# BIODIVERSITY

## Finance Intitative in Thailand

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## Overall Objective

The overall objective of this Policy Brief is to review the significant contribution of Thailand's biodiversity resources to the country's economic growth, economic well-being and to the livelihood of the people of Thailand. In so doing, this Policy Brief aims to provide impetus to the on-going effort to strengthen the institutional and legal framework and to mobilize further resources to the conservation and sustainable use of biodiversity resources in the country.

## Background

Thailand has a total land area of approximately 514,000 square kilometers (sq. km.), of which approximately 316,000 sq. km. is made of coastal and marine areas, along with approximately 2,600 kilometers of coastline and 600 islands. The coral reefs cover the area of 153 sq.km. Thailand's location in Southeast Asia connects all forms of life in the Himalayan Mountain range and the southern part of China with the Malay Peninsula and the humid areas of Cambodia and Laos. As such, despite its relatively small land mass, Thailand accounts for approximately 8% of the estimated total number of plant species found globally, and for approximately 10% of all coral species found in the world.

The Constitution of the Kingdom of Thailand provides for the conservation and sustainable usage of biodiversity resources in the country. It also legally protects the right of the people and local communities to participate in the management, maintenance, protection and use of those resources in a sustainable manner.

The 10th National Economic and Social Development Plan (NESDP) covering the period 2007-2011 explicitly recognized that human activity is a key threat and contributor to the declining biodiversity of the country. The 10th NESDP explicitly stated that **"development must build on the foundations of biodiversity, and enhance community rights of access and management of resources in order to conserve the rich stock of natural resource and environmental capital as a foundation for the sustainable livelihood and happiness of the Thai people."**

As such, one of the 7 objectives of the 10th NESDP is **"to preserve natural resources and biodiversity since this will provide a secure foundation of national development and livelihood for both current and future generations."** The strategy for the development and conservation of biodiversity, natural resources, and environment highlighted an emphasis on developing the economic value of biodiversity.

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The risk of loss of biodiversity resources through several kinds of human activities remains a theme of the 11th NESDP (covering the period 2012-2016), in addition to the newly recognized emerging threat which climate change represents to biodiversity (both terrestrial and marine) resources of the country.

One of the four key objectives of the 11th NESDP is to maintain Thailand's biodiversity through the preservation of natural resources and the environment. Achieving this objective includes (1) encouraging agricultural practices that preserve biodiversity; (2) encouraging the conservation and sustainable utilization of biodiversity; (3) promoting economic development based on biodiversity and local knowledge; (4) protecting conservation areas and vulnerable ecosystems; and (5) changing government investment policies to facilitate conservation and restoration, including the introduction of an environmental tax to provide incentives for efficient use of natural resources and pollution reduction.

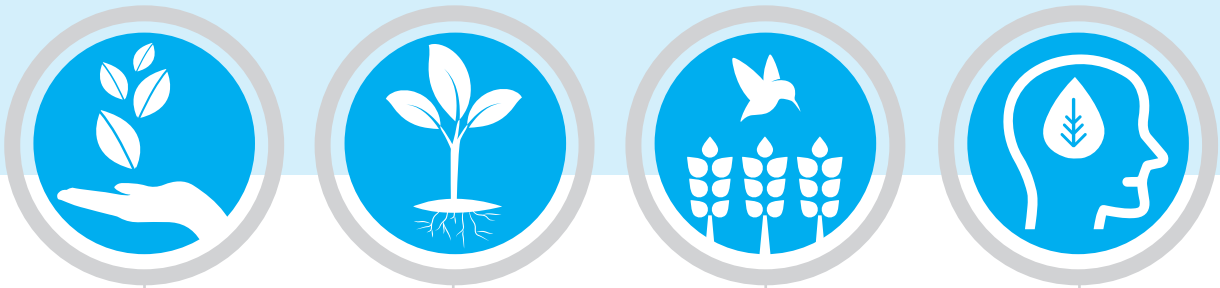
While the current 12th National Economic and Social Development Plan does not mention specific issue about biodiversity resources, utilization and conservation of biodiversity resources are included in connection with continued deforestation, land degradation and loss of mangroves. On vision and development goals, for example, it is stated that the goal is to: 'maintain natural resources base to create balance between the three pillars, namely conservation, sustainable utilization and fairness'. That Thailand aims to become 'a society and economy that is environmentally friendly' Instrumental to this would be to 'ensure good governance in NR and ENVi management'

The terminology ‘environmentally friendly’ embraces a number of principles such as preserving natural capital for green growth, promoting green consumption and green supply chain and green value chain, pollution control and maintaining environmental quality, engaging in regional cooperation in management of natural resources (with ASEAN and Greater Mekong Sub-region countries) and increasing capacity for adaptation to climate change.

