implementation of national marine and coastal policies and action plans in at least 70 percent of participating countries, by 2015; and the 2009 Manila Declaration, focused on priorities to strengthen ICM as an effective management framework and a systematic approach to achieve sustainable development and climate change adaptation goals.

5. We have noted considerable progress towards these targets, as follows:
   a. PEMSEA has now evolved into an international organization with its own legal personality, focused on the implementation of the SDS-SEA;
   b. Nine PEMSEA Partner Countries have initiated the development or put in place national coastal and marine policy;
   c. More than 80 pieces of legislation directly supporting the implementation of the SDS-SEA have been enacted by PEMSEA Partner Countries;
   d. ICM programme coverage has been extended to approximately 11 percent of the region's coastline; and
   e. State of Coasts (SOC) reports have been completed for ICM sites in Cambodia, China, Lao PDR, Philippines, Thailand, Timor-Leste and Vietnam, describing progress, achievements and impacts of ICM programmes.

6. We acknowledge that, despite these efforts and initiatives, advancement towards the vision and objectives of the SDS-SEA has been modest considering such challenges as biodiversity loss and the destruction and degradation of coral reefs, mangroves, fisheries and other natural resources, pollution of rivers and coastal sea areas from land- and sea-based sources, the impacts of climate change and severe weather events on people, livelihoods and properties, and nutrient over-enrichment and the increase in "Dead Zones" in coastal waters.

7. We recognize that the continuing loss and degradation of coastal and marine ecosystem services will adversely affect economic and social development at the national and local levels. The necessity to ensure the sustainability of the ocean sector assumes even greater importance in future GDP growth, particularly in the East Asia region, where the ocean-based economy is already contributing a higher proportion to the total economy than in other parts of the world (up to 20 percent in some countries). To make this sustainable, we must ensure that economic development and the protection and sustainability of coastal and marine ecosystem services are indivisibly connected. Past experiences with "business-as-usual" economic models forewarn of their limitations, and we should now be considering an ocean-based blue economy in the context of sustainable development.

8. We continue to regard the SDS-SEA as an appropriate platform and framework for overcoming the challenges to sustainable development and for building an ocean-based blue economy in the region. We welcome the fact that the GEF, UNDP and World Bank support this approach and have incorporated SDS-SEA implementation into their respective medium-term framework programmes focused on investments in sustainable development of Large Marine Ecosystems and their coasts in East Asia.

9. To optimize the implementation of the SDS-SEA will take more time and effort. Therefore, we agree to adopt the five-year SDS-SEA Implementation Plan (2012–2016) for the region as a timely and important next step in the journey toward an ocean-based blue economy. We further agree to strengthen and accelerate the execution of the five-year SDS-SEA Implementation Plan, in accordance with our respective national priorities and capacities, by:

   a. Mainstreaming SDS-SEA objectives, targets and actions into national and subnational development and investment plans;
   b. Shifting coastal and ocean governance from government-centered to a more inclusive approach, involving both government and non-government stakeholder partners, through institutional mechanisms at the regional, large marine ecosystems (LMEs) and sub-regional sea areas, national and local levels;
   c. Consolidating and aligning Strategic Action Programmes and other endeavors for achieving target-focused action plans in LMEs/sub-regional sea areas into a common platform for improving coastal and ocean governance and for mobilizing the human and financial resources of stakeholder partners;
   d. Converging sectoral initiatives and programmes in priority coastal, marine and watershed areas within the framework of national ICM programmes, which will contribute to the ICM coverage target, while at

the same time advancing an ocean-based blue economy with ICM as the management framework, covering:

i. specific actions for climate change adaptation (CCA) and disaster risk reduction (DRR), including improvement of observation, forecasting and warning of natural and man-made disasters, using among other processes, integrated land and sea-use planning/ marine spatial planning;
ii. conservation and redress of biological diversity and equitable and sustainable management of fisheries, focusing on habitat (blue forest) conservation/restoration and marine protected areas, and rebuilding and maintaining fish stocks at levels that can sustainably support present and future generations;
iii. protection and improvement of water quality in coastal areas and associated river basins for improving ecosystem services and ecosystem health, and addressing hazards associated with unsustainable development on both water quality (e.g., pollution, eutrophication, saltwater intrusion, erosion and sedimentation) and water quantity (e.g., flooding, water shortages, over extraction, subsidence);
iv. food security and the provision and improvement of livelihood options among the coastal poor through sustainable coastal fisheries and alternative and supplemental livelihood programmes in ecotourism, sustainable aquaculture/ mariculture, etc.; and
v. investments in green industry, technology and practices – e.g., eco-agriculture and the development of marine renewable energy – in order to strengthen the resiliency of coastal communities;

e. Building up technical and management capacity in order to achieve expected economic benefits from the oceans;
f. Targeting research on the valuation of ecosystem services, and the losses to society and economy as a consequence of degradation and destruction;
g. Setting up a comprehensive knowledge management platform;
h. Adopting and implementing the SOC reporting system to provide baseline information, and over time information needed for monitoring progress, necessary for achieving the different global and regional targets; and
i. Undertaking joint and collaborative planning with concerned government agencies, levels of government, organizations, sectors and the general public, as appropriate, for the purpose of continually updating the SDS-SEA Regional Implementation Plan.

10. In accordance with respective national policies, strategies, priorities and capacities, we will use the SDS-SEA Implementation Plan to support the implementation of the RIO+20 outcome document, The Future We Want, and other relevant international and regional commitments related to coasts and oceans. We hereby direct the PEMSEA Resource Facility to ensure the incorporation and integration of the said commitments into the Plan.

11. We will also pursue further opportunities for innovative partnerships among national and local governments, regional and sub-regional organizations, UN agencies, international financial institutions, donors, the business community, scientific and technical institutions, civil society and the media, with PEMSEA as the regional coordinating mechanism. We believe that individual Partners will benefit from the SDS-SEA as a common framework for addressing regional and global targets and platform for cooperation in support of an ocean-based blue economy. We note with appreciation that the PEMSEA Network of Local Governments, through the Dongying Declaration on Building a "Blue Economy" through Integrated Coastal Management, adopted on 26 July 2011, has undertaken specific actions for the same objectives.

12. We, the PEMSEA Countries, remain unwavering in the pursuit of our vision for the Seas of East Asia as expressed in the SDS-SEA. We invite all stakeholders at the national, regional and global levels to participate in the same.

Adopted in Changwon City, Republic of Korea, this 12th day of July, 2012.

