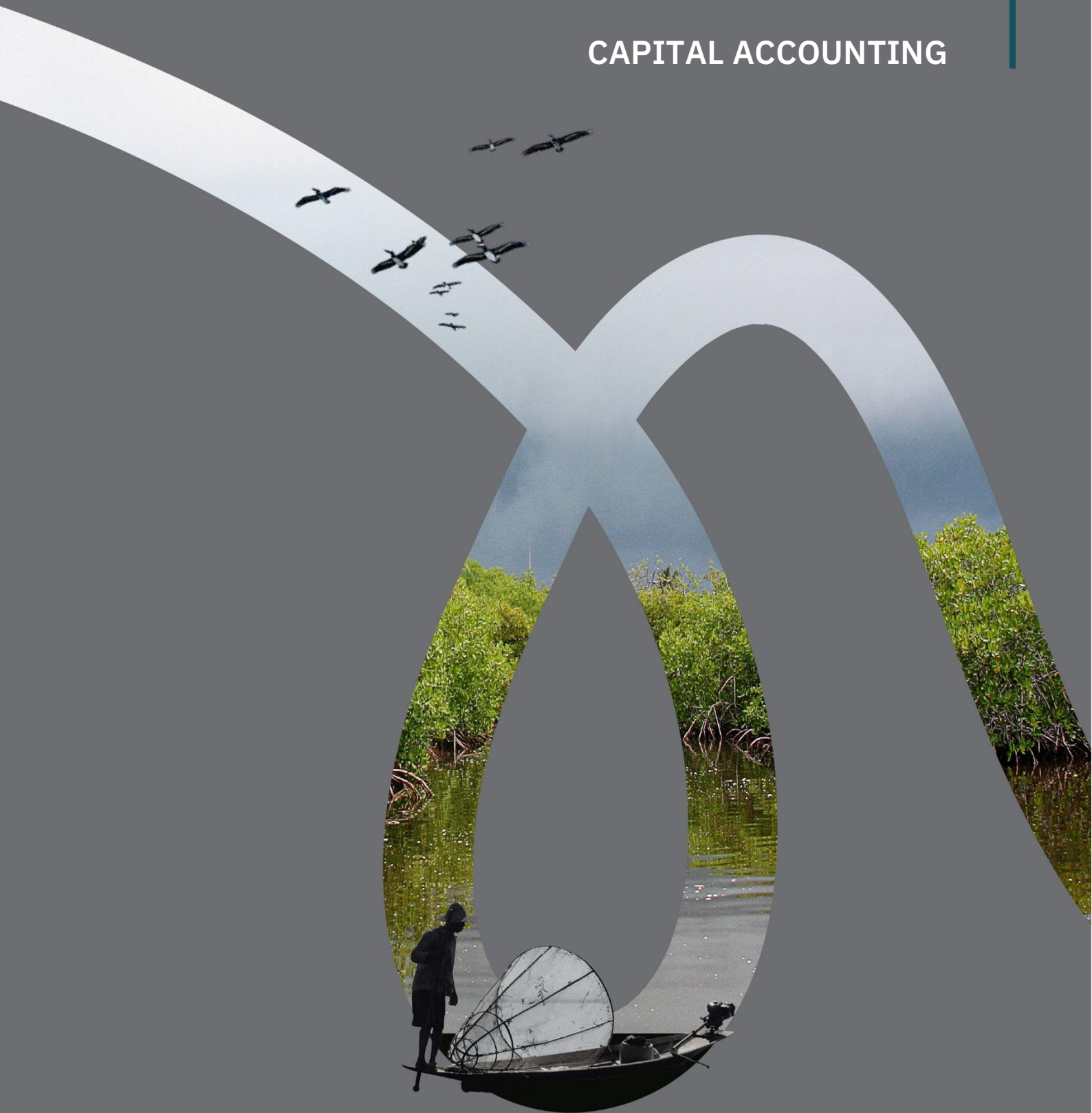


COMPONENT 3

INFORMATION-SHARING, AWARENESS-RAISING
AND NETWORKING TO MAINSTREAM NATURAL
CAPITAL ACCOUNTING



THE INTEGRATION OF NATURAL CAPITAL ACCOUNTING IN PUBLIC AND PRIVATE
SECTOR POLICY AND DECISION-MAKING FOR SUSTAINABLE LANDSCAPES

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COMPONENT 3

INFORMATION-SHARING, AWARENESS-RAISING AND NETWORKING TO MAINSTREAM NATURAL CAPITAL ACCOUNTING

OUTPUT 3.1.1

LOBBY POLITICAL AND
CORPORATE DECISION-MAKERS

OUTPUT 3.1.2

MEETING, BRIEFINGS AND
PRESENTATIONS TO/WITH
TARGET INDIVIDUALS/GROUPS
AND INSTITUTIONS

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1. Introduction

This report presents the outcomes of Output 3.1.1: Lobbying of political and corporate decision-makers and Output 3.1.2: Meetings, briefings, and presentations with target individuals, groups, and institutions. These outputs represent a central pillar of the project's advocacy strategy, designed to strengthen dialogue, foster collaboration, and influence decision-making processes at multiple levels of governance.

The report provides a comprehensive account of meetings convened throughout the project period, systematically organized into two major sections:

1. Implementation of National-Level Meetings – A total of 22 meetings were conducted with political leaders, corporate executives, and institutional representatives. These meetings served as formal platforms for presenting evidence, exchanging perspectives, and advancing the project's objectives within the national policy arena. They highlight the project's commitment to ensuring that key decision-makers are informed, engaged, and aligned with the broader vision of sustainable development.
2. Implementation of Provincial-Level Meetings – Four meetings were organized in selected provinces, providing opportunities to contextualize national priorities within local realities. These meetings facilitated dialogue among provincial stakeholders, strengthened institutional linkages, and promoted the integration of community-level initiatives into broader policy frameworks.

Together, the 26 meetings documented in this volume illustrate the project's sustained efforts to bridge national and provincial perspectives, ensuring that advocacy is both inclusive and responsive to diverse stakeholder needs. The chapters that follow present detailed summaries of each meeting, including objectives, participants, key discussion points, and outcomes achieved. By capturing both the process and the substance of these engagements, the report underscores the importance of structured dialogue as a mechanism for building consensus and driving meaningful change.

2. Implementation of National Level Meetings

2.1 Consultation on National Capital Accounting with NESDC

Date: 26 April 2024, 09.30 - 11.00

Location: the 5th floor, National Economic and Social Development Council

Attendees: 8 people

Office of the National Economic and Social Development Council (NESDC)

1. Ms. Kingkamon Lertthitankul Acting Expert on National Accounts System Development
2. Mr. Sombat Kitjaruwong Plan and Policy Analyst, Senior Professional Level
3. Ms. Taweeporn Kannee Plan and Policy Analyst

Thailand Development Research Institute (TDRI)

- | | | |
|----|----------------------------|-------------------|
| 4. | Dr. Adis Israngkura | Project Leader |
| 5. | Ms. Thippawan Keawmesri | Senior Researcher |
| 6. | Ms. Prinyarat Leangcharoen | Senior Researcher |
| 7. | Ms. Kanjana Yasen | Researcher |
| 8. | Ms. Panida Phranphanat | Researcher |

Main discussion

One-on-one meeting with key personnel at the Office of the National Economic and Social Development Council (NESDC) to consult and exchange opinions on the preparation of the National Capital Account. The personnel interviewed were Ms. Kingkamon Lertthitankul, Acting Expert on National Accounts System Development, National Accounts Office, and Mr. Sombat Kitjaruwong, Plan and Policy Analyst, Senior Professional Level.

Currently, Thailand has many agencies that are trying to calculate the Green Gross Product (Green GPP) in the areas for which they are responsible. However, no agency has yet produced a calculation for the entire country in every area due to limitations such as the large volume of data and the time required to collect data to create an index of resource and environmental costs.

The preparation of Green GPP in Krabi Province involves valuing economic value deducted from the costs of resources and environmental losses or degradation compared to the normal GPP, following the Environmental Cost Accounting System, specifically the System of Environmental-Economic Accounting (SEEA) set by the United Nations.

The use of the Index of Sustainable Economic Welfare (ISEW), which links economic growth with social and environmental costs to reflect the effects of development on the quality of life or welfare of people in society, including social costs, environmental degradation, and depreciation of natural capital, should be considered as another option for calculating Green GPP in Krabi Province.

Figure 1 One-on-one meeting with National Economic and Social Development Council (NESDC)

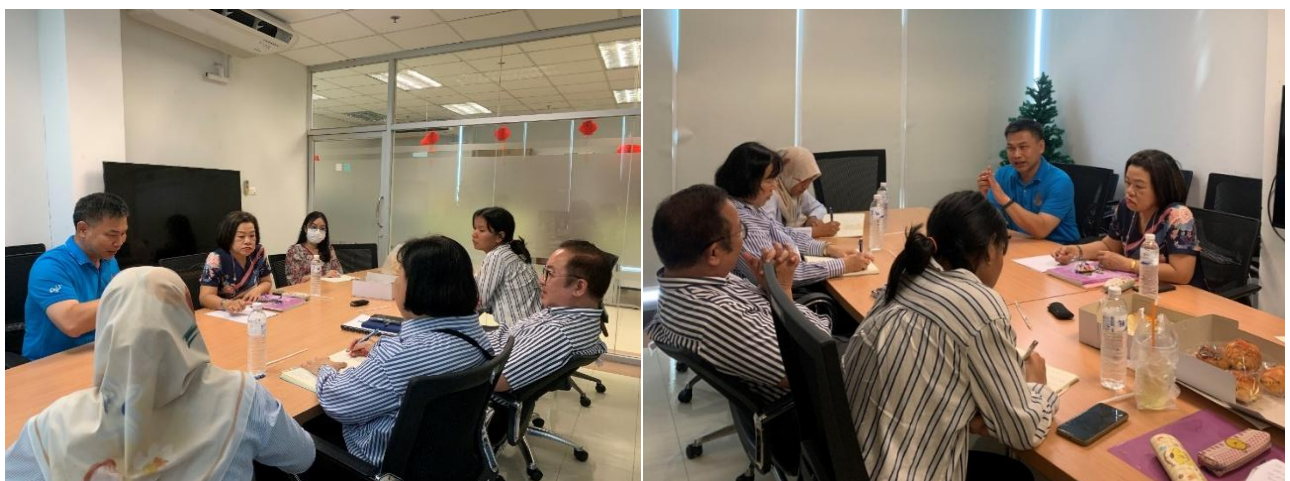


Image source by author

2.2 In-depth interview summarization Process of preparing “Tourism Satellite Account-System of Environmental Economic Accounting (TSA-SEEA) of Thailand”

Date: 6 June 2024, 9.30 – 12.00

Location: Meeting room 2 floor 3, Office of the Permanent Secretary, Ministry of Tourism and Sports

Attendees: 11 people

Economics Tourism and Sports Division (Office of the Permanent Secretary, Ministry of Tourism and Sports)

- | | | |
|----|--------------------------|--|
| 1. | Mrs. Kesaraporn Wimonrat | Plan and Policy Analyst, Senior Professional Level |
| 2. | Miss Benyapa Rakthuam | Plan and Policy Analyst, Practitioner Level |
| 3. | Mr. Tharadon Sinnok | Plan and Policy Analyst |
| 4. | Mr. Sumet Sangthong | Plan and Policy Analyst support officer |

Excellent Business Management Co.,Ltd

- | | | |
|----|---------------------|-----------------------------|
| 5. | Mr. Phak Thongsom | Deputy Managing Director |
| 6. | Mr. Uthen Nanthasen | Assistant Managing Director |

Thailand Development Research Institute (TDRI)

- | | | |
|-----|---------------------------------------|------------|
| 7. | Udomsak Seenprachawong (Assoc. Prof.) | Consultant |
| 8. | Thippawan Keawmesri | Researcher |
| 9. | Prinyarat Leangcharoen | Researcher |
| 10. | Kanjana Yasen | Researcher |
| 11. | Panida Phranphanat | Researcher |

Main discussion

Preparation of TSA-SEEA of the Ministry of Tourism and Sports began conducting in 2019 and 2020, tested/piloted the preparation of TSA-SEEA in 2017 and 2021, created TSA-SEEA in 2017-2018 and Bangkok, and in 2023 and prepared TSA-SEEA 2019-2021 of the country (hiring a consulting company, Excellent Business Management Company Limited)

Overview of the tourism situation for foreigners traveling to Thailand (Inbound) in 2023. In 2019, almost 40 million foreign tourists came to visit Thailand and 2020 was the year that the COVID outbreak occurred. The number of foreign tourists decreased and decreased the most in 2021 due to the announcement of the closing of the country. In 2022, the country began to open in July, causing the number of tourists to improve, and in 2023 there were approximately 28 million tourists, or 70% compared to 2019. The top 5 most incoming tourists are Malaysia, China, South Korea, India, and Russia, respectively, and the top 5 provinces in Thailand that foreign tourists visit are Bangkok, Chonburi, Phuket, Surat Thani, and Chiang Mai, respectively, able to generate 1.23 trillion in revenue for the country. baht or equivalent to 64% compared to 2019

Tourism situation for Thais traveling to Thailand (Domestic) in 2023. The hotel occupancy rate in 2019 was 70%, compared with in 2023, it was similar at 69%. As for the number of Thai tourists traveling to Thailand, it is

interesting that in 2019 It was 172 million people-times, but in 2023 it was 185 million people-times because during the Covid period, there was encouragement for Thai people to travel to Thailand which was able to generate income of 0.86 trillion baht or equivalent to 79% compared to 2019.

Preparation of the Tourism Satellite Account (TSA), the definition of the word for "Tourism" is a journey (travel) where a traveler leaves his or her normal environment to another place for less than 1 year for any primary purpose. Anything other than going to work or work in a place that you travel to visit

Characteristics of tourists: Visitors are divided into: Tourists traveling overnight and sightseeing (Excursionist), traveling in the morning - returning in the evening.

The benefits of TSA are used as indicators of the importance and role of the tourism economy at the macro level of the country. They can express the economic value of a country, such as the consumption value of tourism value added of the tourism industry, GDP value to the tourism industry, and information on tourism indicators that are not in the form of money. It is also used to measure the impact of the tourism sector on the overall economy and can be compared with other countries that have been created by TSA which is the same standard

TSA is a satellite account of the National Accounts that shows overall information on the country's tourism situation, both in monetary and non-monetary forms, systematically and in accordance with the country's National Accounts. And it is a statistical tool used to measure the impact of tourism on the overall economic system of the country. How do you clearly understand the economic impact of the tourism industry? and can analyze and compare at the international level

The Office of the Permanent Secretary, Ministry of Tourism and Sports has developed and prepared the TSA, according to the Tourism Satellite Account: Recommended Methodological Framework 2008 (TSA-RMF 2008), which covers annual TSA (2010-present), quarterly TSA (2013). -present), TSA by tourism development zone (15 tourism zones, Krabi Province is in the Andaman Tourism Development Zone, consisting of Phuket, Krabi, Phang Nga, Trang and Satun with an operations center in Phuket Province), regional TSA (5 regions, North, Central, South, East, Northeast) and has created a Tourism Input-Output table (national level In addition, sustainable tourism indicators have been developed under Linking the TSA and the SEEA: A Technical Note of the UNWTO and have been recently updated according to the Measuring the Sustainability of Tourism: MST of the UN. Tourism

The main objective of preparing TSA-SEEA

- Searching for feasible guidelines for preparing a Tourism Satellite Account (TSA) which includes environmental costs in Thailand.
- Cooperating between relevant agencies to develop and prepare information about natural resources and the environment that are linked to the tourism activities in the country
- Creating a Tourism Satellite Account (TSA) which excludes environmental costs or Tourism Green GDP.

Preparation of TSA-SEEA of the Ministry of Tourism and Sports. Starting in fiscal year 2019, which study the possibility, in fiscal year 2020, the Office of the Permanent Secretary, Ministry of Tourism and Sports, conducted

a pilot project to prepare TSA-SEEA for the year 2017, and in fiscal year 2021, prepared for the years 2017-2018 and Bangkok, and fiscal year 2023, prepared for the year 2019-2021 of the country.

A challenge in preparing TSA-SEEA is the lack of national environmental accounting (No agency has done so yet), No budget has been allocated, primary data storage, and reliance on secondary data.

TSA-SEEA consists of 4 main accounts, 1. Solid waste accounts for tourism characteristic activities 2. Physical supply and use table for water, Water emissions account 3. Tourism industries energy flow account) and 4. Tourism industries GHG emissions account.

The data sources are mainly based on secondary data such as water resource data, including rainfall data, Number of water users, Amount of water produced, and Water distribution. The data source comes from the Provincial Waterworks Authority. Metropolitan Waterworks Authority, Royal Irrigation Department, Department of Groundwater Resources, etc.

Using **Tourism Ratio**, for example, the use of hotel services by tourists who do not use the services in all sectors of the hotel (e.g. wedding room services and laundry service), therefore, the Tourism Ratio must consider, which the Tourism Ratio for every tourism development zone (in Table 6).

Note: Requesting information on the Tourism Ratio for Krabi Province, which is in the Andaman Tourism Development Zone

$$\frac{\textit{Tourists expenditure (Demand)}}{\textit{Gross Profit (Gross output) (Supply)}}$$

Andaman Tourism Development Zone provides the information from the year 2016-present There is information on expenses for both inbound domestic outgoing (Table 1- 4), supply information (Table 5), and Tourism Ratio information (Table 6) *** Request information ***

Figure 2 In-depth interview TSA-SEEA



Image source by author

2.3 Consultation on National Capital Accounting with NCA Expert

Date: 8 August 2024, 11.00 - 15.00

Location: Adamus Cafe by the river, Charansanitwong Road, Bang Phlat District, Bangkok

Attendees: 5 people

NCA Expert (retired government official)

1. Ms. Pattama Domrongphol Expert on NCA (retired government official)

Thailand Development Research Institute (TDRI)

2. Dr. Adis Israngkura Project Leader
3. Ms. Thippawan Keawmesri Senior Researcher
4. Ms. Kanjana Yasen Researcher
5. Ms. Panida Phranphanat Researcher

Main discussion

The Ministry of Natural Resources and Environment, through the Office of Natural Resources and Environmental Policy and Planning, has proposed the project “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-Making for Sustainable Landscapes” to request budget support from the Global Environment Facility (GEF) Round 6 (GEF-6). The objective is to integrate natural capital into the policymaking and operations of key economic sectors at both the local and national levels, promoting the protection of biodiversity and mitigating the impacts of the production sector on ecosystem services. The project proposal has been under development since 2012.

