

FINAL
A SCOPING REPORT ON
THAILAND OCEAN ACCOUNTING FOR SDG 14 IMPLEMENTATION

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GLOSSARY OF TERMS

Blue Economy	A sustainable ocean economy emerges when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy.
Capacity building	Enhancing the skills of people and the ability of institutions to participate in resources management through education and training.
Catch per unit effort (CPUE)	Amount of fish catch that is taken per unit of fishing gear.
Collaboration	An approach to planning and decision-making aimed at improving relationships and seeking resolutions that meet the needs and interests of all parties to greatest possible degree.
Ecosystem	The system of interactive relationships among organisms (e.g. energy transfer), and between organisms and their physical environment (e.g. habitat) in a given geographical unit.
Ecosystem approach	An approach to management that recognizes the complexity of ecosystems and the interconnections among component parts.
Ecosystem assets	Spatial areas containing a combination of biotic and abiotic components and other characteristics that function together. Ecosystems are considered assets because they support not only economic production, but also our well-being, health and security. The key ecosystem assets identified by UNEP (2014) are global fresh water resources, soil quality for plant growth, terrestrial organic carbon, terrestrial biodiversity, marine biodiversity and marine fish stocks.
Ecosystem-based management	The management of human activities so that ecosystems, their structure, function, composition, are maintained at appropriate temporal and spatial scales Ecosystem-based management helps structuring societal behavior in ocean and coastal systems so that humans promote ecosystem health and resilience while allowing sustainable uses of goods and services.
Floating Plastic Debris Density – Indicator 14.1.1	Modelled macro and micro plastics distribution in the ocean, relative quantities of floating micro (<4.75mm) and macro (>4.75mm) plastics in large marine ecosystems measured based on a model of surface water circulation and the use of proxy inputs (shipping density, coastal population density, area of impermeable catchment i.e. urban areas with rapid run-off).
Index of Coastal Eutrophication (ICEP) – Indicator 14.1.1	Inputs of nutrients (nitrogen, phosphorus and silica, in different forms) from rivers, and corresponding nutrient-ratio.

Indicators	Variables used to quantify or qualitatively describe phenomena that are not directly easily measured, but which society considers valuable to monitor.
Integrated management	<p>A continuous process through which decisions are made for the sustainable use, development, and protection of areas and resources</p> <p>Integrated management acknowledges the interrelationships that exist among different uses and the environments they potentially affect. It is designed to overcome the fragmentation inherent in a sectoral management approach, analyzes the implications of development, conflicting uses and promotes linkages and harmonization among various activities.</p>
Marine technology – Indicator 14.a.1	Instruments, equipment, vessels, processes and methodologies required to produce and use knowledge to improve the study and understanding of the nature and resources of the ocean and coastal areas.
Maximum Sustainable Yield (MSY) – Indicator 14.4.1	The maximum average annual catch that can be removed from a stock over an indefinite period without having any negative effect on resource potential under prevailing environmental conditions.
Means of Implementation	Denotes the interdependent mix of financial resources with technology development and transfer, capacity building, inclusive and equitable globalization and trade, regional integration and the creation of an enabling environment for implementation of the 2030 Agenda, in particular in developing countries.
Monitoring	Continuous examination of progress achieved during the implementation of an undertaking to track progress against targets and plans, and to take necessary decisions to improve performance.
Ocean acidification	A reduction in the pH of the ocean over an extended period of time, caused primarily by uptake of carbon dioxide (CO ²) from the atmosphere.
Protected areas – Indicator 14.5.1	Clearly defined geographical spaces, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
Sectoral management	A management approach in which various resources (in the ocean context these include fisheries operations, coral mining, oil and gas development, tourism) are managed independently of one another.
Spatial management and planning	<p>A concept that links land-use planning with economic, social, and environmental development policies, operating at all spatial scales to provide a roadmap and framework for future regional development and resource allocation and investment</p> <p>Spatial management seeks to resolve conflicts in a specific geographic area through land/sea use “zoning” plans.</p>

Stakeholders	Individuals or groups of people with particular interests in an issue or area. In the ocean management context, stakeholders may include: oil and gas developers, fishermen, subsistence harvesters, hotel owners, port developers, aquaculture farmers, environmental groups, government authorities and others.
System of National Accounts (SNA)	<p>The internationally agreed standard set of recommendations on how to compile measures of economic activity. The SNA describes a coherent, consistent and integrated set of macroeconomic accounts in the context of a set of internationally agreed concepts, definitions, classifications and accounting rules. The SNA provides an overview of economic processes, recording how production is distributed among consumers, businesses, government and foreign nations. It shows how income originating in production, modified by taxes and transfers, flows to these groups and how they allocate these flows to consumption, saving and investment. Consequently, the national accounts are one of the building blocks of macroeconomic statistics forming a basis for economic analysis and policy formulation. The SNA is intended for use by all countries, having been designed to accommodate the needs of countries at different stages of economic development. It also provides an overarching framework for standards in other domains of economic statistics, facilitating the integration of these statistical systems to achieve consistency with the national accounts. (United Nations Statistics Division)</p> <p>The 2008 SNA the latest version of the international statistical standard for the national accounts, adopted by the United Nations Statistical Commission (UNSC)</p>
Total economic value	The value obtained from the various constituents of utilitarian value, including direct use value, indirect use value, option value, quasi-option value, and existence value.
Value	<p>What one is willing to give up in order to obtain a good, service, experience, or state of nature.</p> <p>Economists try to measure value in dollars.</p>

PART I: SETTING THE SCENE

1. The Changing Coastal and Marine Ecosystem Management in the Thai Context

The Thai coastline extends 3,010 kilometers (1,500 nautical mile) along the Gulf of Thailand and Andaman Sea in 23 provinces (NRSA, 2017). The total maritime area in Thailand is about 323,488 square kilometers (km²). The Royal Thai Government (RTG) officially established the Exclusive Economic Zone (EEZ) of the Kingdom of Thailand in 1981.¹ The country's maritime border is shared with Cambodia and Vietnam in the south east, Myanmar in the west and Malaysia in the south. Thailand's EEZ covers a total area of approximately 420,280 km²,² of which 116,280 km² are in the Andaman Sea.³

Thailand's marine environment and coastal areas are essential components of the country's economy and society, and contribute tremendously to national development. In terms of the national interest, the estimated value of Thailand's marine resources is about 24 trillion baht.⁴ The coastal zones are of economic and ecological significance both at the local and national level. Based on the initial ocean economy assessments recently conducted by PEMSEA (the Partnerships in Environmental Management for the Seas of East Asia), the coastal and marine sector has contributed significantly to Thailand's national economy. The total economic value of coastal and marine resources in Thailand is around USD 27.67 billion. Almost 37 percent of the value of ecosystems and selected endangered species came from indirect use and non-use values (including mangrove forests for carbon sequestration, coastal protection, and fish breeding ground and nursery). Marine fisheries and aquaculture, as well as coastal tourism and marine transportation, are the main economic activities along the country's coasts.

Coastal and marine fisheries are important to Thailand as sources for food, employment, and international trade. Thailand has one of the world's largest fish and seafood industries and the sector is of vital importance to the country's economy. About 90 percent of its production is exported, accounting for 4 percent of the country's total exports. It is estimated that the seafood industry in Thailand provides either direct or indirect employment for over 650,000 workers.⁵ A recent report reveals that large numbers of migrant workers from Thailand's neighboring countries, particularly Cambodia, Laos and Myanmar, have participated in the Thai seafood industry, both at sea and on land. It was officially estimated in 2015 that 71,132 migrants are working in sea fisheries.⁶

Due to population and economic pressures on the coastal zone, Thailand's valuable coastal ecosystems have been primary targets for development. Key economic development

¹ http://www.un.org/depts/los/LEGISLATIONANDTREATIES/PDFFILES/THA_1981_Proclamation.pdf

² http://www.un.org/depts/los/nippon/unnff_programme_home/fellows_pages/fellows_papers/panjarat_0708thailand_PPT.pdf

³ http://www.un.org/depts/los/LEGISLATIONANDTREATIES/PDFFILES/THA_1988_2_Proclamation.pdf

⁴ <http://englishnews.thaipbs.or.th/rtn-insists-submarines-are-worth-the-spending/>

⁵ http://www.seafish.org/media/publications/ThailandEthicsProfile_201509.pdf

⁶ Ibid.

activities such as shrimp farming, industrial expansion and tourism have contributed to the alarming degradation of coastal resources. These activities have exerted pressures on the sustainable capacity of the country's marine resources and the marine environment. Open access to coastal resources has been the most important underlying factor for overexploitation and thus, multiple-use conflicts over marine resources are inevitable. Important areas of concern include commercial capture fisheries/small-scale fisheries, shrimp farm expansion, degradation and decline of mangrove forests, coastal tourism and related waste disposal, mineral exploitation, coastal road construction, port development, oil spillage and environmental degradation.