In the 12th Plan, biodiversity resources is also briefly in relation to climate change that this will have impact on biodiversity through deforestation, coastal erosion, destruction of coral reefs and also that the loss of biodiversity will affect food security, health, and self-sufficiency at the community level.

The above approaches expressed in successive national economic and social development plans are also found in Thailand’s National Biodiversity Strategies and Action Plans (NBSAP). The vision of the latest NBSAP (covering the period 2015-2021) is for people to **“live in harmony with nature through collaborative promotion and support by the government and other sectors for conservation, restoration, and sustainable use of biodiversity.”** To achieve this vision, the mission statement is **“integration of administration and management for conservation, restoration and effective utilization of biodiversity with participation from every level of society in order to halt biodiversity loss.”**

# Four strategies have been identified under the current NBSAP which are



Integration of biodiversity values and management with participation from all levels;

Conservation and restoration of biodiversity;

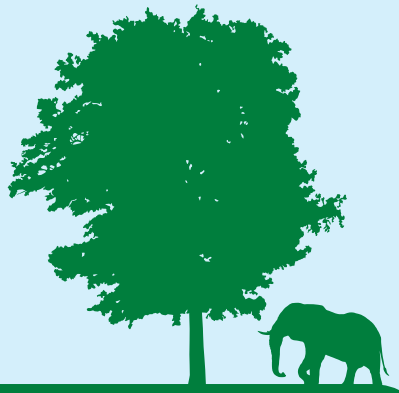
Building capacity for utilization and sharing of benefits derived from biodiversity in accordance to the principle of the green economy;

Developing knowledge and database system on biodiversity, consistent with internationally recognized standards.

In the context of its contribution to global biodiversity resources, Thailand is also signatory of numerous relevant treaties enacting at the international level its commitment to achieving this mandate. This includes, among numerous others, the Convention on Biological Diversity, and the Convention on International Trade of Endangered Species.

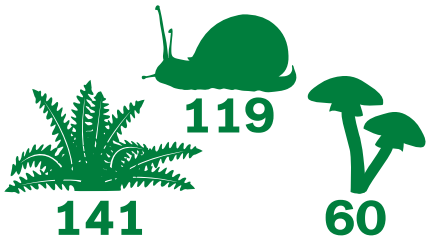
Significant successes have been achieved. Simultaneously however, institutional, legal, and resource challenges remain.

As Thailand aims to achieve green and sustainable growth, awareness of the significant contribution of the country's biodiversity resources to Thailand's economic and growing well-being remains limited. This limited awareness impedes the comprehensive deployment of significant resources for purpose of conserving, maintaining, and sustainably using biodiversity resources in the country.



**This Policy Brief aims to address this limited awareness. We first discuss the contribution of biodiversity to the livelihoods of local communities, and then to macroeconomic sectors of Thailand's economy. We complete this discussion with an assessment of the contribution of biodiversity to the economic well–being of Thailand.**

## Biodiversity as a Source of Livelihood




- On the survey of the Botanical Garden Organization in northern of Thailand during 2009-2010, it was found 141 species of indigenous vegetables, 191 species of invertebrates mainly was insects such as beetles, dragonfly nymph, crickets, ant larvae and scorpion for example, and about 60 species of seasonal wild mushroom were use as food by local residence in Lampang province (Northern of Thailand).


- Surveys form Faculty of Pharmacies, Mahidol University had listed 1,459 species of medicinal plants used in Thai Traditional Medicine. In 2011, the Department for Development Thai Traditional and Alternative medicine, Ministry of Public Health was estimated market value of Thai medicine and herbs would equal to 354.8 billion US$ for medicine, 5,483.8 billion US$ for cosmetics and 2,580.6 billion US$ as dietary supplement. In addition, value from spa therapy and traditional Thai massage roughly about 413.3 billion US$ might be added into the value of traditional medicine.

- There is the sea grass source covering the area of 149.97 square kilometers growing in the shallow water. This is important to the livelihood, cultivation, and a nursery of fish species including dugongs, turtles, lobsters and sea grass found in 19 coastal provinces.

  Thailand has a total area of 189.86 km2 for sea grass sources consisting of Andaman coast for 137.76 km2 (72.56 per cent) and the Gulf of Thailand for 52.10 km2 (27.44 per cent). The most sea grass sources are found in Krabi province in the area of 49.93 km2 (26.30 per cent).

