



The Economics of Ecosystems and Biodiversity for Southeast Asia (ASEAN TEEB)

Scoping Study

9 November 2012



EXECUTIVE SUMMARY

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KEY MESSAGES

- To maintain Southeast Asia's abundant biodiversity it is imperative to take action and sustainably harness the benefits and services provided by these resources. The ASEAN Member States are increasingly starting to recognize the importance of fully accounting for the tangible and intangible values of the region's natural assets.
- The Economics of Ecosystems and Biodiversity (TEEB) initiative provides information that helps decision makers to recognize, demonstrate, and capture the values of ecosystem services and biodiversity.
- The ASEAN TEEB scoping study provides evidence of the links between nature and the human well-being by recognizing and valuing not only the tangible goods and services one can derive from nature but also its intangible values which are usually ignored from analysis, as they have no market, no price or cash value.
- The four case studies developed under the regional scoping exercise capture the value of ecosystem services and biodiversity through explicit recognition, efficient allocation, and fair distribution of the costs and benefits of conservation and sustainable use of natural resources as described in TEEB (2010). The case studies demonstrated how information from economic valuation can be integrated into decision and policy making processes.

The ecosystem services provided by Southeast Asia's biodiversity and natural resources are essential for sustainable economic development.



Almost 600 million people in Southeast Asia rely on the goods and services provided by the region's diverse forest, agricultural, coastal, and marine ecosystems.



Biodiversity and Ecosystems in Southeast Asia: A Region under Pressure

The ASEAN region is endowed with rich natural resources that sustain essential life support systems both for the region and the world. Biodiversity in the region significantly contributes to global environmental sustainability. As of 2007, there were 792 key biodiversity areas (KBAs) identified in the region. KBAs are sites of global significance for biodiversity conservation. These areas provide foundations for ecosystem services to which the well-being of more than 600 million people in Southeast Asia are intimately linked.

The Southeast Asian region has one of the most diverse forest ecosystems in the world. The entire region used to be covered by forests eight millennia ago. As of 2000, only 47% of the region remains forested.

With nine out of ten ASEAN Member States endowed with extensive coastlines, providing an aggregate total of some 173,000 kilometers of shore, the region is home to a third of the world's coral reefs, mangroves and seagrass areas. Based on global estimates, the Southeast Asian region has one-third, or 86,025 square kilometers, of all known coral reef areas in the world. Mangroves in the region occupy an area of over 60,000 square kilometers. Presently, the region has the largest extent of mangroves in the world, with Indonesia accounting for almost 62% of the ASEAN territory's total.

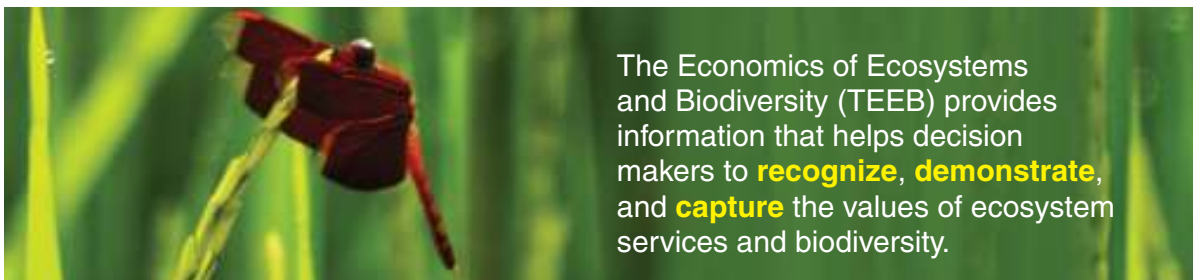
While the region prides itself of having exceptional levels of endemism of land and aqua species, the region is confronted by massive habitat and species loss. Drastic environmental changes brought about largely by economic activities and irresponsible human practices are causing serious harm to plants, animals and its habitats. Reducing the rate of biodiversity loss remains to be a major challenge.

Southeast Asian forest ecosystems are subjected to multiple threats such as deforestation attributed largely to logging and timber harvesting. Of late,

the conversion of forest areas for agricultural use, in particular for oil palm plantations, has become the largest factor in the loss of forest ecosystems. Although the region is home to an immense area of mangrove forests, it has experienced the highest rates of mangrove losses in the world. In the last two decades, it has been estimated that approximately 630 square kilometers of mangroves in the region are stripped away annually. Further, the Southeast Asian region has the highest rate of coral reef loss, which in 2008 was reported at 40%.

Responses to natural resource threats in the region are characterized by a host of programs, projects, and activities in various forms and sizes, with a broad range of donors and implementers involved. The diversity of threats appears to dictate the type of responses. For coral reefs, for instance, the establishment of the marine protected areas (MPA) and MPA networks has been a common response to these threats. At the local and community levels, MPAs are organized in tandem with livelihood components in order to mitigate the impacts of over-exploitation.

Given the abundance of the Southeast Asian biodiversity as well as the looming threats these natural resources are facing, it is imperative to take action and sustainably harness the benefits and services provided by these resources. Cognizant of the enormous opportunities from the region's biodiversity and ecosystem services, the ASEAN Member States supported the economics of ecosystems and biodiversity (TEEB) scoping study initiative for the ASEAN region. The objective of the ASEAN TEEB scoping study is to pursue the mainstreaming process of the economics of ecosystems and biodiversity through the assessment and valuation of key ecosystem services in Southeast Asia. The scoping study also aims to assist ASEAN Member States to develop green growth economies.