Diminishing environmental quality also poses additional threat to coastal fisheries productivity. Coastal water quality at several monitoring stations is reported to be in a degraded or severely degraded condition. Organic enrichment in coastal waters is evidenced by occasional phytoplankton blooms (red tides) and hypoxic conditions in coastal sediments. A beach quality index has been developed for beaches apropos assessing aesthetic and water quality. It is increasingly well known that the ocean has been becoming more acidic since it began absorbing anthropogenic carbon dioxide (CO²) emissions during the industrial revolution. Many studies have shown the harmful effects of acidification on ocean-based food security, as the lower pH levels make it more difficult for marine calcifying organisms, such as corals, molluscs and calcareous plankton, to form biogenic calcium carbonate (build shells and skeletons).

Fundamentally, development activities lead to environmental anomalies such as: 1) changes in species composition and diversity; 2) changes in coastal productivity and production; 3) changes in marine food webs; and 4) increased coastal pollution. Impacts from these activities initiate sequences of environmental changes that, in the long term, affect coastal productivity and diversity. In this regard, there is a need for effectiveness marine and coastal management and governance in optimal trade-offs between Thailand's ecological, social and economic objectives and need for scenario planning to balance environmental protection with beneficial use in such a way as to mitigate conflict, enhance equity, ensure sustainability and allow accountability.

2. Purpose, Scope, and Structure of the Scoping Report

As part of the 2030 Agenda for Sustainable Development, the Sustainable Development Goals (SDGs) are set to help countries addressing key sustainable development issues with the proposed global indicator framework by which to measure progress towards the 17 goals and 169 targets of the 2030 Agenda. Tackling the challenges of monitoring sustainable development goals of which different levels of government as well as private sector and civil society actors are facing is however the essence of exploration, collaboration and research. This scoping report focuses on Thailand's implementation of the SDG 14 on oceans, seas and marine resources, which consists of 10 individual targets and associated indicators.

This report aims to describe Thailand's capacity (including economic, environmental, ecological and social dimensions) to achieve Goal 14 in terms of how marine areas and coasts are integrated into national and indicative plans and policies, including policy and

implementation gaps and good practices, as well as what stakeholder are involved. It reviews the existing frameworks (i.e. Marine Ecosystem-Based Management (MEBM) and Marine Spatial Data Infrastructure (MSDI)) for understanding of the indicative correspondences of SDG 14 indicators to the United Nations (UN) System of Environmental-Economic Accounting (SEEA) definitions in the marine context. It provides a comprehensive governance landscape of SDG 14 (i.e. national and provincial level policy and legal frameworks across sectors and institutions, incentive measures including fiscal measures, international commitments). It examines national, regional and international institutions (including academic) working on oceans in the country, including their mandates, data holdings (including listings of main indicators, databases, or maps on ocean use, ecosystem types, or characteristics) and publications, and partnerships among them. The report then discusses existing gaps in knowledge and data collection for further research and discussion.

3. Conceptual Frameworks

Achieving the goals of the 2030 Agenda in relation to oceans, coasts, and marine resources fundamentally relies upon strengthening knowledge, capacities and institutions to achieve multi-sectoral marine and coastal resource sustainability. This section provides a brief overview of key concepts by which an ecosystem-based approach and accounting for changes in ecosystem service flows in dynamic ocean systems can be utilized in supporting Thailand's implementation of SDG 14.

3.1 Marine Ecosystem-Based Management (MEBM)

Internationally, Marine Ecosystem-Based Management (MEBM) has been embraced as an approach to design holistic marine management regimes. MEBM seeks to manage marine resources in ways that protect ecosystem health while providing the ecosystem services needed by people. Instead of focusing solely on a single species or resource, MEBM incorporates science and balances the demands of user groups in a manner that produces management strategies that are more likely to be sustainable than traditional approaches (Yaffee, 2012). The scientific literature and policy statements on terrestrial and marine resource management contain an evolving set of definitions of Ecosystem-Based Management (EBM). A set of overarching principles of MEBM are identified as follows (Yaffee, 2012; Long, et.al., 2015).

- MEBM seeks to use ecologically relevant boundaries rather than political or administrative boundaries, and often involves management at larger geographic *scales* or longer time frames.
- MEBM views marine resources as elements of complex systems, and seeks to employ strategies that acknowledge and use *complexity* in management.
- MEBM seeks to *balance* and integrate the needs of multiple human user groups while maintaining the health of the underlying system that supports those needs.
- Since managing across boundaries involves the interests of more people, and managing complexity involves more areas of knowledge, MEBM is usually *collaborative* and involves a diverse set of organizations and individuals in thinking about and making decisions.

- Given the existence of uncertainty in what scientists and experts know and the inevitability of change in the future, MEBM seeks to be *adaptive* through monitoring and evaluation tied to changes in future management directions.

These MEBM principles (scale, complexity, balance, collaboration, and adaptive management) are continuous in nature, striving to expand beyond a single-species or single-issue perspective, and working to understand and manage complex marine ecosystems and the conflicting needs of user groups. The MEBM considers the cumulative impacts of different sectors to which it can be applied (McLeod, 2005; Gruby, et.al., 2010). Some of the many benefits of applying the MEBM to improve decision making and marine management include the following but not limited to:

- Development of ecosystem health indicators, including indicators for the entire ecosystem; coral reefs, estuaries and mangroves; sea grass and other critical fish habitats; lagoons; freshwater streams and marine environments; seafloor; and water quality;
- Informed decision-making by producing a better understanding of the ecosystem that has led to the creation of nature reserves and influenced land-use planning efforts; and,
- Enhanced collaboration among agencies that historically did not work directly with one another.

Representing the best-known practice to ensure the long-term sustainability of oceans and the benefits that they provide, the MEBM implementation has been assessed and found to be fundamental to delivering on the 2030 Agenda for oceans and coasts (Rodriguez, 2016; Shackeroff, et.al., 2016). A review and analysis of empirical efforts found the suites of indicators to assess, monitor, and evaluate the implementation of MEBM from across the case studies (Wondolleck and Yaffee, 2012) that can be further explored and developed by the concerned researchers, authorities and stakeholders in Thailand.

3.2 Marine Spatial Data Infrastructure (MSDI)

The term "Spatial Data Infrastructure" (SDI) is often used to denote "the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data" (Nebert, ed., 2004). The SDI provides a basis for spatial data discovery, evaluation, and application for users and providers within all levels of government, the commercial sector, the non-profit sector, academia and by citizens in general. Good quality and well managed spatial data are an essential ingredient to economic and commercial development, and to environmental protection. For this reason, countries are establishing national spatial data infrastructures, bringing together the services and data sets of major national spatial data providers, for example topography (a detailed map of the surface features of land), geodesy (the science of accurately measuring the Earth's size, shape, orientation, positions and gravity for the past, present and future), geophysics (physical processes and physical properties of the Earth and its surrounding space environment), meteorology (the atmosphere and its phenomena, including weather and climate), and bathymetry (the study of underwater depth of lake or ocean floors). In essence, SDI features

include metadata, interoperability of spatial datasets, network services, data and service sharing, and monitoring, reporting and coordination.

An SDI hosts geographic data and attributes, sufficient documentation (metadata), a means to discover, visualize, and evaluate the data (catalogues and Web mapping), and some method to provide access to the geographic data. Additional services or software are needed to support applications of the data. To make an SDI functional, it must also include the organizational agreements needed to coordinate and administer it on a local, regional, national, and or trans-national scale. An SDI can be evaluated by answering the question how people can be linked to data by the three interconnected components: standards, policies and access networks (Strain, et.al, 2006). The later, as an important component of an SDI, can be assessed using the four main components of a successful coastal and ocean information network (Butler, et.al., 2011; Rüh and Bill, 2012):

- Online access to data using recognized standards (people, data, standards and access networks);
- Metadata catalogues that can be used to search for geospatial information (people, data, standards, policies and access networks);
- A web interface that allows users to search, access and retrieve the best available information from the most reliable sources (people, data, standards, policies and access networks); and,
- Active participation of data providers and data users to ensure that the right data are available to contribute to more effective decision-making.

Climate Change leading to increased risk of natural disasters and rising sea levels are important indicators of a changing worldwide marine and coastal environment. The role hydrographic and oceanographic spatial data plays in supporting global, regional and national marine and coastal programs by providing tools for decision making is therefore critical. Marine Spatial Data Infrastructure (MSDI) is the component of a National SDI that encompasses marine and coastal geographic and business information in its widest sense. An MSDI would typically include information on seabed bathymetry (elevation), geology, infrastructure (e.g. wrecks, offshore installations, pipelines, cables), administrative and legal boundaries, areas of conservation, marine habitats, and oceanography (Russell, 2009).