Around 2012, Ms. Pattama Domrongphol, who was then an Environmentalist at the Senior Professional Level in the Biodiversity Management Division of ONEP, coordinated with Mr. Makiko Yashiro from UNEP, since UNEP is a GEF Implementing Agency, to request financial support from GEF for species protection legislation. To enact such legislation and raise public awareness about biodiversity protection and conservation, policymakers needed to first understand the value of biodiversity. This need led to the development of the Natural Capital Accounting project, which aligns with the objectives of the GEF-6 grant. Mr. Yashiro agreed, and ONEP subsequently developed a proposal for the “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-Making for Sustainable Landscapes” project, focusing on the agricultural and tourism sectors with Chiang Rai Province as the initial case study area. However, the study area was later changed to Krabi Province, though the reason for this change is unclear, as Ms. Domrongphol retired before completing her government service. Despite this, Krabi Province was selected due to its rich biodiversity, diverse ecosystems, and variety of migratory birds.

The findings of this project, particularly the recommendations, should be incorporated into various related policies and plans, including national, provincial, and local plans.

Pollution sources, particularly waste and wastewater, come from multiple channels. Therefore, TDRI proposes a holistic tool to manage and control these pollution sources effectively.

Figure 3 Consultation on National Capital Accounting with NCA Expert



Image source by author

2.4 Consultation on Marine and Coastal Pollution

Date: 20 August 2024, 14.00 - 16.00 / 5 September 2024, 14.00 - 15.30

Location: Pollution Control Department (PCD), Ministry of Natural Resources and Environment / The Environment and Pollution Control Office 15 (Phuket)

Attendees: 7 people

Pollution Control Department (PCD) August 20, 2024

1. Mr. Chaiyut Sanghaisuk Director of the Marine Resources Division
2. Mr. Punntorn Kawyord Director of Pollution Management Coordination Division

The Environment and Pollution Control Office 15 (Phuket), September 5, 2024

3. Ms. Chanthira Duangsai Director of the Environment and Pollution Control Office 15 (Phuket)
4. Ms. Nongyao Yutchana Director of the Environmental Planning Division
5. Mr. Thirayut Kamsiripiman Director of Waste and Hazardous Substance Management)

Thailand Development Research Institute (TDRI)

6. Dr. Adis Israngkura Project Leader
7. Ms. Panida Phranphanat Researcher

Main discussion

According to Pollution Control Department, pollution sources can be divided into 10 categories according to the Act in Section 80 of the Enhancement and conservation of National Environmental Quality Act, B.E. 2535 as follows:

- 1) Industrial factories: Type 2 and 3 factories, industrial estates, industrial projects
- 2) Certain types and sizes of buildings: Condominiums with more than 100 rooms, hotels with more than 60 rooms, schools, department stores with an area of more than 5,000 sq.m., office buildings

with an area of more than 10,000 sq.m., hospitals with more than 10 beds, markets, restaurants or food shops with an area of more than 500 sq.m.

- 3) Land developments: Land divided into sub-plots for sale, more than 100 plots
- 4) Pig farming: Livestock unit weight more than or equal to 6 units
- 5) Fishing piers, fish piers and fish raft businesses: All sizes
- 6) Fuel stations: according to the fuel control act
- 7) Community wastewater treatment systems
- 8) Coastal aquaculture ponds
- 9) Brackish aquaculture ponds: All sizes
- 10) Freshwater aquaculture ponds: Herbivorous and carnivorous aquatic animals No salinity-producing substances added, with a total pond area of more than or equal to 10 rai, and aquatic animals with salinity-producing substances added, all sizes.

The main sources of pollution in Krabi Province include palm oil factories, rubber processing facilities, aquatic animal processing factories, fishing piers, and fish piers involved in washing and packaging aquatic animals. There are approximately 200-300 registered fish piers in Krabi Province. The pollution sources impacting seawater quality in Krabi Province are categorized as follows: 1) Industrial factories, 2) Aquaculture ponds (especially for Pacific white shrimp and fish), 3) Tourist attractions, and 4) Rivers and canals in Krabi.

The depth at which seawater quality samples are collected varies depending on the physical characteristics and activities of the beach. Sampling occurs in three stages: Stage 1 at 5-10 meters, Stage 2 at 100 meters, and Stage 3 at 500 meters. Samples are collected at the same point each year, although different depths at each point can affect water quality values. However, samples will be compared annually at the same point, and collections are made at mid-depth during low tide.

Various parameters of seawater quality can indicate pollution sources. For example, phosphorus is expected to originate from household activities; BOD (Biochemical Oxygen Demand) is associated with aquaculture activities; coliform bacteria are linked to tourism activities; and COD (Chemical Oxygen Demand) is related to industrial activities. Turbidity, which measures seawater transparency, is important for tourism but does not directly indicate seawater cleanliness.

Agencies seeking further information on pollution sources can request data on rivers and canals from the Environment and Pollution Control Office 15 (Phuket), which can help identify pollution source groups for analysis and correlate them with seawater quality parameters. Information on industrial plants can be obtained from the Department of Industrial Works, and data on aquaculture can be requested from the Department of Fisheries.

Figure 4 Consultation on Marine and Coastal Pollution with Pollution Control Department (PCD) and The Environment and Pollution Control Office 15 (Phuket)



Image source by author

2.5 Developing Maritime Zone Map in Krabi Meeting

Date: 16 July 2024, 14.00 – 16.00

Location: the 6th floor, Geo-Informatics and Space Technology Development Agency (Public Organization) – GISTDA, The Government Complex Commemorating Chaengwattana, Bangkok

Attendees: 7 people

Naval War College

1. Capt. Asst. Prof. Saman Dairairam Sattahip Naval Base Thai Maritime Enforcement Command Center (MECC)

Geo-Informatics and Space Technology Development Agency (Public Organization) – GISTDA

2. Mr. Chakris Phitakrattanasakul Innovation Specialist
3. Miss Pimnipa Thanupranom Geoinformatics specialist

Thailand Development Research Institute (TDRI)

4. Ms. Thippawan Keawmesri Senior Researcher
5. Ms. Prinyarat Leangcharoen Senior Researcher
6. Ms. Kanjana Yasen Researcher
7. Ms. Panida Phranphanat Researcher

Main discussion

Currently, Thailand does not have a map showing the maritime boundaries of its coastal provinces for management purposes. The existing boundaries of responsibility are limited to the delineation of provincial boundaries in the Gulf of Thailand from 1959. For coastal provinces outside the Gulf of Thailand, there is no delineation of maritime boundaries between them. Therefore, the project “Development of a Maritime Boundary Map between Coastal Provinces of Thailand” was implemented by the Office of the Permanent

Secretary for Defense in collaboration with Thailand Science Research and Innovation (TSRI) in 2019. This project serves as a central tool for all sectors to manage the Thai seas jointly and to support marine spatial planning for Thailand.

The maritime zone division between the coastal provinces of Thailand is defined as follows: 1) Internal waters are the maritime areas behind the baseline of the territorial sea, extending toward the land. 2) The territorial sea is the maritime area under Thailand's sovereignty, with a width of 12 nautical miles. Thai sovereignty extends to the air space above the territorial sea, as well as the land, seabed, and subsoil beneath it. 3) The contiguous zone is the maritime area extending from the territorial sea, measured from the baseline used for the territorial sea, up to 24 nautical miles. Thus, the contiguous zone is a 12-nautical-mile-wide area adjacent to the territorial sea. 4) The exclusive economic zone (EEZ) is the maritime area extending from the territorial sea, measured from the baseline used for the territorial sea, up to 200 nautical miles.

The steps for dividing marine zones between the coastal provinces of Thailand are as follows: 1. Determine the length of the coastline of each pair of provinces by using the endpoints of the land boundary to measure the coastline of each province. 2. Establish the general direction of the coastline by creating a straight line connecting the endpoints of the land boundary between the provinces. 3. Determine the direction of the coastline (Coastal Front) by projecting the general direction of the coastline out to sea. The result is the overlapping marine areas between the provinces, marked in green. 4. Divide the marine responsibility areas between the provinces using the ratio method.

Coastal coordinates: The starting coordinates for drawing the provincial boundary line from the coast out to sea will be the sub-district at the last point connected to the sea that appears on the inter-provincial boundary line. This point will be considered the starting point for determining the provincial boundary line by sea, based on announcements from the Ministry of Interior (regarding sub-district areas) and the Ministry of Agriculture and Cooperatives (concerning the responsibilities of the Provincial Fisheries Committee in the coastal sea area).

The land coordinates used as the starting point for the Phang Nga-Krabi boundary, according to the announcement of the Ministry of Interior, are as follows: Thap Put District, Phang Nga Province, Marui Sub-district adjacent to Laem Sak Sub-district, Ao Luek District, Krabi Province; east of Khao Pun Nuea Island at coordinates MK633267; Laem Sak Sub-district adjacent to Malui Sub-district, Thap Put District, Phang Nga Province; and in front of Laem Yong Pisang at coordinates MK575130.

The land coordinates used as the starting point for the Krabi-Trang boundary, according to the announcement of the Ministry of Interior, are as follows: Khlong Thom District, Krabi Province; Sai Khao Sub-district adjacent to Khao Mai Kaew Sub-district, Sikao District, Trang Province; Ban Laem Sai area at coordinates NJ288464; Sikao District, Trang Province; Khao Mai Kaew Sub-district adjacent to Sai Khao Sub-district, Khlong Thom District, Krabi Province; and the Phraek Pak Khlong Kalase Noi area at coordinates NJ287462.

Figure 5 Developing Maritime Zone Map in Krabi Meeting

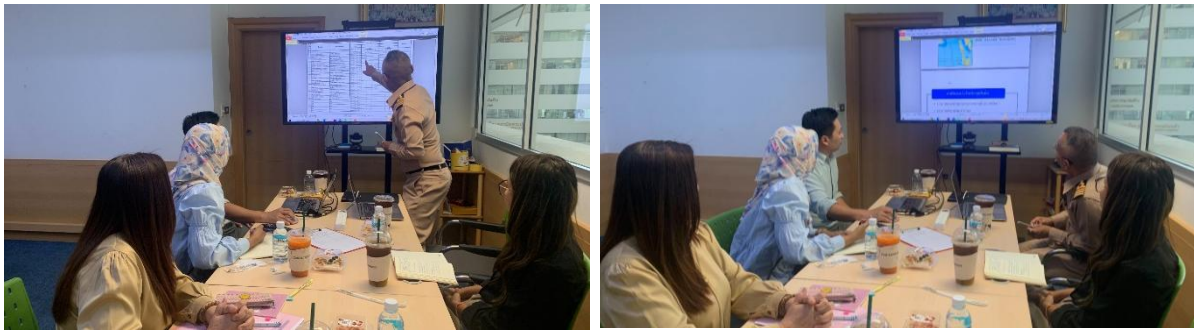


Image source by author

2.6 The 3 parties coordination meeting for NCA Project (UNEP-ONEP-TDRI) Project “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes”

Date: 20 December 2024, 14.00 – 16.00

Location: Online Meeting

Attendees: 6 people

Office of Natural Resources and Environmental Policy and Planning (ONEP)

1. Dr. Benchamaporn Wattanatongchai Environmentalist, Senior Professional Level
2. Ms. Somawan Sukprasert Environmentalist, Senior Professional Level
3. Ms. Wannapa Maneeekul Plan and Policy Analyst

Thailand Development Research Institute (TDRI)

4. Dr. Adis Israngkura Project Leader
5. Ms. Thippawan Keawmesri Senior Researcher
6. Ms. Panida Phranphanat Researcher

Main discussion

In the past, TDRI focused on thinking of the concept of creating SEEA and making templates to analyze the results and present the analyzed data to policy-level agencies to be integrated into the work plan. Therefore, we had to analyze the data in both quantitative terms, with maps and impacts, so that the agencies would see that our tools were useful, but might not be in line with the project results (output). So, we followed the advice of Ms. Anouska, which was to go back and follow the output table in PRODOC. Therefore, we would like to clarify and understand the output with Ms. Kavita because there were some outputs that we still did not understand.

The issues we would like to discuss start with the NCA of the study area in Krabi Province, but in the output table that appears in the PRODOC, NCA should be included in the Tourism Satellite Account and Water Resource Satellite Account, which are only available at the national level, but not at the provincial level (Krabi), including NCA in the I/O Matrix, which is the natural capital of Krabi Province, but the I/O Matrix is at the national level, which is not done at the provincial level because it is too detailed. So we will consult with UNEP about what this output means, whether to include it in concept or to include numbers as well.

What is overlooked is that there needs to be a meeting of expert groups to finalize the economics Instrument or market-based instruments (MBI) to be used. There are 4 instruments (linked to seawater quality):

(1) Collect waste fees from municipal waste bags by changing from the current monthly waste disposal fee to a waste disposal fee per bag, with each local government area responsible for implementing the mechanism. This mechanism will create incentives for people to separate waste and reduce the amount of waste, which will alleviate the burden of waste disposal on local government organizations (LGOs) and generate income for LGOs. This mechanism will help reduce the problem of pollution from landfills that flow into and spread into nature and the sea.

(2) Support coastal communities to install small-scale wastewater treatment systems. The project will develop household-level small-scale wastewater treatment systems for coastal communities that currently do not treat wastewater before discharging it into public water sources. Since small-scale wastewater treatment systems are required expense, which would affect low-income families, the project proposes a Cross Subsidization tool by having local administrative organizations that earn more income from land and building taxes join in providing some support for installing small-scale wastewater treatment systems for households, in order to reduce wastewater discharged into the sea and beaches.

(3) Donation or fee system from tourists to generate income for groups/clubs conserving natural resources in the area, such as dugong and sea grass planting conservation groups, coral reef conservation groups, etc. This financial mechanism will help develop funds and be a source of income for activities conserving sea grass, coral reefs and dugongs, which are important natural capital of Krabi province.

(4) Establish a fund for the conservation of Nong Thale water sources (water production source), in which income into this fund will be based on the Payment for Ecosystem Services (PES) principle, whereby those who benefit from using water from Nong Thale water sources will pay into the fund according to the amount of water used. Income into the fund will be used to develop the Nong Thale water sources for sustainability.

According to the TOR or PRODOC, this project must develop about 1-2 MBI or Economics Instruments as outputs to be used in the Krabi area. While developing the MBI, it also conducted the NCA of Krabi Province (extent account table, condition account table, service account) in parallel. The main focus of the project is the development of natural capital to be used in writing policies/plans at both the central and provincial levels.

ONEP is concerned that TDRI does not need to focus on MBI or Economics Instrument because of the limited time available. It should therefore focus on NCA, perhaps using existing or already prepared data such as Ocean Economy Satellite Accounts, Tourism Satellite Accounts (TSA), and would like a report on what has been done for each component 1-3 in the past 2 years.

TDRI is currently creating the SEEA of NCA, which has completed the extent accounts table and is currently creating the condition accounts and service accounts table. As for creating the NCA Scenario or simulating the situation (e.g. if there are more tourists, what will be the impact on the quality of the sea water?), TDRI has coordinated with GISTDA to form a team that will work to answer the NCA Scenario.

ONEP asked 2 questions: (1) Is there a tendency to include NCA data of Krabi province in the national Satellite Accounts? (In the past, TDRI asked UNEP and UNEP answered that it could be included as a recommendation.) However, ONEP wants to include it at the national level, which is better, for example, we have a natural capital account for water management to include in the national water management account. (2) The pilot area is to try out real tools or accounting calculations, since Krabi province has never had Satellite Accounts for both tourism and water resources. As mentioned, TDRI must prepare tourism accounts and water resources accounts for Krabi province, but the PRODOC states that Krabi NCA data must be included in the national Tourism Satellite Account (TSA) and the national Water Resources Satellite Account (WRSA). Therefore, TDRI will have to ask UNEP about this issue.

ONEP proposes to create Satellite Accounts at the provincial level, namely Krabi Tourism Satellite Account (TSA) and Krabi Water Resources Satellite Account (WRSA), but there must be recommendations for the national level as well.

Since the I/O Matrix is only done at the national level (every 5 years), because the I/O Matrix comes from the provincial GPP to be calculated as the national GDP and then calculated as the national I/O, will ask UNEP regarding this.

In the past, Thailand has implemented I/O Matrix only on a sector-by-sector.

TDRI will make a report to present the results of the past 2 years, stating what each component has done / has not done / and what will be done next, with attached documents. And summarize the 5-year plan, stating what is not yet completed and what will be done next, and what TDRI is still unsure about, such as whether it is necessary to include NCA in the national satellite account or not, then ask for opinions from the PSC.

2.7 One-on-one meeting Impact Analysis of Simulation Scenarios and Market Base Instrument (MBI)

Date: 9 January 2025, 09.30 – 12.00

Location: Meeting Room 2B, 2nd Floor, Thailand Development Research Institute (TDRI)

Attendees: 15 people

UN Environment Programme (UNEP)

1. Kavita Sharma, PhD
2. Mr. Peerayot Sidonrusmee

Special Experts

3. Dr. Udomsak Seenprachawong
4. Dr. Pasita Chaijaroen

Geo-Informatics and Space Technology Development Agency (GISTDA)

5. Dr. Ditchaphong Phoomikiattisak
6. Mr. Chakris Phithakrattanasakun
7. Ms. Pichayarat Piyachan
8. Ms. Pimnipa Thanupran

9. Ms. Nutch Nontarak
10. Mr. Pongrapee Nuchapong

Thailand Development Research Institute (TDRI)

11. Dr. Adis Israngkura
12. Mrs. Thippawan Keawmesri
13. Ms. Prinyarat Leangcharoen
14. Ms. Kanjana Yasen
15. Ms. Panida Phranphanat

Main Discussion

PES (Payments for Ecosystem Services) Concepts: The consultants presented various PES (Payments for Ecosystem Services) concepts, including:

- Establishing a PES fund, such as collecting funds through boat fare for coral conservation.
- Introducing a voluntary tax in 5-star hotels to fund conservation efforts for areas where turtles lay their eggs. This initiative has already been implemented in Phuket province.

TDRI Updates: TDRI provided an overview of their ongoing activities, including:

- Analysis of pollutant sources.
- Development of an extended and conditioned account, as well as a satellite account focusing on water and tourism sectors.
- Ecosystem services related to water, with future plans to monetize these services.

Prodoc Review

- TDRI requested UNEP to review the Prodoc and assess the content of the Input-Output (I-O) table, as it currently operates only at the national level.
- UNEP advised TDRI to consult with Mr. Carl for expertise in economic accounts related to this matter.

TDRI Reporting and Scheduling

- TDRI is in the process of preparing the Mid-Year Report and the PSC (Project Steering Committee) meeting documents.
- Once these documents are completed, TDRI will schedule the next meeting.

Policy Development and Scenario Planning

- TDRI proposed to develop policy scenarios for several ecological issues, including coral reefs, seagrass, dugong population, and water quality indicators (WQI). Specifically, one scenario will focus on solid waste management, including the introduction of a garbage collection fee.

Waste Management Data

- GISTDA expressed interest in obtaining data related to the reduction of waste volume.

Waste Separation and Tourism Sector

- The consultant recommended implementing waste separation, particularly distinguishing between degradable and non-degradable waste. This is especially relevant as tourism generates significant waste, and it is important to have data on waste produced by the tourism sector, compared to household waste.