- Need something about local / rural / farm-based tourism.

- For some coastal villages in Thailand (Ban Khlong Khut and Ban Gong Khong in Nakhon Si Thammarat Province on the Gulf of Thailand, and Ban Sam Chong Tai and Ban Bang Pat in Phangnga Province on the Andaman Sea), economists have estimated that excluding the income from collecting mangrove forest products would significantly raise the number of people in poverty.

## Biodiversity as a Source of Economic Growth

For decades, biodiversity resources such as agricultural products (rice, rubbers, and chili pepper for example), forests products (timbers, wildlife carcasses, and spices) and processed or dried aquatic animals were served as primary GDP of Thailand. Till the late of the 20$^{th}$ century, country main income had shifted into industrial and service industrial instead. However, agricultural products and agro-industry products still contribute 9-12 percent in national GDP.

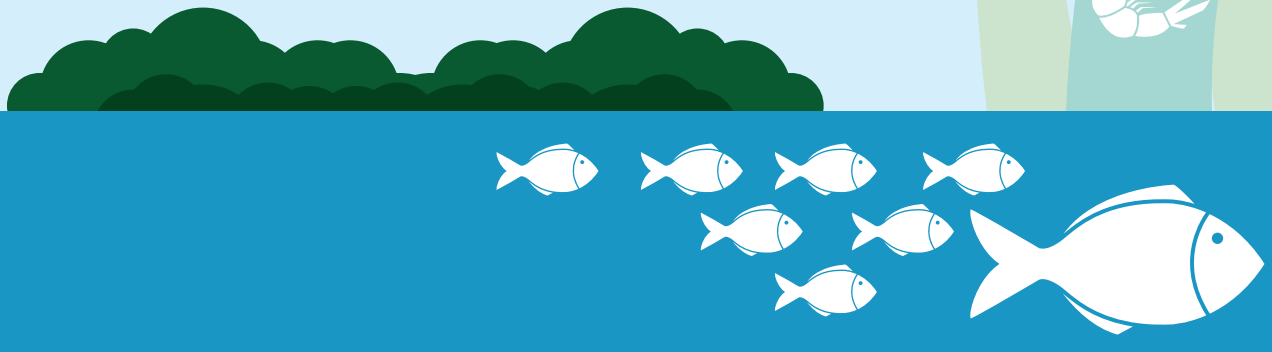
Undoubtedly, agricultural and marine resources contribute significantly to Thailand's overall gross domestic product and economic growth.

Developments in agriculture since the 1960s have supported Thailand's transition to an industrialised economy. As recently as 1980, agriculture supplied 70 percent of employment. In 2008, agriculture, forestry and fishing contributed 8.4 percent to GDP; in rural areas, farm jobs supply half of employment. Rice is the most important crop in the country, contributing approximately USD 2,000 billion to Thailand's exports in 2014. Other crops include coconuts, corn, rubber, soybeans, sugarcane and tapioca.

Thailand is also a major exporter of shrimp, being the world's third-largest seafood exporter. Overall fish exports were worth around USD3 billion in 2014, according to the Thai Frozen Foods Association. Thailand's fishing industry employs more than 300,000 persons. In 2008, the FAO had reported that Thailand had export frozen fish, frozen marine shrimp and other processed marine organisms about USD104.2 billion which equal to 1.2 percent of gross national product (GDP) and the most revenue (about 60%) was contribute to labors and associated expense while 40% belonging to fishermen.

While nature is the highlighted saleable commodity, limited resources have been channelled back for preservation and restoration. The deterioration of the environmental quality of many of these sites has raised awareness that without concerted efforts to maintain the quality of the biodiversity resources, Thailand will not be able to maintain the stream of benefits. The declining quality of Thailand's coral reefs is one important example. The estimated area of coral reefs founded in the Gulf of Thailand and Andaman Sea is around 47,000 and 49,000 square kilometers, respectively. The coral reefs are threatened by a number of reasons including the deposition of sediments from the rivers, pollution of the river mouth, sewage from communities, industry, coastal hotels, and fishing with destructive fishing tools.

