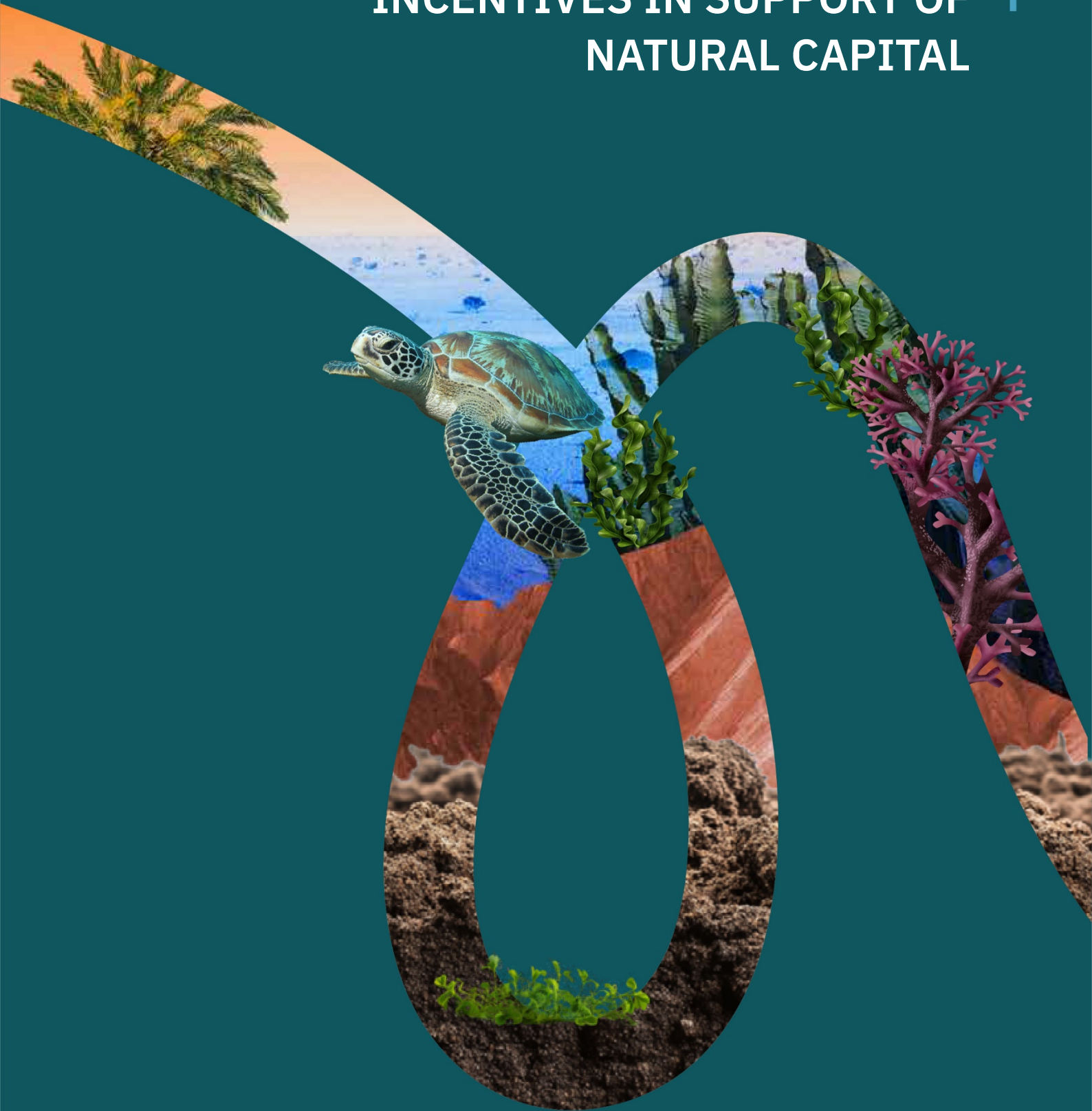


COMPONENT 1

POLICIES AND MARKET INCENTIVES IN SUPPORT OF NATURAL CAPITAL



COMPONENT 1

POLICIES AND MARKET INCENTIVES IN SUPPORT OF NATURAL CAPITAL

OUTPUT 1.2.1

HOST THE SECTORAL
ROUNDTABLE MEETINGS

Author

Adis Israngkura, Thailand Development Research Institute (TDRI)

Thippawan Keawmesri, Thailand Development Research Institute (TDRI)

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

NATURAL
CAPITAL

Funded by



Executing Agencies



TDRI THAILAND
DEVELOPMENT
RESEARCH
INSTITUTE

Acknowledgement

The Office of Natural Resources and Environmental Policy and Planning (ONEP), Thailand Development Research Institute (TDRI) in collaboration with the United Nations Environment Programme (UNEP), gratefully acknowledges the generous financial support provided by the Global Environment Facility (GEF) for the project “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes.”

We also acknowledge the active participation and constructive inputs of representatives from government agencies, public enterprises, private sector organizations, academic and research institutions, civil society groups, and international partners. Their collaboration and recommendations have been instrumental in shaping the conceptual framework of Natural Capital Accounting and ensuring its relevance to Thailand’s tourism and water resource sectors.