Small-Scale Waste Treatment Proposal

- TDRI proposed a scenario for small-scale waste treatment to encourage coastal households to install small waste treatment tanks. This initiative could be promoted through local experts, with the introduction of a cross-subsidy scheme. Under this scheme, households would pay 50% of the full price for the installation, with the subsidy decreasing in subsequent years.

Municipal Programs on Wastewater Management

- UNEP advised that municipalities may already have existing programs aimed at combating wastewater issues, which could be relevant to the proposed initiatives.

Next Step: To be scheduled after the completion of the Mid-Year Report and PSC meeting preparation

Figure 6 One-on-one meeting Impact Analysis of Simulation Scenarios and Market Base Instrument (MBI)



Image source by author

2.8 One-on-one meeting consult and discuss supporting conservation activities, mitigate impacts and restore degraded habitats in coastal marine ecosystems, and the Green Fins project

Date: 6 February 2025, 09:30 – 12:00

Location: Coral Meeting Room, 6th Floor, Marine Resources Conservation Division, Department of Marine and Coastal Resources

Attendees: 10 people

Department of Marine and Coastal Resources (DMCR)

1. Mr.Pinsak Suraswadi Director-General of Department of Marine and Coastal Resources
2. Mr.Thana Chokprasombat Director of Mangrove Conservation and Rehabilitation Subdivision
3. Ms.Orapa Suwattano Fishery Biologist, Professional Level
4. Mr.Chatchai Pucksachad Fishery Biologist, Professional Level
5. Ms.Kanokwan Kirdpol Fishery Biologist, Practitioner Level
6. Ms.Supawadee Khunmuang Fishery Biologist, Practitioner Level

Thailand Development Research Institute (TDRI)

7. Dr. Adis Israngkura Advisor for Resource Sustainability and Mitigation Policy
8. Ms.Prinyarat Leangcharoen Senior Researcher
9. Ms.Kanjana Yasen Researcher
10. Ms.Panida Phranphanat Researcher

Main Discussion

Conserve, mitigate impacts and restore degraded habitats in watershed forests and coastal marine ecosystems (total area of 40,000 ha in Krabi province)

Seagrass Ecosystem:

- The Director-General of the Department of Marine and Coastal Resources (DMCR) recommended that TDRI coordinate with EnLive Foundation.
- EnLive Foundation's mission focuses on preserving natural capital and creating sustainable economic value through a participatory approach involving local stakeholders in Krabi.
- Rayavadee Krabi is a founding member of EnLive Foundation, aiming to support local communities and raise awareness about the importance of protecting Krabi's marine ecosystems.

Mangrove Forest Ecosystem:

- TDRI is coordinating with the Marine and Coastal Resources Office 10 (Krabi).
- TDRI can support and promote mangrove forest areas under the "Krabi Urban Forest" project, especially the mangrove ecotourism site at Khao Khnab Nam in Krabi.
 - Situated in Krabi Town Municipality, Pak Nam Subdistrict, Mueang Krabi District, Krabi Province.
 - Providing knowledge and understanding, raising awareness about the importance of conserving and restoring mangrove resources.

- Installing educational signs about local resources, along with areas for relaxation and photo opportunities for tourists.
- Offering academic assistance and other necessary support to help enhance the conservation efforts.

Coral Ecosystem and Green Fins Thailand (“save our reef-Krabi”)

- Initially, we received advice from officers of the Conservation and Management Measures for Marine Resources Subdivision, Marine Resources Conservation Division, and Green Fins Project officers.
- TDRI is encouraged to support coral reef conservation in Krabi through the Green Fins project.
- Actions to be supported under Green Fins:
 - Training for dive tourism operators in environmentally friendly practices.
 - Raising awareness among tour operators and staff regarding coral reef conservation.
 - Providing financial support to develop the Green Fins project website.

Next Steps:

- Seagrass and Mangrove Ecosystem: Coordinate with EnLive Foundation, Marine and Coastal Resources Office 10 (Krabi), and other stakeholders to implement sustainable practices in Krabi.
- Coral and Green Fins: Coordinate with Green Fins Project (Ms. Kanokwan Kirdpol (DMCR), and Petchrung Sukphong to develop, test and implement sustainable financing mechanisms for the GreenFins program in Krabi province.

Figure 7 One-on-one meeting consult the Green Fins project



Image source by author

2.9 Consult and Discuss on Water Account

Date: 11 March 2025, 09.30 – 12.00

Location: Conference Room 4B, 4th Floor Thailand Development Research Institute

Attendees: 9 people

Specialist (Water Account)

1. Prof.Dr. Nuchanart Sriwongsitanon Water Resources Engineering
Faculty of Engineering, Kasetsart University

Thailand Development Research Institute: TDRI

2. Dr. Adis Israngkura Advisor for Resource Sustainability and Mitigation Policy
3. Dr. Nipon Poapongsakorn Distinguished Fellow
4. Ms. Thippawan Keawmesri Senior Researcher
5. Ms. Prinyarat Leangcharoen Senior Researcher
6. Ms. Kanjana Yasen Researcher
7. Ms. Panida Phranphanat Researcher
8. Mr. Peerawat Suriyaburaphakul Researcher
9. Ms. Pichamon Keakij Researcher

Main discussion

The development of Water Accounts in Thailand constitutes a systematic process of compiling, analyzing, and organizing comprehensive data on the country's water resources. The primary objective is to support efficient, transparent, and sustainable water resources management, while providing an evidence-based foundation for public policy formulation and decision-making.

Thailand's Water Accounts are developed in accordance with the System of Environmental-Economic Accounting (SEEA – Water) framework. The accounts encompass information on water availability, water use, and changes in water resources over time, covering both physical quantities and economic values. This integrated approach reflects the interlinkages among water resources, ecosystems, the economy, and society.

The development of Water Accounts in Thailand aims to:

1. Enhance a comprehensive understanding of the national water resource situation;
2. Support water planning and management at both national and river basin levels;
3. Assess the balance between water supply and demand across key sectors, including agriculture, industry, tourism, and domestic consumption;
4. Strengthen the monitoring and evaluation of water-related policies and sustainable development objectives.

Furthermore, Water Accounts serve as an essential instrument for linking water resource data with other natural resource accounts and the country's Natural Capital Accounts. This integration enhances Thailand's readiness to

advance sustainable development policies, address climate change challenges, and manage long-term water-related risks.

Methodology and Procedures for the Development of Water Accounts in Thailand

The development of Thailand's Water Accounts is undertaken in accordance with the SEEA – Water framework and comprises the following key steps:

1. Establishment of Conceptual Framework and Scope

The geographical scope (national, river basin, or provincial level), accounting period, and types of water accounts (e.g. physical water accounts, economic water accounts, and water flow accounts) are defined. Definitions and data standards are established to ensure consistency with the SEEA framework and alignment with Thailand's national context.

2. Data Collection and Integration

Data are compiled and integrated from relevant agencies, including information on water stocks (surface water and groundwater), water abstraction, wastewater discharge, and water demand across sectors such as agriculture, industry, services, and households. Relevant economic data are also incorporated.

3. Compilation of Physical Water Accounts

Accounting tables are developed to present the status and changes in water resources in quantitative terms, including water stocks, abstraction, returns to the system, and water losses, thereby reflecting the balance of water resources over time.

4. Compilation of Economic and Valuation Accounts

Water use data are linked with economic activities to analyse costs, value added, and water-use efficiency across sectors. This process highlights the contribution of water resources to the national economy and informs policy decisions related to water allocation.

5. Data Verification and Quality Assurance

Data completeness, consistency, and reliability are reviewed. Assumptions and calculation methodologies are refined through consultation with experts and relevant agencies.

6. Analysis, Synthesis, and Reporting

The results of the Water Accounts are analyzed to assess the status of water resources, identify trends, and highlight policy-relevant issues. Reports and policy recommendations are prepared to support government decision-making.

7. Utilization and Further Development

Water Account results are applied in water resource planning and allocation, policy monitoring and evaluation, and integration with other natural resource and natural capital accounts at the national level.

Responsible and Relevant Agencies

Lead Agencies

- Office of the National Economic and Social Development Council (NESDC) Responsible for establishing the environmental-economic accounting framework and integrating Water Accounts into the national accounting system.
- Office of the National Water Resources (ONWR) Responsible for water policy, planning, and water resource data management, including river basin-level information support.

Supporting Data Agencies

- Department of Water Resources and Department of Groundwater Resources
- Royal Irrigation Department
- Pollution Control Department (wastewater and water quality data)
- Thai Meteorological Department (rainfall and climate data)
- Department of Marine and Coastal Resources (coastal water and related ecosystem data)

Academic and Research Institutions

- Thailand Development Research Institute (TDRI)
- Universities and other research institutions providing technical and policy analysis support.

Figure 8 Consult and Discuss on Water Account



Image source by author

2.10 Tripartite meeting (UNEP, ONEP, TDRI) to follow up on NCA project progress

Date: 2 April 2025, 13.30 – 14.30

Location: Online Meeting

Attendees: 9 people

United Nations Environment Programme (UNEP)

1. Ms. Kavita Sharma Task manager for UNEP's GEF portfolio on biodiversity and land degradation in Asia

Office of Natural Resources and Environmental Policy and Planning (ONEP)

2. Dr. Benchamaporn Wattanatongchai Environmentalist, Senior Professional Level Director of Biodiversity National Focal Point Subdivision, Biodiversity Management Division
3. Ms. Somawan Sukprasert Environmentalist, Professional Level Biodiversity Management Division
4. Ms. Wannapa Maneekul Environmentalist, Biodiversity Management Division

Thailand Development Research Institute (TDRI)

5. Dr. Adis Israngkura Project Leader
6. Ms. Thippawan Keawmesri Senior Researcher
7. Ms. Prinyarat Leangcharoen Senior Researcher
8. Ms. Panida Phranphanat Researcher
9. Mr. Peerawat Suriyaburaphakul Researcher

Main Discussion

1. Updates from ONEP

- ONEP informed that after receiving the work plan submission from TDRI, it has been approved, and formal letters have been sent back to TDRI. UNEP can now proceed with the next step in preparing the budget.
- ONEP requested TDRI to take responsibility for preparing the meeting minutes.
- ONEP emphasized the importance of documenting the meeting to track the progress for reporting to the Project Steering Committee (PSC).

2. Progress Report from TDRI

Developing Natural Capital Accounting (NCA):

- Extent Account: Development of a matrix table covering water and tourism classified by ecosystem types.
- Condition Account: Water Quality Index (WQI) developed in collaboration with the Pollution Control Department, in accordance with SEEA guidelines.

- Supply and Demand Account: Assessment of ecosystem services and economic activities by ecosystem types, covering provisioning, regulating, and cultural services. Target completion: July 2025.
- Output 2.3 and Related Outputs:
 - Suggesting working with the State Audit Office of the Kingdom of Thailand on legal aspects related to fee collection at the sub-district administrative and Municipality since they must wait for the department of local administration to issue relevant policies that enable the adoption of garbage collection fees (e.g., per bag charge).
- Output 3.1 – Market-Based Instruments (MBI):
 - Garbage bag fees (to be discussed with the OAG regarding legislation, revenue collection, and fund usage by government agencies).
 - Small-scale wastewater treatment systems.
 - Collecting donations from tourism.
 - Freshwater conservation fund (e.g., "Baan Nong Thalea" area).
- Project Reporting:

TDRI is compiling the technical report, including progress on components and pilot implementations.

3. Upcoming Meetings

- PWG (Project Working Group): Expected to be scheduled in June 2025.
- PSC (Project Steering Committee): Second meeting scheduled in August 2025.

ONEP Suggestions:

- PWG should ideally convene in May or early June, with the second PSC meeting possibly moved up to August.
- An additional technical meeting may be arranged in late June, especially to support Component 3, ensuring sufficient dialogue and information-sharing with stakeholders.

4. Feedback and Suggestions

From ONEP:

- Market-Based Instruments:

The provincial governor should be informed about the project as there are multiple initiatives in Krabi. The MBI pilot should not be delayed, as its effectiveness must be tested.
- Emphasized the importance of raising awareness and having dialogues with National / local stakeholders for NCA implementation.

From UNEP:

- There is a need to ensure integration of Component 3 into provincial-level policy, particularly regarding garbage fees and prioritization.
- The extent account, ecosystem condition accounts, ecosystem services flow accounts and the monetary ecosystem asset accounts should align with SEEA guidelines and clearly identify required variables.
- The spatial aspect of data will enhance communication and understanding at the provincial level.
- UNSD is currently piloting SEEA implementation in five countries, which can provide useful references.

Final Reporting:

- UNEP confirmed that a final report will be produced, including both technical and financial aspects, with third-party review.

5. Additional Notes

- ONEP expressed concern regarding PSC engagement. Since the PSC decided to meet twice a year, clarity is needed on the second PSC meeting schedule.
- TDRI confirmed the 2nd PSC meeting is scheduled for August 2025.

2.11 Tripartite meeting (UNEP, ONEP, TDRI) to follow up on NCA project progress

Date: 12 May 2025, 13.30-14.30

Location: Online Meeting

Attendees: 9 people

United Nations Environment Programme (UNEP)

1. Ms. Kavita Sharma Task manager for UNEP's GEF portfolio on biodiversity and land degradation in Asia

Office of Natural Resources and Environmental Policy and Planning (ONEP)

2. Dr. Benchamaporn Wattanatongchai Environmentalist, Senior Professional Level Director of Biodiversity National Focal Point Subdivision, Biodiversity Management Division
3. Ms. Somawan Sukprasert Environmentalist, Professional Level Biodiversity Management Division
4. Ms. Wannapa Maneekul Environmentalist, Biodiversity Management Division

Thailand Development Research Institute (TDRI)

5. Dr. Adis Israngkura Project Leader
6. Ms. Thippawan Keawmesri Senior Researcher
7. Ms. Prinyarat Leangcharoen Senior Researcher
8. Ms. Panida Phranphanat Researcher
9. Mr. Peerawat Suriyaburaphakul Researcher

Main Discussion

1. Update from UNEP

- UNEP informed that there will be a new UNEP officer to join the project who is from the Asia-Pacific region during the leave of Ms. Kavita

2. TDRI Presentation

- TDRI delivered an update on ongoing work related to natural capital accounting outputs, consisting of **Output 2.1.2 - 2.3.5**

- 1) Output 2.1.2: Tourism situation assessment
- 2) Output 2.1.4: Water resources situation assessment
- 3) Output 2.1.3 & 2.1.5: Ecosystem Extent Account and Ecosystem Condition Account
- 4) Output 2.2.1: Integrate provincial NCAs into Tourism Satellite Account (TSA) and integrate provincial NCAs into Water Resource Satellite Account (WRSA)
- 5) Output 2.3.1: Selecting Market-based instrument
- 6) Output 2.3.2: Trust Fund
- 7) Output 2.3.3: Conserve, mitigate impacts and restore degraded habitats in watershed forests and coastal marine ecosystems
- 8) Output 2.3.4: Financial mechanisms for Green Fins
- 9) Output 2.3.5: Small scale wastewater treatment

3. Discussion and question

- UNEP inquired about the net change in the extent account, particularly whether it referred to changes in plantation stock, specifically rubber and palm oil. UNEP also asked why TDRI did not apply the Travel Cost Method, which is now recommended in the SEEA framework. TDRI clarified that the observed change in the extent account was indeed related to rubber and palm oil plantations. Regarding the Travel Cost Method, TDRI explained that it was not used due to the requirement for data on the frequency of visits, which is often difficult to obtain accurately.
- UNEP emphasized that water quality is a critical attribute of ecosystems, particularly for services such as water purification and nursery functions, which are relevant in the context of Krabi Province. UNEP recommended framing water quality benefits in terms of regulating services, such as flood control
- UNEP suggested consulting with Carl from the IDEEA Group for technical advice on the Tourism Satellite Account and the Water Resource Satellite Account (WRSA), particularly to ensure alignment with the condition account.
- UNEP highlighted the importance of communicating the impacts of wastewater discharge and the benefits of improving water quality. UNEP recommended engaging with the municipality regarding

the installation of wastewater treatment systems, particularly in areas such as fish landing sites and jellyfish habitats, and ensuring these are included in project planning.

- ONEP raised a question about TDRI's selection of a relatively small area for installing the wastewater treatment system and whether it would be representative of the broader Krabi province. TDRI responded that this is a pilot area, chosen for its manageability in the initial phase. The intention is to use this site as a starting point for future expansion. TDRI also proposed raising this topic in the upcoming PWG meeting to gather feedback on the wastewater treatment installation.
- ONEP recommended including garbage management as an agenda item in the next PWG meeting.

4. Next Steps

- Follow up on the PSC meetings planned for August and September.
- Revisions to the budget and workplan must be communicated to Kavita (UNEP).

2.12 To consult and discuss the Environmental Impact Assessment (EIA) process for public investment projects covering the valuation of natural capital and ecosystem services.

Date: 30 September 2025, 10.00 – 12.00

Location: Meeting room 1005 Tipco Tower 2, ONEP

Attendees: 9 people

Office of Natural Resources and Environmental Policy and Planning (ONEP)

1. Dr. Benchamaporn Wattanatongchai Environmentalist, Senior Professional Level Director of Biodiversity
2. Mr. Woraphot Thongupakarn Director, Water Resources and Agriculture Development Group, Environmental Impact Assessment Division
3. Ms. Pannipa Suebsing Director, Technical and Database Group, Environmental Impact Assessment System Development Division
4. Mr. Prasan Itthipolkul Director, Transportation Group, Environmental Impact Assessment Division
5. Ms. Tippawadee Lertwiryavanich Senior Environmental Specialist, Environmental Impact Assessment Division

Thailand Development Research Institute (TDRI)

6. Dr. Adis Israngkura Director of Resource Sustainability and Mitigation Policy Division Project Leader
7. Ms. Thippawan Keawmesri Senior Researcher
8. Ms. Ramida Hansaward Coordinator

Main Discussion

The meeting aimed to discuss opportunities for strengthening the Environmental Impact Assessment (EIA) process through the integration of **Natural Capital** and **Ecosystem Services** considerations, particularly in relation to the tourism and water resource sectors.

Officials from the Office of Natural Resources and Environmental Policy and Planning (ONEP) provided an overview of the current EIA system, including project classification procedures and the review mechanism undertaken by the Expert Review Committees (ERCs) at both the national and provincial levels.

Participants acknowledged the need to develop standardized guidelines for environmental economic valuation, as the current composition of most Expert Review Committees lacks specialists in environmental economics. Consequently, the meeting recommended the preparation of practical guidelines and capacity-building programmes to strengthen institutional capacity, with Krabi Province serving as the pilot area.

1. Integration of Environmental Economics and Natural Capital into the EIA Process

The incorporation of environmental economic valuation and Natural Capital considerations into the Environmental Impact Assessment (EIA) process should focus on strengthening the existing assessment framework through the establishment of standardized methodologies and practical guidance.

Objectives

The primary objective is to improve and strengthen the EIA process to ensure that natural capital is systematically taken into account in development planning, investment decisions, and financial decision-making processes.