Many of the nature based tourism sites in Thailand are island destinations. These are where the richness and diversity of biodiversity resources constitute the major attractions and are therefore the major revenue generator. One such island destination is Koh Tao, a destination that hosted 352,209 visitors in 2009. Using Travel Cost Method, the benefits that tourists enjoy from visiting destinations such as Koh Tao translated into monetary value was estimated to be 6,636 per person/ trip/ year (in 2009 prices) and a total recreational value of 2,337 million Baht per year. This 'recreational' value is contingent upon both land and more importantly on the quality of the island's coral reefs and marine life diversities confirmed by tourists interviewed for this study that they would consider going to other sites if the state of the coral reefs deteriorates.



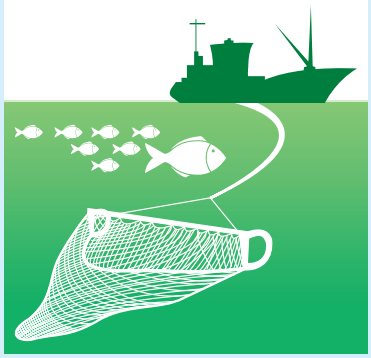
# Biodiversity as a Source of Economic Well-Being *(mostly indirect use value)*

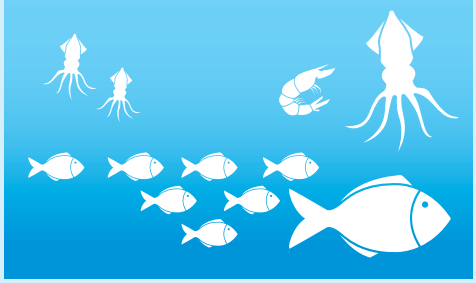
## *About mangroves*

Mangroves deliver a range of economic, social and environmental benefits to people, collectively referred to as their ecosystem goods and services (Table 1).

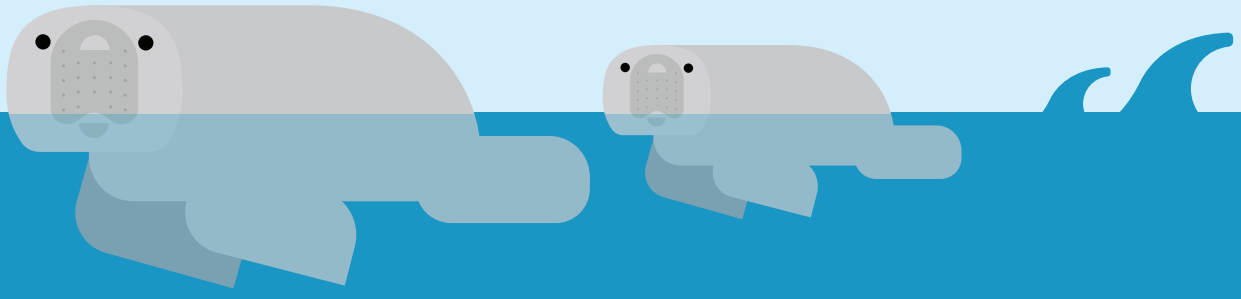
Table 1: Ecosystem Goods and Services Provided by Mangroves

| Provisioning | Regulating and supportin | Cultural |
|---|---|---|
| Construction materials | Climate regulation | Ecotourism |
| Fisheries | Coastal protection | Heritage and culture |
| Biodiversity | Water quality maintenance | Spiritual enrichment |
| Medicine | Nutrient cycling | Religious value and cultural ceremony |
| Food | Water cycling | Recreation |
| Fuelwood | Soil stabilisation and erosion control | Aesthetics |
| Fibre | Provision of nursery habitats | Education |
| Tannins | Support to coral reefs, seagrass beds, mud flats and sand flats | Scientific research |
| Fodder | | |





Source: UNEP. 2014. The Importance of Mangroves to People: A Call to Action. World Conservation Monitoring Centre.



Around the world, approximately 100 million people live within 10 kilometres of benefiting from the goods and services produced by these forests. In Thailand, these ecosystem services are worth an estimated USD 33,000 to 57,000 per hectare per year to local economies. Mangroves are found in all 23 coastal provinces of Thailand covering an estimated 250,000 ha. The economic value of the services provided by the mangrove forests to the people of Thailand may reach between USD8.2 and 14.2 billion per year. At the current estimated annual loss of approximately 1,600 ha per year, the lost economic value of those services could reach between USD50 and 90 million per year.

In addition to the local services, the mangrove forests of Thailand provide significant global benefits by mitigating global climate change as mangrove forests are among the most carbon-rich forests in the tropics. Emissions resulting from mangrove losses make up nearly one-fifth of global emissions from deforestation recent studies have shown Thailand's mangroves to sequester approximately 660 MgC per hectare. While estimates of the social cost of carbon vary significantly across models and studies, using a low bound value of approximately USD35 per ton, maintaining Thailand's mangrove forests provides a global service worth approximately USD20 billion.