The Economics of Ecosystems and Biodiversity (TEEB) provides information that helps decision makers to **recognize, demonstrate,** and **capture** the values of ecosystem services and biodiversity.



Changing the Tide: Making the Value of Biodiversity Economically Visible

The abundance of forest, agricultural, coastal and marine ecosystems in the region has been well documented as shown in the ASEAN Biodiversity Outlook report published in 2010. The livelihood of almost 600 million people in Southeast Asia largely depends on the goods and services provided by the region's ecosystems and biodiversity such as food and raw materials among others. The current rate of destruction of forests, depletion of aquifers, extinction of plant and animal species, and overharvesting of coastal and marine resources resulting from unsustainable practices, however, have threatened the very well-being and quality of life of hundreds and thousands of Southeast Asians. Taking urgent action to *recognize, value, and sustainably manage* the ASEAN region's biodiversity and ecosystem services is, therefore, crucial and pertinent. To counter the degradation and unsustainable use of biodiversity, it is necessary to realize that the region's biodiversity and ecosystem services are vital factors in the regional and national economic development equation.

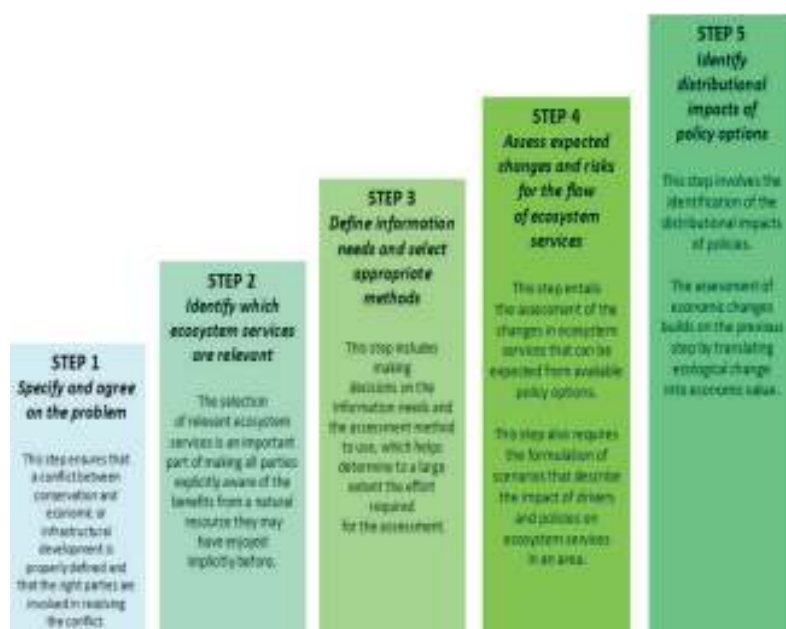
The notion that ecosystems and biodiversity are vital for a strong and resilient economy is starting to gain traction in the ASEAN region. With support from the United Kingdom Foreign and Commonwealth Office (UK FCO) and follow-up support from the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), the ASEAN Centre for Biodiversity (ACB) has initiated a region-wide scoping study on the economics of ecosystems and biodiversity (ASEAN TEEB). The scoping study offers evidence of the compelling links between nature and the economy by recognizing and valuing not only the tangible goods one can derive from nature – e.g. timber, fruits, crops, livestock, and fish among others, – but also the intangible items in which, for a time, no market exists for the exchange of any part of these intangible goods and services.

The tangible and intangible benefits from nature are captured in the concept of ecosystem services. The Millennium Ecosystem Assessment (2003) has identified four groupings of ecosystem services that contribute to human well-being.

- *Provisioning services* are the products one directly obtains from direct or indirect interaction with nature (e.g. wild foods, crops, fresh water and plant-derived medicines).
- *Regulating services* are the benefits obtained from the regulation of ecosystem processes, such as filtration of pollutants by wetlands, climate regulation through carbon storage and water cycling, pollination and protection from disasters.
- *Cultural services* are the non-material benefits people obtain from ecosystems through recreation, spiritual and aesthetic experience, and educational development.
- *Supporting services* are ecosystem services that are necessary for the production of all other ecosystem services (e.g. soil formation, photosynthesis, water cycling and nutrient cycling).

From an economic point of view the flows of ecosystem services are the 'premium' that society receives from the natural assets and maintaining stocks of these resources make the flow of the services available for the future generations (TEEB, 2010). The values of ecosystem services particularly those related to regulating, cultural, and supporting services are not widely recognized, and where they are, there are gaps and inconsistencies in the way different ecosystem services stakeholders value these in their decision-making process. The third Global Biodiversity Outlook (GBO3) has identified *failure to account for the full economic values of ecosystem services* as a significant factor in their continuing loss and degradation.

In recognition of the strategic role of the ASEAN region in preserving biodiversity and ecosystem services of global, regional, and national significance, the ASEAN Centre for Biodiversity (ACB) is taking the lead in mainstreaming the value of ecosystem services in the policy landscape. Following a variant of the recommended *step-wise approach* developed by the global TEEB team, the ASEAN Centre for Biodiversity (ACB) initiated a regional scoping exercise to estimate and demonstrate the value of ecosystem services and biodiversity in Southeast Asia.



The step-wise approach followed by the ASEAN TEEB team in developing the case studies for the economics of ecosystems and biodiversity in the Southeast Asian region.