Key Considerations

- Integrate Natural Capital and Ecosystem Services concepts into EIA procedures and sectoral planning.
- Assess both direct and indirect environmental impacts, including impacts on upstream ecosystems, wastewater discharge, solid waste generation, and the long-term degradation of ecosystem services.
- Ensure consistency with the National Capital Accounting initiative by incorporating natural capital valuation methodologies into the assessment process.

2. Expected Outputs (Guidelines and Recommendations)

The proposed integration framework should be developed in the form of **Guidelines, Recommendations**, or a **User Manual** to facilitate the incorporation of environmental economics and natural capital considerations into the Environmental Impact Assessment (EIA) process.

- **Establishment of minimum standards:** A standardized framework should be developed that is practical, straightforward to implement, and does not impose an excessive burden on project developers or environmental consultants.
 - The proposed framework should serve as a **minimum standard** for environmental economic valuation.
 - For example, standardized reference values may be established for selected environmental resources, such as a benchmark value for good-quality water (e.g. THB 3 per cubic metre), with

periodic adjustments through indexation to reflect inflation and maintain the relevance of the valuation parameters.

- **Clear definition of study scope and methodology:** The guidelines should clearly specify the scope of work required of environmental consultants. Well-defined methodological guidance will facilitate consistent and effective implementation.
 - The guidelines should define the **scoping requirements** and the appropriate assessment methodologies.
 - Common valuation parameters and assumptions, including the **discount rate, inflation rate, and assessment period**, should be standardized to enhance the credibility, consistency, and fairness of the valuation process.
- **Scope of impact assessment:** The guidelines should clearly define the categories of impacts to be subject to environmental economic valuation. These should include, among others, recreational values, human health, psychological and cultural well-being, as well as both **use values** and **non-use values**.
- **Consideration of both natural capital stocks and ecosystem service flows:** Assessments should explicitly address both the conservation of **natural capital stocks (assets)** and the **flows of ecosystem services**. Natural capital stocks represent the environmental assets that should be maintained over time, while ecosystem service flows represent the recurring benefits derived from these assets, provided that their use remains within sustainable limits.

3. Addressing Institutional Gaps and Strengthening Capacity

To facilitate the effective implementation of the proposed framework, several institutional and capacity-building measures should be undertaken.

- **Strengthening the composition of the Expert Review Committees (ERCs):** At present, most Expert Review Committees responsible for reviewing EIA reports do not include specialists in environmental economics, with the exception of the committee responsible for water resource projects. Should this study demonstrate the importance of environmental economic expertise in the EIA process, its findings could support the future inclusion of environmental economists in the composition of the relevant Expert Review Committees.
- **Capacity-building:** Capacity-building programmes should be organized to enhance the knowledge and technical competencies of government officials and relevant stakeholders regarding the application of the proposed guidelines and valuation framework.
 - Training programmes should be provided for both central-level and provincial-level officials to strengthen local EIA implementation capacity.
- **Promoting institutional acceptance:** Environmental economic valuation has not yet gained widespread confidence or institutional acceptance within the current EIA review process. The establishment of

standardized methodologies would reduce inconsistencies in valuation approaches and contribute to greater consensus among technical experts during the review and decision-making process.

As an initial step, it is strongly recommended that the **2023 Water Resources Development Project Guidelines** be reviewed, as they already incorporate environmental economics considerations within their assessment framework. These guidelines could provide a valuable foundation for developing and expanding similar approaches to other project sectors.

4. Number of Central Expert Review Committees (ERCs)

According to the available information, there are **nine (9) Central Expert Review Committees (ERCs)** responsible for reviewing Environmental Impact Assessment (EIA) reports at the national level. These committees are supported by the **Office of Natural Resources and Environmental Policy and Planning (ONEP)**, which serves as the Secretariat.

Each ERC is responsible for reviewing specific categories of infrastructure or development projects. Collectively, the nine committees oversee the **35 project categories** prescribed under the EIA regulatory framework. In practice, each committee is responsible for more than one project category, which are generally organized into sectoral groupings.

Examples of the project groupings assigned to the Central ERCs include:

- Water infrastructure;
- Land transportation infrastructure;
- Air transportation infrastructure (combined with the land transportation infrastructure group); and
- Other sector-specific project groupings as prescribed under the EIA framework.

Detailed information regarding the composition and responsibilities of all nine Central ERCs is available on the official ONEP website.

In addition to the nine Central ERCs, responsibility for reviewing certain EIA reports has been decentralized to **Provincial Expert Review Committees (Provincial ERCs)** in **12 provinces**. These comprise **seven provinces located within environmentally protected areas** and **five provinces assessed by ONEP as having adequate institutional capacity**. The Provincial ERCs are authorized to review **building development projects only**, excluding high-rise buildings and exceptionally large buildings.

5. Provinces with Decentralized EIA Review Responsibilities

At present, responsibility for reviewing Environmental Impact Assessment (EIA) reports has been decentralized to **Provincial Expert Review Committees (Provincial ERCs)** in a total of **12 provinces**.

These provinces are classified into two groups:

1. Provinces Located within Environmentally Protected Areas (7 Provinces)

- Chon Buri
- Phetchaburi

- Prachuap Khiri Khan
- Krabi
- Phang Nga
- Phuket
- Surat Thani

2. Provinces Assessed by ONEP as Institutionally Ready (5 Provinces)

- Bangkok
- Nonthaburi
- Pathum Thani
- Samut Prakan
- Chiang Mai

The Provincial ERCs are mandated to review **building development projects only**, excluding high-rise buildings and exceptionally large buildings. An exception applies to **Bangkok**, where the Provincial ERC has authority to review building projects of all sizes, equivalent to the authority exercised by the Central ERCs.

6. Main Categories of Environmental Impact Assessment (EIA)

Under the **Enhancement and Conservation of National Environmental Quality Act (No. 2), B.E. 2561 (2018)**, development projects requiring environmental assessment are classified into three principal categories:

- **Initial Environmental Examination (IEE): 2 project categories**
- **Environmental Impact Assessment (EIA): 35 project categories**
- **Environmental Health Impact Assessment (EHIA): 13 project categories**, covering projects, activities, or operations that are likely to cause significant adverse impacts on the environment, natural resources, or public health.

In addition, certain development activities are required to prepare environmental assessment reports pursuant to specific **Cabinet Resolutions**. This requirement particularly applies to projects located within **protected forest areas**, such as dam and reservoir development projects with a storage area of **500 rai or more**, which may be required to prepare both an EIA and an IEE, depending on the applicable legal and regulatory provisions.

In summary, projects subject to environmental assessment under the current regulatory framework are classified into **three principal levels**:

- **Initial Environmental Examination (IEE);**
- **Environmental Impact Assessment (EIA) covering 35 project categories;** and
- **Environmental Health Impact Assessment (EHIA) covering 13 project categories.**

7. Classification of EIA Project Categories

According to the available information, a total of **35 project categories** are required to prepare an **Environmental Impact Assessment (EIA)** report.

For the purpose of review by the **Central Expert Review Committees (ERCs)**, for which the **Office of Natural Resources and Environmental Policy and Planning (ONEP)** serves as the Secretariat, these 35 project categories are organized into **nine sectoral groupings**, corresponding to the responsibilities of the nine Central ERCs.

These groupings are referred to as **project category groups**, as each Central ERC is responsible for reviewing one or more of the prescribed project categories.

Examples of the project category groups include:

- Water infrastructure;
- Land transportation infrastructure;
- Air transportation infrastructure (combined with the land transportation infrastructure group);
- Energy projects (including projects located within Class 1 watershed areas); and
- Mining and petroleum development projects.

In summary, although the EIA system comprises **35 prescribed project categories**, these are administered through **nine project category groups**, each assigned to a designated Central Expert Review Committee.

8. Key Findings

The key findings arising from the discussion on integrating **environmental economics** and **natural capital** into the Environmental Impact Assessment (EIA) process are summarized below.

8.1 Project Context and Objectives

- The primary objective of the project is to **improve and strengthen the EIA process** to ensure that development planning and investment or financial decision-making systematically incorporate **Natural Capital** considerations.
- **Krabi Province** has been selected as the pilot area due to its rich natural resources. The project will focus on integrating natural capital considerations into the **tourism sector** and **water resources management**.

8.2 Key Concepts: Natural Capital and Ecosystem Services

- The discussion distinguished between **Natural Capital** and **Ecosystem Services**.
 - **Natural Capital** represents the **stock (asset)** that should be conserved and maintained over time, analogous to the principal balance in a bank account.
 - **Ecosystem Services** represent the **flow of benefits** generated by natural capital, comparable to interest earned from that principal, which can continue to provide benefits when utilized sustainably.

- Consequently, the assessment should consider impacts on both **natural capital assets (stocks)** and **ecosystem service flows**, including the long-term reduction of ecosystem service benefits resulting from environmental degradation, such as wastewater discharge or solid waste generated during construction activities.

8.3 Expected Outputs and Application

- The project outputs should be developed as **Guidelines, Recommendations**, or a **User Manual** to support the integration of environmental economics into the EIA process.
- The guidelines should establish **minimum standards** for environmental economic valuation that are practical, transparent, and not unduly burdensome for project developers or environmental consultants. One example would be the adoption of standardized reference values for environmental resources, such as benchmark values for good-quality water.
- The guidance should clearly define the **scope of assessment (scoping)**, **assessment methodologies**, and the use of standardized **valuation parameters**, including the **discount rate**, **inflation rate**, and other common assumptions.
- **Capacity-building programmes** should be organized to strengthen the knowledge and technical capacity of relevant stakeholders, including government officials at both the central and provincial levels, to ensure the effective implementation of the proposed framework.

8.4 Current Gaps and Challenges

The discussion identified several institutional and technical gaps that should be addressed.

- **Composition of the Expert Review Committees (ERCs):** Among the nine Central ERCs responsible for reviewing the 35 EIA project categories, only the committee responsible for **water resource projects** currently includes an environmental economics specialist. The remaining committees do not have expertise in environmental economics.
- **Limited confidence in environmental economic valuation:** Environmental economic valuation has not yet gained sufficient institutional recognition within the EIA review process. Assessment methodologies vary considerably, and ONEP has not yet established comprehensive guidelines for environmental economic valuation.
- **Limited technical capacity:** Environmental consultants responsible for preparing EIA reports often have limited expertise in environmental economics. Similarly, the technical knowledge of ERC members varies considerably, resulting in inconsistent interpretation and review of valuation studies.
- **Limited scope of Provincial ERCs:** The 12 Provincial ERCs (comprising seven provinces within environmentally protected areas and five provinces assessed as institutionally ready) primarily review building development projects. As such projects generally do not require environmental economic valuation, Provincial ERCs currently do not include environmental economics specialists.

9. Recommendations

The following recommendations were proposed to facilitate the integration of environmental economics and natural capital into the Environmental Impact Assessment (EIA) process.

9.1 Development of Appropriate Outputs

- Project outputs should be prepared in the form of **Guidelines, Recommendations**, or a **User Manual** to support their practical application by the Expert Review Committees (ERCs).
- These documents should complement the existing EIA guidance issued by ONEP by providing detailed procedures for environmental economic assessment, including assessment methodologies, **scoping requirements**, and implementation procedures.
- The report should explicitly demonstrate the linkage between environmental economic valuation and **Natural Capital Accounting (NCA)** to ensure consistency with the objectives of the National Capital Accounting initiative.

9.2 Development of Standardized Methodologies

- A **Central Standard** or **Centralized Standard** should be established to ensure consistency, transparency, and fairness in environmental economic valuation while reducing variations in assessment methodologies.
- The proposed standards should represent **minimum requirements** that are practical to implement and do not impose unnecessary burdens on project proponents or environmental consultants.
- Standard valuation parameters should be clearly specified, including common **coefficients, discount rates, inflation rates**, and **assessment periods**, to improve the credibility and consistency of valuation results.
- The guidelines should clearly define the scope of environmental economic impacts to be assessed, including recreational values, public health, psychological and cultural well-being, as well as **use values** and **non-use values**.
- Consideration should also be given to establishing standardized reference values for selected environmental resources. For example, a benchmark value may be established for good-quality water (e.g. THB 3 per cubic metre), with periodic adjustments through inflation indexation to ensure that valuation parameters remain up to date.

9.3 Addressing Institutional Gaps

- A comprehensive review should be undertaken to identify gaps within the current EIA system that limit the effective integration of environmental economics and natural capital considerations.
- The study should clearly demonstrate the need to include environmental economics specialists within the composition of the Expert Review Committees, thereby providing an evidence base for future institutional reforms.

- Priority should be given to incorporating environmental economics expertise into the ERCs responsible for:
 - Water resource projects;
 - Infrastructure projects (land, water, and air transportation);
 - Energy projects, particularly those located within Class 1 watershed areas; and
 - Mining and petroleum development projects.

9.4 Capacity-building

- Training programmes should be organized to ensure that government officials and relevant stakeholders are able to effectively apply the newly developed guidelines and standards.
- Capacity-building initiatives should place particular emphasis on strengthening **local EIA capacity**, including Provincial ERCs and environmental consulting firms operating at the provincial level.
- Continuous technical support should be provided to improve knowledge and competencies in environmental economic valuation among all relevant stakeholders.

9.5 Implementation Strategy

- As an initial step, the **2023 Guidelines for Water Resources Development Projects** should be reviewed, as they already contain broad provisions relating to environmental economics and can serve as a foundation for developing guidance applicable to other project sectors.
- The preparation of the proposed framework and guidance documents should be completed within the agreed project timeframe to facilitate their timely application.
- A clear set of implementation priorities should be established to ensure that the study focuses on the most critical issues and produces outputs that can be effectively utilized in subsequent phases of the project, taking into account the limited implementation period.

Figure 9 consult and discuss the Environmental Impact Assessment (EIA)



Image source by author

2.13 Tripartite meeting (UNEP, ONEP and TDRI) to follow up on NCA project progress

Date: 20 November 2025, 13.30 – 15.00

Location: Meeting Room 1001, Office of Natural Resources and Environmental Policy and Planning (ONEP),
Tipco Tower 2

Attendees: 12 people

United Nations Environment Programme (UNEP)

1. Ms. Allyson Anne Tinney Rivera Task Manager for Asia's portfolio
2. Mr. Peerayot Sidonrusmee Programme Management Assistant

Office of Natural Resources and Environmental Policy and Planning (ONEP)

3. Dr. Benchamaporn Wattanatongchai Environmentalist, Senior Professional Level
4. Ms. Wannapa Maneekul Plan and Policy Analyst
5. Ms. Suprawee Kuhatanasatian Policy and planning analysis officer

Thailand Development Research Institute (TDRI)

6. Dr. Adis Israngkura Project Leader
7. Ms. Thippawan Keawmesri Senior Researcher
8. Ms. Prinyarat Leangcharoen Senior Researcher
9. Ms. Kanjana Yasen Researcher
10. Mr. Peerawat Suriyaburaphakul Researcher
11. Ms. Pichamon Keakij Researcher
12. Ms. Ramida Hansaward Coordinator

Presentation

Asso. Prof. Dr. Adis Israngkura presented progress updates of the activities the research team has completed or almost completed, categorized into its respective component as follows:

Component 1

Output No.	Activity
1.1.1	Establish and maintain the inter-agency national working group (NWG) <ul style="list-style-type: none">• 4 meetings
1.1.2	Draft the 'National framework for NC accounting inThailand'
1.2.1	Host the national sectoral roundtable meetings <ul style="list-style-type: none">• 11 meetings with various stakeholder groups (academics, government agencies, etc.)
1.2.2	Assess the inter-dependencies of <u>the tourism sector</u> onNC and ecosystem services <ul style="list-style-type: none">• Report can be found in the drive

Output No.	Activity
1.2.3	Assess the inter-dependencies of <u>the water resources</u> sector on NC and ecosystem services <ul style="list-style-type: none"> • Report can be found in the drive
1.2.5	Opportunistically integrate emerging NC information into the national Tourism Satellite Account (TSA) <ul style="list-style-type: none"> • Should be complete in December 2025
1.2.6	Opportunistically integrate emerging NC information into the national Water Resources Satellite Account (WRSA) <ul style="list-style-type: none"> • Should be complete in December 2025
1.2.9	Update the water resources and tourism-related policies, plans and regulations to improve the conservation and sustainable use of NC
1.2.10	Improve and strengthen EIA procedures to ensure that the financial impact of developments on NC and ecosystem services are adequately assessed
1.2.11	Evaluate alternative market-based instruments (MBI), and select one viable instrument for further development

Main limitations

- 1.1.2 still in process but the report was redirected by Kavita's advice, which will include the policy and legal structure of Thailand (which will be the backbone of the activities in this project)
- 1.2.5 as the account is reduced to the provincial level, a few (national) accounts were eliminated as advised by Dr. Carl (consultant) due to difficulties measuring Krabi's genuine population and visitors. But the account is almost completed (national and provincial).
- 1.2.11 legal challenges of the garbage bag option but working to find a solution

Component 2

Output No.	Activity
2.1.1	Establish and maintain the inter-agency provincial working group for Krabi province
2.1.2	Conduct a tourism situation assessment for Krabi Province <ul style="list-style-type: none"> • Report can be found in the drive
2.1.3	Develop and maintain a comprehensive provincial Tourism sector NCA for Krabi province
2.1.4	Conduct a water resources situation assessment for Krabi province <ul style="list-style-type: none"> • Report can be found in the drive
2.1.5	Develop and maintain a comprehensive provincial Water Resources NCA for Krabi province

Output No.	Activity
2.2.7	Identify opportunities for PPPs in conserving, mitigating impacts, and restoring degraded habitats in watershed forests and coastal marine ecosystems
2.2.8	Assess the water tariff rates to ensure that the costs associated with the management and protection of watersheds is adequately reflected in the price
2.3.3	Conserve, mitigate impacts and restore degraded habitats in watershed forests and coastal marine ecosystems (total area of 40,000 ha in Krabi province)
2.3.4	Develop, test and implement sustainable financing mechanisms for the GreenFins program in Krabi province <ul style="list-style-type: none"> • Report can be found in drive
2.3.5	Provide technical support to the installation of small-scale wastewater treatment technologies in small-scale tourism enterprises <ul style="list-style-type: none"> • Only 6% of wastewater is treated before going into the ocean • Collected wastewater samples as evidence of tourism impacts

Main limitations

- 2.2.7 we hope to see more concrete results by the end of the year (conducted interviews and meetings), the last meeting participants expressed that monitoring wastewater inspection/monitoring was lacking in the past 3-4 years. The Muslim group (of housewives or Muslim women) were considered to possibly participate with the trust fund, but we are still examining feasibility

Component 3

Output No.	Activity
3.1.2	Meetings, briefings and presentations to/with target individuals/groups and institutions <ul style="list-style-type: none"> • Total of 14 meetings
3.1.3	Production and distribution of fact sheets, pamphlets, brochures, newsletters and media inserts
3.1.4	Project performance monitoring and reporting
3.2.1	Develop, host and maintain an online knowledge portal
3.2.3	Facilitate <u>exchange programs</u> for NC accounting decision-makers, manager and/or researchers <ul style="list-style-type: none"> • Current proposed location is Kinabalu, Malaysia

Main limitations

- 3.2.1 adding enough content to update the website
- 3.2.3 where to decide to go

Main discussion

Ms. Allyson's Comments

- For output 1.1.2, when do you expect to complete this?
 - TDRI answer: the deadline is December of this year
- For output 1.1.3, has the team begun to identify resources on how to find potential sources for the trust fund?
 - TDRI answer: we're still looking but could it link with MBI
 - Ms. Allyson said that it could since the output can be interpreted in a few ways
- For output 1.2.4 is there any updates?
 - TDRI answer: we have begun meeting with the National Budget Agency, but after meeting Krabi on this, they suggested we go to meet with Central Budgeting (agency/office) increase Krabi's budget, which we plan to go meet after finish preparing materials (such as an excel sheet to demonstrate economic impacts of NCA; lower economic costs from tourism) to present the project
 - Ms. Allyson's additional comments: this could also link with output 1.2.7 and 1.2.8
- For output 1.2.9, have there been proposal developed? And what has been achieved on this output?
 - TDRI answer: we have started on this but, we're hoping to further clarify with Kavita what is meant by "update", but the report will have all the basic policies
 - Agreed that "update" can be providing [policy] recommendations
- For EIA processes Ms. Allyson inquired if ONEP could help facilitate. It was explained that TDRI will provide recommendations to the current EIA procedure [how to incorporate natural capital accounting into the EIA process]
- For output 1.2.11, which one (out of the four) will the team be pursuing?
 - TDRI answer: we have tested the four mechanisms but now we are concentrating on the first option (garbage bags) but still deciding whether to charge an additional fee of 5 baht per bag or implement monthly fee price differentiation (similar to what Bangkok Administration has implemented). The fee price differentiate seems to be more viable, however, a legal sub-analysis is needed to finalize which option is most appropriate (feasible). The governor of Ao Nang municipality launched a garbage bad initiative in the past but failed, so we have their support to revive (improve) the program.
 - This also is relevant to 1.2.12
 - It was also agreed that all MBI should also have (policy) recommendation
- For output 2.2.1, [TDRI asked] what it the tangible outcome for this output?
 - Allyson explained that it would depend on the data source
 - The team should clarify with Kavita (what is meant by "annually integrate") and other unclear outputs
- For outputs 2.2.2 and 2.2.3 TDRI asks on how to manage keeping contact with Provincial personnel for seamless cooperation
 - Dr. Benchamaporn explains that due to the government personnel rotation system, it is difficult to know who will assume the position, however, we can make use of the PWG to have constant meetings and make contact with "newcomers" to explain the project to alleviate this issue.