Kingdom of Cambodia

H.E. Mok Mareth
Senior Minister
Ministry of Environment

People's Republic of China

Hon. Chen Lianzeng
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State Minister for the Environment
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Hon. Chanthanet Boualapha
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Hon. Analiza Rebuelta-Teh
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Hon. Marcos da Cruz
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Ministry of Agriculture and Fisheries

Socialist Republic of Vietnam

Hon. Chu Pham Ngoc Hien
Vice Minister
Ministry of Natural Resources and Environment

Mapping of the fishery management area in Stung Hav District, Cambodia.

Investing in Our Future by Investing in a "New Breed" of Coastal Leaders

By Mr. Danilo Bonga, Ms. Diane Factuar, Ms. Nicole Afable, PEMSEA Resource Facility; Mr. Stephen Olsen, University of Rhode Island, USA; Dr. Chou Loke Ming, National University of Singapore; and Dr. Gil Jacinto, Coastal Management Center and University of the Philippines - Marine Science Institute

Introduction

Managing the sustainable uses of the coasts, islands and oceans has grown very complex due to the multiplicity of issues and actors that are inherently embedded in larger economic, cultural, sociopolitical and transboundary contexts. The need for innovations in policies, structures, mechanisms and leadership strategies is thus very urgent and has increasingly driven ocean and coastal policy agendas in recent years.

Both integrated coastal management (ICM) and ecosystem-based approaches (EBA) have been advocated over the years to address the challenges. In particular, the practice of ICM has matured in the last 20 years. This may be evidenced by the increasing policies enacted and implemented toward integrated coastal and ocean governance. Most countries in the East Asian Seas (EAS) region have initiated ICM programs. In fact, a good number have started to scale up their ICM programs both geographically and functionally to address the many challenges to effective management of coastal and marine areas.

But a dilemma is becoming apparent with only a few qualified people able to lead and manage these programs. Moreover, existing interdisciplinary and ICM-related degree-granting programs have failed to deliver their intent of producing coastal managers. Most programs being offered are, at best, multidisciplinary; graduates are ill-equipped and being left to themselves to apply on-the-ground integration. While there may be an increase in the number of graduates with an orientation toward marine affairs and/or coastal management trainings, many are pursuing careers that are different from their training.

There is also a cadre of ICM-related trained practitioners in the region who have benefitted from extensive and intensive trainings. For the most part, these practitioners remain untapped. Comprehensive, integrated capacity development programs on ocean and coastal governance have yet to be developed in most countries. Thus, there is a need to also consider incentives for trainees to stay within ICM programs, as well as ways and means of using their skills.

Wanted: A New Breed of Coastal Leaders

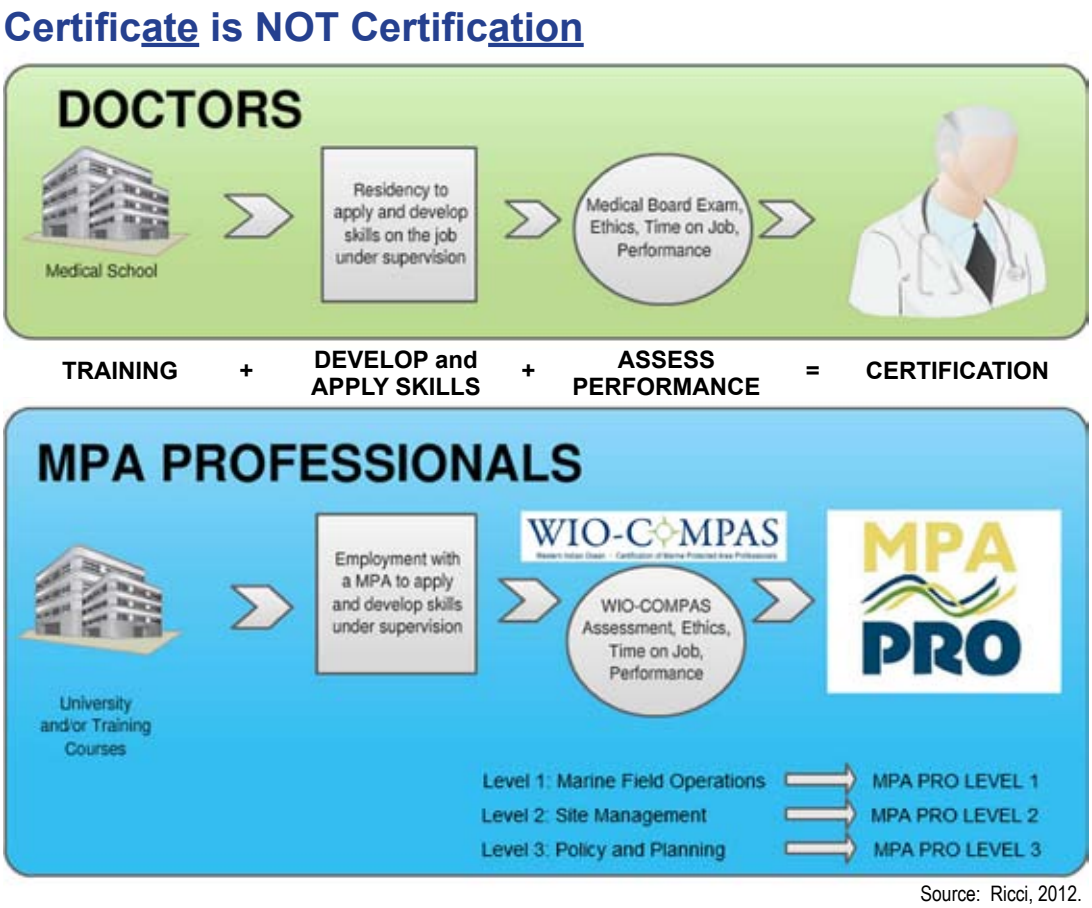
With the emerging trends in ocean and coastal governance approaches — in particular, the maturity of ICM toward integrative, collaborative governance amid problems of sustainability, complexity and uncertainty — the demand for a "new breed" of coastal leaders and managers increases.

Coastal leaders of today are expected to be knowledgeable of numerous disciplines as well as be enablers, facilitators, communicators and brokers. They are more than just knowledge/policy entrepreneurs; they are now challenged to complement existing technical tools and policy reforms with that of changing their internal thought processes and assumptions. Thus, to be an effective leader, one is required to intuitively integrate knowledge, skills and values that enable productive engagement with a governance system and an interdisciplinary team.

Recent capacity development strategies have tried to combine fluency in ecological sustainability principles with that of a leadership strategy, which influences external and internal change. The strategies have so far tended to center on three platforms: internships, short-term trainings and degree-granting programs. Efforts to try another platform — that of certifying leaders and allied professionals in integrated coastal and ocean governance — to complement the existing platforms have gained credence in recent years.