Valuation for Policy Development: Evidence from Across the Region

Building upon existing body of evidence on the value of ecosystem services in Southeast Asia, the ASEAN Centre for Biodiversity (ACB) has taken a significant step to mainstream the valuation of ecosystem services in the development processes of the region. Equipped with information from 182 studies published mostly within the last 15 years from across the region, mainly from *Indonesia, Philippines, Thailand, Malaysia, and Vietnam*, ACB compiled ecosystem services and biodiversity economic values to assess the extent and depth of economic valuation of ecosystem services and biodiversity in the region. Empirical studies encompassing local, provincial, and national boundaries show that of the four categories of ecosystem services, provisioning services, particularly food and raw materials such as timber and fuel wood, have been the most extensively valued in the region. Cultural services in the form of recreation and tourism are also highly valued in many parts of Southeast Asia. Due to limited biophysical understanding and absence of sound science, regulating and supporting services have been less widely assessed and valued in the region.

To complement the scoping exercise, four valuation case studies were developed. The four cases feature the valuation of services provided by mangrove, coral

reef, forest ecosystems and marine protected area ecosystems at regional and local scales. These cases reflect the high priority placed by countries to these natural assets as evidence shows that forests have been by far the most extensively studied among the ecosystems, followed by wetlands, mangroves, and marine and coastal ecosystems, which includes coral reefs and sea-grasses. The four case studies *capture the value of these ecosystem services through explicit recognition, efficient allocation, and fair distribution of the costs and benefits* of conservation and sustainable use of natural resources (TEEB, 2010).

In a traditional economic valuation, the full range of ecosystem services is assessed. The four case studies focus on just a few services depending on the needs and priorities of the stakeholders. Existing valuation studies from the region show that through the employment of one or a combination of direct market and non-market valuation techniques, one can *assess the consequences of changes in ecosystem services* resulting from alternative management options (TEEB, 2010). The four case studies provide recommendations for potential solutions on how to integrate the value of ecosystem services and biodiversity in both public and private decision making.



The Case Studies in Brief

The four case studies illustrate how information on the economic value of natural capital can draw attention to the need for conservation, the trade-offs involved, and the design of policy instruments to aid and finance conservation. Below, the four cases are described in brief.

Mangrove Ecosystem. The case study on mangroves provides estimates of the value of the change in ecosystem services provision due to the estimated and projected loss of mangrove areas in Southeast Asia over the period 2000-2050 with the assumption that present circumstances and practices remain constant in the years to come (*business-as-usual scenario*).

Coral Reef Ecosystem. The case study on coral reefs employs the value transfer approach to provide an estimate of the loss in value of coral reef ecosystem services resulting from a decline in coral reefs under a business-as-usual scenario over the period 2000-2050. The ecosystem services examined in this case study focused on the provision of recreation and tourism opportunities as well as the habitat and nursery support for commercial fisheries.

Forest Ecosystem. The case study describes the value of a broad set of ecosystem services provided by the Leuser forest ecosystem in Sumatra, Indonesia. The case study highlights the distribution of ecosystem service benefits across different stakeholders and the trade-off between short term gains for some versus larger long term losses for others. The analysis shows that the net benefits of conservation outweigh the net benefits of deforestation in the long-run.

Marine Protected Areas. The case study describes the Hon Mun Marine Protected Area (MPA) in Nha Trang Bay, Khanh Hoa Province, Vietnam. The case study provides an illustration of the potential impact of information on the economic values of ecosystem services to improve decision making regarding nature conservation and finance.

Market valuation involves the utilization of existing market prices to value 'marketable' goods and services.
(*market price-based approaches, cost-based approaches, production function-based approaches*)

Non-market valuation
includes techniques to value goods and services not readily sold or exchanged in a traditional market system.

Non-market valuation techniques:

Stated preference methods
(*contingent valuation, choice modeling*)

Revealed preference methods
(*hedonic pricing, travel cost method*)

Value transfer method
(*benefit transfer*)



Measuring What We Value: A Tale of Mangrove Ecosystems in the Region

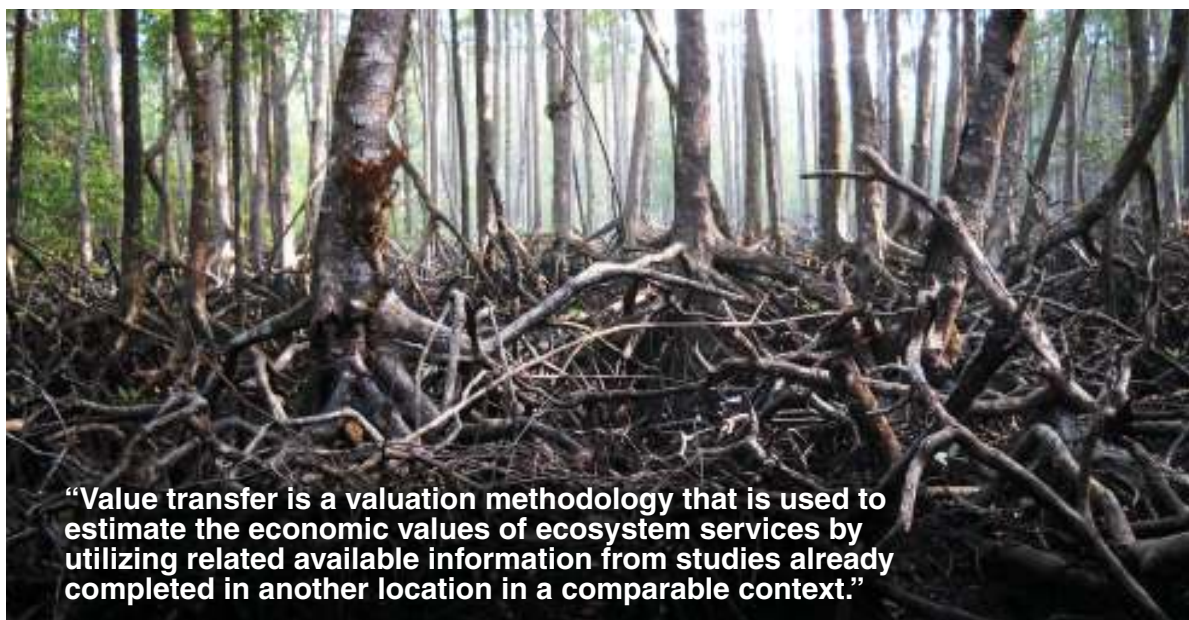
Mangrove ecosystems in Southeast Asia are valuable sources of fish, timber, fuel wood, and charcoal. They serve as breeding, spawning, and nursery grounds for many fish species. These ecosystems have also been recognized for the flood, storm and erosion control that they provide as a buffer against natural disasters.