3.3 System of Environmental-Economic Accounting (SEEA)

The System of Environmental-Economic Accounting (SEEA) is a framework that integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment, as well as the stocks and changes in stocks of environmental assets, as they bring benefits to humanity.⁷ The SEEA framework follows a similar accounting structure as the System of National Accounts (SNA). The framework uses concepts, definitions and classifications consistent with the SNA in order to facilitate the integration of environmental and economic statistics. The SEEA is a multi-purpose system that generates a wide range of statistics, accounts and indicators with many

⁷ <https://seea.un.org/>

different potential analytical applications. It is a flexible system that can be adapted to countries' priorities and policy needs while at the same time providing a common framework, concepts, terms and definitions.

The internationally agreed standards governing environmental-economic accounting which include environmental accounts are described in the System of Environmental-Economic Accounting 2012—Central Framework (SEEA Central Framework). The SEEA CF was developed and endorsed by six key international economic and environmental organizations: the European Commission; the Food and Agriculture Organization; the International Monetary Fund; the Organization for Economic Co-operation and Development; the United Nations; and the World Bank.

The SEEA-CF is a statistical framework for measuring the environment and its relationship with the economy, consisting of a comprehensive set of tables and accounts, which guides the compilation of consistent and comparable statistics and indicators for policymaking, analysis and research (United Nations, 2014a). The SEEA-CF covers measurement in three main areas:

- Environmental flows: the flows of natural inputs, products and residuals between the environment and the economy, and within the economy, both in physical and monetary terms;
- Stocks of environmental assets: the stocks of individual assets, such as water or energy assets, and how they change over an accounting period due to economic activity and natural processes, both in physical and monetary terms; and,
- Economic activity related to the environment: monetary flows associated with economic activities related to the environment, including spending on environmental protection and resource management, and the production of environmental goods and services.

The SEEA Central Framework takes into account individual environmental assets, such as water resources, energy resources, fisheries resources, and how those assets move between the environment and the economy.

Considering the increasing demand for statistics on ecosystems within analytical and policy frameworks on environmental sustainability, human well-being and economic growth and development, the System of Environmental-Economic Accounting 2012 - Experimental Ecosystem Accounting (SEEA-EEA)⁸ has been developed by the European Commission, Organization for Economic Co-operation and Development, United Nations Statistical Commission and World Bank to compliment the SEEA-CF. The SEEA-EEA approach provides a set of terms, concepts, accounting principles and classifications; and an integrated accounting structure of ecosystem services and ecosystem condition in both physical and monetary terms (United Nations, 2014b). Taking the perspective of ecosystem assets (delineated as spatial areas containing a combination of biotic and abiotic components) and considering how individual environmental assets interact as part of natural processes within a given spatial

⁸ <https://seea.un.org/ecosystem-accounting>.

area, the SEEA-EEA assesses changes in ecosystem assets and the services they provide to benefit economic and other human activity.

The SEEA Experimental Ecosystem Accounting has a system of accounts that present a coherent and comprehensive view of ecosystems:

- Ecosystem extent account: serves as a common starting point for ecosystem accounting. It organizes information on the extent of different ecosystem types within a country in terms of area;
- Ecosystem condition account: measures the overall quality of an ecosystem asset and captures, in a set of key indicators, the state or functioning of the ecosystem in relation to both its naturalness and its potential to supply ecosystem services;
- Ecosystem services accounts: measures the supply of ecosystem services as well as their corresponding beneficiaries, classified by broad national accounting categories or other groupings of economic units.;
- Monetary asset account: records the monetary value of opening and closing stocks of all ecosystem assets within an ecosystem accounting area and additions and reduction to those stock; and,
- Thematic accounts (covering accounts for land, water, carbon and biodiversity): are standalone accounts on topics of their own right and are also of direct relevance in the measurement of ecosystems and in assessing policy response.

The SEEA-EEA is not an international standard for ecosystem accounts. It is consistent with the System of Environmental-Economic Accounting (SEEA) and the 2008 System of National Accounts (2008 SNA). The original intent of ecosystem accounting described in the SEEA EEA was for application of the framework at a national level; linking information on multiple ecosystem types and multiple ecosystem services with macro level economic information such as measures of national income, production, consumption and wealth. The current international efforts in testing and experimenting on the ecosystem accounts and statistics have contributed greatly to advancement of understanding and knowledge in this area, involving people from many disciplines including ecology, economics, statistics and geography. Data sources range from specific local data to global satellite imagery.

However, at an experimental level, there is a need to articulate the broad logic or framing of a national accounting-based approach to compiling ecosystem accounts (UNSD and UNEP, 2017). The central measurement challenge and it underpins the breadth envisaged for ecosystem accounting, the approach to the organization of information and the potential applications comprise: Spatial scale and ecosystem assets; ecosystem condition and change in condition over time; supply of ecosystem services; basket of different ecosystem services; demand or use of ecosystem services; linking to benefits and flows of benefits; valuation concept that is aligned to the SNA; pricing and valuation of ecosystem services; and, valuation of ecosystem assets. Meeting this central measurement challenge will require a substantive collaboration of skills and data that can be applied and implemented at national and sub-national levels.

PART II: ANALYSIS OF THAILAND'S COMMITMENT AND NATIONAL CAPACITY TOWARD ACHIEVING SDG 14

4. Overall Assessment of National SDG Implementation

Thailand attaches great importance to the concept of sustainable development which has long taken root in the country. The country has been guided by the Sufficiency Economy Philosophy (SEP), conceived by His Majesty the Late King Bhumibol Adulyadej. SEP has been adopted as the core principle of National Economic and Social Development Plan since 2002. The current constitution has integrated SEP and sustainable development as integral parts. The development approach based on SEP is in conformity with the core principle of the 2030 Agenda and can serve as an approach to support the realization of the SDGs. SEP promotes sustainability mindset and provides guidelines for inclusive, balanced and sustainable development. The SEP has continued to be the guiding principle in completing the unfinished MDGs⁹ business and achieving the SDGs. The Thai Cabinet decided on 25 October 2016 to promote the application of SEP for SDGs in all areas and at all levels. Thailand has also been actively sharing SEP as a development model to the international community especially since her G-77 chairmanship in 2016.

SEP and SDGs have been integrated in the 20-Year National Strategy Framework and the 12th National Economic and Social Development Plan (2017-2021). All plans and budgeting of government agencies have been developed in line with SEP and SDGs. The National Committee for Sustainable Development (CSD), chaired by the Prime Minister, is Thailand's main and highest mechanism responsible for the country's sustainable development. It comprises members from public, private academia and civil society, with the Secretary-General of National Economic and Social Development Board (NESDB) as the secretariat. The main task of CSD is formulating policies and strategies on national sustainable development and oversight their implementation, including the SDGs. The CSD has established three sub-committees to advance the three interconnected processes namely mobilizing the SDGs, raising awareness on sustainable development and the application of SEP, and compiling data and statistics to support the implementation and monitoring of the 2030 Agenda.

Three taskforces were established and respectively tasked with (1) reviewing and recommending legal, economics and social measures necessary for achieving the SDGs; (2) coordinating works by numerous agencies, and priority setting; and (3) preparing report on Thailand's progress, challenges, and recommendation in implementing the 2030 Agenda including the Voluntary National Review (VNR). The CSD has undertaken several steps to advance the SDGs implementation including establishing coordinating body for each of the SDGs, formulating roadmaps for all 17 SDGs, identifying 30 priority targets, synthesizing examples of SEP for SDGs model projects, examining gaps and discrepancies between the national baselines and the proposed global indicators.

This section assesses Thailand's overall marine sector policies and means implementation. It is based on the SDG 14 indicator set relevant to Thailand as adopted by the CSD in July 2017,

⁹ Millennium Development Goals (MDGs) – eight international development goals with measurable targets and clear deadlines for improving the lives of the world's poorest people.

which enables the monitoring of progress towards the goals in the context of Thailand's sustainable policies and is aligned with the UN list of global indicators.

4.1 National Marine Policy Frameworks and SDG 14 Implementations

The Thai Government has special interest in managing the country's marine and coastal areas and resources to foster sustainable growth as evidenced by various plans, policies and measurements in many levels of administration. Guided by the national development plans, Thailand's new transportation development strategies (2015-2022) have been developed, consisting of 5 key programs – one of which concerns maritime transport development, aiming at enhancing competitiveness and promoting regional connectivity. Key long-term national development activities include projects on corridor networks, regional supply chain and production base, and Special Economic Zone Development.¹⁰ As part of Thailand's new transportation development strategies, in making Thailand a leading marine hub in the region, a focus is on development of ports and facilities for yachts and cruise ships to promote coastal and marine tourism along Thailand's coasts.