Certifying Professionals in Integrated Coastal and Ocean Governance

During the past EAS Congresses in 2009 and 2012, the need to further professionalize ICM practice through the certification of its practitioners was emphasized. This sentiment echoes the 2008 report, *Increasing Capacity for Stewardship of Oceans and Coasts: A Priority for the 21st Century* of the National Research Council of the National Academies in Washington, D.C., U.S.A. The Council notes: "Establishment of continuing education and certification programs to build the capabilities of practitioners will enable current and future generations of professionals to adapt and apply the best practices to ocean and coastal management in diverse settings."



Source: Ricci, 2012.

A *certification* is a recognition typically granted through a formal process either by nongovernmental organizations (NGOs), associations or private sector companies. It recognizes that a person has met predetermined qualifications demonstrated by education, experience knowledge and ethical standards and is competent to practice the designated area of expertise. Certification is different from a *certificate*, which signifies completion of training or education program. Certification also differs from *licensing*, where licenses are given by government agencies and governed by regulatory agreements.

Objectives of a Certification for ICM Leaders in the EAS Region

The certification of ICM leaders and allied professionals is an incentive, as well as a mark of excellence and ensures continuous professional development. It could prevent a "brain-drain effect," when ICM-trained individuals are lured by other professions to pursue careers different from what they were trained.

But more than just creating an incentive and a stamp of excellence, certification can generate other opportunities. Based on the tenets of continuous professional development within the certification process — and consequently, to institutional reforms — and in the furtherance of a robust ICM practice, certification can add value in at least three ways.

First, certification can leverage the gains from the other capacity development strategies — i.e., internships, short-term trainings and degree-granting programs that have been instituted before — in setting the standard of the ICM practice.

Second, certification can capitalize on communities of practice as well as ICM platforms, institutions and analytical and decisionmaking tools and not to lose the "pools of capacity" already built over the years. This strategy, while addressing the aims of certification for professional growth, can simultaneously strengthen the communities of practice and help in maintaining their relevance as effective avenues of capacity development.

And third, a regular certification process can gauge competencies that have already been met and may reflect gaps in capacity development that are still needed. In this way, designing and delivering trainings become a regular process as well, and are not only contingent on what a constantly evolving ICM practice requires, but more importantly on what individuals and institutions need.

Thus, the aim is a certification conferred to individuals who can demonstrate competencies on ecosystem-based sustainability and leadership frameworks, and who are willing to undergo professional growth toward an integrative and collaborative coastal and ocean governance. The certification program is likewise underpinned by the following: (a) the maturation of leadership gained by and committed to ICM as an approach; (b) the continuing growth of PEMSEA and its significant role as a center of excellence for ICM in the region; and (c) the flourishing of communities of practice using other integrative approaches.

The certification program places as much importance to individual leadership transformation as to the provision of contexts and platforms where this type of leadership can flourish.

The Three Levels of Certification

The development of a coastal leader is a long-term process, as competencies need a lot of time to develop and mature.

Skills are not fully developed as one gets out of the university or completes stand-alone trainings. Since the interdisciplinary knowledge base is so huge — and is continuously being updated, validated and improved (or discarded) — it is impossible to know everything at once. Trainees need to be shown where to obtain knowledge and be guided continuously in the furtherance of their careers.

As ICM requires various competencies that are expected to mature and evolve over the years, a tiered, continual improvement in the certification process can be optimal. This strategy takes a cue from the ICM Code of Practice, which covers three levels of recognition in an ICM System: transition, transformation and sustainability.

PEMSEA has recently developed the ICM Code, an international standard that measures a local government's performance vis-à-vis its explicit and agreed upon integrated coastal management system (ICMS). This covers planning, developing, implementing and improving an ICMS that is consistent with the ICM Code and its framework for the sustainable development of coastal areas. As the ICMS matures, it is imperative that the competencies of ICM leaders and allied professionals continue to improve as well, and be certified at the three levels.

The certification program is envisioned as both recognition and a leadership development intervention. The design of the three-tiered certification program is two-pronged: (1) to articulate a developmental scheme; and (2) to articulate a mechanism for a shared or distributed leadership.

Tiered Certification as a Developmental Scheme

Certification is conferred based on a developmental, evolving scheme as integrative, collaborative governance is a huge research agenda for policy and implementation. Additionally, the growth of an ICM practitioner in terms of personal perceptions and framing of problems and innovations, meaning-making mechanisms and consciousness are also expected to mature. This is the basic tenet of a developmental approach.

The three levels are as follows:

1. **Transition**. Competencies establish the need to create "political coalition" and institutional structures based on immediate priority interventions and collaborations with stakeholders.

The intention is to take advantage of leverages and opportunities for intervention in areas where stakeholders can easily agree to invest.

2. **Transformation**. Competencies are expected to be commensurate with the start of scaling up when additional risks, larger coverage area and other stakeholders can prove challenging to a partnership approach in governance. The intention is to become fully aware where limitations are occurring in a system, such as tensions, limiting beliefs, power struggles and wrong assumptions. Measures are then instituted to address the blockages and free up the system so that interventions can be implemented.

3. **Sustainability**. Whereas Levels 1 and 2 are geared toward strengthening partnerships through regulative and cognitive (knowledge-based) avenues, this level looks at the normative or metagovernance — a change in the mindset to inform reforms in policies.

Tiered Certification: A Group of Developmentally Mature Leaders Working in Concert

The region's skills and knowledge providers need to be integrated and networked. An effective interaction among them is not only practical but essential. Certification (and the certified leaders and allied professionals it produces) can provide the platforms and incentives (and the drivers) that can influence the continuous engagement of those trained within this ambit.

The tiered scheme is another way of engaging trained leaders and professionals. The scheme can be viewed as a visual representation of a group of leaders and allied specialists — differing in perspectives, action logics and approaches — working in concert to effect change in the context of ocean and coastal governance. Thus, change emanates not from one person but from a group. Experts refer to a "shared or distributed leadership" or to a "tandem leadership," which is a new, emerging dimension in sustainability initiatives where developmentally mature leaders work together.

Aside from leaders/professionals engaged in the planning and decisionmaking, this certification program can also attract other professionals (even certifiers and assessors) who can form part of an interdisciplinary group of leaders and professionals.

Three Tracks in the Certification of ICM Leaders and Allied Professionals

Building on the efforts from existing capacity development platforms, there are three tracks to certification. Participants can follow: (1) a series of nonformal, short-term ICM trainings, which will produce leaders and managers for ICM programs; (2) a series of nonformal, short-term specialized trainings, which will produce allied ICM professionals; or (3) a formal, postgraduate degree program, which will produce management science professionals equipped with managing and leadership skills.