- For output 2.2.7, could it be possibly linked with the trust fund (1.1.3) in terms of additional funding? And for the water tariffs (2.2.8), what comes next after the assessment?
 - TDRi answer: yes, we've been looking for potential groups for the trust fund. As for the analysis, water tariffs will help with wastewater fee (economic wastewater costs) as more tourists visiting Krabi increases. The wastewater costs more than fresh water (rice) irrigation. These numbers would be useful for the Central Budget Agency to see the hidden costs of wastewater and demonstrate the value of more wastewater facilities.
- For output 2.3.2, is there a criteria or capacity in implementing the MBI
 - TDRi answer: we are eyeing the Muslim group, however, we still need to finalize the chosen MBI first (to overcome the legal constraints) and assess whether the group will be around to continue interest in this issue
- Ms. Allyson clarified that the trust fund will not have any seed money (seed money was not allocated/designated in the project's budget)
- For output 2.3.3, where there any restoration [impacts] after the implementing activities?
 - TDRi answer: seagrass restoration was done (by Enlive) often but we do not have the current numbers in front of us (the number is included in the report and is over the benchmark written in the ProDoc)
- For output 2.3.5, did TDRi help with the costs of installation?
 - TDRi answer: we only provided the technical information from our expert, but from meeting local stakeholders they wanted to increase random inspections of wastewater disposal (which can incentivize the importance of wastewater system installations to properly treat their water)
 - Ms. Allyson suggested that supporting installations of wastewater treatment systems can be counted as co-finance in the project's budget
- For output 3.1.1, has there been any approaches?
 - TDRi answer: there are two levels, the central government and the local government. The local government seems to work quite well (they came to join our activities since it is good for the province), but we have not really worked with the central government yet
 - Ms. Allyson pointed out that meeting with hotel associations and tourism operators (to disseminate information) also counts towards this output i.e., meetings with local stakeholders.
- For output 3.1.3, who will take care of (host) the website post-project?
 - It was agreed that TDRi would take care of the website until ONEP is ready to take over (due to the volume of international projects ONEP is handling)

Dr. Benchamaporn's Comments

- Clarified the deadline of the project (June 2026)
- Choose 1 MBI and report its results to PWG (as the previous meeting when the 4 MBIs were presented, some were controversial i.e. the garbage bag option)

- We should decide when the next PSC should be held
 - Consult with Kavita (aiming to have the PSC mid or late January 2026)
- How to simplify results [of the project/component 3] for the general public to understand NCA to ensure application/implementation
 - How to communicate with NCA for the public to understand
 - Also providing the information in Thai as well

2.14 Tripartite meeting (UNEP, ONEP, TDRI) to follow up on NCA project progress

Date: 8 January 2026, 11.00 – 12.00

Location: Online Meeting

Attendees: 14 people

United Nations Environment Programme (UNEP)

1. Ms. Kavita Sharma Task manager for UNEP’s GEF portfolio on biodiversity and land degradation in Asia
2. Mr. Peerayot Sidonrusmee Programme Management Assistant

Office of Natural Resources and Environmental Policy and Planning (ONEP)

3. Dr. Benchamaporn Wattanatongchai Environmentalist, Senior Professional Level
4. Ms. Wannapa Maneekul Plan and Policy Analyst
5. Ms. Suprawee Kuhatanasatian Policy and planning analysis officer

Thailand Development Research Institute (TDRI)

6. Dr. Adis Israngkura Project Leader
7. Ms. Thippawan Keawmesri Senior Researcher
8. Ms. Prinyarat Leangcharoen Senior Researcher
9. Ms. Kanjana Yasen Researcher
10. Mr. Peerawat Suriyaburaphakul Researcher
11. Ms. Panida Phranphanat Researcher
12. Mr. Promphat Bhumiwat Researcher
13. Ms. Pichamon Keakij Researcher
14. Ms. Ramida Hansaward Project Coordinator

Main Discussion

1. Brief presentation on outputs 2.2.6 (Develop a business case for the piloting of the selected market-based instrument in Krabi Province) and 3.2.3 (Facilitate exchange programs for NC accounting decision-makers, manager and/or researchers)

- For output 3.2.3, TDRI presented the proposed location for the exchange program trip as Kinabalu, Malaysia with information about its ecosystems (that were comparable to Krabi Province), national and state (provincial) policies related to environmental conservation and proposed a tentative

itinerary. The team consulted Ms. Kavita whether the location is appropriate, so preparations can begin.

- For output 2.2.6, TDRI presented the previous market-based instrument(s) that were changed due to limited feasibility and proposed a new instrument: payment for ecosystem services through a bird watching tour package in Khlong Prasong area in Krabi. To sustain the initiative after the project ends, a small group of local students (with interests in the environment and/or birds) from the primary level (year 4 to year 6) and the secondary level (sophomores to seniors) will be trained to be tour guides for this initiative. And if they are passionate when they graduate from school, they can work as full-time guides.

2. Upcoming meetings

- PWG (Project Working Group): scheduled for January 20th, 2026
- PSC (Project Steering Committee): scheduled for January 29th, 2026

3. Feedback and Suggestions

From UNEP

- For output 3.2.3, Ms. Kavita has concerns about whether Malaysia would be an appropriate choice because their experience with NC accounting is unclear and would prefer to visit another site that has experience with NC accounting as Thailand (this project), which has some experience with NC accounting. She also reminded the team to consider the budget for this output and the gender balance of participants. Additionally, Ms. Kavita advised TDRI to conduct further research on which countries (within the ASEAN region) have NCA experience or similar natural capital evaluation experience. TDRI will do so and send updates within 10 days.
- For output 2.2.6, Ms. Kavita enquired on whether there would be issues with involving children to be tour guides (child labor laws) and suggested that teaching children the practical skills to become (bird watching) guides should fall under community awareness instead of MBI related outputs. She also suggested that PES for bird watching tours should clearly identify buyers and sellers. Ms. Kavita mentioned that the buyer is the tourists and that the seller is the community that does restoration (where the tourists are paying for the ecosystem service).

From ONEP

- Dr. Benchamaporn enquired to Ms. Kavita on whether budgets from unfinished outputs would be returned to UNEP or GEF. And Ms. Kavita confirms that the remaining funds will go back to GEF via UNEP. On this point, Ms. Kavita suggested that reallocation of the budget can be made for documents to be translated into Thai or to produce PR media. It should also be noted that the project's budget may not be used after the end date of the project, July 31th, 2026.

5.	Ms. Kanjana Yasen	Researcher
6.	Mr. Peerawat Suriyaburaphakul	Researcher
7.	Ms. Panida Phranphanat	Researcher
8.	Mr. Promphat Bhumiwat	Researcher
9.	Ms. Pichamon Keakij	Researcher
10.	Ms. Ramida Hansaward	Project Coordinator

Office of Natural Resources and Environmental Policy and Planning (ONEP)

1. Ms. Wannapa Maneekul Environmentalist, Biodiversity Management Division (online)

Main Discussion

Dr. Winai Chaowiwat from Hydro Informatics Institute Bangkok presented how “Water Accounting in Krabi Province” has been created. The presentation outlines what water accounting is, the components included, an assessment of water demands and use, key sources of water distribution, and the two main components: the physical assets account and the physical supply and use tables (PSUT).

The key frameworks for water accounting is the System of Environmental-Economic Accounting for Water (SEEA), Integrated Water Resources Management (IWRM) Approach and System of National Accounts (SNA) Integration for economic analysis. The expectation of water accounting includes, comprehensive data insights, policy development support (using evidence-based strategies), environmental-economic integration, and enhanced decision making (such as actionable management insights). The scope includes collecting hydrological data from agencies such as the Royal Irrigation Department.

Assessments included in water account are as follows:

- Water resource volume assessment (of water storage, inflow, and river runoff)
 - Including on which agencies are key water sources and distribution methods
- Domestic water demand assessment
- Industrial water demand assessment (based on 107 types of industrial plant data)
- Agricultural water demand assessment

These assessments include which type of data was collected and the appropriate calculation formulas

Water demand for services (sector) was categorized into four key user groups: educational institutions, commercial enterprises, hotels and resorts, and hospital services.

The two main components of water accounting:

1. **Physical asset accounts for water**

This account records freshwater and brackish water stock in reservoirs, lakes, rivers, groundwater, and soil water. It tracks extraction volumes, consumption, precipitation, inflows/outflows, and flows to sea. And the data is measured in million cubic meters.

2. Physical supply and use tables (PSUT)

The PSUT table shows water circulation from environment to economic system. Which covers (1) Water extraction from environment, (2) Distribution and use, (3) Wastewater and recycling, (4) Return to environment, (5) Evaporation and product incorporation. It uses ISIC industry classification.

Meteorological & rainfall conditions were taken into account for the water-related data that was collected. The **three main water resources** in Krabi include medium reservoirs (6 major reservoirs in Krabi Province, with a total of 33.68 million cubic meters), small water sources that are distributed across Krabi's 8 districts (with a total capacity of 6 million cubic meters) and river runoff (varies between the dry season and wet season).

Key suppliers include Provincial Waterworks Authority (16.05 million cubic meters per year surface extraction), Royal Irrigation (39.61 million cubic meters per year, mostly agriculture using 99.76% of water), and village groundwater (4.18 million cubic meters /year). Private/government wells add approximately 17 million cubic meters /year combined, with allocations split by dry/wet seasons.

The overview of **Krabi's water demand** can be broken down into four sectors: domestic (2.00 million cubic meters per year), industrial (4.95 million cubic meters per year), agricultural (5,313 million cubic meters per year), and the service sector (6.01 million cubic meters per year).

Figure 10 Sample of Physical Asset Accounts

Provincial Physical Asset Account - Dry Season							
Dry season	Type of water resources						Total
	Reservoirs	Surface water		Groundwater	Others	Soil water	
		Ponds	River and Canals				
Water Resources Stock at the Beginning	45.25	7.84	0.00	0.00	0.00	0.00	53.09
Stock Increases							
Return flow	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Precipitation	3.15	4.01	2,385.00	2,385.00	0.00	0.00	4,737.16
Inflow from Other Territories	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflow from Other Inland Water Resources	18.44	3.73	2,100.00	236.29	0.00	0.00	2,358.46
Discovery of Water in Aquifers	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Stock Increases	21.59	7.74	4,485.00	2,621.29	0.00	0.00	7,095.62
Stock Decreases							
Water Extraction	0.78	7.69	9.85	12.77	3,255.08	0.00	3,286.17
Evaporation and Transpiration	3.10	3.70	0.00	0.00	0.00	0.00	6.80
Outflow to Other Territories	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Outflow to the Sea	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Outflow to Other Inland Water Resources	2.81	0.00	3.22	0.42	0.00	0.00	6.45
Total Stock Decreases	6.69	11.39	13.07	13.19	3,255.08	0.00	3,299.42
Water Resources Stock at the End	25.18	3.76	0.00	0.00	0.00	0.00	28.94

Dry Season: November - April

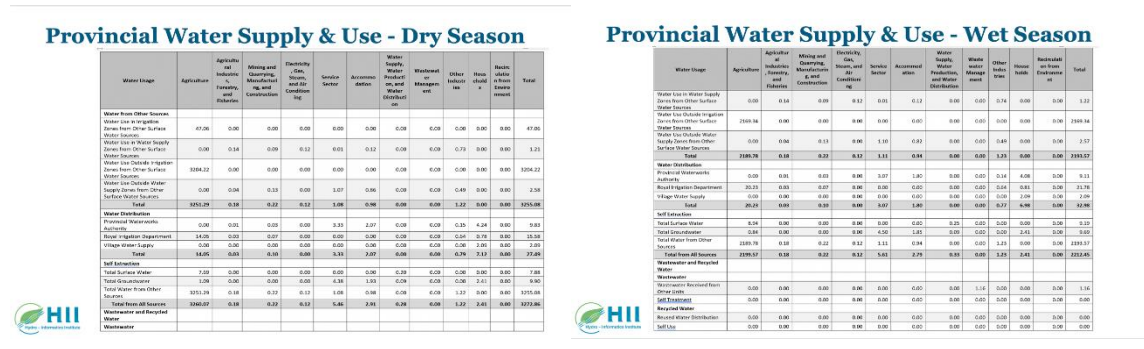
Provincial Physical Asset Account - Wet Season

Wet season	Type of water resources						Total
	Reservoirs	Surface water		Groundwater	Others	Soil water	
		Ponds	River and Canals				
Water Resources Stock at the Beginning	22.69	3.37	0.00	0.00	0.00	0.00	26.06
Stock Increases							
Return flow	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Precipitation	6.56	7.77	6,738.00	6,738.00	0.00	0.00	13,490.32
Inflow from Other Territories	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflow from Other Inland Water Resources	38.77	14.25	3,029.00	674.01	0.00	0.00	3,756.04
Discovery of Water in Aquifers	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Stock Increases	45.33	22.02	9,767.00	7,412.01	0.00	0.00	17,246.37
Stock Decreases							
Water Extraction	0.81	8.94	9.31	12.53	2193.57	0.00	2225.17
Evaporation and Transpiration	2.45	2.92	0.00	0.00	0.00	0.00	5.37
Outflow to Other Territories	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Outflow to the Sea	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Outflow to Other Inland Water Resources	4.05	0.00	2.72	0.42	0.00	0.00	7.18
Total Stock Decreases	7.30	11.77	12.03	12.95	2193.57	0.00	2237.62
Water Resources Stock at the End	36.55	5.73	0.00	0.00	0.00	0.00	42.28

Wet Season: May - October | 185% higher precipitation than dry season

It should be noted that water data was collected starting from November 1st, Krabi's dry season.

Figure 11 Sample of the PSUT



For the PSUT tables, Dr. Winai was asked to include a diagonal labeling of the rows and columns of “water usage” to clearly label: use and supply sources.

Further discussions

- How to integrate SEEA (of Krabi) into the water accounts (for other component 2 outputs)
- Since the information in the water accounts were categorized into “within” and “outside” the provincial water authority’s jurisdiction, SEEA will aggregate the data as “Krabi”.
- Dr. Winai suggested that the value of water used for agriculture can be calculated as 0.50 Baht as the minimum rate instead of 1.50 Baht for accuracy (1.50 baht was calculated as the cost)

Figure 12 A lecture and knowledge-sharing session on “Water Accounting in Krabi Province”



Image source by the author

2.16 The 3 parties coordination meeting for NCA Project

Date: 20 April 2026, 14.00 – 16.30

Location: Office of Natural Resources and Environment Policy and Planning, Tipco Tower 2

Attendees: 10 people

Office of Natural Resources and Environment Policy and Planning (ONEP)

1. Ms. Nareerat Panmanee Deputy Secretary-General of ONEP
2. Mrs. Katunchalee Thammakul Director of Biodiversity Management Division
3. Ms. Benchamaporn Wattanatongchai Director of Biodiversity National Focal Point Section
4. Ms. Wannapa Maneekul Policy and Planning Analyst
5. Ms. Supawin Kuhathanasathian Policy and Planning Analyst

United Nations Environmental Programme (UNEP)

6. Ms. Kavita Sharma Task Manager
7. Mr. Peerayot Sidonrusmee Programme Management Assistant

Thailand Development Research Institute (TDRI)

8. Assoc. Prof. Dr. Adis Israngkura Project Manager
9. Mrs. Thippawan Keawmesri Senior Researcher
10. Ms. Ramida Hansaward Project Coordinator

Topic 1 Revising the Key Deliverables

Activity (Output)	KEY DELIVERABLES	Meeting Resolution	Opinions (Feedback)
<p>Component 1 Activity 1.1.3 Raise funding to co-finance development of national water resource and tourism sector NCAs</p>	<p>Additional funding committed to development of NCAs</p>	<p>Remains the same however, a clarification note needs to be added to explain that “co-finance” refers to synergizing similar projects with other agencies such as the NSO or other tourism-related projects, not starting a new fund. The objective is to have at least 2 sources (agencies) to co-finance</p>	<p><u>The Project Manager</u> informed that finding “co-financing” sources to support NCA can not be done due to budgetary constraints from the public sector</p> <p><u>The Deputy-Secretary General</u> informed that receiving budget allocations from the public sector for the NCA project can not be done at this time, due other environmental issues that are impacting citizens such as PM 2.5, forest fires, and climate change take priority.</p> <p><u>The Task Manager</u> clarified that the wording of “co-financing” is rather vague and can be interpreted in many ways. The benefits (results) of implementing the NCA project that contribute to other public sector projects or collaboration with the NCA PSC members can be considered as “co-finance”. The activity aims to mainly contribute to other</p>

Activity (Output)	KEY DELIVERABLES	Meeting Resolution	Opinions (Feedback)
			public sector projects, rather than finding additional sources to monetarily fund the project.
Component 1 <u>Activity 1.2.4</u> Update the National Budget policy	Budget policy revision	Revise to “provide policy recommendations to demonstrate the importance of natural capital accounting”	<u>The Project Manager</u> informed that revising existing policies is difficult and proposed to provide policy recommendations instead, to demonstrate the importance of natural capital to the Budget Bureau.
Component 1 <u>Activity 1.2.7</u> Link NC information for tourism and water resources with the development of MTEFs and the 13th NESDP	Revised MTEFs and 13th NESDP	Revise to “Revised MTEFs and 14th NESDP”	<u>The Project Manager</u> requested to revise providing recommendations for the 14 th NESDP instead of the 13 th NESDP, to align with the current plan.
Component 1 <u>Activity 1.2.9</u> Update the water resources and tourism-related policies, plans and regulations to improve the conservation and sustainable use of NC	Policies, plans and regulations that: (i) Endorse green GDP reporting (ii) Promote more sustainable management of NC (iii) Remove “perverse incentives”	Remains the same “Policies, plans and regulations that: <ul style="list-style-type: none"> (i) Endorse green GDP reporting (ii) Promote more sustainable management of NC (iii) Remove “perverse incentives” *however, additional information needs to be added relating to policies, plans, and regulation instead of formulating new policies, plans or regulations	<u>The Task Manager</u> <ol style="list-style-type: none"> 1. suggested that reviewing the current plans and providing recommendations would be more feasible than modifying existing plans 2. proposed that any policies (national and provincial levels) that have been implemented since the NCA project began such as green GDP reporting, sustainable management of natural capital, and removing perverse incentives can be used to show correlations of this project on government initiatives relating to natural capital accounting (to demonstrate the benefits and/or impacts). These projects can include but not limited to forests, marine, watersheds, and ecosystem projects.