Finally, we would like to express our sincere gratitude to stakeholders from relevant central agencies, including the National Economic and Social Development Council (NESDC), the National Statistical Office, the Department of Marine and Coastal Resources, the National Water Resources Office, the Water Resources Information Institute (Public Organization), the Department of Tourism, and the Office of the Permanent Secretary of the Ministry of Tourism and Sports, among others. Their active participation and expertise have contributed significantly to strengthening the integration of natural capital into national policy and planning. Their continued commitment underscores the importance of collaborative action in advancing sustainable landscapes and fostering an eco-friendly economy.

Contents

Acknowledgement	i
Executive Summary	v
1. Overview	1
2. Consultation Meetings.....	2
2.1 Minutes of the Focus Group for recommendations on The Conceptual Framework of Natural Capital Accounting (NCA)	2
2.2 Consultation on National Capital Accounting with NESDC.....	8
2.3 Consultation on National Capital Accounting with NCA Expert	9
2.4 Consultation on Marine and Coastal Pollution.....	10
2.5 One-on-one meeting Impact Analysis of Simulation Scenarios and Market Base Instrument (MBI).....	12
2.6 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	15
2.7 Consult and Discuss on Water Account.....	17
2.8 To consult and discuss the Environmental Impact Assessment (EIA) process for public investment projects covering the valuation of natural capital and ecosystem services.....	20
2.9 Minutes of the linking Natural Capital Accounting for Tourism and Water Resources to Development Planning Medium-Term Expenditure Framework (MTEF) and the 14th National Economic and Social Development Plan (2028–2032).....	228
3. In-depth Interviews	28
3.1. In-depth interview summarization Process of preparing “Tourism Satellite Account-System of Environmental Economic Accounting (TSA-SEEA) of Thailand”	35
3.2 In-depth Interview with the National Statistical Office	38
3.3 In-depth Interview with the Budget Bureau	40
3.4 In-depth Interview with the Office of the National Economic and Social Development Council (NESDC)	41
3.5 In-depth Interview with the Office of the Permanent Secretary, Ministry of Tourism and Sports.....	44
3.6 In-depth Interview with the Office of the National Water Resources (ONWR)	46

Figures

Figure 1	The Focus Group for recommendations on the Conceptual Framework of Natural Capital Accounting (NCA)	7
Figure 2	One-on-one meeting with National Economic and Social Development Council (NESDC).....	9
Figure 3	Consultation on National Capital Accounting with NCA Expert.....	10
Figure 4	Consultation on Marine and Coastal Pollution with Pollution Control Department (PCD) and The Environment and Pollution Control Office 15 (Phuket)	12
Figure 5	One-on-one meeting Impact Analysis of Simulation Scenarios and Market Base Instrument (MBI)	14
Figure 6	One-on-one meeting consult the Green Fins project	16
Figure 7	Consult and Discuss on Water Account	19
Figure 8	Consult and discuss the Environmental Impact Assessment (EIA)	28
Figure 9	The linking Natural Capital Accounting for Tourism and Water Resources to Development Planning Medium-Term Expenditure Framework (MTEF) and the 14th National Economic and Social Development Plan (2028–2032).....	34
Figure 10	In-depth interview TSA-SEEA.....	37
Figure 11	In-depth Interview with the National Statistical Office.....	39
Figure 12	In-depth Interview with the Budget Bureau	41
Figure 13	In-depth Interview with the Office of the National Economic and Social Development Council (NESDC)	43
Figure 14	In-depth Interview with the Office of the Permanent Secretary, Ministry of Tourism and Sports.....	45
Figure 15	In-depth Interview with the Office of the National Water Resources (ONWR)	47

Executive Summary

The Office of Natural Resources and Environmental Policy and Planning (ONEP), in collaboration with the United Nations Environment Programme (UNEP) and with support from the Global Environment Facility (GEF), is promoting the integration of Natural Capital Accounting (NCA) into Thailand's policy-making and decision-making processes. The Thailand Development Research Institute (TDRI) serves as the project's advisor.

This initiative focuses on two key sectors—tourism and water resource management—with Krabi Province selected as the pilot area due to its ecological significance and its role as a leading tourist destination.

The project aims to develop a Natural Capital Accounting system for tourism and water resources, providing scientific data and empirical evidence for national and provincial planning. It seeks to strengthen decision-making mechanisms by integrating the value of biodiversity and ecosystem services, while also enhancing awareness and capacity among stakeholders to promote sustainable resource use.

The main activities under this output include sector-level roundtables and central-level consultations. These forums convene government agencies, private sector representatives, academics, and civil society organizations to exchange knowledge, strengthen collaboration, and provide feedback for effective implementation.

The project is structured into three components: (1) Policy and Incentives—establishing a national framework and integrating NCA into policy, planning, and budgeting; (2) Provincial Implementation—applying NCA in Krabi Province and linking accounts with development plans; and (3) Capacity Building and Awareness—knowledge dissemination, networking, and stakeholder engagement.