One: Certification of ICM Leaders and Managers

Following a series of nonformal, short-term ICM trainings, this certification is for individuals who will lead and manage an ICM program. Targeted in this certification are leaders and managers whose perspective comes from integrative ecosystem-based governance. Their action logics are based on the effective management of programs and staff through interpersonal skills and facilitation. They are also adept as policy entrepreneurs and effective as communicators.

Thus, aside from integrative ecosystem-based governance, the other lens is on leadership. Current opportunities and challenges in managing coasts and oceans require competencies, not only in technical knowledge and project management but more importantly in leadership.

The certification program is framed as a three-tiered leadership development intervention. As such, appropriate knowledge and leadership skills are honed at each level. As it is, Levels 1 and 2 are for the day-to-day leaders and managers. The literature would term them as project champions, whereas Level 3 is for the executive type or a more senior practitioner.

A Level 1 leader has mastery over the first-order governance and is skillful in program development and management, tools and structural arrangements. A Level 2 leader has mastery over second-order governance and is skillful at navigating and influencing in more complex environments and varied relationships and interactions, partnerships and leverages, and power structures in the context of scaling up ocean and coastal governance. A Level 3 leader has mastery of metagovernance and a higher-level management skill that looks at reforms in policy development. Thus, in this three-leveled context, leadership qualities are not confined to the executive type.

The certification program thus offers two opportunities. One, an individual can aspire to "walk through" the three levels and become the executive type afterward, which is a developmental approach. Two, because ICM is a long-term engagement, different types of leaders exist within and during the entire period of an ICM program. In other words, a Level 1 type has to work closely with a Level 2 type and a Level 3 type gives the overall guidance. (And all three have to work closely with other ICM allied professionals.) This is *tandem leadership*.

Two: Certification of Allied ICM Professionals

Following a series of nonformal, short-term specialized trainings, this certification is for highly skilled technical professionals. The professional's action logic is to effectively demonstrate the use of one's

own expertise in the context of integrated coastal and ocean governance. As such, this competence can delve around one of the following:

- a particular coastal and ocean governance tool (e.g., risk analysis, marine spatial planning, ICM certification to become an assessor or auditor, etc.); or
- a specific approach (e.g., disaster risk reduction, climate change adaptation, integrated water resources management, ecosystem approach to fisheries, etc.).

Additionally, when operating within an ICM program, the competencies of allied professionals are considered gradient and become more mature and complex as the ICM program progresses. From establishing an ICM system to scaling up ICM and then to policy reforms, the commensurate growth in the roles of an allied professional is expected, including one's communication and leadership skills. As an example, the marine protected area (MPA) certification program in the Western Indian Ocean followed this developmental track (see **Box 1**).

Three: Certification of Management Science Professionals

Following a formal, postgraduate degree program, this certification is aimed at producing a management science individual. The said professional's action logic is based on the rigors of research as a fundamental requirement in completing a postgraduate program. To be certified, he/she is required to conduct a thesis targeted at demonstrating his/her competence in managing a particular coastal area. Upon graduation, he/she is conferred a master's degree and a certification based on knowledge- and performance-based evidences.

At the recent EAS Congress 2012, it was reiterated that universities play an important role in terms of academic education and professional training activities. The education of the next generation of leaders through innovative modes is crucial.

Recent efforts show several typologies of intra- and inter-university collaboration that advance interdisciplinary curricula and research (see **Box 2**). The development of an interdisciplinary educational program (within and among the universities and institutions) on coastal and ocean governance is becoming essential in producing the new breed of ICM leaders and managers. However, it was recognized that there is a need to strengthen existing integrated coastal and ocean management

Box 1. Typologies of Certification of ICM-related Professionals.

MPA Certification Program in the Western Indian Ocean

The MPA certification program in the Western Indian Ocean region is governed by an encompassing challenge: how to invest in individuals. Beyond assessing competency, the program has been effective in addressing the practitioners' concerns, such as: (1) how their skills are progressing; and (2) how they go forward in their career tracks. In a very innovative way, the program has been instrumental in the realization of leadership qualities within each participant. The program is designed to certify roles and core competence area (and not the participants' place in the hierarchy).

The three levels of certification based on their roles are: (1) marine field operations; (2) site management; and (3) strategy, policy and planning. It took five years to finally offer the certification program and the key to their success is the independent assessors from the region who provided the support and mentoring.

Association of Coastal Management Experts Indonesia (HAPPI)

The certification scheme for coastal planners in Indonesia serves as a guarantee of expertise in ICM. This program — instituted in 2010 by HAPPI (Himpunan Ahli Pengelolaan Pesisir Indonesia) in cooperation with the Ministry of Marine Affairs and Fisheries — addresses competence in coastal planning. In the preparation of coastal planning documents, it is compulsory that only certified coastal planners are involved. The HAPPI experience in Indonesia has been instrumental in ensuring the standard of work competence in coastal planning. The standards within ICM planning include general competence of the planners' professional ethics, core competence on the knowledge of coastal systems and planning and special competence on leadership and communication.

Professional Certification of Sea Area Use Management in China

The professional certification of sea area use management in China is in step with the improvement of marine functional zoning and planning, and the use of science in the development and protection of marine areas. Based on the Sea Area Use Management Law of PR China, three management systems had been instituted: (1) a marine function zoning management system; (2) a sea area ownership management system; and (3) a sea areas paid use management system. Accordingly, four professional teams are mandated to implement sea areas use management. These include: (1) a marine functional zoning preparation team; (2) a sea areas use surveying and mapping team; (3) a sea areas use dynamic surveillance and monitoring team; and (4) a sea areas use feasibility assessment team. All sea areas use management units and staff must receive professional training and must be certified before engaging in sea areas use management work.

Sources: Ricci, 2012; Sudiarta, 2012; Zhang, 2012.

course programs in theory and practice to enable ICM practitioners to address the dynamics of the interplay between the environmental and societal realms within ecosystems. A certification program is envisioned to fill that gap.

Leadership Development Intervention

The mechanism of the certification program will achieve the following: (1) provide an objective assessment of an applicant; (2) document how a leader chooses and evaluates interventions; and (3) evaluate change in or the analysis of progress (or nonprogress) of the participant.

As a mechanism by which certification standards can be actively assessed and verified, recent leadership development intervention programs advocate a feedback-intensive leadership development program. As such, the assessments and verifications are generally conducted and evaluated several times during the program, and use several instruments and feedback tools to identify strengths and weaknesses of participants. Guthrie and King (2004) exhort that such mechanism: "create[s] a supportive learning environment that usually involves interaction amongst participants, the opportunity to practice leadership skills, the teaching of practical content that is supported by leadership research and coaching."