The provisioning, regulating, and supporting services that the mangrove ecosystems provide across the region have the characteristics of 'public goods' such that the people who benefit cannot be effectively excluded from its use and where use by one individual or group of individuals does not reduce availability of the resource to others. Due to these characteristics and the fact that markets for regulating and supporting services do not exist, the potential for private incentives to sustainably manage mangrove ecosystem services is limited. As a result, mangroves are generally undervalued in both private and public decision-making relating to their use, conservation, and restoration.

To equip decision makers with empirical estimates of the value of the ecosystem services provided by mangroves, the *value transfer* approach was employed to assess the value of the change in ecosystem services provision due to the estimated and projected loss of mangroves in Southeast Asia over the period 2000-2050. The estimation involves a comprehensive analysis of monetary estimates of

mangrove ecosystem service values generated from 41 related studies from six world regions—North America, Latin America, South Asia, Southeast Asia, Africa, and Oceania. By using existing estimates from already completed studies, the economic valuation exercise resulted in a range of monetary estimates of values of benefits foregone by not maintaining the stock of mangroves or equivalently the cost of policy inaction to conserve this stock of natural capital.

By using the World Conservation Monitoring Centre's IMAGE-GLOBIO modeling framework, the *business-as-usual* or *baseline scenario* of the extent of spatial change in mangrove areas in Southeast Asia was estimated for the period 2000-2050. The IMAGE-GLOBIO includes a set of tools to assess past, present and future impacts of human activities on biodiversity. This modeling framework generated the rate of loss of mangrove areas in Southeast Asia for the given period if present circumstances and practices remain constant in the years to come (*business-as-usual scenario*). From 6.04 million hectares in 2000, the mangrove area in the region is projected to decrease by 2.08 million hectares by 2050 under the *business-as-usual scenario*. The economic value of the estimated loss in the physical area of mangroves over the period 2000-2050 is monetized to amount to US\$ 2.16 billion dollars (in 2007 prices) with Indonesia (US\$ 1.73 billion) projected to bear much of the loss followed by Malaysia (US\$ 279 million).



"Value transfer is a valuation methodology that is used to estimate the economic values of ecosystem services by utilizing related available information from studies already completed in another location in a comparable context."



Over the period of 2000 to 2050, mangroves in Southeast Asia will decline by 2.08 million hectares if action is not taken and current practices remain unchanged.

The influence of the characteristics of mangrove sites, its bio-physical features, and the socioeconomic profile of beneficiaries of mangrove ecosystem services to the economic value of mangroves in Southeast Asia has been examined alongside the estimation of monetary values of mangrove ecosystem services. The abundance of neighboring mangroves in the vicinity of the valued sites is found to have a positive effect on the economic value of the ecosystem services. The values of individual mangroves are enhanced when there is a larger extent of other mangrove patches in the surrounding area. This suggests that isolated patches of mangroves tend to be of lower value than more intact contiguous mangrove systems. This finding has important implications for mangrove conservation strategies—preservation of contiguous areas is preferable to patches that are spatially dispersed.

The analysis further suggests that fragmentation of mangroves and their surrounding areas by road infrastructure has a negative effect on the value of mangrove ecosystem services. Increasing the accessibility of mangrove areas by developing more road networks appears to degrade the services they provide. This might be particularly the case for the coastal protection and fisheries habitat and nursery services, which are off-site services that do not require access to the mangrove itself. Mangrove conservation efforts should therefore aim to mitigate the impacts of fragmentation by transport infrastructure.

The projected loss in the value of ecosystem services from the decrease in mangrove areas is estimated at US\$ 2.16 billion annually (in 2007 prices).



Appraising Marine Ecosystem Services: Economic Value of Coral Reefs in Southeast Asia

The World Coral Reef Atlas estimates that Southeast Asia accounts for a third of the world's total coral reef area. The coral reefs in the region are 11 times larger than the aggregate coral reef area of China, India and Japan. Indonesia and the Philippines are ranked as two of the top three countries with the most coral reef areas in the world.