By integrating natural capital into economic systems and policy frameworks, Thailand is taking concrete steps toward building a nature-positive economy and contributing to global sustainable development goals.

1. Overview

The Office of Natural Resources and Environmental Policy and Planning (ONEP), in collaboration with the United Nations Environment Programme (UNEP), has appointed the Thailand Development Research Institute Foundation (TDRI) as the implementing consultant for the project entitled Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes. The project is financially supported by the Global Environment Facility (GEF).

The project aims to integrate Natural Capital Accounting (NCA) into policy formulation and decision-making processes across key economic sectors at both national and subnational levels. It also seeks to promote the conservation of biodiversity and ecosystem services while mitigating the environmental impacts arising from economic production activities. Implementation focuses on two priority sectors: tourism and water resources management.

The project is expected to deliver Natural Capital Accounts for Thailand's tourism and water resources sectors, which will serve as a scientific and evidence-based foundation for integrating natural capital considerations into national and local policies, plans, and decision-making processes. Furthermore, the project aims to enhance knowledge, awareness, and understanding of natural capital, thereby promoting the sustainable use of biodiversity and ecosystem services. In addition, it will strengthen national decision-making mechanisms and natural resource management planning by incorporating scientific evidence and the economic valuation of marine, coastal, and freshwater ecosystems into policy and planning processes.

To ensure effective implementation and foster broad-based stakeholder participation, national-level sectoral roundtables have been convened. These meetings bring together representatives from government agencies, the private sector, academic and research institutions, and civil society organizations at the central level. To date, sixteen meetings have been organized, categorized into two formats: consultation meetings and in-depth interviews. The purpose of these meetings is to: enhance stakeholder understanding of the project's objectives, scope, and expected outcomes; promote awareness of the importance of natural capital accounting; facilitate the exchange of knowledge and technical perspectives on the development of natural capital accounts; strengthen cooperation and collaboration among relevant stakeholders; and solicit advice and feedback to support continuous improvement and effective project implementation.

2. Consultation Meetings

2.1 Minutes of the Focus Group for recommendations on The Conceptual Framework of Natural Capital Accounting (NCA)

Meeting Minutes of the Focus Group for recommendations on The Conceptual Framework of Natural Capital Accounting (NCA) on **Tuesday 13th June 2023** 09:30 am - 12:00 pm at Alpha Meeting Room, 2nd Floor Pullman Bangkok King Power (Rangnam), Bangkok Thailand

Principles and Rationale: Office of Natural Resources and Environmental Policy and Planning (ONEP) and United Nations Environment Programme (UNEP) have assigned Thailand Development Research Institute (TDRI) to be the Lead Service Provider for undertaking “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes” project with the budget support from the Global Environmental Facility (GEF) with the project implementation duration of 54 months (2022 - 2026) The objectives of the project are to integrate the natural capital into the preparation and implementation of the mainstream economic sector both at the local and the national levels, enhancing the protection and mitigation of the impact from the production sector on the biodiversity and the ecosystem services by focusing on 2 sectors, i.e. tourism and water resources, and have selected Krabi Province as the project implementation area since the area is vital as the head waterway covering thru the coastal and marine areas which is significant for the livelihood of local people, including a major travel destination of the country. The activities of the project consists of 3 major components, i.e.

1. Preparation of the policy and incentives creation to enhance the integration of the natural capital accounting comprising of : conceptual development, roadmap to adopt the natural capital accounting system for Thailand by analysis of the relationship between the information of natural capital in the tourism and water resources sectors and the ecosystem services and the policy, planning, and the budgeting on water and tourism of the country.

2. The integration of natural capital accounting into the development planning at the provincial and the local levels by selection of Krabi Province as the project implementation area. The implementation comprises : initiation of development of natural capital accounting in tourism and water resources at the provincial level, and promoting the private sector participation in impact mitigation, rehabilitation, and protection of ecosystems in the watershed, coastal and marine areas.

3. Compilation of data, enhancement of capacity, knowledge, and awareness, including information related to the natural capital accounting which are activities supporting the component 1 and 2 at the national and the provincial levels.

TDRI reckons that to prepare for the project implementation of component 1 which is the conceptual framework development, roadmap for adoption of natural capital accounting for Thailand, “Conceptual Meeting of the Focus Group for Natural Capital Accounting in Tourism and Water Resources, and Roadmap” has been scheduled,

leading to the integration of natural capital accounting into the preparation of policy and implementation of the main economic sector both at the local and the national levels.

Objectives: (1) To consult and open for suggestion of the conceptual framework in the preparation of natural capital accounting (NCA) focusing on the tourism and water resources sectors, and the roadmap leading to the integration of natural capital into the policy and implementation off the mainstream economic sector at both the local and the national levels. (2) To exchange information, knowledge, and understanding in the preparation of natural capital accounting

Target Group: Scholars, experts, and representatives of governmental agencies related to the Natural Capital Accounting (NCA) focusing on the tourism and water resources sectors.