A possible feedback-intensive assessment program in the certification of ICM leaders is seen on **Table 1**. As a generic assessment program applicable to the different levels of certification, it can incorporate various assessment instruments including: written exams, interviews, case study report and presentation, presentation and defense of field demonstration (practicum), mentoring sessions, profile or journal of ICM-related trainings, workshops and conferences attended, articles in peer-reviewed journals, etc. Possibly, it can run from as short as six months to as long as one year. It can culminate in the conferment of the certification during the regular PEMSEA events, i.e., the annual PEMSEA Network of Local Governments for Sustainable Coastal Development (PNLG) Forum or the triennial EAS Congress.

The certification program provides an individualized leadership development plan. It incorporates mentoring and coaching and other instruments that provide necessary feedback on key leadership behavior before and after assignment. It exposes participants to collaborate with other individuals and regions during and after certification. Also, participants can be kept abreast of latest

Box 2. Typologies of Intra- and Inter-university Collaboration.

In Indonesia, the ICM Graduate Program of Bogor Agricultural University has, to date, produced 394 graduates in the master level and 99 in the doctorate level. They are now employed in NGOs, universities, research institutes, central and local governments and private companies. The program has gained a wealth of knowledge and skills when it partnered with several European and Asian universities through student exchanges. Using an institutional and policy approach based on both governance and ecological knowledge, the program's ICM curriculum develops specific ICM competencies, such as the ability to develop coastal and marine resource plans and knowledge of governance mechanisms based on an understanding of the structure and function of coastal and marine ecosystems.

In Japan, the University of Tokyo's Ocean Alliance (UT-OA) designed a transdisciplinary network to facilitate joint efforts on education and research related to the ocean. The relevant graduate schools, institutes and centers under the UT are members of the OA that have jointly formulated a transdisciplinary framework that can impart deeper knowledge and understanding of the ocean to its students. Aside from a wide range of subject areas, students also take part in practical problem-solving sessions and internships at related government and national institutions. The UT-OA's research network recognizes the need for a comprehensive and systematic perspective to develop natural resources. An interdisciplinary research group composed of experts from different fields and various departments can collectively work toward a common goal that will be applied to these environmental issues, ultimately benefiting society.

In PR China, the Coastal and Ocean Management Institute (COMI) of Xiamen University (XMU) spearheaded a network of learning institutions that has become a beneficial and efficient approach in capacity development for integrated coastal and ocean management (ICOM). The XMU's International Master Program for Marine Affairs (MMA) is a two-year, interdisciplinary thesis education program that exemplifies the partnerships among colleges from different disciplines. The MMA's curriculum includes ocean policy and law, marine economics and ocean and coastal management. The XMU started various networking efforts, such as: (1) cooperating with foreign universities like the University of Rhode Island, University of Delaware, University of Washington and Inha University; (2) inviting well-known professors to give lectures; (3) exchanging of faculty and students; (4) collaborating thesis work with home agencies; (5) continuing the implementation of the regional ICM training courses; and (6) organizing study tours and web-based seminars.

Sources: Adrianto, 2012; Hong, 2012; Tabeta, 2012.

developments and training offerings. Several short-term seminars, webinars, internships and other activities — e.g., production of case studies, presentations in international conferences — are slated after each certification level has been conferred.

Continuing Education and Training of ICM Leaders and Allied ICM Professionals: The Role of the Communities of ICM Practice

ICM has become more robust because it has matured from a mere environmental management approach to a governance system based on sustainable development principles. Alongside this maturity is the growth of communities of practice that advocate integrated coastal governance and share similar skills, information and knowledge, including parallel worldviews on how to address problems and opportunities.

There is a need to capitalize on these communities and not lose out on the "pools of capacity" already built over the years.

These communities can serve as one of the entry points to operationalize the tenet of continuous professional growth within the certification program. These effectively create linkages between individuals and organizations.

Over the years, aside from regular short-term trainings offered in the region, PEMSEA has contributed in establishing centers of excellence, a network of learning centers and universities and a standardized monitoring scheme. The organization provides the avenues in the continual improvement of

Officers from Timor-Leste's Ministry of Agriculture and Fisheries attend training in the Philippines on various livelihood options in support of the development of sustainable alternative livelihood programs for the districts of Manatuto and Liquica (April–July 2012).

ICM as a management approach and helps retool managers and mentors to be in step with what is happening and to respond to challenges in the region.

The following veritable suite of PEMSEA platforms to ensure professional development and networking can be utilized through the following:

- ICM demonstration and parallel sites;
- The East Asian Seas Congress;
- ICM short-term trainings;
- PEMSEA Network of Local Governments for Sustainable Coastal Development (PNLG);
- Twinning Network for Integrated River Basin and Coastal Area Management (IRBCAM);
- ICM Learning Centers in universities across the region;
- Regional Centers of Excellence; and
- Regional and National Task Forces.

Aside from PEMSEA, several regional mechanisms have established effective communication tools for knowledge sharing and collaboration. These facilitate learning and sharing of results and best practices in the region. As examples, at the recent EAS Congress 2012, the initiatives of the ASEAN Center for Biodiversity (ACB) and the GEF International Waters: Learning Exchange and Resource Network (IW:LEARN) were highlighted to showcase a support system for decisionmaking, planning and policy for ocean and coastal governance (See **Box 3**).

Table 1. A Feedback-intensive Assessment Program in the Certification of ICM Leaders.

Prior Qualification/Capacity Assessment	Professional Development Sessions		Personal Development	Evaluation
• Educational attainment • Years of experience • Trainings attended (e.g., ICM Level 1, State of the Coasts Reporting, Risk Assessment) • Interviews • Written exams • Pre-orientation (e.g., online orientation) • Self-assessment exam • Other psychometric instruments	• Mentoring • Coaching	• Formal, structured training sessions • Practical project development - Participant-led problem identification and possible project plans and budget as an initial activity (to undergo peer review) - Presentation of plan of action with participation of local executives as a final activity	• Introspection; reflection • Journaling • Meditation • Mentoring	• Outcome of targeted case studies • Defense - Codification of good practices - Analysis of the action logic of managers

Box 3. Regional Knowledge Management Mechanisms for Coastal and Ocean Governance.

The Biodiversity Information Management component of the ACB facilitates the prudent use of available data and its transformation toward becoming a support system to decisionmaking, planning and policy preparation. The experiences in identifying Key Biodiversity Areas in the Philippines and the GAP Analysis of Protected Areas in the Association of Southeast Asian Nations (ASEAN) Region are essential in demonstrating the use of accessible data, the invaluable contribution of stakeholders and the processes that provided the means to transform available but disaggregated data into beneficial knowledge products.