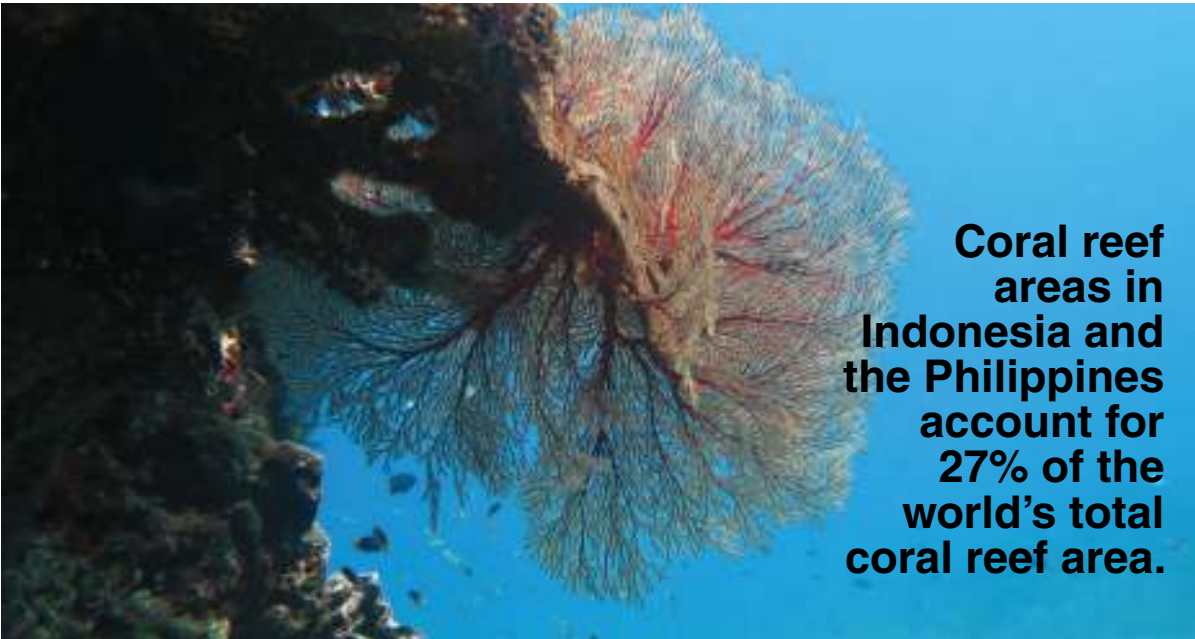
The diversity of coral reef ecosystems in Southeast Asia is paramount. The region has more than 75% of the world's coral species and one third of the world's reef fish species. Approximately 55% of the 3,764 reef-associated fish species in the Indo-Pacific region can be found in Indonesia alone.

Coral reefs in the region are highly productive ecosystems. They provide a variety of valuable goods and services such as fish that serves as the main source of protein for a large segment of the population in Southeast Asia and supports the livelihood of millions of coastal families. Coral reef resources in the region also provide services like recreation and tourism as well as coastal protection from storm surges.

Although Southeast Asia is host to a third of the world's coral reef areas, it also has the highest rate of loss, standing at almost 40% in total to date. Population encroachment in the coastal areas of

Southeast Asia is one of the main reasons of the decline. Between 1990 and 2000, coastal population in the region averaged to almost 126 million, ranging from a low of 115.4 million in 1990 to a high of 135.7 million in 2000. With more people living in the coastal region, the demand for goods and services provided by coral reef areas increases, ultimately threatening the sustainability of these critical ecosystems. Anthropogenic activities are another major factor contributing to the loss of coral reefs, particularly destructive practices and over-fishing. Some of the other natural and anthropogenic threats to the region's coral reefs are climate change, disease outbreak, sedimentation from land sources and from mining activities, physical damage from boat anchors and reef walking from tourists.

Given the range and serious nature of the threats to the ecological integrity of coral reefs, fishery resources are in a very vulnerable juncture if unsustainable practices do not change. Through the years, however, some ASEAN Member States have responded to these threats by undertaking actions that promote conservation and the sustainable use of these resources. One of the most recent efforts is the valuation of coral reef fisheries in the region. A case study has been conducted to estimate the loss in value of coral reef ecosystem services resulting from the loss in coral reef areas in the region.



Coral reef areas in Indonesia and the Philippines account for 27% of the world's total coral reef area.



Following the *value transfer* approach and using some of the findings of the 'Reefs at Risk' assessment exercise, the case study investigated the value of coral reef fisheries in terms of the habitat and nursery support services that this ecosystem provides. A total of 31 reef-related valuation studies published between 1992 and 2012 were reviewed for the value transfer analysis. With values generated for coral reefs of the Caribbean, the United States, Australia, some Indian Ocean and Pacific Island states, and Southeast Asia, the value transfer analysis assessed the economic value of the region's reef fisheries for the period 2000-2050. The value transfer analysis was complemented by a spatial assessment of the degree of threats to coral reef areas in the region. The threats assessed include coastal development, watershed based pollution, marine based pollution and damage, overfishing and destructive fishing, thermal stress, and ocean acidification.

In 2000, it was estimated that approximately 54% of coral reefs in the region are categorized as highly and very highly threatened. In 2050, it has been projected that almost 72% of all the coral reefs in Southeast Asia will experience a high or very high level of threats with additional 24% in the critical condition category. These findings show that if current practices continue and no action is taken to reverse the trend, coral reef areas in the region may almost be wiped out in half a century.