Expected Outcome: Brainstorming, recommendation on the conceptual framework of the Natural Capital Accounting (NCA) in the tourism and water resources sectors, and roadmap clearly leading to practice.

The objective of the Focus Group meeting is to brainstorm for ideas and recommendations for the preparation of natural capital accounting in the tourism and water resources sectors in Krabi Province with participants comprising of independent scholars, and representatives from various agencies, i.e. Kasetsart University, Puey Ungphakorn Institute for Economic Research, National Economic and Social Development Board, Geo-Informatics and Space Technology Development Agency (Public Organization) (GISTDA), National Institute of Development Administration (NIDA), Ramkhamhaeng University, National Statistical Office, Tourism Division, The National Science and Technology Development Agency (NSTDA), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), Thailand Research Development Institute (TDRI), and Office of the Natural Resources and Environmental Policy and Planning (ONEP) totally 25 persons.

The meeting process of the Focus Group was divided into 3 sessions as follows:

Session 1 : Welcoming and Opening Remarks

Dr. Benchamaporn Wattanatongchai, Director of the Central Convention Coordination Group, Biodiversity Management Division, ONEP delivered the welcoming remarks, project background, and meeting opening remarks.

Session 2 : Presentation of the conceptual framework for the Natural Capital Accounting (NCA) : Tourism and Water Resources Sectors and Roadmap

Dr. Adis Israngkura, NCA Project Manager, TDRI presented the objective, target, project implementation duration, scope and implementation area, components, and project outcome, conceptual framework and project implementation plan, and environmental value assessment, which the preparation of the natural capital accounting have to incorporate information on natural resources and various ecosystems in the Krabi Province area to apply jointly with the geo-informatics system. Then the appropriate economic tools are selected to assess the monetary value of various categories of natural resources for preparation of policy recommendations.

Mr. Chakris Pitakratanasakul, Geo-informatics Expert, GISTDA presented the geographical information system, comprising of Data & Information Satellite, and Data & Information GIS: on Natural Resource Solution, e.g.

monitoring of change in the green areas, land utilisation analysis, biodiversity analysis, and monitoring of change in the coastal and marine areas, etc.; on Agricultural Solution, e.g. economic crop plantation area analysis, future output forecast, and accurate monitoring of crop plantation scenario, etc.; on Urban Solution, e.g. change in building boundary; on Disaster Solution, e.g. accurate forecast and monitoring of flooding scenario, speedy identification of wildfire location, etc.; on Water Management Solution, e.g. prompt water demand management, urban water management, and agricultural water management, etc.

Associate Professor Dr.Dullawit Sathapanajaru, Environmental Technology and Management Expert, Kasetsart University presented the geographical landscape of Krabi Province which comprises of watershed on the west coast in the southern region, land-based ecosystem (forest resource), Krabi Rivermouth wetland (biodiversity source), rare plants vital to the conservation at the national level, classified conservation wildlife, rivermouth ecosystem (migrating birds), terrestrial (land-based) ecosystem (wildlife), marine and coastal ecosystem (coral reef, seagrass, rare marine creatures), and famous Krabi travel attractions.

Hence, the meeting has provided suggestions in the NCA project implementation as follows:

1. NCA project can benefit from utilisation of information from other projects or activities, e.g. survey of Krabi Province marine and coastal resources condition, assessment of economic benefits arising to the local community from bird watching activity in the area, etc.

2. Impact on natural resources and environment in Krabi province from the tourism activities, and water utilisation might not limit only to Krabi area, therefore the meeting has requested consideration to review the boundary of the project implementation area, which might be extended beyond the Krabi area, but still within the water basin of the west coast in the southern region.

3. Assessment of the monetary value of the natural resources Category 1 might have to employ the various types of economic tools together.

4. Assessment of the change in monetary value of the natural resources due to project or activities implementation in the area between the project/ activity with severe environmental impact and project/ activity with minimal environmental impact, would have to employ different methods to prevent overestimation or underestimation.

5. Although the economic tools might focus mainly on collecting and paying money, they have different characteristics, have to use with different groups of people, and create different accounting impacts, e.g. the collection of expenditure from polluter to treat or dispose of the pollution arising (e.g. trash collection fee from disposer) is not the same as the environment tax collection to stimulate the social awareness toward environmental value because in collection of expenditure the balance sheet of treatment fee have to be zero (money spent equal to money collected) while the balance sheet from the tax collection is not zero (government does not have to pay for the treatment fee equal to money received and can use the money jointly with revenue from other sources for other government activities). Therefore, to be proper and appropriate for both the budget and balance sheet, governmental agencies in both central and regional levels have to be aware of this issue.

6. In using the economic tools, consideration shall be given to which group of the population have the right to access which type of resources, and who should pay the expense or receive the payment. Two main types of concepts shall be considered, i.e. “Polluter Pay Principle” or “Willing to Pay”, and “Payment for Ecosystem Service” or “Willingness to Accept Compensation”.

7. In assessment of natural resource value, care should be given to duplicating in assessment, especially in the tourism sector. However, water and tourism are in fact connected issues.