Activity (Output)	KEY DELIVERABLES	Meeting Resolution	Opinions (Feedback)
			<p><u>The Task Manager</u> informed that Krabi has their “Krabi Goes Green” Strategy and currently in collaboration with the Sub-District Administration Organization of Ao Nang on their wastewater management.</p> <p><u>The Director of Biodiversity National Focal Point Section</u> believes that this activity does not need revision but should add information to show the connection with policies and plans of the tourism and water resources sectors.</p>
<p>Component 1 <u>Activity 1.2.10</u> Improve and strengthen EIA procedures to ensure that the financial impact of developments on NC and ecosystem services are adequately assessed</p>	<p>Revised EIA regulations</p>	<p>Revise to “Provide recommendations to incorporate NCA into the EIA guidelines (of the relevant sectors such as water source development projects or projects that impact ecosystem services”</p>	<p><u>The Project Manager</u> informed that EIA process is enforceable by law and has many procedural steps (if revisions were to be done), thus it was requested to revise the deliverable to provide recommendations to consider incorporating NCA into the EIA guidelines for the related projects such as water sources development, mining, and commercial buildings</p> <p><u>The Director of Biodiversity Management Division</u> suggested that if the step or process in the EIA guidelines where NCA can be incorporated can be identified, then the process to implement the recommendation more convenient and enhance the potential for further applications.</p>
<p>Component 1 <u>Activity 1.2.12</u> Build political support, institutional capacity and private sector for</p>	<p>Enabling policy for the preferred MBI</p>	<p>Revise to “Provide recommendations from MBI assessment experience (previous MBIs studied) and include the lessons learned and the challenges of</p>	<p><u>The Project Manager</u> informed that while studying the MBI(s) to pilot in Krabi Province, challenges and legal constraints were encountered. Thus, the MBI has been changed to bird</p>

Activity (Output)	KEY DELIVERABLES	Meeting Resolution	Opinions (Feedback)
introducing the selected market-based instrument into the national policy mix		implementing MBIs in Thailand”	<p>watching (community level) instead</p> <p><u>The Task Manager</u> suggested that the challenges and lessons learned from the previously proposed MBIs to analyze the weaknesses and constraints as to why they are not feasible to implement. Also, before a policy is implemented it should be tested (piloted). Thus, providing policy recommendations would be more appropriate.</p>
<p>Component 2 <u>Activity 2.2.4</u> Promote the adoption of SEA in the preparation of municipal/district spatial development plans in Krabi province</p>	Provincial SEA regulations	<p>Revise to “Provide provincial recommendations (namely Krabi Province) demonstrating the spatial hotspots (of wastewater generated) and cost-effectiveness data (GPP-based) for the province to utilize in their provincial development plan”</p>	<p><u>The Project Manager</u> informed the following points:</p> <ol style="list-style-type: none"> 1. Collaboration with NESDC is needed, as the SEA is under the NESDC’s responsibility. A map identifying the hotspots of where wastewater is generated (in Ao Nang Sub-District) will be presented as a part of a policy recommendation to manage wastewater in Krabi’s Provincial Development Plan meeting (with the Governor of Krabi), which will also include recommendations for budget allocation and guidelines on SEA) 2. a report on how to improve Krabi (namely Ao Nang) with spatial aspects, using maps demonstrating the hotspots of wastewater generated by tourist-related businesses and data displayed in graphs, will be prepared for the province to use for practical applications.
<p>Component 2 <u>Activity 2.2.5</u> Assist in the development and</p>	EIAs using NC accounting tools to assess financial impacts of developments	<p>Revise to “Provide recommendations or guidelines for Krabi Province to utilize Provincial NCA as a</p>	<p><u>The Task Manager</u> emphasized that the main objective of the activity (output) is to integrate NCA data into the process or</p>

Activity (Output)	KEY DELIVERABLES	Meeting Resolution	Opinions (Feedback)
testing of EIA-based tools for assessing financial impacts of proposed developments on NC		tool for local decision-making”	<p>guidelines of EIA (provincial level), to demonstrate the monetary loss or cost of a construction (development) project; not just the amount of resources sacrificed, to show clearly show the impacts. This activity is a continuation from activity 1.2.10, which aims to provide recommendations specifically tailored to the province’s spatial context such as recommendations for the tourist sector or for provincial development projects</p> <p><u>The Deputy-Secretary General</u> observed that in practice, revising the regulations or process of EIA at the provincial level is difficult. However, with the original benchmark stating that EIAs should be completed, it was suggested to revise the deliverable to provide recommendations instead. Nevertheless, these recommendations should emphasize utilizing the provincial NCA information to demonstrate how Krabi differs from other provinces.</p>

* Task Manager informed that although all components of the benchmark may not be fulfilled, there should be justifications explaining why some components can not be implemented.

Topic 2 Additional Topics of Discussion

Activity (Output)	เรื่องเสนอ	Meeting Resolution	Opinions (Feedback)
<p>Component 3 Activity 3.2.3 Facilitate exchange programs for NC accounting decision-makers, manager and/or researchers</p>	Site visit to the Republic of Philippines. The project consultant has coordinated with ONEP to determine the trip schedule and agencies to include	No objections to the site-visit and schedule the visit for June	<u>The Task Manager</u> has no objects to the drafted agenda to visit the Philippines, as the project consultant has presented. But emphasized the importance of participation of national

			<p>level agencies such as ONEP and provincial agencies in Krabi to utilize and apply knowledge (from the visit) in their respective jurisdictions</p> <p><u>The Deputy-Secretary General</u> proposed to limit participants to be 10 – 12 people and will review the list of relevant agencies. The proposed location of the site visit will also be reviewed to ensure optimal suitability and value.</p> <p><u>The Director of Biodiversity Management Division</u> proposed to schedule the site-visit to June, due to scheduling conflicts of ONEP (during May 18th - 20th 2026, ONEP is responsible for hosting activities for International Biological Diversity Day)</p>
<p>Component 2 <u>Activity 2.3.1</u> Pilot the implementation of the selected market-based instrument in Krabi province</p>	<p>Proposed to approve budget allocation of approximately 1,000,000 baht to expand (scale-up) implementation of youth camps.</p>	<p>Approved the budget allocation of approximately 1,000,000 baht to expand implementation of youth camps (in Krabi) after the project’s end date, however, budget disbursement must be done before June</p>	<p><u>The Project Manager</u> requested a budget allocation of approximately 1,000,000 baht to expand implementing additional youth camps in 2-3 schools (in Krabi) after the project’s end date. However, budget disbursement will be done before June</p> <p><u>The Director of Biodiversity Management Division</u> proposed that since migratory bird-watching as an eco-tourist activity has seasonal constraints (around 3 months per year), additional eco-tourist activities should be</p>

			<p>considered to add diversity and to enable year-round activities for sustainability</p> <p><u>The Director of Biodiversity National Focal Point Section</u> additionally suggested that the remaining funds should be allocated to produce materials to promote and disseminate knowledge from the project (under component 3) to make use of the project's results for future applications.</p>
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Figure 13 The 3 parties coordination meeting for NCA Project on 20 April 2026



Image source by the author

2.17 In-depth Interview with the National Statistical Office

Date: 7 April 2026, 09:00–11:00

Location: 10th Floor, National Statistical Office, Building C, The Government Complex

Attendees: 10 people

National Statistical Office

1. Mr. Prawit Banjong Statistician, Senior Professional Level
2. Ms. Narissara Chanpet Statistician, Professional Level
3. Ms. Tanwarat Muangtrup Statistician, Practitioner Level
4. Ms. Pensiri Yosyingyong Statistician, Practitioner Level
5. Mr. Siwakon Suppalap Statistician, Practitioner Level
6. Mr. Supawich Chanpoom Statistician, Practitioner Level
7. Ms. Wannarat Paisannan Statistician, Professional Level

Thailand Development Research Institute (TDRI)

8. Mr. Adis Israngkura Project Leader
9. Ms. Prinyarat Leangcharoen Senior Researcher
10. Mr. Peerawat Suriyaburaphakul Researcher

Main discussion

The meeting commenced with a presentation on natural capital accounting for the tourism sector and water resources in Krabi Province, developed in accordance with the SEEA EA (System of Environmental-Economic Accounting – Ecosystem Accounting). The presentation was delivered by Associate Professor Dr. Adis Israngkura, the project lead. This was followed by a consultation session to gather feedback on the Water Resources Satellite Account (WRSa) by representatives from the National Statistical Office (NSO). The key points are summarized as follows:

1. Classification of “Other” Water Resources

The category of “other” water resources should be further disaggregated into more clearly defined subcategories. The current aggregation contains a relatively large volume of water resources, and more detailed classification would improve the accuracy and interpretability of the data.

2. Consistency of Internal Water Flows

Flows between inland water resources—representing transfers from one water body to another—should exhibit balanced inflows and outflows. However, the current accounts display inconsistencies, indicating an imbalance in recorded figures.

3. Recording of Precipitation Inputs

Increases in water resources from precipitation are currently recorded as equal additions to both rivers/streams and groundwater, which does not reflect hydrological reality. Moreover, precipitation should not be directly attributed to groundwater, as infiltration through soil layers is required before recharge occurs, typically over an extended period.

4. Structure of Water Use Tables

In line with the SEEA-Water framework, water use tables should be separated into (i) Supply table, indicating sources of water, and (ii) Demand table, reflecting water use across different purposes. This separation would enhance analytical clarity.

5. Treatment of Missing Data in Accounting Tables

Cells with unavailable data should be recorded as n/a rather than zero, as the two carry distinct meanings in interpretation. For example, cases such as inflows from external territories or newly discovered aquifers should not be represented as zero values.

In addition, the NSO has prior experience in developing National Ocean Accounts, which are classified as satellite accounts. This experience has played an important role in supporting relevant agencies in establishing systematic and comprehensive approaches to national accounting. Currently, the NSO seeks to initiate a collaborative framework with relevant agencies to promote data integration across multiple dimensions of national accounts. For instance, the NSO has presented the National Ocean Accounts framework to the Office of National Water Resources (ONWR) to enhance clarity and methodological consistency, as well as to support inter-agency data linkage.

Figure 14 In-depth Interview with the National Statistical Office



Image source by the author

2.18 In-depth Interview with the Budget Bureau

Date: 29 April 2026, 14.00 – 16.30

Location: 16th Floor Conference Room, the Budget Bureau Building

Attendees: 11 people

Budget Bureau

1. Ms. Kulkanya Lekhyananda Budget Analyst, Senior Professional Level
2. Ms. Sujitta Chotirat Budget Analyst, Professional Level
3. Ms. Pimpan Wuthipongprasert Budget Analyst, Professional Level
4. Mr. Kittisak Makmeesup Budget Analyst, Professional Level
5. Ms. Sasitha Sinprasopchai Budget Analyst, Professional Level
6. Ms. Tipawan Bovonsanee Budget Analyst, Practitioner Level
7. Ms. Boonnaree Chinwipat Budget Analyst, Practitioner Level
8. Ms. Arthitiya Phiokham Budget Analyst, Practitioner Level

Thailand Development Research Institute

9. Mr. Adis Israngkura Project Leader
10. Mr. Peerawat Suriyaburaphakul Researcher
11. Ms. Ramida Hansaward Project Coordinator

Main discussion

The Budget Bureau emphasized that data from natural capital accounting are highly useful for budget allocation, especially if expanded to other areas to strengthen evidence-based decisions. Budget allocation must balance economic, social, and environmental dimensions, but projects must also be formally incorporated into agency plans to be eligible. At the local level, agencies can request budgets directly if supported by clear plans, readiness, and tangible benefits. Risks of duplication are mitigated through verification and committee-level coordination. Allocation criteria prioritize project readiness, equity, appropriateness, and cost-effectiveness, with co-financing applied where agencies have revenue capacity. Spatial and contextual data, such as drought maps, are critical for targeted budgeting under fiscal constraints. For fiscal year 2027, the Bureau is pursuing demand-driven budgeting supported by data analytics to ensure precision and responsiveness to local needs. In Krabi, data on tourism activities can inform tailored support measures. Agencies are advised to submit focused, necessary requests aligned with the fiscal framework, given limited resources. The budget process involves submission, Bureau review, Cabinet approval, and parliamentary scrutiny, with the Bureau acting as technical advisor. Data that demonstrate impacts through cost-benefit analysis can strengthen proposals. Monitoring and evaluation require agencies to prepare Medium-Term Expenditure Frameworks, while transparency is promoted through public disclosure of budget information. In summary, spatial and empirical data can make budget allocation more precise, equitable, and cost-effective, provided they are linked to agency mandates, problem-oriented requests, and systems for monitoring and transparency.

Figure 15 In-depth Interview with the Budget Bureau



Image source by the author

2.19 In-depth Interview with the Office of the National Economic and Social Development Council (NESDC)

Date: 5 May 2026, 15.30 – 16.30

Location: Office of the National Economic and Social Development Council

Attendees: 8 people

Office of the National Economic and Social Development Council

1. Mr. Sombat Kitjaruwong Plan and Policy Analyst, Senior Professional Level
2. Ms. Wilailak Maiwong Plan and Policy Analyst, Senior Professional Level
3. Ms. Taweeporn Kannee Plan and Policy Analyst, Practitioner Level
4. Ms. Nollaphan Simarirut Plan and Policy Analyst, Practitioner Level
5. Ms. Pichayapron Dechsakul Plan and Policy Analyst, Practitioner Level

Thailand Development Research Institute (TDRI)

6. Mr. Adis Israngkura Project Leader
7. Mr. Peerawat Suriyaburaphakul Researcher
8. Ms. Ramida Hansaward Project Coordinator

Main Discussion

The meeting commenced with a presentation on natural capital accounting for the tourism sector and water resources in Krabi Province, developed in accordance with the SEEA EA (System of Environmental-Economic Accounting – Ecosystem Accounting). The presentation was delivered by Associate Professor Dr. Adis Israngkura, the project manager. The key points are summarized as follows:

The NESDC team explains that NESDC looks at the big picture (national level plans and policies) and is responsible for monitoring national indicators such as GDP. There are many groups responsible for ecosystem accounts, including the department of National Accounts that can provide relevant data and/or recommendations. For the

context of SEEA, NESDC advises that the data (used in the 5 accounts) be consolidated with other government agencies to certify the credibility of the data, otherwise the data can be deemed unreliable. It was mentioned that one of the pain points for developing statistical data (such as this project) is whether the data was collected using the National Statistical Office's data collection standards. If the data collection method is not aligned with the NSO's standards, its' credibility may be disputed.

There was a discussion on the challenges of double counting of assets and not seeing the clear link between the ecosystem accounts and the economy. Due to limited experts in ecosystem accounting, some assets may be double counted (different methodologies). Since environmental (ecosystem) data was recently collected, there was a gap in environmental data to construct complete accounts. However, to consider the project's SEEA accounts into the planning of the 14th NESDP, the links between ecosystem accounting and the economy should be clear (i.e. the opportunity costs for investing in ecosystem conservation and/or restoration), along with consolidation of the collected data. And since the SEEA is done on a provincial level, the boundaries of the Krabi's Gross Provincial Product (GPP) is unclear. The NESDC team explained that NESDC's GPP is used as a tool to quantify value from provincial assets. GPP of all provinces are then used for national planning.

The TDRI team mentioned that Krabi Province faces issues of water shortages that impact tourist businesses, to the extent that hotels and resorts must refund their guests because they do not have sufficient water. The province also has a wastewater management issue that is affecting its valuable ecosystems (as demonstrated in the Ecosystem Services Flow Accounts). Data from Krabi's SEEA could be used as a cost-benefit analysis to assess the impacts of land use. The developed SEEA is aimed to support sectorial policy, specifically for the tourism sector and the water resources sector.

On the topic of requesting budget allocations, it was advised that NESDC is responsible for the National Development Plan (that is the master plan for Provincial Development Plans), which is not the same as Sub-district Administrative Organization Plans (under the jurisdiction of the Ministry of Interior). Before requesting allocations, it must be defined which plan the project or activity will be included in, to determine which budget group to make the request. TDRI shared that the Budget Bureau also advised this point.

In terms of recommendations for the SEEA, the NESDC team suggests changing the units (of land) from hectare to "rai", to be more contextually appropriate for Thailand.