The value of coral reef fishery was assessed using spatial data from the 'Reefs at Risk' assessment exercise combined with patch level data on coral reefs from the UNEP World Conservation Monitoring Centre. The potential loss of coral reef areas as well as the factors (e.g. coastal population, size and location) influencing the change in the reef areas were examined to estimate the associated coral reef fishery value per year. The analysis showed that if activities such as over-fishing and destructive fishing practices continue, reef-related fisheries in Southeast Asia are subjected to an annual loss in value of US\$ 5.64 billion per year (in 2007 prices) for the period of 2000 to 2050. Indonesia and the Philippines, the two countries in the region with the largest coral reef areas, are projected to have the highest annual loss in foregone fisheries value at US\$ 2.7 billion and US\$ 2.2 billion, respectively.

If current unsustainable practices continue, almost 96% of coral reef areas in Southeast Asia will be in high, very high, and critical conditions in 2050.

If coral reef areas continue to decline between now and 2050, the foregone value of reef-related fisheries in Southeast Asia is estimated at US\$ 5.64 billion per year (in 2007 prices).



Finding Better Ways to Govern Forest Ecosystems: The Case of the Leuser Forest in Sumatra, Indonesia

In Aceh Province in Northern Sumatra, Indonesia lies a 25,000 square kilometer national park known as the Leuser Forest Ecosystem. The area is mostly characterized by montane tropical rainforest. It also comprises freshwater swamp forest, peat swamp forest, mangrove forest and other ecosystems.

The Leuser Forest Ecosystem is one of the two remaining homes of the Sumatran Orangutan (*Pongo abelii*). Other mammals that can be found in the area are the Sumatran Elephant (*Elephas maximus sumatranus*), the Sumatran Tiger (*Panthera tigris sumatrae*), and the Sumatran rhinoceros (*Dicerorhinus sumatrensis*). These species are categorized as critically endangered by the International Union for Conservation of Nature (IUCN).

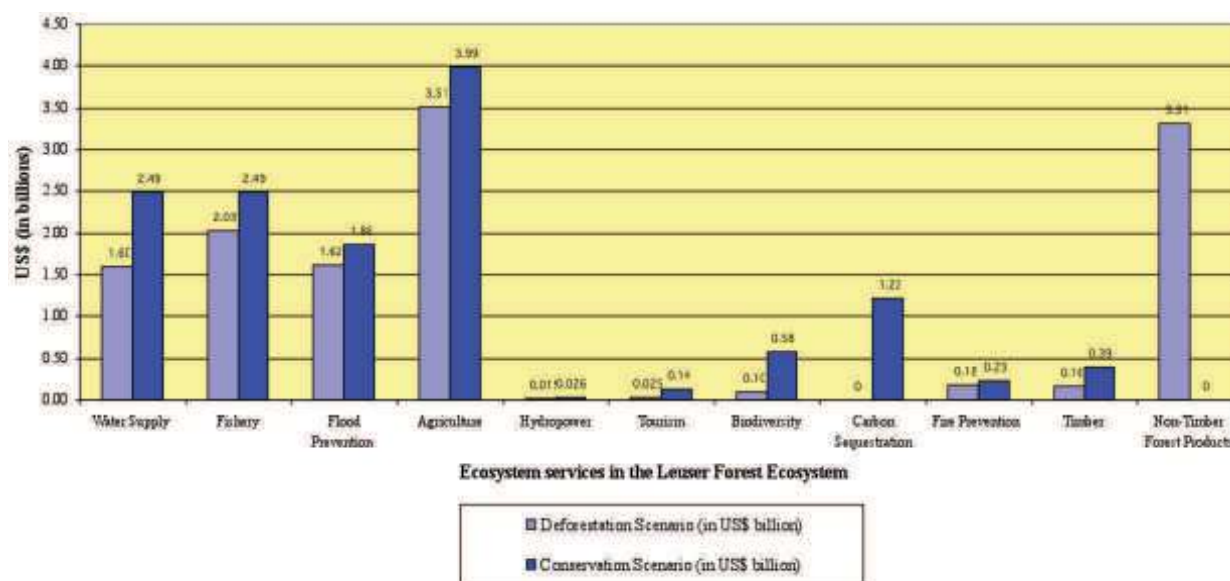
A part of the Leuser Forest Ecosystem, the Gunung Leuser National Park, forms a protected core with an area of 7,927 square kilometers. The Gunung Leuser National Park is recognized as an ASEAN Heritage Park. Together with the Kerinci Seblat National Park and the Bukit Barisan Selatan National Park, the Gunung Leuser National Park is also one of the three Tropical Rainforest Heritage of Sumatra, a UNESCO World Heritage Site.

Given the international recognition and national status of the Leuser Forest Ecosystem, under Indonesian law, activities inside the forest ecosystem that are not directly related to either the protection or restoration of the ecosystem are prohibited. In the late 1980s, however, deforestation in the area became widespread despite the formally protected status. The fragmentation of the area for roads and trails to make way for logging activities made harvesting of both timber and non-timber forest products and animals easily accessible.

The illegal activities in the Leuser Forest Ecosystem resulted in severe ecological consequences, such as the unsustainable decline in rattan and damar resin as well as near extinction of the Sumatran orangutan, rhinoceros, tiger and elephant. At present, it is estimated that less than a hundred individual rhinos are left. Further, structural damage to the local economy has been observed with the decline in crucial ecological functions such as the ecosystems potential inability to regulate water flows, reduce soil erosion and provide local households and entrepreneurs with income from forest resources and tourism.