The GEF IW:LEARN has been mandated as a coordinating mechanism for experience sharing and learning, dialogue facilitation, targeted knowledge sharing and replication to enhance the efficiency and effectiveness of GEF IW projects. The IW:LEARN knowledge management platform for supporting communities of practice is a useful platform for capturing results and best practices and lessons from various projects.

Sources: Custodio, 2012; Vergara, 2012.

Signposting the Way Forward

Two main messages have been amply articulated in the development of certification of ICM professionals in the region in recent years. First, certification is an appropriate means of gauging competencies of effective ICM leaders and allied professionals. Second, certification of ICM leaders and allied professionals in the EAS region is beneficial and necessary at this point in time.

As PEMSEA steers its direction toward strengthening its role as a center of excellence for coastal and ocean governance, the provisions for the certification program as a service to the region is imperative. Several important strategies are needed to be developed and set in place to move this initiative forward, such as:

- Creating an advisory group composed of well-respected, highly competent professionals;
- Developing the standards to gauge each competency;
- Developing the mechanisms of an objective assessment process, including knowledge- and performance-based evidences;
- Developing the code of ethics; and
- Developing the strategies to increase the level of recognition and credibility (certifying body, team of assessors, how to certify, its benefits, enhancing credentials for local government officials; strengthening the contribution of nonformal training and others).

Presentations at the EAS Congress 2012:

Subtheme 5: Meeting Institutional and Individual Skills and Capacities for Integrated Coastal and Ocean Governance

Workshop 1: Transforming Human Resources into Resourceful Humans

Adrianto, L. "Strengthening Integrated Coastal and Ocean Management at Graduate Level: Bogor Agricultural University's Experience."

Chou, L. M. "The Challenges of Developing Interdisciplinary Environmental Degree Programs in a Discipline-Structured University."

Custodio, K. R. "Knowledge Management Platforms to Support CoPs."

Hong, H. "Mechanism for Networking of Learning Institutions to Enhance the ICOM Course Curriculum and Delivery."

Ross, S. A. and D. Factuar. "Building a Regional Knowledge Management Mechanism for Coastal and Ocean Ecosystem Governance."

Tabeta, S. "Interdisciplinary Network Organization: The University of Tokyo (UT) Ocean Alliance."

Tsuchiya, M. "Development of a Modern Curriculum of Education for Integrated Coastal Management in Japan."

Vergara, S. "Transforming Data: Information Sources for Coastal Management Policy."

Virapat, C. "IOI Strategy and Approaches to Enhance Capabilities in Coastal and Ocean Governance."

Workshop 2: Certifying Leaders in Integrated Coastal and Ocean Governance

Castro, J. T. "The Role of the UP School of Urban and Regional Planning in the Certification of Urban Planners in the Philippines: Prospects, Issues and Constraints."

Lim, C. H. "Building Institutional Skills and Capacities for Integrated Coastal and Ocean Governance: An Objective of a Joint Project Agreement Between the Republic of Korea and the United States."

Nakahara, H. "Interdisciplinary Education on Ocean and Coastal Governance."

Olsen, S. "Building Capacity to Produce the Ecosystem Approach."

Ricci, G. "Innovative Solutions for MPA Leadership: Certification of Professionals."

Ross, S. A. and D. Bonga. "Investing in Our Future by Investing in a "New Breed" of Coastal Leaders Now: Certifying Leaders in Integrated Coastal and Ocean Governance in the East Asian Seas Region."

Sudiarta, I. K. "Certifying Coastal Managers: Experiences in Indonesia."

Wakita, K. "Facing Challenges and Capacity Development Needs of Practitioners on Integrated Coastal Management in Japan: Prospects for Certification."

Zhang, Z. "Certification of Professionals Engaged in Sea Use Management in China."

References:

Guthrie, V. and S. King. 2004. "Feedback-intensive Programs." *In The Center for Creative Leadership Handbook of Leadership Development*. Edited by McCauley, C. and E. Van Velsor. Second edition. San Francisco, California: Jossey-Bass. pp. 25–57.

National Research Council. 2008. *Increasing Capacity for Stewardship of Oceans and Coasts: A Priority for the 21st Century*. Washington DC, USA: National Academies Press.

EAS Congress 2012 Changwon City Republic of Korea
EAST ASIAN SEAS CONGRESS

The East Asian Seas Partnership Council

Special Meeting

With a vision for PEMSEA to be a fully independent and self-sustaining international organization, the East Asian Seas (EAS) Partnership Council held a special meeting to look into the significant aspects involved in the next phase of PEMSEA. These include governance requirements, sustainable financing and focused actions as defined in the Five-Year SDS-SEA Implementation Plan.

The special meeting, led by Council Chair Dr. Chua Thia-Eng, stressed the need for PEMSEA to comply with international fiduciary standards and demonstrate competence in implementing activities from various donors. The PEMSEA Resource Facility (PRF) is expected to secure, by 2013, the approval of the Office of the President of the Philippines and the Philippine Senate on the Headquarters Agreement and develop the terms of reference and mechanism that will establish an Audit Committee under the Council. In addition, the Executive Committee was requested to guide the PRF in completing the PEMSEA Rules of Governance and By-Laws by the end of 2012. The Committee will also consult with Country Partners regarding sustainable financing for PEMSEA and voluntary contributions to support PRF operations.

Council Chair Dr. Chua Thia-Eng addressing the Partnership Council during the EAS Congress 2012 in Changwon City, RO Korea.

Noting the growing confidence of funding agencies in PEMSEA, the Council pushed for the completion and adoption of national and regional Five-Year SDS-SEA Implementation Plans. These Implementation Plans aim to bolster collaborative planning, implementation and monitoring and reporting of the SDS-SEA among PEMSEA partners, sponsors and collaborators.

To support the operationalization of the Implementation Plans, the PRF was tasked to complete and secure the approval of the following project documents: *the GEF/World Bank Proposal on Applying Knowledge Management to Scale up Partnership Investments for Sustainable Development of the Large Marine Ecosystems of East Asia and their Coasts, and the GEF/UNDP Proposal on Scaling up the Implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA)*. The PRF was also requested to complete and finalize the ongoing Terminal Evaluation of the current GEF/UNDP Project on the Implementation of the SDS-SEA.

During the meeting, the Council welcomed the Korea Marine Environment Management Corporation (KOEM) as a new PEMSEA Non-Country Partner. KOEM is a specialized organization that is tasked to support the effective implementation of marine pollution prevention and management policies in RO Korea.