Thai marine tourism industry has been expanded rapidly and set high on the country's national tourism development agenda.¹¹ Based on recent studies by Thailand's the Ministry of Transport, some 11 potential locations have been identified where ports could be developed on the Andaman Sea coast.¹² Some of the best tourist destinations and natural attractions in Thailand are found along the coasts and within the marine parks. Thailand has a total of 22 declared marine national parks, covering a total estimated area of 5,812 km² or 1.8 percent of the total marine area of Thailand, 15 of which are located in the Andaman Sea. The current Twelfth National Economic and Social Development Plan (2017-2021)¹³ has set a national target to increase income from economic activities including revenue generated from coastal tourism.

Thailand's 12th National Plan describes key development strategies to move Thailand forward on a more sustainable path and pave way to achieve high income country in a longer term, transportation development is a key national policy. Key national guidelines for addressing marine and coastal areas and resources management are twofold: to conserve and restore natural resources, and create a balance between conservation and sustainable utilization; and to encourage sustainable consumption and production (SCP), placing an emphasis on managing resources efficiently and sustainability while adopting the Philosophy of the Sufficiency Economy as the guiding principle, as well as applying the life cycle concept.

A number of policy guidelines, measures and initiatives have been identified in the current national plan including: a) development of a 5-year flagship project (2017-2021) to preventing

¹⁰ <http://www.boi.go.th/upload/content/5.%20Enhancing%20Infrastructure%20Development%20of%2092919.pdf>

¹¹ <http://www.superyachtbusiness.net/marinas/thailand-looks-to-boost-its-marine-tourism-industry-6638>

¹² http://thailand.prd.go.th/ewt_news.php?nid=1965&filename=index

¹³ NESDB, Twelfth National Economic and Social Development Plan (2017-2021). Retrieved from http://www.nesdb.go.th/nesdb_en/ewt_w3c/ewt_dl_link.php?filename=develop_issue&nid=4345

illegal unreported and unregulated (IUU) fishing and developing sustainable fisheries and aquaculture systems; b) protection of marine resources and preventing coastal erosion; c) promotion of sustainable tourism by taking the carrying capacity of ecosystems (destinations) into account while designing and piloting systems of revenue collection in marine protected areas, islands and marine parks; d) improving the inland water and marine transportation system by increasing the utilization of existing ports and regulating and monitoring public-private partnership contractors at the existing deep sea port; e) development of international telecommunication networks, including international submarine cables; f) capacity development in fisheries and marine culture in coastal areas; and g) prioritization of solid waste and hazardous waste management as well as restoring water quality in the major rivers.

Based on information from Thailand's 2017 and 2018 Voluntary National Reviews on the Implementation of the 2030 Agenda for Sustainable Development, some progress toward the SDG 14 in the Thai context are described as follows.

Marine Conservation

Thailand has engaged in national and regional efforts on sustainable coastal management through the integrated coastal management approach for many decades. Integrated coastal zone management has been introduced as a mitigatory effort in Thailand's coastal provinces. Currently, areas under various marine resource and ecological management regimes account for 15.68 per cent of total marine area in Thailand, including 18,136 square kilometers of protected marine and coastal areas.

The Thai Government decided in 1979 at the beginning of disappearing mangrove forests that measures would be taken to protect the national marine interests derived from mangroves-fisheries-local livelihoods linkages. This prompted the formulation of a clear mission policy on mangroves conservation and rehabilitation along the country's coasts. Coastal development must take necessary account of existing biophysical settings and community activities and the protection of mangrove ecosystems and the coastal environment. A broad range of management measures and tools have been adopted to maximize the benefits and help secure the long-term future of mangroves and the people who rely on them, including the involvement of local governments and communities in mangrove management. Thailand had successfully increased its mangrove forest area from 2,333.08 square kilometers in 2004 to 2,455.34 square kilometers in 2014 (by 5.24 per cent) through reclaiming shrimp farms that had encroached mangrove forest areas and turning them back into mangrove forests. The Coastal reforestation program has resulted in 5.24 per cent increase of mangrove forest area during 2004 – 2014, returning to its former health.

Despite the small increase in area protected to maintain biodiversity, Thailand was not able to achieve MDG 7B on the reduction of biodiversity loss. In 2015, Thailand's marine and coastal resources were still in deteriorating condition. Coastal areas had eroded by 830 kilometers. Up to 80 percent of coral reefs were in severely damaged condition. Up to 40 percent of sea grass was in severe condition. Near extinct animals such as dolphins, whales, sea turtles and dugongs were found in smaller numbers and the abundance of marine animal resources had declined as a result of population increase, infrastructure development in

coastal areas, and economic expansion especially illegal fishing using unsuitable fishing methods. Climate change and other natural causes such as the change in tidal wave patterns due to higher seawater temperatures also impacted the marine ecosystem, resulting in the depletion of marine and coastal resources.

Sustainable Fisheries

The Government attaches high priority to eliminating illegal, unreported and unregulated (IUU) fishing and spares no effort to address the concerns by reforming and modernizing its fisheries sector in compliance with international rules. The Command Center for Combating Illegal Fishing (CCCIF) was set up in May 2015 to coordinate the efforts of all state agencies to carry out the reform with a clear objective to achieve sustainability in the Thai fisheries sector.

In 2015, Thailand adopted the National Plan of Action to Prevent, Deter and Eliminate IUU Fishing 2015 – 2019 (Thailand NPOA-IUU) and the Fisheries Management Plan 2009-2018 (FMP). The FMP aims to tackle overcapacity and overfishing of the Thai fishing fleet and prevent the degradation of marine resources. Studies were conducted to determine the country's Maximum Sustainable Yield (MSY) on benthic fisheries, anchovy fishing and other surface fisheries.

The NPOA-IUU was designed to fulfill Thailand's responsibilities to marine fisheries resources both inside and outside Thai waters. Since 2015, Thailand has taken efforts in combating IUU based on policy commitments established in Thailand NPOA-IUU.¹⁴ As part of Thailand's national policy, the government has applied law and policy frameworks to promote sustainable development of the marine fisheries sector.¹⁵ Recent developments on policy and strategic measures for Thai fishing industry include an action plan for improving working conditions in Thai fisheries; guidelines for the installation of a vessel monitoring Systems (VMS) on vessels operating in international waters; a Hazardous Work List in the shrimp and seafood industry for young workers between 15-17 years of age; a Ministerial Regulation to Protect Labor in the Sea Fishing Industry (2014); measures to register and legalize irregular migrants, codes of conduct adopted by Thai seafood industry associations; the new Royal Ordinance on Fisheries B.E. 2558 (2015) aiming to improve official oversight of Thai fisheries to better reflect current industry realities, establishes a fisheries management scheme, and improves port-state measures in line with international standards; and the formulation and implementation of the National Plan of Action to Prevent, Deter and Eliminate IUU Fishing.¹⁶

Ocean Health

Thailand attaches great importance to addressing the issue of marine pollution and marine debris. Series of research have been conducted to improve the situation such as studies on the types and volume of marine litters, the movement and pathway of marine litters and the

¹⁴ <https://sustainabledevelopment.un.org/content/documents/24244thailand.pdf>

¹⁵ The Nation, 4 Dec 2015, Thailand eyes long-term sustainable development of fishing sector, <http://www.asianews.network/content/thailand-eyes-long-term-sustainable-development-fishing-sector-4853>

¹⁶ Highlights of Thailand's New Fisheries Legislation, 2015, <http://www2.thaiembassy.be/highlights-of-thailands-new-fisheries-legislation/>

problem of micro plastics in beach ecosystems. In addition, clean-up activities have also been operated in 24 coastal provinces. Waste reduction measures are also implemented in 7 selected pilot areas.

The Ministry of Natural Resources and Environment (MoNRE) announced a plan to estimate one million tons of garbage and waste spilling into Thai waters each year, threatening its marine ecological system. The MoNRE has formulated the Roadmap for Solid and Hazardous Waste by integrating all 77 provincial solid waste management plans, including the BMA. Recently, the National Master Plan on Waste Management (2016-2021) has been adopted as the guideline for practical, efficient, and sustainable solid waste management. The Master Plan has set the framework direction for managing solid and hazardous waste in a systematic and integrated manner. All stakeholders, namely the government sector, private sector, and the people, can participate in solid and hazardous waste management such that the solutions are efficient and consistent with local conditions.