Indirect use value of mangroves was estimated to be 211,510 million Baht in 2015 prices. Even this should be considered as a lower bound estimate as it only takes into account 3 ecological functions namely, carbon sequestration, coastal protection and habitat and nursery grounds.

Unit: Million Baht (in 2014 prices)

| | |
|---|---|
| Carbon sequestration function | 53,796.5 a/ |
| Coastal protection function | 138,402 b/ |
| Habitat and nursery ground | 19,311 b/ |

Source: Orapan Nabangchang-Srisawalak, A Study of the Economic Value of Human Induced Impact on Marine Ecosystems and Implications for Local Communities Participation. A Report commissioned by the Department of Marine and Coastal Resources (DMCR). 2015

a/ Calculated by using the DMCR's estimate carbon stock of Thailand's mangrove adn the value of social cost of carbon in 2015 which was 37 USD/ton carbondioxide;

b/ Adjusted from original value estimated by E. Barbier. Ecosystem Services and Wealth Accounting. Inclusive Wealth Report. Measuring Progress Towards Sustainability. 2012. Cambridge: Cambridge University Presss.

## About sea grass

Sea grass ecosystem is one of the main coastal ecosystems that provide both direct and indirect benefits. Apart from the direct benefits from fisheries and eco-tourism, there are also indirect benefits such as storing and sequestering carbon, water purification, and protection against coastal erosion (Wongsurirat 2007). In Thailand, there are 7 genera and 12 species of sea grass on both the east coastline, on the Gulf of Thailand and west sides of the Andaman coasts (Kanchanapart Liewmanomond, Suchin Deetae, Wittataya Srimanokart, Hisao Ogawa 1993). According to the latest data set from the Department of Marine and Coastal Resources (DMCR), in 2013 the total area of sea grass beds was 18,986 hectares. Most of the sea grass beds, (i.e. over 70% of the total area) are located on the Andaman coast), with the coastlines of Trang province recognized as being recognized as being rich diversity of sea grass species. In order to demonstrate the economic importance of preserving the sea grass beds of this province, the Department of Marine and Coastal Resources had requested that a study of the economic value of sea grass ecosystems be undertaken by using Trang Province as a case study area.

As indicated in Table 2, the share of benefits from tradable goods and services, i.e., from tourism and fisheries are by far exceeded by various types of intangible benefits. The indirect use value from one ecological function alone, namely carbon sequestration is 65 million USD. But greater than that is intangible and non-traded benefits of the sea grass ecosystem in terms of water purification and habitat and feeding ground for one of Thailand's most iconic marine species, the dugong was estimated to be as high as 275 million USD. Clearly, to recognize only the benefits of sea grass beds in terms of use value alone would be grossly underestimating the importance of this coastal ecosystem.