8. GIS mapping should be prepared to illustrate the flight route of migrating birds in the Krabi Province or import the flight route of migrating birds from ONEP, and Bird Conservation Society of Thailand for exploitation in this project.

9. Data from GIS Mapping of GISTDA might reflect the natural integrity outside the conservation area in Krabi Province.

The meeting also identified the challenges and problems in the NCA project implementation as follows:

1. Information to be utilised, e.g. source of data, data integrity, up-to-date data, including the unofficially recorded data, e.g. underground water, or rain water which people collected for their own household consumption, etc.

2. Water quantity for maintenance of balance in ecosystem might be difficult to calculate.

Suggestions and Recommendations

1. It is noted that the concept of “Polluter Pay Principle - PPP” has already been embedded in the Thai laws. However, “Payment for Ecosystem Service - PES” still does not exist in (Thai laws). The meeting therefore deems that the important laws on biodiversity of Thailand (e.g. (draft) Biodiversity Act (B.E. ...)) should include both concepts as well.

2. The meeting has provided the information of methods in wastewater treatment and recycling of wastewater for reutilisation which is favoured by hotel business and small size resorts in Krabi Province area which is water saving and cost saving, and mitigate the environmental impact around the hotel area as well.

3. Migrating birds route and tourist interest on migrating birds should be included to calculate the economic benefits, e.g. development of goods and local products related/ or with story on migrating birds, or development of activities on migrating birds watching for tourists to benefit local community sustainably, and also might connect with the feeding ground for other migrating birds outside Krabi Province area

4. Presently, there is a standard for tourism companies on bird watching which is a good practice, but the general tourism companies still have yet to pay attention to this appropriately.



Agenda Focus Group

Conceptual Framework of “Natural Capital Accounting (NCA) : Tourism and Water Resources Sector and Roadmap”

under

“Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes”

Tuesday 13th June 2023 09:00 am - 01:00 pm

at Alpha Meeting Room, 2nd Floor Pullman Bangkok King Power (Rangnam)

- | | |
|-------------------|--|
| 09.00 – 09.30 am | Registration |
| 09.30 – 09.45 am | Welcome remark and project introduction by
Dr.Benchamaporn Wattanatongchai, Environmentalist, Senior Professional Level, Biodiversity Management |
| 09.45 – 10.30 am | Presentation of Conceptual Framework for Natural Capital Accounting (NCA) : Tourism and Water Resource Sectors, and Roadmap by :
Dr. Adis Israngkura - Project Leader, TDRI;
Dr. Tunlawit Satapanajaru - Environmental Science Specialist, Faculty of Environment, Kasetsart University;
Dr.Pasinee Worachananant - Environmental and Tourism Management Specialist, Faculty of Environment, Kasetsart University;
Mr. Chakris Phithakrattanasakun - Geo-Informatics and Space Technology specialist, GISTDA |
| 10.30 – 10.45 am | Coffee Break |
| 10.45 – 11.45 am | Discussion issues, opinions hearing, and Recommendations : <ul style="list-style-type: none">▪ NCA▪ Roadmap Panel discussion facilitated by Dr.Adis Israngkura (Project Leader) |
| 11.45 am–12.00 pm | Summary of the meeting and hearing from open Discussion |
| 12.00 – 13.00 pm | Lunch |

Figure 1 The Focus Group for recommendations on the Conceptual Framework of Natural Capital Accounting (NCA)



Image source by the author

2.2 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 2 One-on-one meeting with National Economic and Social Development Council (NESDC)



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 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. Nutchana 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 5 One-on-one meeting Impact Analysis of Simulation Scenarios and Market Base Instrument (MBI)



Image source by author

2.6 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 6 One-on-one meeting consult the Green Fins project



Image source by author

2.7 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 7 Consult and Discuss on Water Account



Image source by author

2.8 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 Lertwiriyanich 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 8 Consult and discuss the Environmental Impact Assessment (EIA)



Image source by author

2.9 Minutes of the linking Natural Capital Accounting for Tourism and Water Resources to Development Planning Medium-Term Expenditure Framework (MTEF) and the 14th National Economic and Social Development Plan (2028–2032)

Meeting Minutes of the linking Natural Capital Accounting for Tourism and Water Resources to Development Planning Medium-Term Expenditure Framework (MTEF) and the 14th National Economic and Social Development Plan (2028–2032) **on 31 March 2026, 09:00–12:00** at the DAWN Room, 2nd Floor Pullman Bangkok King Power (Rangnam), Bangkok Thailand, **Attendees: 39 people**

Fiscal Policy Office, Ministry of Finance

- | | |
|---------------------------------|--------------------------------------|
| 1. Mr. Kamolphong Wisitwanit | Economist, Senior Professional Level |
| 2. Mr. Sanhanat Satetasakdasiri | Economist, Senior Professional Level |
| 3. Ms. Thanyalak Kosawiang | Economist, Practitioner Level |
| 4. Ms. Saithip Khamphut | Economist, Practitioner Level |