A long-term program to monitor the ecological impacts of ocean acidification on coral reef ecosystems has been developed by scientists. A number of stakeholders have made integrated efforts to help combat declining coastal resources and in particular to sustain the fishing community. In this regard, community-based management has been introduced for managing coastal resources in the context of fishery management and coastal rehabilitation. Public awareness and participation in coastal resource conservation and rehabilitation have become important internal driving forces to sustain Thailand's marine and coastal resources.

4.2 Blue Economy Initiatives

The Blue Economy concept is particularly relevant in the context of SDG 14 and the Paris Agreement on Climate Change. Focusing on ocean and coastal development, the Blue Economy concept is based on principles of equity, low carbon development, resource efficiency and social inclusion. With significant coastlines and rich marine biodiversity, Thailand is particularly well-placed to promote a blue economy approach aimed at generating livelihoods and building resilience against climate change challenges.

As part of regional cooperation toward achieving sustainable development of the oceans and seas in the Asia-Pacific and Indian Ocean regions, several initiatives have been taken by the Thai Government and research community to forge partnerships for driving new ways of thinking about the country's coastal and marine resources incorporating ocean values and services into economic modelling and decision-making processes. With technical support from the Partnership Management for the Seas of East Asia (PEMSEA), a Thailand State of Oceans and Coasts (SOC) report has been developed to evaluate the contribution of oceans and coasts, impacts of human activity on the ocean, as well as monitor progress towards the SDGs and other international agreements.

A series of research and discussions have been conducted to implement the Roadmap on Strategic Research (SRI) on National Interests and Marine Security (SRI 7) adopted by the Thailand Research Fund (TRF). The roadmap of SRI 7 aims to mobilize Thai research community partnerships for developing national policy research and knowledge that can be used to determine Thailand's positions and policies on national interests and marine security,

and is based on the National Marine Security Plan (2015-2021). Since 2016, a number of research projects under the Blue Economy concept have been implemented with funding from the TRF. The TRF-funded blue economy studies focus on the estimation of the economic value of Thailand's mangrove ecosystem, potential developments for blue economy of Thai coastal provinces, development of the System of Environmental Economic Accounting for Blue Economy (SEEA-Blue Economy) in Thailand context, Thailand's blue economic zone, international agreement related to the implementation on the UNCLOS 1982, the status and impacts of international commitments that relate to the sustainable development of the Blue Economy: Case Study on Marine and Coastal Tourism, and the State of Ocean and Blue Economy Assessment (in partnership with PEMSEA).

4.3 Thailand's SDG 14 Indicator Set and Status: A Preliminary Policy Gap Analysis

A preliminary gap analysis on Thailand's SDG 14 implementation and a mapping of policy measures has been conducted with results presented in the matrix below. According to the documentary survey and previous stakeholder consultation exercise, the initial analysis shows that the Thai Government and other marine-related sectors have already been implementing measures and taking actions in the fields of all SDG 14 targets. Whereas some targets are covered partially or via international cooperation, there are still gaps at the domestic level.

SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

SDG 14 Target and Indicator	UN Metadata Status (as of July 2018)	State of Thailand's Implementation
<p>Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p> <p>Indicator 14.1.1: Index of coastal eutrophication and floating plastic debris density</p>	<p>Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.</p> <ul style="list-style-type: none"> No data for this indicator is currently available and its methodology is still under development. 	<ul style="list-style-type: none"> Research on waste management in coastal provinces: clean-up activities; waste reduction measures; monitoring program for water quality and eutrophication. Determine baseline data on the concentration of nitrate, nitrite, phosphate as well as the amount of Chlorophyll a in coastal seawater. Based on the recent adoption of Thailand's Plastic Debris Management Plan, an approach is being promoted through collaboration between concern government agencies and the plastic industry to develop a material flow of plastic containers and packaging inventory by identifying and quantifying the flows and stocks of plastic waste in Thailand. Public-private partnership initiatives on marine plastic reduction are being implemented.
<p>Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p> <p>Indicator 14.2.1: Proportion of national exclusive economic zones managed using ecosystem-based approaches</p>	<p>Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.</p> <ul style="list-style-type: none"> No data for this indicator is currently available and its methodology is still under development. There are existing mechanisms in place which are reported to the 	<ul style="list-style-type: none"> Declare marine and coastal conserved and reserved areas, and adopt marine spatial planning as an integral part of marine and coastal zone management. DMCR has studies on coral bleaching. There are also studies on vulnerability of fishing communities from sea level change; impact and cost of tsunami, and flooding, etc. Blue Economy research projects being undertaken or funded by the Thailand Research Fund and PEMSEA. Marine protected areas (MPAs), MPA networks

SDG 14 Target and Indicator	UN Metadata Status (as of July 2018)	State of Thailand's Implementation
	<p>Regional Seas Conventions that can be used for this indicator.</p> <ul style="list-style-type: none"> A data collection of the geospatial information to determine the percentage of total exclusive economic zones which are managed using ecosystem-based approaches would require additional resources as compared to measuring the number of countries with a maritime or integrated coastal zone management plan in place. 	<ul style="list-style-type: none"> Green Fins Programme; and Khung Kraben Bay Royal Development Study Center Migratory wild birds (water birds, shore birds) data under the East Asian – Australasian Flyway Partnership Project An annual survey to assess and evaluate the quality of coral reefs was also conducted to update the national marine and coastal resources database. The Government introduced a national guideline on evaluating and monitoring coral reef conditions. New marine and coastal protected areas declared.
<p>Target 14.3: Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels</p> <p>Indicator 14.3.1: Average marine acidity (pH) measured at agreed suite of representative sampling stations</p>	<p>Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.</p> <ul style="list-style-type: none"> No data for this indicator is currently available and its methodology is still under development. 	<ul style="list-style-type: none"> Develop ocean acidification observing network in cooperation with the Global Ocean Acidification-Observation Network (GOA-ON) New techniques on monitoring ocean acidification developed for application in the Gulf of Thailand and the Andaman sea, as well as its impact on the marine ecosystem
<p>Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to</p>	<p>Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.</p>	<ul style="list-style-type: none"> In 2015. Thailand adopted the Fisheries Management Plan 2009-2018 (FMP). The FMP aims to tackle overcapacity and overfishing of the Thai fishing fleet and prevent the degradation of marine resources.

SDG 14 Target and Indicator	UN Metadata Status (as of July 2018)	State of Thailand's Implementation
<p>levels that can produce maximum sustainable yield as determined by their biological characteristics</p> <p>Indicator 14.4.1: Proportion of fish stocks within biologically sustainable levels</p>	<ul style="list-style-type: none"> • Metadata is available from UNEP, but disaggregation by country is not possible for the moment. • Fishery sustainability is defined based on stock abundance. To know stock abundance, one needs to carry out stock assessment that uses fish catch statistics, fishing effort data and biological information and fit the data to a population dynamics model. After completing stock assessment for all stocks concerned, fish stocks that have abundance at or above the level associated with the maximum sustainable yield are counted as biologically sustainable, and otherwise are considered as overfished. 	<ul style="list-style-type: none"> • Programs and projects implemented in Thailand as part of Bay of Bengal, Regional Strategic Action Plans, and South China Sea. • Policies and strategic measures adopted and implemented for Thai fishing industry.
<p>Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information</p> <p>Indicator 14.5.1: Coverage of protected areas in relation to marine areas</p>	<p>Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.</p> <ul style="list-style-type: none"> • Metadata is available from UNEP. Data are available for protected areas and Key Biodiversity Areas in all of the world's countries, and so no imputation or estimation of national level data is necessary. 	<ul style="list-style-type: none"> • Restrict improper use of tourism destinations: environmental management systems in tourism sites, including solid waste and wastewater treatment facilities. • Limit the numbers of tourists by setting quotas depending upon the vulnerability ecosystems. • There are also studies on shoreline vulnerability; coastal erosion hazard and risk assessment. • Mangrove reforestation; rehabilitation of seagrass beds and coral reefs. • Marine protected areas (MPAs), MPA networks.

SDG 14 Target and Indicator	UN Metadata Status (as of July 2018)	State of Thailand's Implementation
<p>Target 14.6: By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation</p> <p>Indicator 14.6.1: Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing</p>	<p>Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.</p> <ul style="list-style-type: none"> • Methodology is available from FAO. Indicator will only be available for responding countries who approve of the use of their responses to the CCRF questionnaire for this indicator. • No data for this indicator is currently available. 	<ul style="list-style-type: none"> • Fish sanctuaries; marine turtle sanctuaries. • Establishment of an up-to-date vessel database “Fishing Info”; E-license scheme and fishing day scheme based on MSY • Port in/Port out (PIPO) Scheme, Vessel Monitoring System (VMS), Fishery Monitoring Center (FMC), National Plan of Fishery Control and Inspection (NPFCl) and Database for Fishing Vessels and Labors. • The Command Center for Combating Illegal Fishing (CCCIF) was set up in May 2015 to coordinate the efforts of all state agencies to carry out the reform with a clear objective to achieve sustainability in the Thai fisheries sector. • In 2015, Thailand adopted the National Plan of Action to Prevent, Deter and Eliminate IUU Fishing 2015 – 2019 (Thailand NPOA-IUU).
<p>Target 14.7: By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism</p> <p>Indicator 14.7.1: Sustainable fisheries as a proportion of GDP in small island</p>	<p>Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.</p> <ul style="list-style-type: none"> • Data from National Accounts series. Also, data on fishing and aquaculture would need additional validation work before becoming 	<ul style="list-style-type: none"> • Programs and projects implemented in Thailand as part of Bay of Bengal, Regional Strategic Action Plans, SDS-SEA, and South China Sea. • Ocean Health Index (Thailand, 2013-2017: scored 70/100) • Data from the National Income Accounts and Sector Accounts, ISIC or Thai equivalent, Input-Output tables.