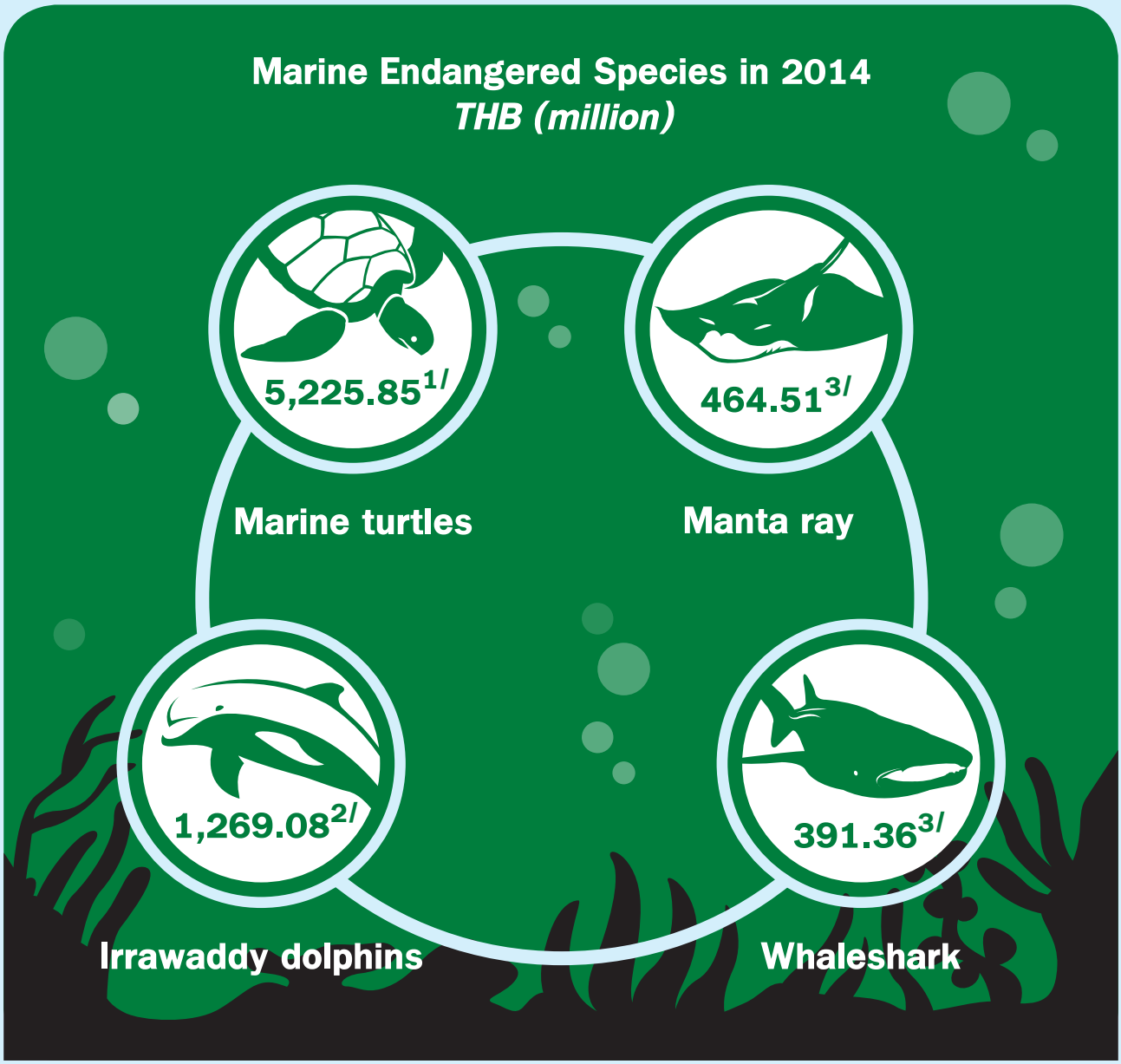
Table 2: Economic benefits of sea grass ecosystem in Trang Province (million THB)

| Type of economic value | Estimate in million THB |
|---|---|
| **Direct use value:** | |
| Fishery | 39 (1.2 million USD) |
| Tourism | 192 (5 million USD) |
| Indirect use value (carbon sequestration) | 2,126 (65 million USD) |
| Intangible and non-traded benefits of the sea grass ecosystem | 8,956 (275 million USD) |
| Total Economic Value of sea grass beds in Trang *(including contribution from households in Bangkok)* | 11,313 (348 million USD) |
| Total Economic Value of sea grass beds in Trang *(excluding contribution from households in Bangkok)* | 2,685 (83 million USD) |

Source: Orapan Nabangchang-Srisawalak, Economic Value of Sea grass Ecosystem: A Case Study of Trang Province, Southern Region of Thailand. A Report commissioned by the Department of Marine and Coastal Resources (DMCR). 2012

## About Marine endangered species

Within these coastal and marine ecosystems are iconic species such as marine turtles, whale sharks, manta rays and dolphins. For many tourists, these have been among the attractions that drew them to Thailand. Yet for many, whether or not they will get to see these animals, there is a willingness to contribute to conservation efforts to ensure their survival and reduce their risk of extinction. A series of studies have been undertaken using Contingent Valuation Method to estimate the non-use value of selected marine endangered species of Thailand. Combined and converted into 2014 prices, the non-use values of four marine endangered species of Thailand shown in Table amounted to 7,351 million Baht.




1/ converted to 2014 prices from Orapan Nabangchang-Srisawalak. The value estimated in Mobilizing Resources for Marine Turtle Conservation in Asia: A Cross-Country Perspective. EEPSEA 2008.;

2/ converted to 2014 prices from Orapan Nabangchang-Srisawalak. Estimating Non-use Value of Endangered Species: Willingness to Pay for Dolphins;

3/ Srisawalak. Valuation Assessment of Icon Species in Lanta Marine National Park: Willingness to Pay for Conservation. A study submitted to the World Wildlife Fund (WWF). 2011