If deforestation continues, the Leuser Forest Ecosystem may lose US\$ 1.4 billion worth of ecosystem services that the area can provide if conservation is implemented.





The Leuser Forest Ecosystem is indeed under enormous ecological pressure. If the rate of destructive activities in the Leuser Forest Ecosystem remains constant, the likelihood of the area losing its ecological integrity is imminent. The illegal activities pose a threat to the wide array of ecosystem services that are provided by the ecosystem. These ecosystem services include supply of raw materials, habitat services, climate regulation, erosion prevention, regulation of water flows, moderation of extreme events, and maintenance of soil fertility among others.


To illustrate the positive impacts of forest conservation and to reach out to decision makers faced with 'development versus conservation dilemma', studies with existing economic values to capture the conventional marketplace's commonly ignored intangible benefits of forest ecosystems have been assembled. By using the results from the work of van Beukering, et al (2003), locally contextualized economic value of the Leuser Forest Ecosystem has been generated. Two scenarios were compared to estimate the economic benefits of conserving the Leuser Forest Ecosystem over the benefits of continuing with current deforestation rates.

Under the continued deforestation scenario, the economic value of ecosystem services in the Leuser Forest Ecosystem such water supply, flood prevention, biodiversity, and carbon sequestration among others was estimated at US\$ 12 billion (in 2009 prices) over a 30-year period. Under the conservation scenario, the value of these ecosystem services was estimated at US\$ 13.4 billion over the same period. The estimates under the two scenarios show that conservation

outweighs the benefits from deforestation and forest land conversion. This suggests that conservation can deliver greater benefits in the long-run because a conserved forest ecosystem will continue to provide ecosystem services, whereas a fully deforested area will eventually collapse and fail to deliver tangible and intangible ecosystem services.

The case of the Leuser Forest Ecosystem demonstrates that to make sound forest policies, decision makers need information and empirical evidence on the benefits and costs of different policy options. The economic valuation of the ecosystem services of the Leuser Forest Ecosystem emphasizes that conservation makes economical and social sense. Of late, the local government of Aceh has stepped up its conservation policies in the Leuser Forest Ecosystem by endorsing the Green Development and Investment Strategy for Aceh Province, which aims to conserve 3.1 million hectares of the area.

It has also been observed that with conservation efforts in place, population of ecologically significant animal and plant species in the Leuser Forest Ecosystem are starting to recover. The Jakarta Globe reported in 2012 that Sumatran rhinos have been spotted once again in the Leuser Forest Ecosystem after a quarter of a century (Satriastanti, 2013). By continuing these efforts and practices and trying to resolve remaining issues such as institutional arrangements and assignment of property rights, the management of the Leuser Forest Ecosystem is heading in the right direction.



Informative Valuation for Conservation Action: The Story of the Hon Mun Marine Protected Area in Nha Trang Bay, Viet Nam

The marine and coastal ecosystems in Southeast Asia are considered as one of the region's highly valuable natural assets. These resources, however, are faced with a wide array of pressures that threatens their ability to supply goods and services for various stakeholders. In response to these threats marine protected areas (MPAs) have been established across Southeast Asia to ensure that marine and coastal ecosystems are protected and maintained for future generations.

The establishment of MPAs involves setting aside of a marine or coastal geographic region(s) with the aim of protecting areas by (1) reducing threats on zones of high natural, ecological or cultural values and (2) allowing resources to naturally regenerate. Marine protected areas have been considered as a tool for fisheries management and conservation of reef resources. In Southeast Asia, some of the MPAs of global significance include UNESCO World Heritage Sites such as the Komodo National Park (Indonesia), Tubbataha Reef National Marine Park (Philippines), Ujung National Park (Thailand), and Halong Bay (Viet Nam). At the regional level, Lampi Marine National Park (Myanmar) and Tarutao National Park (Thailand) are among the marine ASEAN Heritage Sites.

Recognizing the value of establishing marine protected areas and the urgency of addressing some of the pressures on Viet Nam's marine and coastal areas, the Vietnamese government in tandem with the local community has established several MPAs in the last 12 years. The main goal of establishing these MPAs is to mitigate the impacts of over-exploitation of marine fisheries and coastal ecosystems. The Hon Mun Marine Protected Area in Nha Trang Bay was primarily established for this purpose.

The Hon Mun marine area is a group of small islands consisting of the Hon Mot, Hon Tam, Hon Mieu, Hon Mun and part of Hon Tre islands. The area is surrounded by 122 square kilometers of water and has a land area of about 38 square kilometers. The Viet Nam Biodiversity Action Plan considers the Hon Mun group of islands as one of Viet Nam's significant marine ecosystems with the highest biodiversity. The area, according to Viet Nam's Institute of Oceanography, has 65 genera of marine biodiversity. This is just five genera short of the 70 genera reported for the Indo-Pacific's center of marine biodiversity.


The group of islands in the Hon Mun Marine Protected Area is known to locals for its fisheries

and bird nests. Tourism is a major activity in the marine protected area. Recreational activities on the islands include snorkeling, scuba diving, jet skiing, and boating among others. Because of the marine life in the area, the Hon Mun Marine Protected Area is also considered as one of Viet Nam's living marine research area that helps to advance marine education and understanding in the country.