The Council also witnessed the signing of a Memorandum of Agreement signifying the continuous support of the Center for Coastal and Marine Resources Studies, Bogor Agricultural University of Indonesia (PKSPL-IPB) as an ICM Learning Center of PEMSEA. Since 2009, PKSPL-IPB members have conducted training workshops in Indonesia and other ICM sites.

Korean Marine Environment Management Corporation (KOEM) formalizing its partnership with PEMSEA as a Non-Country Partner during the EAS Congress 2012. Seated (L-R): Mr. Kwak in Seob, CEO, KOEM, and Prof. Raphael Lotilla, Executive Director, PEMSEA; Standing (L-R): Mr. KIm Hyun Jong, Vice President, KOEM; Amb. Mary Seet-Cheng, Vice Chair, EAS Partnership Council ; and Dr. Chua Thia-Eng, Chair, EAS Partnership Council.

EAS Partnership Council discussing the next steps as PEMSEA moves toward becoming an independent organization in coastal and ocean governance in East Asia. Clockwise (L-R): Prof. Stephen de Mora, Plymouth Marine Laboratory (PML); Prof. Raphael Lotilla, PEMSEA; and Mr. Josefo Tuyor, World Bank Manila.

The meeting endorsed the proposed *Changwon Declaration Toward an Ocean-based Blue Economy: Moving Ahead with the Sustainable Development Strategy for the Seas of East Asia* for adoption by the Fourth Ministerial Forum.

In closing the meeting, then PRF Executive Director Prof. Raphael Lotilla expressed his deepest gratitude to the Executive Committee and PEMSEA partners as he relinquished his post. In turn, the Council Chair appreciated Prof. Lotilla for leading PEMSEA into a new phase by securing its legal personality, the ongoing finalization of the Headquarters Agreement and the initiation of PEMSEA's transformation into an international organization.

EAS Congress 2012 Changwon City, Republic of Korea
EAST ASIAN SEAS CONGRESS

Green Ports: *Gateway* to a Blue Economy

Top: Ms. Lawan Oungkiros presenting APA's climate change projects. Bottom: Ms. Franca Sprong of ASEAN-GIZ on positive impacts of PSHEMS on the implementation of SHE systems in the ASEAN region.

The vital role of ports in the economic growth and sustainable development of countries in the East Asian Seas (EAS) region was highlighted in the Special Workshop on Green Ports: Gateway to a Blue Economy held on 9 July 2012 during the EAS Congress 2012 in Changwon City, RO Korea.

The workshop reinforced the need for an integrated management system that would improve operational performance and address safety, health and environmental (SHE) concerns in the region's ports.

International organizations and port authorities from the region, especially those that have implemented the Port Safety, Health and Environmental Management System (PSHEMS) developed by PEMSEA, shared how their initiatives are moving them on the right track toward becoming greener ports.

Ms. Lawan Oungkiros, chair of the ASEAN Ports Association (APA), presented APA's projects that aim to counteract the negative impacts of port operations on the environment. Notable initiatives include the reduction of greenhouse gas emissions from port operations and the establishment of emission inventories for seven ASEAN ports. Ms. Oungkiros noted that green ports in the ASEAN region are still at its early stage of development. She added that ASEAN ports are moving on the right track and its members will work together with port communities to ensure that in every business process of port operations, the impacts of climate change will be given utmost priority.

Ms. Franca Sprong, team leader of the ASEAN-German Technical Cooperation (GIZ) Project on Sustainable Port Development in the ASEAN Region, reported on the benefits of PSHEMS on the implementation of SHE systems

Mr. Renato Cardinal of the PEMSEA Resource Facility discussing the PSHEMS Code and Certification System. The case studies on the ports of Bangkok and Laem Chabang in Thailand were presented during the meeting.

in six ports in the region. Some significant outcomes include improvements in waste management, enhanced port personnel welfare, establishment of emissions inventories, port governance and traffic management.

Three case studies from port authorities and operators in Bangkok and Laem Chabang in Thailand and Iloilo, in Philippines, validated the value and usefulness of PSHEMS. Ms. Aunporn Poopetch, general administrative officer of Bangkok Port; Mr. Thongchai Thammapredee, port operations division director of Laem Chabang Port; and Engr. Constante Fariñas, Philippine Ports Authority, presented the various benefits brought by PSHEMS in their respective ports, including increased green coverage of the port area, reduction of accidents and carbon footprint, and improvement in handling of dangerous goods and of compliance to international regulations.

The last session of the workshop highlighted PEMSEA's objective to improve SHE management in the port industry by further promulgating the use of the PSHEM Code and institutionalizing a PSHEM Certification System in cooperation with international organizations. The PSHEM Code aims to serve as a standard for voluntary use by port authorities and those companies operating in the port, to provide them with a systematic approach for implementing a PSHEMS, while a Certification System will examine whether an established PSHEMS meets the requirements of the Code and confirms effective implementation.

Given the many benefits brought by PSHEMS, the Green Ports Workshop participants agreed to carry out the following actions: (a) facilitate the roll-out of PSHEMS by engaging associations and government agencies overseeing the port industry in developing advocacy programs and initiatives; (b) use the "business context" in implementing SHE management systems to maximize their potential business growth; and (c) capitalize on the momentum created by the willingness of relevant international organizations and funding agencies to collaborate and provide support for the implementation of SHE programs in the region.

EAS Congress 2012 Changwon City Republic of Korea
EAST ASIAN SEAS CONGRESS

Preparing for the Worst: Environmental Sensitivity Mapping for the Gulf of Thailand

Participants of the Subregional Inception Workshop on Environmental Sensitivity Mapping for the Gulf of Thailand during the EAS Congress 2012 in Changwon City, RO Korea.

The growing trade and transportation of crude oil in the Gulf of Thailand (GOT) puts this important economic and ecological region at great risk from damaging oil spills. Realizing the potential risks to the region's natural and marine resources, it is important that management tools are developed to reduce the impact of oil spills. Developing tools like Environmental Sensitivity Index (ESI) maps provides a comprehensive and accurate summary of coastal resources that are at risk if an oil spill occurs.

A project on *Strengthening Oil Spill Preparedness and Response in a Subregional Sea Area: Environmental Sensitivity Mapping in the Gulf of Thailand* is being executed by the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) in collaboration with the International Maritime Organization. This project is coordinated by the Korean International Cooperation Agency (KOICA) and funded by RO Korea through the Yeosu Project Fund.

The overall goal of the project is to build the capacity of the three littoral states of the GOT in planning for and responding to oil spill incidents by developing management tools that will help minimize the impact of such environmental disasters to coastal and marine resources in the region.