National Statistical Office

- | | | |
|----|-----------------------|---|
| 5. | Ms. Kanchana Phumalee | Director of Government Strategic Information Center |
| 6. | Mr. Prawit Banjong | Statistician, Senior Professional Level |
| 7. | Ms. Narissara Chanpet | Statistician, Professional Level |
| 8. | Ms. Chonnipa Tanyong | Statistician, Practitioner Level |

Hydro-Informatics Institute

- | | | |
|-----|-----------------------|------------------------|
| 9. | Dr. Sorathep Wannarat | Acting Deputy Director |
| 10. | Dr. Winai Chaovivat | Researcher |

Office of the National Water Resources

- | | | |
|-----|------------------------|---|
| 11. | Mr. Thanawit Sirijaree | Environmental Officer, Professional Level |
| 12. | Ms. Premmika Paskul | Economist, Practitioner Level |

Office of Natural Resources and Environmental Policy and Planning

- | | | |
|-----|-----------------------------|---|
| 13. | Dr. Pattarin Thongsima | Director of Policy and Strategy Section |
| 14. | Ms. Adchara Wattaserikul | Plan and Policy Analyst |
| 15. | Mr. Phisit Suksakon | Project Analyst |
| 16. | Ms. Wannapa Maneekul | Plan and Policy Analyst |
| 17. | Ms. Suprawee Kuhatanasatian | Plan and Policy Analyst |

Office of the National Economic and Social Development Council

- | | | |
|-----|--------------------------|--|
| 18. | Ms. Wannapa Klaisuan | |
| 19. | Mr. Watchapol Pumkaew | Plan and Policy Analyst, Senior Professional Level |
| 20. | Mr. Thammanoon Manorum | Plan and Policy Analyst, Professional Level |
| 21. | Mr. Ruechakorn Thongchim | Plan and Policy Analyst, Practitioner Level |

Department of Water Resources

- | | | |
|-----|------------------------|------------------------------|
| 22. | Mr. Priyachat Rongkaew | Engineer, Professional Level |
|-----|------------------------|------------------------------|

Budget Bureau

- | | | |
|-----|-------------------------------|--|
| 23. | Ms. Phiangpinit Sukyaemsri | Computer Specialist, Expert Level |
| 24. | Ms. Penpak Suparee | Computer Specialist, Senior Professional Level |
| 25. | Ms. Pimphan Wutthipongprasert | Budget Analyst, Professional Level |
| 26. | Ms. Thipwan Bovornseni | Budget Analyst, Practitioner Level |

Office of the Permanent Secretary, Ministry of Tourism and Sports

- | | | |
|-----|----------------------------|--|
| 27. | Mr. Boonsan Prasertkulchai | Plan and Policy Analyst, Senior Professional Level |
| 28. | Ms. Priyapha Kanitphan | Plan and Policy Analyst, Senior Professional Level |
| 29. | Ms. Dhanyabhorn Sukmak | Plan and Policy Analyst, Practitioner Level |
| 30. | Ms. Benyapha Rakthum | Plan and Policy Analyst, Practitioner Level |
| 31. | Ms. Boonyanuch Sornprasert | Plan and Policy Officer |

Thailand Development Research Institute (TDRI)

- | | | |
|-----|-------------------------|-------------------|
| 32. | Mr. Adis Israngkura | Project Leader |
| 33. | Ms. Thippawan Keawmesri | Senior Researcher |

34.	Ms. Prinyarat Leangcharoen	Senior Researcher
35.	Mr. Promphat Bhumiwat	Researcher
36.	Ms. Kanjana Yasen	Researcher
37.	Mr. Peerawat Suriyaburaphakul	Researcher
38.	Ms. Panida Phranphanat	Researcher
39.	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. This was followed by a presentation on the Water Resources Satellite Account (WRSA) by Dr. Winai Chaovivat, representing the Hydro-Informatics Institute. Subsequently, group discussions were conducted to gather additional input and data. The key points can be summarized as follows:

Office of the Permanent Secretary, Ministry of Tourism and Sports

The Office expressed its appreciation to the research team for presenting a systematic and well-structured overview of natural capital accounting and its linkages with the tourism sector. In particular, the selection of the case study area was commended for aligning well with the research questions, enabling a clearer and more accessible assessment of the value of natural resources.

Regarding the Tourism Satellite Account (TSA) data used in the study, the Office noted that more recent data—up to 2025—are now available and recommended that the research team update the dataset accordingly. It also suggested further consideration of the use of TSA data at the regional or provincial level to ensure that the findings more accurately reflect spatial contexts. For example, in estimating the value of rail transport at approximately THB 15 million, the figures may not be consistent with the reality of Krabi Province, which does not have a rail transport system. This could lead to analytical results that do not fully reflect local conditions. The Office further recommended increasing the collection of primary data, as the current analysis relies largely on secondary data. Additional field data would enhance the robustness and credibility of the study.