The ecological and socioeconomic benefits that the Hon Mun Marine Protected Area provide have been assessed in a number of local and internationally-recognized studies (*for complete list, please see the complete ASEAN TEEB Scoping Study: Valuing Ecosystems Services in Southeast Asia report*). The studies demonstrated the benefits of how information and recommendations from economic valuation exercises can help a financially constrained and socially-challenged marine protected area to become well-functioning and sustainably financed. This case study of the Hon Mun Marine Protected Area documents how the application of value transfer, travel cost method, and the contingent valuation techniques can contribute to the effective management of a marine protected area.

A number of economic valuation studies conducted in the groups of island in the Hon Mun marine area applied either the travel cost method or the contingent valuation method to capture the value of the goods and services provided by in the area. By using the *zonal travel cost method*, the recreational value generated from domestic visitors to the marine protected area was estimated at US\$ 3.9 million annually (in 2000 prices) and at US\$ 13.9 million annually (in 2000 prices) for foreign visitors. If combined together the value of recreational services in the Hon Mun group of islands amounts to US\$ 17.9 million per year (in 2000 prices).

To capture people's willingness to pay (WTP) for funding the establishment and maintenance of a marine protected area in the Hon Mun group of islands, the *contingent valuation method* was employed. Local visitors to the area revealed that they are willing to pay US\$1.20 per visit to the group of islands whereas foreign visitors expressed their willingness to pay up to US\$ 1.90 per visit. At this rate and with the estimated number of local and foreign visitors in the marine area, the annual willingness to pay for funding the area under a protected status amounts to US\$ 400,000.



Zonal travel cost method estimates the value of recreational services of an area by using information on the number of visits to the site as well as the travel and time costs incurred by individuals from varying locations and distances.

The results of the valuation studies encouraged the local government in charge of managing the freely accessible public marine park – Hon Mun group of islands – to establish the islands under a protected area status. The potential of introducing a visitor entrance fee to establish a management and conservation fund for the islands was considered as a springboard by the local government to justify the value of the islands as a marine protected area. With assistance from international donor agencies such as the World Bank/Global Environmental Facility, the International Union for Conservation of Nature (IUCN), and the Government of Denmark, the Hon Mun group of islands was established as a marine protected area in 2001 with the long-term vision of making the area financially self-sustaining and autonomous.

The initial financial support from international donor agencies enabled the development of a participatory management plan for the Hon Mun Marine Protected Area. Repression of unsustainable practices and alleviation of poverty in the area through sustainable fisheries and aquaculture were included in the plan. The development of a sustainable financial regime for the newly established marine protected area was also part of the plan. The management of the Hon Mun Marine Protected Area has recognized the economic benefits of having the area under a protected status and has used the findings of several economic valuation studies to propose a user fee from eco-tourism as part of the sustainable financial regime.

In 2009, under Decision No. 23/2009/HQ-HDND, a variable visitor fee depending on the types of activities was introduced for the core zone of the Hon Mun Marine Protected Area. The revenue under this fee scheme goes to the provincial treasury, which earmarks 100% of the collection for the use by the Hon Mun Marine Protected Area. In 2011, total revenue amounted to US\$ 66,000, which constitutes approximately 40% of the total annual budget of the marine protected area. In the case of the Hon Mun Marine Protected Area, the success of implementing the variable visitor fee shows that economic valuation results may prove useful in shaping policy development and influencing decisions to earmark the variable visitor fee to the marine protected area.

Since the establishment of the Hon Mun Marine Protected Area and the introduction of the variable visitor fee, overfishing has been drastically reduced in the area. The diversity of reef fish has also been maintained. The current ecological status of the area is a manifestation that the potential for marine resource conservation is high if effective management is aided by empirical economic evidence.

Contingent valuation method estimates economic values of ecosystem services and biodiversity by directly asking individuals about their willingness to pay for an ecosystem service. The willingness to pay estimate is ‘contingent’ on a specific hypothetical scenario with respect to an ecosystem service(s).

Summing It Up: The Road Ahead



This Executive Summary highlights and illustrates how a multitude of economic valuation techniques can be utilized to incorporate values of ecosystem services and biodiversity into the decision-making process. The values synthesized from an extensive review of economic valuation literature within and beyond the Southeast Asian region demonstrated that when scarce natural assets are linked to economic pricing and compensation mechanisms, it can lay the bedrock for the establishment of a policy framework that can drive sustainable economic and social development. The four cases developed as part of the ASEAN TEEB Scoping Study provided evidence that economic visibility of biodiversity and ecosystem services can help combat the accelerating decline of environmental goods and services. Overall, the propositions provided in the ASEAN TEEB Scoping

Study seek to not only inform and influence but also to potentially trigger initiatives and processes that depart from the 'business-as-usual' practices to a more economically- and socially-inclusive approaches of managing the environment.

With suggestions from the ASEAN Member States, the ASEAN Centre for Biodiversity (ACB) with support from the Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) intends to eventually cover a wider spectrum for the economic assessment of the ASEAN ecosystem services and biodiversity. Some of the potential areas for further investigation include the provision of urban green space to the financing of protected forests and wetlands. Results from these assessments will be disseminated to key policy makers and stakeholders for further consideration in the decision making processes.

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References and Other Sources of Information

The contents of this Executive Summary are largely based on the following sources, which are published by and available upon request from the ASEAN Centre for Biodiversity:

- (1) ASEAN Biodiversity Outlook 2010 Report
- (2) ASEAN TEEB Scoping Study: Valuing Ecosystem Services in Southeast Asia 2012 Report

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