Figure 16 In-depth Interview with the Office of the National Economic and Social Development Council (NESDC)



Image source by the author

2.20 In-depth Interview with the Office of the Permanent Secretary, Ministry of Tourism and Sports

Date: 8 May 2026, 10.00 – 12.00

Location: The Office of the Permanent Secretary, Ministry of Tourism and Sports

Attendees: 10 people

Office of the Permanent Secretary, Ministry of Tourism and Sports

1. Mr. Boonsan Prasertkulchai Plan and Policy Analyst, Senior Professional Level
2. Ms. Dhanyabhorn Sukmak Plan and Policy Analyst, Practitioner Level
3. Mr. Kittikun Khakhai Public Sector Development Officer, Practitioner Level
4. Mr. Tharadol Sinnok Plan and Policy Analyst
5. Ms. Boonyanuch Sornprasit Plan and Policy Officer
6. Ms. Boonyisa Janton Plan and Policy Officer
7. Ms. Benyapa Ruktum Plan and Policy Analyst, Practitioner Level

Thailand Development Research Institute (TDRI)

8. Mr. Adis Israngkura Project Leader
9. Mr. Peerawat Suriyaburaphakul Researcher
10. Ms. Ramida Hansaward Project Coordinator

Main Discussion

The meeting commenced with a presentation on natural capital accounting for the tourism sector and water resources in Krabi Province, developed in accordance with the SEEA EA (System of Environmental-Economic Accounting – Ecosystem Accounting). The presentation was delivered by Associate Professor Dr. Adis Israngkura, the project lead. The key points are summarized as follows:

The MOTS representatives mentioned that they are planning to “Measure Sustainable Tourism” as an indicator to measure sustainability of tourism activities. In which, they believe that NCA information can be useful for this initiative.

Dr. Adis explained that for this project we have a youth camp initiative to train local youth (in Krabi) to become tour guides for migratory bird watching in Khlong Prasong. This activity aims to instill environmental awareness and the importance of ecosystems in their homes. The NCA’s project collaboration with “GreenFins” on sustainable (environmentally friendly) diving was also presented.

The MOTS team mentioned their “Thailand Tourism Standard”, under the responsibility of the Department of Tourism. The standard (a form of certification) ensures that consumers receive quality, safety, hygienic, fairness and uniqueness from eco-friendly tourism goods and services, to promote sustainable tourism. In which the MOTS team advised TDRI to inquire the Department of Tourism for further details (i.e. to begin the process of receiving the Thailand Tourism Standard certification for the project’s migratory bird watching activity). The TDRI shared videos from the project (GreenFins and Jib Jib Youth Conservation camp).

The TDRI team shared that Krabi (as a popular tourism destination) encounters issues with wastewater management, particularly in Ao Nang Sub district. The untreated wastewater (from Klong Chak) was found flowing into the ocean on Ao Nang Beach, causing tourists to visit other beach areas such as Nopparat Beach. It also reflects a negative impression on tourists. It was also explained that (based on the NCA project's findings on Krabi Province's water supply and use) tourist-related businesses use 5-10% of the water supply, yet they are the most impacted during droughts.

Another management issue is park officials not properly tearing physical tickets, which compromises the true number of visitors (the park's generated revenue). It was proposed to implement e-ticketing to ensure transparency and to track tourism related data such as which attractions tourists visit and which province they come from (i.e. Phuket or Trang Province) to visit Krabi. However, the MOTS team explained while e-ticketing would provide richer data to improve tourism experiences or policies. There is a concern about PDPA for e-ticketing to gauge more data from tourists.

Figure 17 In-depth Interview with the Office of the Permanent Secretary, Ministry of Tourism and Sports



Image source by the author

2.21 In-depth Interview with the Office of the National Water Resources (ONWR)

Date: 19 May 2026, 9.00 – 12.00

Location: Office of the National Water Resources

Attendees: 19 people

Office of the National Water Resources

1. Mrs. Patcharaawe Suwannik Deputy Secretary-General
2. Ms. Barwornrat Sukrakanchana Director, Master Plan and Policy Division
3. Miss Nantawan Suwansatit Director, Environmental Analysis Group
4. Mr. Tanawit Sirijaree Environmental Officer, Professional Level
5. Ms. Wiranpat Srisemameung Environmental Officer
6. Mr. Olarn Vesurai Deputy Director, River Basin Management Division
7. Mr. Kittisak Pitakwong Director, River Basin Management Group IV
8. Mr. Sakchai Kulsuwan Director, River Basin Planning Coordination Group IV
9. Mr. Tanavat Singhvanawongse Expert on Project Monitoring and Evaluation
10. Mr. Siri wattana Towiwat Director, Legal Division
11. Mr. Pongsak Noonueathong Director, Western Southern River Basin Coordination Group
12. Ms. Kittiya Phumchan Irrigation Engineer
13. Mr. ittikorn Buasomboon Environmentalist, Professional Level
14. Ms. Premmika Pasakoon Economist, Practitioner Level
15. Ms. Mallika Jodnom Intern

Hydro-Informatics Institute

16. Dr. Winai Chaowiwat Researcher

Thailand Development Research Institute (TDRI)

17. Ms. Prinyarat Leangcharoen Senior Researcher
18. Mr. Peerawat Suriyaburaphakul Researcher
19. Ms. Ramida Hansaward Project Coordinator

Main Discussion

The consultation with the Office of the National Water Resources (ONWR) emphasized that Krabi's current water pricing structure does not reflect true and opportunity costs, and recommended revising tariffs to include wastewater management across the entire water chain. ONWR highlighted the importance of demand-side management, particularly encouraging farmers to adopt less water-intensive, higher-value crops to address seasonal shortages. It was proposed that water resource accounts be compiled at the river basin level rather than provincial boundaries, to better capture inflows, outflows, and circulation dynamics. At the national scale, ONWR recommended integrating natural capital and water resource accounts into planning and budgeting processes. Coordination with the NESDC and the Budget Bureau was identified as essential to ensure data serve

as empirical evidence for project prioritization and allocation. Such integration would align provincial budgets with ecosystem conservation and restoration objectives. The approach underscores that water resource management must combine pricing reform, demand-side adaptation, and basin-level accounting. Ultimately, embedding NCA data into national frameworks will strengthen evidence-based policy, promote efficient resource use, and support balanced environmental and economic development.

Figure 18 In-depth Interview with the Office of the National Water Resources (ONWR)



Image source by the author

3. Implementation of Provincial Level Meetings

3.1 One-on-one meeting to consult and discuss on “Sustainable conservation of natural resources and economic development of Krabi Province”

Date: 23 July 2025, 14.00 – 16.00

Location: Krabi Provincial Hall, Krabi Province

Attendees

Krabi Provincial Office

1. Mr. Anuwat Modping Deputy Governor of Krabi Province

Provincial Office of Natural Resources and Environment Krabi

2. Mr. Surachai Kulthong Director of Environmental Division
3. Ms. Kanokporn Phokaanon Environmentalist

Office of Natural Resources and Environmental Policy and Planning (ONEP)

4. Mrs. Katunchalee Thammakul Director of Biodiversity Management Division
5. Ms. Benchamaporn Wattanatongchai Senior Professional Level
6. Ms. Wannapa Maneekul Policy and Planning Analyst
7. Ms. Supawin Kuhathanasathian Policy and Planning Analyst

Thailand Development Research Institute (TDRI)

- | | | |
|----|-------------------------|-------------------|
| 8. | Dr. Adis Israngkura | Project Leader |
| 9. | Ms. Thippawan Keawmesri | Senior Researcher |

Main Discussion

The key conclusions and findings from the Natural Capital Accounting (NCA) project and the context of Krabi Province are summarized as follows.

1. Project Objectives and Application of the Study Results

The primary objective of the project is to integrate the concept of Natural Capital Accounting (NCA) into government planning and decision-making mechanisms. The project comprises three main components:

- Integration of natural capital accounting into the national planning and budgeting framework;
- Integration of natural capital considerations into provincial and local development plans; and
- Raising awareness, strengthening communication, and enhancing the capacity of relevant stakeholders.

Use of Economic Evidence

- The project is undertaking the valuation of natural resources in economic terms, including marine resources such as seawater and coastal ecosystems.
- The resulting economic valuation will serve as evidence to support policy recommendations for provincial development planning and to demonstrate the economic justification for increasing public investment in addressing environmental threats, such as wastewater pollution, where the anticipated environmental and socio-economic benefits outweigh the associated costs.
- The project team will tailor the outputs to respond to the needs of provincial authorities by identifying how the valuation results can best support provincial planning and decision-making processes.

Financial Instruments

- The project also explores financial mechanisms that could enable local authorities to generate additional revenue for the conservation and maintenance of beaches and marine resources. One potential option is to allocate a portion of tourism-related revenues or visitor charges to support the long-term management of coastal and marine ecosystems.

2. Current Situation and Threats to Krabi's Natural Resources

The project focuses primarily on marine resources, which are regarded as one of Krabi Province's most valuable natural assets and a major source of economic income through tourism.

Key Environmental Challenges and Threats

- **Wastewater pollution remains the most critical environmental issue.** While solid waste management has improved considerably, wastewater pollution continues to be a significant yet largely invisible problem until its impacts become evident along beaches and coastal areas.

- **Multiple sources of wastewater pollution** have been identified, including households, industrial facilities, and particularly agricultural activities, especially oil palm cultivation, where the use of agrochemicals and untreated wastewater frequently results in polluted runoff entering canals and eventually discharging into the sea.
- **Wastewater management among private operators remains inadequate.** Existing legal and regulatory mechanisms are insufficient to ensure compliance, particularly among hotels, where wastewater treatment systems are reportedly not operated continuously and may only be activated during inspections. Furthermore, many restaurants and small-scale businesses are not legally required to install wastewater treatment systems.
- **Centralized wastewater treatment infrastructure is insufficient.** Major tourism areas, particularly Ao Nang, generate wastewater volumes that exceed the capacity of existing treatment facilities. In addition, proposals for constructing large centralized treatment ponds in certain locations have encountered public opposition due to concerns over potential environmental impacts.

Impacts on Marine Ecosystems

- **Marine ecosystems are highly sensitive to environmental disturbances.** Coral reefs, seagrass beds, and other coastal ecosystems are particularly vulnerable to wastewater pollution and other human-induced pressures. Combined with the effects of climate change, these stressors have contributed to increasing occurrences of coral bleaching.
- **Dugong migration patterns are changing.** Dugongs have increasingly shifted their feeding grounds away from traditional habitats, such as those surrounding Sri Bo Ya Island. This movement is likely associated with declining seagrass availability and the impacts of climate change. As dugongs move into new areas, they become more vulnerable to entanglement in fishing gear and collisions with vessels.
- **Natural resource recovery during the COVID-19 pandemic** demonstrated the resilience of marine ecosystems. The reduction in tourism and other human activities resulted in noticeable ecological recovery in several locations, including Maya Bay, highlighting the capacity of coastal ecosystems to regenerate when anthropogenic pressures are reduced.

3. Tourism-Related Issues

Impacts of Tourism Growth

- Prior to the COVID-19 pandemic, Krabi Province generated approximately **THB 120 billion** in annual tourism revenue, ranking as the **fourth-largest tourism destination** in Thailand. However, the province received approximately **six million visitors annually**, compared with a resident population of around **400,000**, resulting in excessive pressure on natural resources and ecosystems, as demonstrated by the degradation of Maya Bay.

Management of External Tourism Operators

- Tourism operators based outside Krabi Province frequently utilize the province's tourism resources without contributing to their conservation. These operators primarily focus on deriving economic

benefits from the destinations while assuming limited responsibility for the long-term management and protection of Krabi's natural resources.

Promoting High-Quality and Sustainable Tourism

- There is a strong interest in promoting environmentally sustainable tourism in order to attract higher-value visitors, particularly those from Europe and the Scandinavian countries, who place considerable emphasis on environmental quality, cleanliness, and sustainability.

Diversification of Tourism Destinations

- Krabi's tourism potential extends beyond the five coastal districts. The province possesses significant opportunities for **ecotourism**, **mountain tourism**, and **community-based tourism** in inland districts, which could help reduce visitor congestion in sensitive coastal areas while distributing tourism benefits more broadly across the province.

4. Challenges Related to Stakeholder Participation and Partnerships

Income Inequality

- Significant disparities exist between the economic benefits received by local communities and those accruing to external investors and large private-sector operators.

Limited Stakeholder Partnerships

- Local communities often perceive that they receive limited benefits from conserving natural resources, while those who derive the greatest economic gains do not contribute proportionately to their protection. This has resulted in weak partnerships between local communities and tourism operators in the shared management of natural resources.

Recommendations

The recommendations arising from the **Natural Capital Accounting (NCA)** project in Krabi Province emphasize the use of economic evidence to strengthen planning, budgeting, and decision-making at both provincial and national levels.

1. Recommendations on Budgeting and Development Planning

The project seeks to integrate **Natural Capital Accounting (NCA)** into public sector planning and management through the following recommendations:

Use of Economic Evidence to Support Budget Allocation

- Economic valuation of natural resources, including marine ecosystems and seawater, should be used as evidence to support provincial development planning and inform budget allocation decisions.

Adjusting Budget Allocation to Address Environmental Threats

- The valuation results should be used to engage provincial authorities in considering whether public expenditure should be reallocated to address key environmental threats, particularly wastewater pollution and solid waste management. The analysis indicates that relatively modest increases in

investment for environmental protection could generate substantially greater economic returns through the preservation of marine ecosystem services.

Tailoring Project Outputs to Provincial Needs

- The project team should work closely with provincial authorities to identify how the economic valuation results can best support provincial planning and decision-making, ensuring that project outputs respond directly to local policy needs.

2. Recommendations on Financial Instruments

To strengthen the sustainable financing of natural resource management, the project recommends the development of financial mechanisms capable of generating long-term revenue for conservation.

Strengthening Local Revenue Generation

- Appropriate financial instruments should be explored to enable local governments to generate additional revenue dedicated to natural resource conservation and environmental management.

Tourism-Based Financing

- Consideration should be given to allocating a portion of tourism-related expenditures or visitor charges to finance the conservation and maintenance of beaches and marine ecosystems. At present, most tourism revenue is retained by private operators, while relatively limited funding is reinvested in the protection of the natural resources that support the tourism industry.

3. Recommendations for Addressing Environmental and Economic Challenges (Particularly Wastewater Management)

Given that wastewater pollution represents one of the most critical environmental challenges facing Krabi Province, the following actions are recommended:

Strengthening Legal and Regulatory Enforcement

- Existing legal and regulatory mechanisms should be strengthened to improve compliance among tourism operators, particularly hotels, where wastewater treatment systems are reportedly not operated consistently and may only be activated during official inspections. Regulatory measures should also be expanded to include restaurants and small-scale businesses that are currently not required to install wastewater treatment systems.

Strengthening Collaboration on Wastewater Management

- Greater cooperation should be promoted among public authorities and private operators to facilitate connection to centralized wastewater treatment systems. Existing challenges, including reluctance among some operators to share treatment costs, should be addressed through appropriate institutional and financial arrangements.

4. Recommendations on Sustainable Tourism and Stakeholder Participation

Diversifying Tourism Opportunities

- Where visitor numbers cannot be effectively controlled in environmentally sensitive areas, tourism products should be diversified by promoting ecotourism, mountain tourism, and community-based tourism in inland districts beyond the five coastal districts. This would help reduce visitor pressure on fragile coastal ecosystems while creating broader economic opportunities across the province.

Strengthening Partnerships

- Stronger partnerships should be established between local communities and tourism operators to promote shared responsibility for natural resource management. Current perceptions that local communities receive limited benefits from conservation while private beneficiaries contribute insufficiently to resource protection should be addressed through more equitable benefit-sharing mechanisms and collaborative governance arrangements.

Strengthening the Responsibility of External Tourism Operators

- Appropriate policy measures should be introduced to encourage tourism operators based outside Krabi Province, who bring visitors to local attractions, to share responsibility for conserving the natural resources upon which their businesses depend. Such measures would promote a more equitable distribution of conservation responsibilities among all beneficiaries of Krabi's tourism resources.

Figure 19 consult and discuss on “Sustainable conservation of natural resources and economic development of Krabi Province”



Image source by the author

3.2 To consult and discuss on the Development of Market-Based Instruments (MBIs) for resource conservation in Krabi Province

Date: 27 November 2025, 15.00 – 16.00

Location: Online Meeting

Attendees: 11 people

EnLive Foundation

1. Ms. Jarintip Kaewklam
2. Ms. Sunisa Makyod
3. Ms. Mujalin Prathummas

4. Mrs. Jaruwan Kaewmahanin Enright

Thailand Development Research Institute (TDRI)

- | | |
|----------------------------------|---------------------|
| 5. Dr. Adis Israngkura | Project Leader |
| 6. Ms. Thippawan Keawmesri | Senior Researcher |
| 7. Ms. Prinyarat Leangcharoen | Senior Researcher |
| 8. Ms. Panida Phranphanat | Researcher |
| 9. Mr. Peerawat Suriyaburaphakul | Researcher |
| 10. Ms. Pichamon Keakij | Researcher |
| 11. Ms. Ms. Ramida Hansaward | Project Coordinator |

Main Discussion

Information on Local Areas and Community Groups

1. Waste Management

- **Khlong Haeng Subdistrict, Krabi Province:**

The community collects and sorts waste. Income from selling recyclables is contributed to the Khlong Haeng Mosque Fund, which operates similarly to a “waste bank” (Tha Phlu area).

- **Khlong Prasong Subdistrict, Krabi Province (Wongpanit Team):**

Although this group is not directly supported by the EnLive Foundation, the community sorts recyclable waste and sells it as a source of income for the village fund. Most members are Muslim women residing near the beach area.

- **Other related groups in nearby areas:**

- **Bang Fad – Tha Khlong Subdistrict (route to Koh Lanta):** A women’s group collaborating with Save Andaman Foundation (Trang Province) on products made from crabs.
- **Bang Yalid:** Produces herbal products derived from mangrove forests.
- **Bang Mu (Nakhon Si Thammarat Province):** A community group with strong internal management capacity.

Challenges and Constraints

- **Non-recyclable waste:**

- **Marine debris (orphan waste):** Efforts have been made to collaborate with hotels and the Wongpanit waste management group, but limitations remain.
- **Logistics challenges:** Transportation of waste poses major difficulties due to the island or semi-island geography.
- **Waste disposal:** Marine debris is often burned due to lack of alternatives.

2. Potential Areas for Tool Development

2.1 Waste Management

Waste management is a key focus of the community. Many groups have ongoing activities that can be expanded into economic mechanisms, such as village funds financed by recyclable sales and mosque-based waste bank systems.

2.2 Development of Birdwatching Routes

- A local birdwatching club has been established within the community.
- The EnLive Foundation provides technical knowledge and aims to develop youth capacities—particularly secondary school students—as birdwatching guides.
- TikTok is actively used for communication and tourism promotion within the community (Khlung Prasong Village received equipment support from Samsung).
- **Kidthung Cottage** may serve as a base for activities or as a hub for the club.
- **Site selection and tools:**
Khlung Prasong Village, Khlung Prasong Subdistrict, Mueang Krabi District, is suitable as a pilot site due to its diverse resource management and community activities, including waste management and birdwatching. The area is well-positioned for developing economic tools to support birdwatching tourism and natural resource conservation.
- **External collaboration:**
There are connections with **Pankan Foundation** and **Taejai.com**, which may serve as funding or support channels for future conservation or community initiatives.