The Office also observed that the definition of tourism applied in the study differs from the operational definition used by the Ministry. However, this discrepancy stems from data limitations in Thailand, which do not yet allow for full adherence to the Ministry's definition. For instance, in the case of domestic tourism in Krabi Province, the Ministry defines this as residents of Krabi traveling within the province. In practice, however, such disaggregated data are not available. As a result, the research team has had to rely on data representing Thai tourists traveling to Krabi instead.

Finally, with regard to the findings on natural capital asset accounts for terrestrial ecosystems, the Office agreed with the conclusion that the value of natural capital declined over the study period. This trend was considered consistent with the tourism dynamics of the area, which experienced high levels of activity in 2019, followed by a significant downturn due to the COVID-19 pandemic.

National Statistical Office (NSO)

The NSO expressed its appreciation to the research team for initiating the application of the System of Environmental-Economic Accounting (SEEA) framework in the study. This approach was recognized as instrumental in systematically capturing the existence, utilization, and valuation of natural resources.

Regarding the Water Resources Satellite Account (WRSA), the NSO noted that the study design allows for a clear disaggregation of data into supply and use components, in line with analytical needs. The accounting process can also be aligned with the fiscal year framework, as the underlying data are available on a monthly basis. In practice, water accounts are often compiled in reference to the hydrological cycle used in water allocation planning by the Royal Irrigation Department, which typically begins in November each year.

The NSO further shared its prior experience in developing tourism accounts under the TSA-SEEA framework, following the guidelines of the United Nations World Tourism Organization (UNWTO), in collaboration with the National Science and Technology Development Agency (NSTDA) for the Andaman Tourism Development Cluster prior to the COVID-19 pandemic. In addition, the NSO has collaborated with the Department of Tourism, NSTDA, and experts from ESCAP to develop natural capital accounts for tourism in the form of Ocean Accounts for the same cluster, also under the SEEA framework. These studies examined the types of resources utilized by tourism activities and developed related satellite accounts, including water, energy, waste, and greenhouse gas accounts, supported by five core accounts under the SEEA framework.

On data usage, the NSO emphasized the importance of ensuring consistency in data sources, definitions, and temporal coverage to enable accurate linkage with Gross Domestic Product (GDP) calculations. For example, the TSA compiled by the NSO is fully aligned with the national TSA framework. The NSO also suggested that the research team may consider constructing accounts at a “cluster” or multi-province level for areas with similar characteristics. Defining the unit of analysis at an excessively granular level may limit the applicability of the results for policy formulation and management purposes.

Budget Bureau

The Budget Bureau noted that the issues raised would be taken under consideration and further consulted internally, with coordinate relevant sectors in subsequent discussions, including at the next meeting.

Fiscal Policy Office (FPO)

Krabi Province generates significant economic value from the tourism sector, which has led to increasing pressure on natural capital and the degradation of local resources. However, during the COVID-19 pandemic, tax revenues declined markedly. This reflects an inherent trade-off between the utilization of natural resources for economic gains and the long-term sustainability of the resource base. From the agency’s perspective, natural capital accounting should be integrated into the project appraisal and approval process—particularly for tourism-related infrastructure projects in provinces that are highly dependent on tourism revenues, such as Krabi, Phuket, and Phang Nga. In this regard, data from natural capital accounts should be used in conjunction with Gross Provincial Product (GPP) to support more comprehensive and balanced policy decision-making.

The FPO also noted that it has conducted studies on the valuation of natural capital loss, which could be highly relevant to this line of research. In particular, the use of satellite imagery was highlighted as a valuable tool for analyzing economic activities linked to changes in natural resources. For example, nighttime light data can be

used to identify areas with high light intensity, which may serve as a proxy for concentrated economic activity during nighttime—particularly in tourism areas. Similarly, data on nitrogen emissions from heavy industrial activities can indicate the spatial concentration of industrial operations. These approaches can be further extended to other dimensions, such as changes in natural water bodies, to better capture spatial dynamics.

Regarding budget allocation, current criteria are largely based on population size at the provincial level. This approach may not be suitable for tourism-dependent provinces such as Krabi, which, despite having relatively small resident populations, experience high volumes of tourists. As a result, the burden on infrastructure and public services is significantly higher than what is reflected by official population figures. The existing allocation mechanism may therefore not adequately capture the true fiscal and service demands of such areas. The FPO suggested that alternative data and emerging technologies should be incorporated to improve the allocation framework. While some alternative data have begun to be utilized, tourist numbers are not yet included in the calculation, partly due to the view that tourists are not direct taxpayers. However, tourists do contribute to tax revenues indirectly through consumption of goods and services. Therefore, the budget allocation criteria should be revisited to better reflect the economic and social burdens faced by tourism-intensive provinces.

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

The Office of Natural Resources and Environmental Policy and Planning highlighted an approach implemented in Malaysia known as the Ecological Fiscal Transfer (EFT) mechanism. This approach allocates higher budgetary resources to states or areas that maintain a high proportion of forest cover, using forest area as a key indicator in determining budget allocation for natural resource conservation.