A Subregional Inception Workshop on Environmental Sensitivity Mapping for the Gulf of Thailand was held on 10 July 2012 during the EAS Congress 2012 in Changwon City, RO Korea. The workshop identified and agreed on the protocols for developing correlated sensitivity maps for the GOT and discussed the implementing arrangements of the project including project workplan and schedule.

The workshop agreed to establish national ESI technical teams that will carry out project activities at the country level and to formulate technical guidelines for ESI mapping in the GOT to assist each team in generating a set of country-level ESI maps, which will be integrated into a Gulf of Thailand ESI Atlas.

A follow-on subregional Integration Workshop was organized on 5–7 August 2013 in Phuket, Thailand. The workshop reviewed outputs of national ESI technical teams of Cambodia, Thailand and Vietnam and discussed standards and requirements for developing the Gulf of Thailand ESI Atlas.

The ESI GOT Atlas is expected to be completed and published in 2014.

EAS Congress 2015

THE EAST ASIAN SEAS CONGRESS 2015

Global Targets Local Benefits

Setting the Sustainable Development Agenda for the Seas of East Asia beyond 2015

16-21 November 2015 • Danang,Vietnam

2015 is a landmark year in the annals of sustainable development targets and achievements. The EAS Congress 2015 will serve as a platform for assessing lessons learned and progress made, scaling up good practices and initiatives towards building an ocean-based blue economy, and mapping new targets and schedule for the East Asian region in accordance with the UN Sustainable Development Goals and other international commitments.

International Conference

Session 1:
A Decade of Partnerships in Sustainable Development of the Seas of East Asia: Synergies and Achievements

- Session 1.1: Redefining Coastal and Ocean Governance in the Seas of East Asia
- Session 1.2: Maritime Sector Contributions to a Blue Economy for the Seas of East Asia
- Session 1.3: Managing Risks in Climate Change and Disasters in the Seas of East Asia

Session 2:
Accelerating Actions for Sustainable Development and Climate Change

- Session 2.1: **Scaling up ICM: Innovations and Impacts at Local, National and Regional Levels**
- Session 2.2: **Application of Knowledge Management in Scaling up Public and Private Sector Investments in Blue Economy**
- Session 2.3: **Valuation of Coastal Ecosystem Services and Benefits and Marine Spatial Planning Tools for Better Planning and Implementation**

Session 3:
From Vision to Reality: Aligning the Global Agenda with Local Benefits

- Session 3.1: **Responding to the SDGs in the Seas of East Asia: Are we ready?**
- Session 3.2: **Matching the Societal Aspiration for a Blue Ocean through Public-Private Partnerships**
- Session 3.3: **Future Cities – Future of Cities**
- Session 3.4: **Blue Economy Development: Where are we now? Where are we headed?**

Fifth Ministerial Forum

The Fifth Ministerial Forum will review and assess the status of the SDS-SEA targets that were adopted during the Second Ministerial Forum in 2006. Building on the accomplishments and priorities of the countries, the Ministerial Forum will map out the direction of PEMSEA beyond 2015, including an updated regional marine strategy and post-2015 targets.

4th EAS Youth Forum

Fourth EAS Youth Forum (YF4) theme: "Charting the Future We Want: Engaging Young Champions for the Ocean Beyond 2015."

The YF4 will feature "best practices" lectures, peer-to-peer learning discussions, interaction with experts and successful young leaders in the business, science and political sphere, and teambuilding/ creative sessions designed to build the next generation of young champions for the ocean in the region.

Environmental Exhibition

"Building Blue Economies and Connecting Partners"

The exhibition will showcase good practices, innovative technologies and new approaches in coastal and ocean governance and development from local to global levels. Exhibits will highlight contributions to achieving sustainable development targets and commitments.

Key Side Events:

- PEMSEA Network of Local Governments (PNLG) Forum
- Partners Roundtable: Investing in a Blue Economy
- Inaugural Meeting of the East Asian Seas Sustainable Business Network (EAS-SBN)
- Launch of the Regional Knowledge Management Platform on Coastal and Ocean Governance
- Meeting of PEMSEA Regional Centers of Excellence and ICM Learning Centers
- Launch of Case Studies on ICM Good Practices
- National ICM Forum for Vietnam

For further information, please contact:

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PEMSEA ICM Learning Centers and Regional Centers of Excellence:

Partners in Molding Future ICM Leaders

Over the past two decades, PEMSEA has cultivated the region's wealth of knowledge and experience in implementing integrated coastal management (ICM) through various capacity development initiatives. Building on the success of promoting reciprocal partnerships in the region, PEMSEA ultimately aims to establish a network of competent individuals and institutions that would continue to assist national and local governments in realizing the region's shared vision of sustainable oceans and coasts.

To this end, PEMSEA has collaborated with several universities in the region to establish ICM Learning Centers that would provide technical assistance to national focal agencies, ICM project sites, local governments, nongovernmental organizations and local communities. ICM Learning Centers across the region support capacity-building activities and other local ICM initiatives, as well as receive support in building up their knowledge and experience. To date, PEMSEA has partnered with eight universities in six PEMSEA Country Partners.

PEMSEA Regional Centers of Excellence (RCOEs) were also established to provide expert advice and support for the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) implementation across the region through the following: (a) undertaking studies and projects on coastal and ocean management; (b) training researchers; or (c) organizing regional training courses. At present, PEMSEA is working with the Centre for Marine Environmental Research and Innovative Technology (MERIT) of Hong Kong as an RCOE on marine pollution and with the Marine Science Institute (MSI) of the University of the Philippines as an RCOE on coral reef research and marine protected areas management.

The PEMSEA National and Regional Task Forces (NTF and RTF) were also established to provide technical support for the SDS-SEA in the region. These Task Forces are composed of individuals, institutions and organizations with extensive background and experience in coastal and marine management and sustainable development-related fields. Since 2008, PEMSEA has mobilized around 60 individuals as part of the region's RTF and NTF.

For further information on PEMSEA ICM Learning Centers and RCOEs, please email info@pemsea.org.

Number of People Directly Trained by PEMSEA ICM and Specialized Training Courses

COUNTRIES	First Phase (1995–1998)	Second Phase (1999–2006)	Third Phase (2007–2013)	TOTAL
Brunei Darussalam	18	4	0	22
Cambodia	25	77	229	331
PR China	29	129	39	197
DPR Korea	14	96	32	142
Indonesia	25	174	147	346
Japan	0	0	1	1
Lao PDR	0	0	73	73
Malaysia	29	221	47	297
Philippines	49	404	1,184	1,637
RO Korea	11	26	8	45
Singapore	8	7	1	16
Thailand	41	333	153	527
Timor-Leste	0	0	99	99
Vietnam	27	190	185	402
TOTAL	276	1,661	2,198	4,135