Figure 20 consult and discuss on Development of Market-Based Instruments (MBIs)

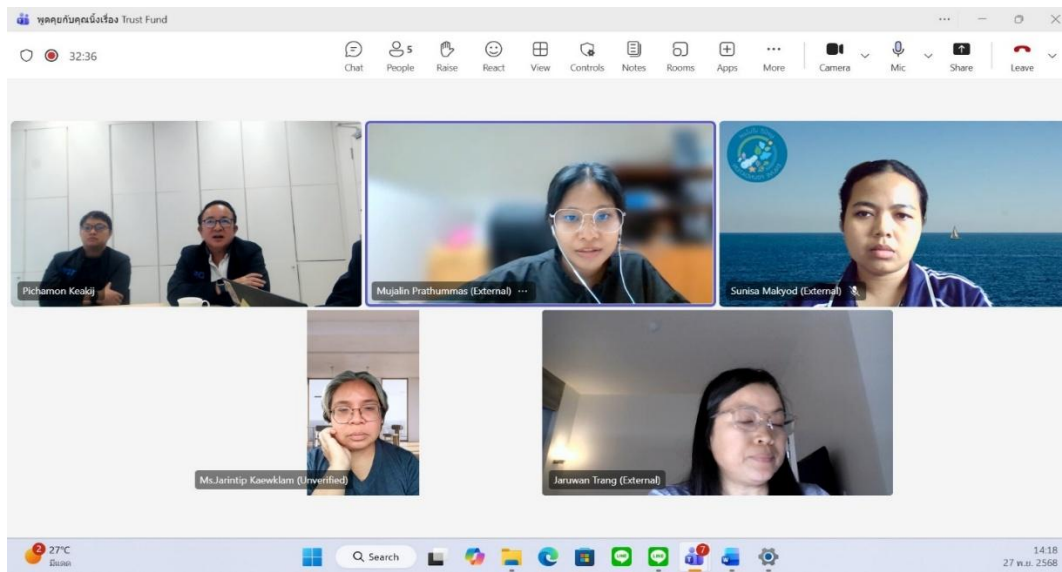


Image source by the author

3.3 To consult and discuss on “The public–private collaboration in jointly monitoring wastewater management and treatment practices of establishments in Ao Nang Sub-district, Krabi Province.”

Date: 18 December 2025, 13.30 – 14.30

Location: Provincial Office of Natural Resources and Environment Krabi

Attendees: 15 people

Provincial Office of Natural Resources and Environment, Krabi Province

- | | | |
|----|----------------------------|---|
| 1. | Mr. Pairat Limprasert | Director of the office of natural resources and environment Krabi |
| 2. | Mr. Surachai Kuntong | Director, Environmental Division |
| 3. | Mrs. Mayura Rotjanamno | Director, Strategy Division |
| 4. | Mr. Praphat Praditkan | Environmental Specialist |
| 5. | Ms. Thanchira Ittipanyakul | Project Coordination Officer |
| 6. | Ms. Sriwilai Thongkhao | Technical Officer, Level 4 |

Wastewater Management Office, Krabi Branch

7. Mr. Amornchai Hirunrat Manager of Wastewater Management Office, Krabi Branch

Krabi Hotel Association

8. Ms. Katsamaporn Limpanpongthep President of the Krabi Hotel Association
9. Mr. Akara Sriraksa Vice President of the Krabi Hotel Association
10. Ms. Sirirat Jeeraphiwat Manager, Krabi Hotel Association

Thailand Development Research Institute (TDRI)

11. Dr. Adis Israngkura Project Leader
12. Ms.Thippawam Keawmesri Senior Researcher
13. Ms. Kanjana Yasen Senior Researcher
14. Mr. Peerawat Suriyaburaphakul Researcher
15. Ms. Pichamon Keakij Researcher

Main discussion

- A consultative meeting was held with relevant personnel at the Provincial Office of Natural Resources and Environment Krabi to discuss and exchange views on issues concerning public–private collaboration in the joint monitoring of wastewater management and treatment practices of establishments in Ao Nang Sub-district, Krabi Province. The key informants for this consultation included Mr. Phairat Limprasert, Director of the Provincial Office of Natural Resources and Environment; Mr. Surachai Kuntong, Director of the Environmental Division; Mrs. Mayura Rotjanamno, Director of the Strategy Division; Mr. Praphat Praditkan, Environmental Technical Officer; Mr. Amornchai Hiranrat, Manager of the Krabi Branch of the Wastewater Management Office; Ms. Gatsamaporn Lipnaphongthep, President of the Krabi Hotel Association; Mr. Akkhara Srirak, Vice President of the Krabi Hotel Association; and Ms. Sirirat Jeeraphiwat, Manager of the Krabi Hotel Association

- **The objective of this meeting** was to address the fact that, in the past, wastewater management had involved the appointment of a committee responsible for conducting on-site inspections of wastewater quality at establishments. However, these inspections had been suspended for several years due to budgetary constraints. The Thailand Development Research Institute (TDRI) therefore sought to provide project-based support to stimulate the resumption of wastewater management and monitoring activities

- **In 2018**, an Appointment of operating team on wastewater and solid waste management was formally established in Krabi Province. This team was chaired by the Vice Governor of Krabi Province, with heads of relevant agencies serving as committee members. The Provincial Office of Natural Resources and Environment Krabi acted as the secretariat, with division directors serving as assistant secretaries

- **Following the establishment of this Appointment of operating team in 2018**, Provincial Office of Natural Resources and Environment Krabi submitted a request for provincial funding to support the implementation of its activities. Budget approval for the project was granted in 2020. Under this initiative, the task force conducted training programs for local establishments focusing on wastewater discharge practices, emphasizing the principle that each operator is responsible for managing wastewater generated by their own

activities. After the training sessions, random inspections of establishments were carried out in accordance with the standards set by the Pollution Control Department (PCD). These inspections served partly as an incentive to encourage improved wastewater management practices among operators and partly as an enforcement mechanism, although they did not involve the application of legal penalties. Following the most recent round of activities, no further budget was allocated to continue this program

- In 2020, Provincial Office of Natural Resources and Environment Krabi developed a new project proposal to request provincial funding and subsequently received an annual budget of approximately 300,000 THB. This budget covered both capacity-building activities for establishment operators and random inspections of establishments. However, these activities were implemented only once per year

- Wastewater management challenges are not limited to Ao Nang, similar issues have also been identified on Koh Lanta. Consequently, the operations of the Krabi Provincial Task Force on Wastewater and Solid Waste Management were divided into two operational zones: Ao Nang and Koh Lanta. Capacity-building activities were conducted in both areas, with training programs provided to local stakeholders in each zone. Similar training activities will also be conducted in Koh Lanta, with approximately 100 participants selected to attend the training sessions organized by the relevant agencies

- The implementation procedures of this project comprised the following steps: (1) An initial consultative meeting was convened among all committee members to determine a coordinated approach for inter-agency implementation. Following this discussion, the relevant agencies jointly formulated an operational plan and timetable for field activities. (2) Field activities were subsequently conducted to deliver training programs on wastewater and solid waste management for establishment operators, with training sessions organized approximately twice per year (3) Random inspections of establishments were then carried out. After the training sessions, the agency responsible informed operators in advance that random inspections would be conducted; however, no prior notice was given regarding the specific establishments to be inspected or the timing of inspections. Based on past implementation, inspections primarily targeted restaurants and hotels (4) If, following inspection, wastewater discharge levels were found to exceed the standards prescribed by the Pollution Control Department (PCD), the Provincial Office of Natural Resources and Environment (PONRE) issued an initial warning. This was followed by a subsequent re-inspection, conducted without prior notification to the establishment concerned. (5) Members of the inspection team and the committee then jointly deliberated on the application of appropriate legal provisions as illustrative regulatory measures to ensure that operators complied with proper wastewater management practices, with the ultimate objective of ensuring that wastewater in both Ao Nang and Koh Lanta is adequately treated prior to discharge into natural water bodies

- The outcomes of previous implementation indicated that the provincial budget of 300,000 THB was allocated to field inspections of restaurant and hotel establishments located in Phi Phi Island, Railay Beach, and Koh Lanta. These inspections focused primarily on the preliminary wastewater management systems of establishments, with particular attention to the installation of grease traps and on-site wastewater treatment systems. The findings revealed that, although grease traps had been installed at many establishments, the majority were not installed in accordance with proper technical standards. This was largely attributable to inappropriate system integration, as grease traps must be installed in conjunction with suitable piping systems.

In the case of hotel establishments, even where kitchen grease traps were present, further assessment was required to determine whether the hotel operated an internal wastewater treatment system prior to discharging effluent into public water bodies. In accordance with the policy direction of the Deputy Governor of Krabi Province, a stepwise regulatory approach was adopted. This approach ranged from issuing warnings to establishments that failed to meet the standards of the Pollution Control Department (PCD), to the enforcement of legal measures by local administrative organizations in cases of repeated non-compliance. Enforcement under the Cleanliness and Orderliness Act at the sub-district administrative level could be undertaken directly. In contrast, enforcement under Thailand's Public Health Act requires the collection of wastewater samples for laboratory analysis and the completion of official reporting procedures prior to taking legal action against non-compliant establishments. The Provincial Office of Natural Resources and Environment Krabi considered this latter process to be relatively time-consuming and operationally slow. Nevertheless, field-based monitoring and inspections conducted by The Provincial Office of Natural Resources and Environment Krabi played a significant role in encouraging greater awareness and improvements in wastewater management practices among operators. As a result, water quality in the affected areas demonstrated a clear trend towards improvement. However, from the COVID-19 period to the present, no further on-site wastewater quality inspections at establishment sources have been conducted. During the COVID-19 period, water quality was observed to be relatively good due to the suspension of economic activities. These observations underscore the effectiveness of systematic wastewater quality inspections conducted by The Provincial Office of Natural Resources and Environment Krabi in contributing to positive environmental outcomes

- Accordingly, in the initial phase, the Thailand Development Research Institute (TDRI) will provide financial support and serve as a catalyst to facilitate the resumption of this project. If the project delivers positive outcomes and generates satisfaction and favorable impressions among both provincial authorities and tourists, it is expected to provide strong justification for budget approval. Implementation will initially commence in the Ao Nang area

- At present, Krabi Province contains several designated special areas subject to oversight by multiple agencies, including pollution control zones and provincially protected areas. The pollution control zone was designated in the Phi Phi Islands in response to wastewater and solid waste management challenges; however, the Pollution Control Department, in collaboration with the Provincial Office of Natural Resources and Environment Krabi, and relevant agencies, is currently considering revoking this designation due to the establishment of an effective wastewater treatment system in the area. With respect to solid waste management, sub-district administrative organizations have acknowledged the issues and are continuing to advance implementation efforts. A meeting of the Pollution Control Zone Committee and its subcommittees is expected to be convened in January 2026, chaired by the Deputy Governor of Krabi Province, to review progress and to deliberate future management approaches

- In summary, the current status of implementation remains at the stage of awaiting coordination by the Provincial Office of Natural Resources and Environment Krabi to determine a suitable date and time when the committee and relevant agencies are available to convene and jointly deliberate on the project concerning wastewater quality inspections. Under the existing committee structure, representatives from the private

sector, specifically the Hotel Association are already included. However, the private sector has proposed expanding committee membership to include representatives from the Restaurant Association, Tourism Association, Spa Association, and laundry service operators. For laundry service establishments, which operate under permits issued by local administrative organizations, it is recommended that the Sub-district Administrative Organization coordinate the participation of relevant permit holders in training sessions or meetings. The private sector associations will jointly consider and select the most appropriate associations prior to submitting the proposed list of representatives, which will be communicated through designated representatives to PONRE Krabi for further action

- The Vice President of the Krabi Hotel Association provided observations regarding the training content, noting that small-scale restaurants and small accommodation facilities that do not fall under the legal definition of hotels are not currently required, under existing regulations, to install dedicated wastewater treatment systems. Nevertheless, in practice, these establishments collectively constitute a major source of wastewater, accounting for approximately 80% of total wastewater generation. In addition, many buildings were originally designed for residential use but have been repurposed for commercial activities, resulting in wastewater discharges that exceed the capacity of the original infrastructure, which typically consists of septic tanks or outdated cement pipe systems. Accordingly, it was recommended that the training programs place greater emphasis on providing practical knowledge and guidance on upgrading wastewater treatment systems that are easy to install, cost-effective, and do not impose excessive burdens on operators. Proposed options included the installation of additional holding tanks or infiltration pits in conjunction with grease traps to reduce wastewater loads prior to discharge into public sewer systems, with an estimated reduction of approximately 30–40% in wastewater volume. Given that many operators are tenants and face limitations with respect to excavation or structural modifications, it was further suggested that specialists play an active role in designing and recommending appropriate above-ground wastewater treatment solutions

- For large-scale establishments, it was recommended that priority be given to verifying whether the wastewater treatment systems declared during the permitting process have been properly installed and are being operated in accordance with the approved designs, as well as whether such systems are adequately maintained and remain fully functional. Only in cases where clear non-compliance is identified should wastewater samples be collected for laboratory analysis to support legal enforcement, as this step requires additional financial resources. It was further noted that implementing preventive measures and undertaking preliminary system improvements could help reduce both short- and long-term budgetary burdens, with the primary costs associated with field operations such as travel, accommodation, and subsistence. Moreover, for establishments that are legally required to conduct regular wastewater quality monitoring, the most recent analytical results within the preceding six months may be utilized as supporting information for initial assessment. If these results are found to be inconsistent with on-site conditions, supplementary sampling from alternative sources should then be conducted to ensure data accuracy and reliability. Finally, it was proposed that the budget be structured into two separate projects to enhance operational clarity and overall efficiency

- The primary legal instruments applied are the Public Health Act enforced by the Sub-district Administrative Organizations (SAOs) and the Provincial Public Health Act, which provide clear legal authority for

immediate enforcement in cases of observable non-compliance. During previous inspection rounds, there were several instances in which SAOs issued official orders directly to establishments

- Provincial Office of Natural Resources and Environment Krabi will expedite the revision of the relevant administrative order in accordance with the views and recommendations discussed during this meeting. Implementation will initially commence in the Phi Phi Islands; however, the revised document will explicitly include both the Phi Phi Islands and Koh Lanta

- Operational constraints associated with random inspections were identified, particularly during the high tourist season, when on-site inspections are difficult to conduct due to high occupancy rates at establishments and the large number of committee members involved, which may cause inconvenience and disrupt tourist activities. In response, inspection procedures have recently been adapted by dividing inspection teams into smaller units of approximately four members per team and distributing inspections across different locations, thereby minimizing impacts on establishments and avoiding unnecessary concern among guests and tourists

- A preliminary implementation plan discussed and jointly agreed upon may be summarized as follows:
 - (1) January 2026: A committee meeting will be convened to deliberate on the implementation of the plan and to identify an appropriate timeframe for operational activities. During this meeting, revisions to the committee membership will also be made to incorporate newly proposed representatives into the official appointment document.
 - (2) February 2026: Capacity-building and training programs will be conducted for various groups of establishment operators, focusing on wastewater and solid waste management practices.
 - (3) March 2026: Random inspections of establishments will be carried out in the Ao Nang area

- The Krabi Hotel Association recommended that public communication focusing solely on wastewater quality inspections may create negative perceptions and excessive pressure on operators, and therefore proposed complementing regulatory measures with positive, incentive-based approaches. These include the introduction of awards or recognition schemes for establishments demonstrating effective wastewater management and compliance with prescribed standards, such as certification symbols or endorsement stickers displayed at establishments, as well as certification signage in common areas or facilities managed by local administrative organizations. Such measures would inform tourists and encourage support for environmentally responsible businesses, thereby enhancing voluntary improvements in wastewater management. Public communication could be implemented through multiple channels, including on-site signage, local government and private sector media, social media platforms of relevant associations, and provincial media networks in Krabi, using both online and on-site formats in public spaces and key tourist destinations to promote broader awareness and strengthen the province's image as a sustainable tourism destination

- Mr. Surachai Kuntong, Director of the Environmental Division, noted that issues related to public communication would be included on the agenda of the forthcoming meeting. At present, there is no province-wide public communication strategy in place; however, once provincial-level communication is initiated, responsibility for further dissemination would be formally assigned to the relevant public relations units

- The Krabi Hotel Association proposed budgetary planning approaches, suggesting that upon completion of the pilot project, the “Ao Nang Model,” the outcomes should be utilized as supporting evidence for the preparation of a provincial budget proposal for the 2029 fiscal year, commencing during the provincial budget planning cycle after April. Furthermore, should contingency or unallocated funds be available under the authority of the Governor during the 2026–2027 period, the project could be included as a Tier 2 (reserve) project to enable immediate implementation in the event that additional funding in the range of 500,000–1,000,000 THB becomes available

- With regard to target implementation frequency, the Association considered quarterly monitoring to be an appropriate approach; however, the operational readiness of relevant agencies must be taken into account. Certain areas face constraints in human resources, particularly local administrative organizations in the Ao Nang area, which have limited personnel and substantial workloads related to licensing procedures. Accordingly, a more practical approach would be to conduct monitoring activities at least twice per year per area, with inspections scheduled around the transition from the late low tourism season to the early high season (October–November) and during the early low tourism season (April–May). Depending on local context and institutional capacity, some areas—such as Phi Phi Islands and Koh Lanta—may be monitored once per year, while Ao Nang may be monitored twice per year, in order to align implementation with site-specific conditions and the capacity of responsible agencies. In addition, Mr. Amornchai Hiranrat, Manager of the Krabi Branch of the Wastewater Management Office, provided a progress update on project implementation, noting that on 28 November 2025, a follow-up meeting was held at the Ao Nang Sub-district Administrative Organization to review wastewater management issues. During this period, the Wastewater Management Office and the Ao Nang SAO considered the development of a Memorandum of Agreement (MOA), on which the Sub-district Chief Executive expressed two key observations

(1) **Cost considerations:** Concerns were raised regarding the relatively high projected costs outlined in the MOA. The management of the Wastewater Management Office acknowledged this concern and agreed to review and assess the estimated annual operational costs

(2) **Contract duration and termination conditions:** The MOA between the Wastewater Management Office and the Sub-district Administrative Organization is proposed to have a duration of 15 years. In the event of early termination initiated by the Sub-district Administrative Organization, the latter would be required to reimburse construction costs to the Wastewater Management Office. Given that the total construction cost of the project is estimated at approximately 800 million THB, this provision was considered to represent a substantial financial burden

(3) **Land allocation for construction:** The project requires designated land for construction, located opposite the sports stadium. This aspect has largely been resolved, with only two outstanding matters pending formal approval: (i) the signing of the MOA between the Wastewater Management Office and the Sub-district Administrative Organization, and (ii) the formal handover of the project site

Figure 21 consult and discuss on PPPs in Krabi province



Image source by the author

THE INTEGRATION OF NATURAL CAPITAL ACCOUNTING IN
PUBLIC AND PRIVATE SECTOR POLICY AND DECISION-MAKING
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