SDG 14 Target and Indicator	UN Metadata Status (as of July 2018)	State of Thailand's Implementation
<p>developing States, least developed countries and all countries</p>	<p>publishable, this point requires further investigation from FAO (ESS) side.</p> <ul style="list-style-type: none"> • Further data processing would still be required to render the data fully comparable over time as data may draw on different ISIC and SNA revisions. • No data for this indicator is currently available and its methodology is still under development. 	
<p>Target 14.a: Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries</p> <p>Indicator 14.a.1: Proportion of total research budget allocated to research in the field of marine technology</p>	<p>Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.</p> <ul style="list-style-type: none"> • Metadata is available from IOC/UNESCO. • Method: National governmental research expenditure in marine technology / National governmental R&D expenditure. • National governmental R&D expenditure data are assessed annually by the UNESCO Institute for Statistics (UIS). 	<ul style="list-style-type: none"> • Roadmap on Strategic Research (SRI) on National Interests and Marine Security (SRI 7) adopted. • Marine Biotechnology Laboratory established to conduct research to develop useful technologies for sustainable aquaculture industry in collaboration with between BIOTEC and Chulalongkorn University. • Programs and projects implemented in Thailand as part of Bay of Bengal, Regional Strategic Action Plans, SDS-SEA, and South China Sea.

SDG 14 Target and Indicator	UN Metadata Status (as of July 2018)	State of Thailand's Implementation
<p>Target 14.b: Provide access for small-scale artisanal fishers to marine resources and markets</p> <p>Indicator 14.b.1: Progress by countries in the degree of application of a legal/regulatory/policy/ institutional framework which recognizes and protects access rights for small-scale fisheries</p>	<p>Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.</p> <ul style="list-style-type: none"> • Methodology is available from FAO. The use of expert judgement is a critical factor as the indicator assesses the state of management/ policy implementation at a national level. • No data for this indicator is currently available. 	<ul style="list-style-type: none"> • Fisheries Act 2015 introduced measures to facilitate access to marine resources and markets for small-scale local fishermen • Programs and projects implemented in Thailand as part of Bay of Bengal, Regional Strategic Action Plans, and South China Sea. • The Department of Marine and Coastal Resources issued two new regulations to enhance partnership and participation of coastal communities and Local Administrative Organizations in marine and coastal resources management.
<p>Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"</p> <p>Indicator 14.c.1: Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of</p>	<p>Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.</p> <ul style="list-style-type: none"> • More data will be available from OLA/DOALOS. • At this stage, involvement of National Statistical Systems is not expected. Data is expected to be directly provided to OLA/DOALOS by the relevant ministries and/or other government agencies. At this stage, a separate data validation process by countries is not deemed to be necessary. 	<ul style="list-style-type: none"> • Addressing transboundary marine issues as part of UNEP Global International Waters Assessment (GIWA) in 2004-2005; UNEP Transboundary Waters Assessment Project (TWAP) in 2015-2016 for Bay of Bengal, Gulf of Thailand and South China Sea • Cooperation on Oil Spill Preparedness and Response in the Gulf of Thailand between Thailand, Cambodia and Vietnam • Thailand has ratified the United Nations Convention on the Law of the Sea (UNCLOS) 1982 on 15 May 2011. The Royal Thai Government intends to undertake a comprehensive review of existing domestic laws and regulations with a view to progressively harmonizing them with the provisions of the Convention.

SDG 14 Target and Indicator	UN Metadata Status (as of July 2018)	State of Thailand's Implementation
the Sea, for the conservation and sustainable use of the oceans and their resources	<ul style="list-style-type: none"> No data for this indicator is currently available and its methodology is still under development. 	<ul style="list-style-type: none"> Amendment of the Navigation in Thai Waters Act to allow Thailand to consider harmonizing domestic laws with a view to acceding to various conventions and agreements under the International Maritime Organization, which include MARPOL Annex V, CLC Protocol 1992, FUND Protocol 1992 and London Protocol 1996.

5. Existing National Capacity for Implementation of SDG and Means of Implementation

Statistical capacity

The CSD recognizes the importance and necessity of statistical data collection and formulation of indicators in designing evidence-based policies. The Sub-committee on Developing Information System to Support Sustainable Development was established to support decision-making and policy design of CSD and relevant agencies. While formulating indicators that respond to the needs of SDGs is an important challenge, it is an opportunity to improve the national statistical capacity. The National Statistical Office (NSO) and relevant agencies will expedite the implementation by using the country's official statistics as the main database, collecting, compiling and developing additional statistical data and indicators and enhancing statistical capacity of relevant agencies and personnel to make the database and indicators for SDGs as comprehensive as possible.

Financing

Driving SDGs in the public sector mainly relies on annual budget allocation to concerned agencies. This is possible due to the fact that SDGs are mainstreaming into the 20-Year National Strategy Framework and the 12th National Economic and Social Development Plan, serving as foundations for agencies' proposed action plans. In addition, for the goals, targets and indicators that need to be implemented in an integrated manner among various agencies and considered priorities for implementing key development policies, national security policies, other key government policies and SEP, as well as focusing on sustainable development, agencies can request for strategically integrated budget allocated from the central budget. The public spending on SDGs implementation is anticipated to be connected, harmonized and mutually supportive in an efficient, cost-effective and non-duplicative manner.

Recognizing that the public expenditures cannot be the sole source to finance the SDGs implementation, the 2015 Addis Ababa Financing for Development Conference (and the follow up reviews) have encouraged the use of different resource streams to meet the SDGs. Central to achieving these ends are private resources, whether in the form of direct financing, co-financing, blended financing, or a host of other innovative structures. Work to establish a standard to measure the amounts of private resources mobilized for SDGs and other development areas has been underway by the National Statistical Office.

Science, technology and innovation

Science, technology and innovation is an important means of implementation of SDGs in Thailand. It enhances the well-being of people and national economic, social and environment capacities. Some examples include increasing productivity, promoting green growth and renewable energy, improving the quality of education and public health and reducing disaster risks.

In accordance with Thailand's 20-Year National Strategy Framework, the Government aims to upgrade Thailand from a middle-income country to a high-income country by 2036 (with a GDP per capita of approximately 13,000 USD) and transform Thailand into a value-based

economy to drive the country towards “Thailand 4.0” or an innovation-driven economy. Thailand has set targets in expanding the country’s R&D expenditures from 0.62 per cent in 2015 to 1.5 per cent by 2021 and increasing the number of R&D personnel from 13.6 researchers per 10,000 people in 2015 to 25 researchers per 10,000 populations by 2021. Therefore, science, technology and innovation (STI) are important means of implementation of the SDGs in Thailand. Focusing on area-based development, Thailand has developed several best practices that utilize applicable, affordable and accessible science, technology and innovation for development that suit developing countries. Nevertheless, there are challenges to be addressed, for example, fostering inclusion at the local level, especially by increasing access to financial services and social security.

Stakeholder Engagement

Thailand has already entered the medium-term roadmap program for achievement of the SDGs (2018–2021). After the country nationalized the SDGs with the national mechanism, the Government has successfully encouraged all stakeholders to participate in the sustainable development process, opening fora for all stakeholders to express views and opinions, raising awareness of the SDGs among all groups of citizens and localizing the SDGs through existing or purposely-established mechanisms.