From the agency's perspective, the System of Environmental-Economic Accounting (SEEA) framework—given its emphasis on the valuation of natural capital—could be adapted to support the design of such budget allocation mechanisms. This approach would not only enable budget allocation to better reflect the value of natural resources, but also serve as an incentive for local areas to prioritize the conservation and sustainable management of forest resources on a continuous basis.

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

The NESDC noted that the compilation of accounts under the System of National Accounts (SNA) framework must take into account issues of hidden populations and labor mobility. At present, three key agencies are involved in producing such data: the NESDC, the Bank of Thailand, and the National Statistical Office. Given that population mobility cannot be accurately captured using household registration data alone, estimation techniques are required. In this regard, tourists exhibit similar characteristics, and their measurement also requires supplementary tools and data. For example, tourism surveys conducted by the Ministry of Tourism and Sports—such as those capturing travel purposes and motivations (e.g., attraction to the unique qualities of destinations)—can help improve data accuracy.

In the context of the System of Environmental-Economic Accounting (SEEA), the NESDC emphasized the need to consider both economic and environmental dimensions in tandem. On the economic side, attention should be given to income generation and value creation, while on the environmental side, the costs of conservation, restoration, and resource management must be incorporated. A comprehensive assessment therefore requires

accounting for all relevant environmental factors. The inclusion of forest accounts was also recommended, as it would enhance the completeness of SEEA-based analyses.

The NESDC further suggested that reporting should clearly specify the components of data, particularly distinguishing cost elements and providing greater clarity on the sources of resources for example, identifying the originating river basins of water resources. This would improve transparency and facilitate more effective policy use. In addition, the application of opportunity cost concepts was recommended to ensure a more comprehensive evaluation of costs and returns.

From a policy perspective, the NESDC advised that, given its mandate to adopt a national-level perspective, recommendations should avoid prescriptive language such as mandating the integration of SEEA principles directly into provincial plans. Instead, more appropriate phrasing would be to encourage the promotion or adoption of SEEA principles as guiding practices within the framework of the 14th National Economic and Social Development Plan.

Regarding biodiversity, the NESDC observed that while domestic funding for biodiversity conservation has declined, international funding has increased. This suggests the need to explore alternative financing mechanisms linked to conservation efforts, such as sustainability funds or instruments including green bonds and blue bonds, which are specifically designed to support conservation-related activities. The NESDC considered this to be an area that could be advanced and incorporated into the 14th National Economic and Social Development Plan.

Finally, the NESDC noted that SEEA-related initiatives in Thailand have progressed steadily since 2012, with several agencies already undertaking relevant activities. For instance, the agricultural sector has developed concepts such as Green GDP, while in the services sector, the Ministry of Tourism and Sports is currently the only agency implementing such approaches in a concrete manner. Other sectors have yet to develop comparable accounting systems. The NESDC also cautioned that certain activities may pose risks of double counting and emphasized the importance of carefully verifying data to avoid duplication before using the results for reporting or policy reference.

Figure 9 The linking Natural Capital Accounting for Tourism and Water Resources to Development Planning Medium-Term Expenditure Framework (MTEF) and the 14th National Economic and Social Development Plan (2028–2032)



Image source by the author

3. In-depth Interviews

3.1. 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)

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|----|--------------------------|--|
| 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

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

Thailand Development Research Institute (TDRI)

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|-----|---------------------------------------|------------|
| 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

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

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 10 In-depth interview TSA-SEEA



Image source by author

3.2 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)

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|-----|-------------------------------|-------------------|
| 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 1 In-depth Interview with the National Statistical Office



Image source by the author

3.3 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 Chinwipas | Budget Analyst, Practitioner Level |
| 8. | Ms. Arthitiya Phiokham | Budget Analyst, Practitioner Level |

Thailand Development Research Institute

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|-----|-------------------------------|---------------------|
| 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 12 In-depth Interview with the Budget Bureau



Image source by the author

3.4 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

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|----|---------------------------|--|
| 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 Kanee | Plan and Policy Analyst, Practitioner Level |
| 4. | Ms. Nollaphan Simarirut | Plan and Policy Analyst, Practitioner Level |
| 5. | Ms. Pichayaporn Dechsakul | Plan and Policy Analyst, Practitioner Level |

Thailand Development Research Institute (TDRI)

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|----|-------------------------------|---------------------|
| 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 13 In-depth Interview with the Office of the National Economic and Social Development Council (NESDC)



Image source by the author

3.5 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)

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|-----|-------------------------------|---------------------|
| 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 2 In-depth Interview with the Office of the Permanent Secretary, Ministry of Tourism and Sports



Image source by the author

3.6 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

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|-----|------------------------------|---|
| 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 Kulswan | 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

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|-----|---------------------|------------|
| 16. | Dr. Winai Chaowiwat | Researcher |
|-----|---------------------|------------|

Thailand Development Research Institute (TDRI)

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|-----|-------------------------------|---------------------|
| 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 3 In-depth Interview with the Office of the National Water Resources (ONWR)



Image source by the author

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

NATURAL
CAPITAL

Funded by



UN
environment
programme

Executing Agencies



TDR
THAILAND
DEVELOPMENT
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