At the national level, key institutional cooperation mechanisms for driving SDG 14 implementation include the interagency taskforce on SDG 14 implementation (on policy and roadmap) and the Sub-Committee on Natural Resources and Environment Statistics (on data and statistics). Other relevant and concerned ministries, agencies, and organizations have also contributed to the SDG14 design and implementation including but not limited to the Department of Marine and Coastal Resources (DMCR), the Department of Fisheries (DoF), the National Statistical Office (NSO), the Pollution Control Department (PCD), the Office of Natural Resources and Environmental Policy and Planning (ONEP), the Office of the National Economic and Social Development Board (NESDB), the Ministry of Tourism and Sports, the Fisheries Statistics Analysis and Research Group (FSARG), the Marine Fisheries Research and Development Bureau, the Department of Local Administration, the Provincial Electricity Authority, the Provincial Waterworks Authority, the Ministry of Industry, the National Science and Technology Development Agency (NSTDA) and national research centers (BIOTEC, MTEC, NECTEC), the Marine Department, the Thai Maritime Enforcement Coordinating Center (THAI-MECC), the Geo-Informatics and Space Technology Development Agency (GISTDA), the Command Center for Combating Illegal Fishing (CCCIF), PIPO Centres (Port-in Port-out), FMC (Fisheries Monitoring Center), and the Thai Catch Certificate system, the Thailand Research Fund (TRF), the Thai Sea Watch Association, the Marine Science Association of Thailand, and research and academic institutes.

The Department of Marine and Coastal Resources issued two new regulations to enhance partnership and participation of coastal communities and Local Administrative Organizations in marine and coastal resources management. Provincial Committees on Marine and Coastal Resources Management were established as a multi-stakeholder platform to propose management plans for local marine and coastal resources. This platform has encouraged participation by all stakeholders, as well as provided local solutions to local challenges.

Currently, Thailand is considering registering coastal communities in 24 coastal provinces to participate in coastal and marine conservation and management programs/activities under government initiatives.

Other sectors are also strongly committed to achieve the Sustainable Development Goals. Key sectors of society acting as the main channels through which broad participation would be facilitated in Thailand's SDGs implementation include: women, children and youth, indigenous peoples, non-governmental organizations, local authorities, workers and trade unions, business and industry, scientific and technological community, and farmers/fishers.

Business Sector: Some large- and medium-sized businesses have adopted the principles of sustainable development to their business practices according to the UN Guiding Principles on Business and Human Rights (UNGP). They welcomed the members of the UN Working Group on the issues of human rights and transnational corporation and other business enterprises (WG on BHR) during their visit to Thailand on 26 March - 4 April 2018, expressing their commitments to the UNGP and the Sustainable Development Goals.

Civil Society Organizations: CSOs and the Government together form the Open-ended Working Group for the SDGs, which focuses on strengthening the means of implementation and partnership for not only SDG 17 but all Sustainable Development Goals. This is another forum for government agencies to communicate with relevant civil society organizations, especially on cross-cutting issues, so as to form coherent policies on the implementation of the SDGs and to reinvigorate the trust between the two parties in creating a true partnership for sustainable development.

6. Data Gap Analysis for SDG 14 Indicators

Achieving SDG 14 and sustainable, ecosystem-based marine and coastal management in Thailand needs to be measured using parameters available at both national and provincial levels; many of which are identified in the data gaps table below. The Goal can be achieved if there is concerted collaboration and consolidation of actions at different levels of government concerned. Given the diversity of ocean-related targets and suggestive indicators, it can be safely assumed that there will be a need for significant amount of data and information that need to be collated and analyzed. Such diversity of data and information need to be collected and collated from a wide range of actors, including the private sector, academics and research institutions, as well as civil society organizations to effectively use the data for measuring progress.

The United Nations Statistical Commission (UNSC) has published metadata for some of the SDG 14 indicators as described in the above table. The metadata provides a detailed overview of the proposed indicator with the purpose of reporting, definition by global agency and method of computation along with the level of disaggregation. It also identifies different data sources and proposes new methods of data collection. Many SDG 14 indicators are currently classified by the Inter-agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs) as either "data is not available on a regular basis but standards are available" or "neither data nor standards are available, which is due mainly to the fact that these SDG 14

indicators require institutional data for reporting, and may not be available from most of the survey data sources. These aspects make the data gap exercise exploratory in nature.

Thailand SDG 14 Data Gap Analysis

SDG 14 Target	SDG 14 Indicator	Proposed Relevant National Indicator (MEBM Approach)	Disaggregation Available/ Lead Agency	Status (2018) ¹⁷¹⁸
<p>Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p>	<p>Indicator 14.1.1: Index of coastal eutrophication and floating plastic debris density</p>	<ul style="list-style-type: none"> • Polluted runoff into rivers, seas and oceans • % of marine debris/total solid wastes from coastal areas • Amount, source and composition of plastic wastes washed ashore and/or deposited on coastlines • Amount and composition of plastic wastes in the water column and accumulation on the sea floor • Amount and composition of litter ingested by marine animals • Amount, distribution and composition of microparticles (mainly microplastics) • Amount of wastewater flows directly into the seas and oceans • Level of eutrophication of estuaries 	<ul style="list-style-type: none"> • Provincial • National • Monthly/Yearly • Department of Marine and Coastal Resources • Pollution Control Department • Local governments 	<ul style="list-style-type: none"> • Tier III • Department of Marine and Coastal Resources has established more than 166 research stations along the Gulf of Thailand and Andaman coasts for collection data on coastal water qualification and eutrophication, as well as projects and activities to monitor coastal and marine debris.

¹⁷ Tier Classification by IAEG-SDG, as of 31 December 2018 – Tier I: Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 per cent of countries and of the population in every region where the indicator is relevant. Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries. Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.

¹⁸ SDG 14 implementation progress as reported by DMCR in October 2018.

SDG 14 Target	SDG 14 Indicator	Proposed Relevant National Indicator (MEBM Approach)	Disaggregation Available/ Lead Agency	Status (2018) ¹⁷¹⁸
		<ul style="list-style-type: none"> Number of initiatives by provincial authorities on protection of coastal and marine resources 		
<p>Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p>	<p>Indicator 14.2.1: Proportion of national exclusive economic zones managed using ecosystem-based approaches</p>	<ul style="list-style-type: none"> Number of Marine Protected Areas designated and managed Extent of restored mangroves and estuaries Spatial planning strategies for coastal and marine areas 	<ul style="list-style-type: none"> Provincial National Yearly Department of Marine and Coastal Resources Department of Fisheries Department of National Park, Wildlife and Plant Conservation 	<ul style="list-style-type: none"> Tier III Department of Fisheries has applied measures on closure of areas to fishing and establishment of closed seasons, as well as establishment of aquatic sanctuaries Coral reefs and seagrass beds conservation measures applied by Department of Marine and Coastal Resources
<p>Target 14.3: Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels</p>	<p>Indicator 14.3.1: Average marine acidity (pH) measured at agreed suite of representative sampling stations</p>	<ul style="list-style-type: none"> National climate policy that considers a measurable decarbonization strategy Reduction in the amount of chlorinated hydrocarbon (CHC) emissions in the Agriculture, Forestry and Other Land Use (AFOLU) sector Ocean acidity measurements National Climate Change Action Index 	<ul style="list-style-type: none"> National Yearly Office of Natural Resources and Environmental policy and Planning Thailand Greenhouse Gas Management Organization 	<ul style="list-style-type: none"> Tier II Department of Marine and Coastal Resources has regularly conducted studies on sea water acidity at more than 400 stations along the Gulf of Thailand and the Andaman Sea coasts, as well as developed a guidebook for testing and research on coastal acidification.

SDG 14 Target	SDG 14 Indicator	Proposed Relevant National Indicator (MEBM Approach)	Disaggregation Available/ Lead Agency	Status (2018) ¹⁷¹⁸
<p>Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p>	<p>Indicator 14.4.1: Proportion of fish stocks within biologically sustainable levels</p>	<ul style="list-style-type: none"> • % share of marine fisheries to total fisheries • Catch per Unit Effort (CPUE) • Total Allowable Catch (TAC) • Fish stocks assessment • Trend in fish production • Volume of production, by species • Sustainable harvesting practices • Indices for fisheries and coastal resources • Certification schemes for sustainable fishery catch and management • Synergies between provincial and national level organizations and institutions on developing and implementing sustainable bioresource management plans and actions 	<ul style="list-style-type: none"> • Provincial • National • Monthly/Yearly • Department of Fisheries 	<ul style="list-style-type: none"> • Tier I • Department of Fisheries manages the fisheries to ensure maximum sustainable yield, as well as promote reduced bycatch under the new ordinance.
<p>Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information</p>	<p>Indicator 14.5.1: Coverage of protected areas in relation to marine areas</p>	<ul style="list-style-type: none"> • National and provincial level marine and coastal resource conservation plans developed and used • Number of Marine Protected Areas designated and managed 	<ul style="list-style-type: none"> • National • Yearly • Department of Marine and Coastal Resources • Department of National Park, Wildlife and Plant Conservation 	<ul style="list-style-type: none"> • Tier I • Department of National Park, Wildlife and Plant Conservation and Department of Marine and Coastal Resources have established 17,000 sq.km., and continued to announce more (targeted at 32,000 sq.km. by

SDG 14 Target	SDG 14 Indicator	Proposed Relevant National Indicator (MEBM Approach)	Disaggregation Available/ Lead Agency	Status (2018) ¹⁷¹⁸
				2030), marine parks and marine protected area complexes, with frameworks for assessing area management effectiveness.
<p>Target 14.6: By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation</p>	<p>Indicator 14.6.1: Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing</p>	<ul style="list-style-type: none"> • Reduction and subsequent elimination of subsidies (monetary value) at national and provincial levels that is not consistent with regional and global practice and standards • Number of illegal fishing vessels/Total • Number of illegal fishing gears/Total 	<ul style="list-style-type: none"> • Provincial • National • Monthly/Yearly • Department of Fisheries • Marine Department 	<ul style="list-style-type: none"> • Tier II • Efforts to eliminate IUU fishing and ensure the sustainability of Thailand's fisheries have been strengthened with the enactment of the new Royal Ordinance on Fisheries B.E. 2558 (2015) being implemented through 28 port in-port out centers at Thailand's main fishing ports by officers from the Department of Fisheries (DOF), Ministry of Labor, Marine Department and its mobile team units, and the Ministry of Foreign Affairs (MFA).
<p>Target 14.7: By 2030, increase the economic benefits to small island</p>	<p>Indicator 14.7.1: Sustainable fisheries as a proportion of GDP in</p>	<ul style="list-style-type: none"> • Social and economic benefits of fishing and resource management assessed for artisanal, sustenance 	<ul style="list-style-type: none"> • Provincial • National • Yearly 	<ul style="list-style-type: none"> • Tier III • National and sectoral policies on sustainable

SDG 14 Target	SDG 14 Indicator	Proposed Relevant National Indicator (MEBM Approach)	Disaggregation Available/ Lead Agency	Status (2018) ¹⁷¹⁸
developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism	small island developing States, least developed countries and all countries	and commercial fisheries and marine resources <ul style="list-style-type: none"> • Reduction and subsequent ban on use of destructive fishing practices • Extent of coastal area restoration promoting enhanced biodiversity • % share of marine tourism to ocean economy • % share of marine tourism to GDP • Employment in marine tourism sector 	<ul style="list-style-type: none"> • Department of Marine and Coastal Resources • Department of Fisheries • Local governments 	fisheries, aquaculture and tourism have been established and implemented.
Target 14.a: Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing	Indicator 14.a.1: Proportion of total research budget allocated to research in the field of marine technology	<ul style="list-style-type: none"> • % share of public budgeting to marine research and technology • Nature and impact of collaboration between public and private institutions on resource management and use • Measures to enhance the impact of investments into institutions – public sector – that results in collective impacts on resource use and enhancement 	<ul style="list-style-type: none"> • National • Yearly • Ministry of Finance • Thailand Research Fund • National Research Council of Thailand 	<ul style="list-style-type: none"> • Tier II • Marine research budget was 0.33 of total research budget in 2017, reduced to 0.17 in 2018.

SDG 14 Target	SDG 14 Indicator	Proposed Relevant National Indicator (MEBM Approach)	Disaggregation Available/ Lead Agency	Status (2018) ¹⁷¹⁸
States and least developed countries				
Target 14.b: Provide access for small-scale artisanal fishers to marine resources and markets	Indicator 14.b.1: Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries	<ul style="list-style-type: none"> Nature and type of access to marine resources for small-scale artisanal fishers and subsistence fisheries Social and economic benefits of fishing and resource management assessed for artisanal 	<ul style="list-style-type: none"> Provincial National Yearly Department of Fisheries National Statistical Office 	<ul style="list-style-type: none"> Tier II Provincial Committees on Marine and Coastal Resources Management were established as a multi-stakeholder platform to propose management plans for local marine and coastal resources - encouraging participation by all stakeholders, as well as provided local solutions to local challenges Coastal community registration in 24 coastal provinces.
Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the	Indicator 14.c.1: Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international	<ul style="list-style-type: none"> Active participation in regional and international negotiations (e.g., the ongoing UN-led negotiations for a legally binding agreement on management of resources in areas beyond national jurisdiction National actions on synergies between Conventions and processes at global and regional levels 	<ul style="list-style-type: none"> National Yearly Department of Marine and Coastal Resources Ministry of Foreign Affairs 	<ul style="list-style-type: none"> Tier III Thailand has elected to a nine-year term as a judge of the UN's International Tribunal for the Law of the Sea and has actively participated in consideration of the guiding approaches and principles of an

SDG 14 Target	SDG 14 Indicator	Proposed Relevant National Indicator (MEBM Approach)	Disaggregation Available/ Lead Agency	Status (2018) ¹⁷¹⁸
conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"	law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources	<ul style="list-style-type: none"> Number of action programs that respond to the international governance schemes 		international legally binding instrument on Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction.

PART III: THE WAY FORWARD

7. Measuring and Monitoring SDG 14 in the Thai Context

Achieving Thailand's marine sustainability and the SDG 14 will take integrated approach and coordinated action. The development of the marine and coastal economy in Thailand from the current baseline described in the above sections will require thoughtful consideration and a set of principles agreed to guide both policy and investment. These marine and coastal management principles as well as modalities to support implementation and building sustainable statistical capacity for the implementation and review of SDG 14 in the Thai context should be based on the internationally adopted principles of a) marine ecosystem-based management; b) spatial data discovery, evaluation, and application; and c) assessment of changes in ecosystem assets and the services.

Based on the MEBM approach, there is a need to move away from the sectoral and species-based approaches, which characterize the country's current approach to managing the marine environment. Ecosystem approaches need to be further refined and made operational. Large-scale MSP and networks of MPAs, and other area-based management measures for biodiversity conservation purposes, should be integral parts of Thailand's Blue Economy initiatives. Such processes must be participatory, accountable, transparent, equitable, and inclusive, to be responsive to present and future human uses and needs, including the needs of minorities and the most vulnerable groups in society. To make informed trade-offs, such processes should also use appropriate tools and methods to capture the range of benefits that ecosystem goods and services can bring to different stakeholders.

The role and relevance of private sector funding as well as resources raised through civil society groups is yet to be fully assessed in Thailand. To achieve inclusive results in sustainable ocean development, it is important to forge long term partnerships with private sector and civil society groups in the country. The public sector especially at the local level should have the opportunity to understand and gain more knowledge on marine ecosystem-based management and ecosystem accounting so that they can effectively implement the SDG 14 at the local level and pass the knowledge on to the local people.

The collection and management of marine and coastal ecosystem data and statistics are among one of the challenges for Thailand because of such factors as the lack of statistical experts in concerned government agencies, the ambiguity in the definition of the SDG 14 indicators in the national context and lack of data disaggregation and comprehensiveness.

To address these challenges, there is a need for Thailand to:

- a) Continue to develop the scientific support for an integrated assessment of Thailand's progress toward achieving SDG 14 and sustainable marine management to support ecosystem approaches to science and management. A national MEBM monitoring plan need to be developed, implemented, and directly linked to management targets and threats and include a variety of biological and socioeconomic indicators across all Thailand's marine and coastal ecosystem types contained by the management area.

The MEBM principles are applicable at larger spatial scales and can be incorporated into national and sub-national policies and programs;

- b) Apply marine spatial planning at the scale of EEZs, investing in restoration and maintenance of marine ecosystem function and integrity, with a focus on protecting critical ecosystems and ecosystem processes;
- c) Improve the statistical and methodological base for measuring the scale and performance of the marine and coastal economy (e.g., fisheries, tourism, industry, maritime transportation) and establish natural capital accounts for Thailand's marine and coastal areas and ecosystems at the national and provincial levels; and,
- d) Create/expand integrated approaches to marine governance, and build and strengthen the institutional and human capacity to act.

Specifically, some priority or pilot actions can be identified as follows:

- Applying standard methods to calculate the economic value of the ocean economy
 - Correct undercounting in SNA (e.g., harvesting by households)
 - Conduct estimations on non-SNA benefits (CO₂ seq., coastal protection, marine pollution, ocean acidification, positive and negative externalities)
- Spatially referencing waste and water effluent data
 - Develop spatially detailed SEEA Waste and Water Effluent Accounts
- Integrating spatial information on coastal and marine ecosystems (fisheries and biodiversity accountings), their conditions and their services
 - Apply national spatial data infrastructure to integrate marine maps
 - Incorporate existing spatial mapping data from relevant government agencies, stakeholders, and global partners
- Other R&D initiatives in relevant areas such as
 - Tourism (link to ecosystem vulnerability)
 - Marine fish catch (MSY requires estimate of stock and reproduction/CPUE)
 - Marine protected areas/reserves (based on MEBM approach)

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