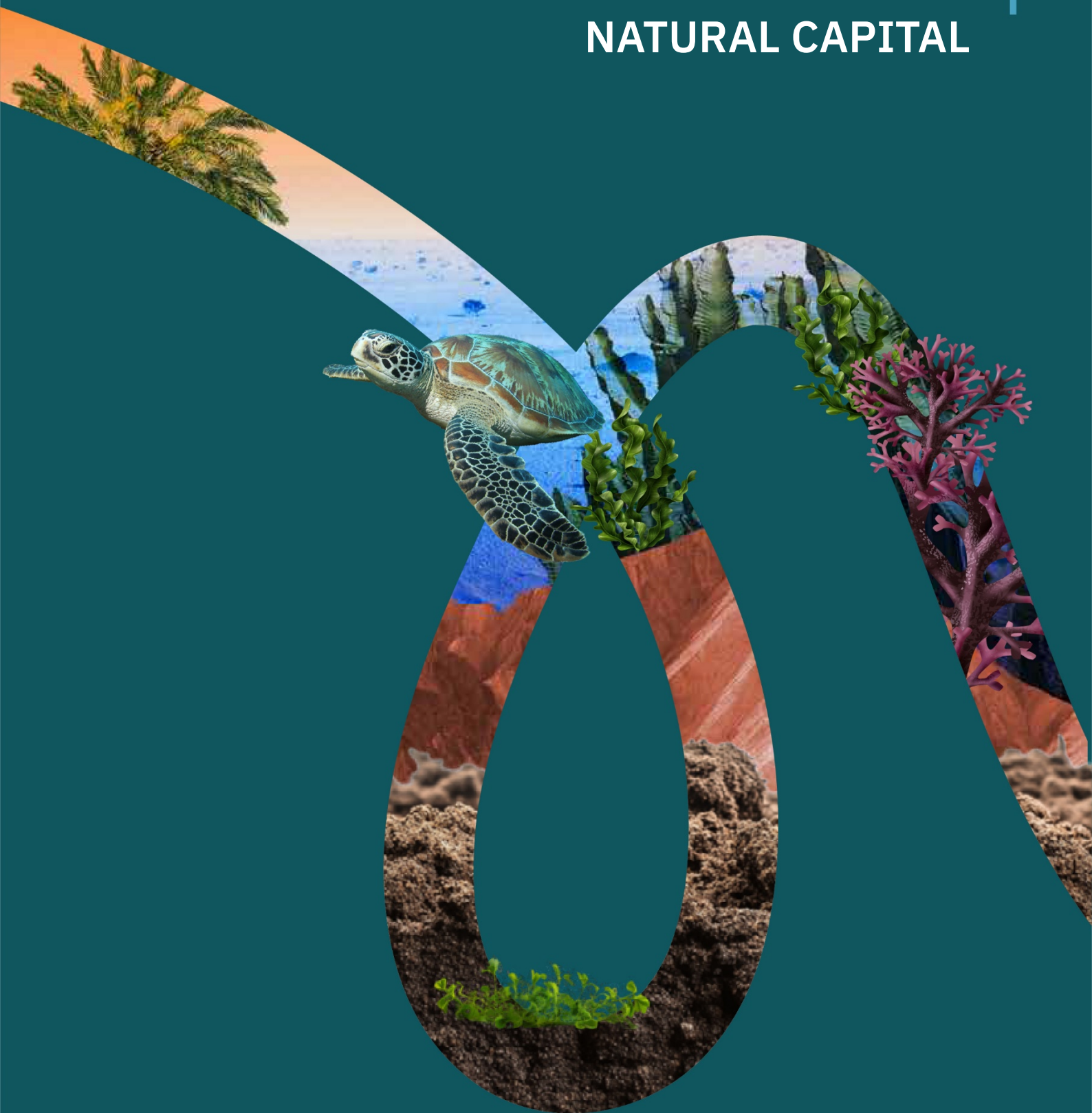


COMPONENT 1

POLICIES AND MARKET INCENTIVES IN SUPPORT OF NATURAL CAPITAL



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

NATURAL CAPITAL

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TDRI THAILAND DEVELOPMENT RESEARCH INSTITUTE

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)

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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 express gratitude to the stakeholders in Krabi Province, whose engagement and local knowledge have enriched the pilot implementation and strengthened the integration of natural capital into provincial development planning. Their commitment underscores the importance of collective action in advancing sustainable landscapes and a Nature Positive Economy.

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Executive Summary

The Office of Natural Resources and Environmental Policy and Planning (ONEP), in collaboration with the United Nations Environment Programme (UNEP) and supported by the Global Environment Facility (GEF), is advancing the integration of Natural Capital Accounting (NCA) into Thailand’s policy and decision-making processes. The Thailand Development Research Institute (TDRI) serves as the implementing consultant.

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

The project aims to:

Develop Natural Capital Accounts for tourism and water resources.

Provide scientific and evidence-based inputs for national and provincial planning.

Strengthen decision-making mechanisms by incorporating biodiversity and ecosystem service values.

Enhance awareness and capacity among stakeholders to promote sustainable resource use.

Key activities include Sectoral Roundtable Meetings and consultations at both national and provincial levels. These forums bring together government agencies, private sector representatives, academia, and civil society to exchange knowledge, strengthen partnerships, and provide recommendations for effective implementation.

The project is structured around three components:

Policy and Incentives – Establishing a national framework and integrating NCA into policy, planning, and budgeting.

Provincial Implementation – Applying NCA in Krabi Province and linking accounts to development plans.

Capacity Building and Awareness – Disseminating knowledge, fostering networks, and promoting stakeholder engagement.

By embedding natural capital into economic and policy systems, Thailand is taking concrete steps toward a Nature Positive Economy, aligning with the Kunming-Montreal Global Biodiversity Framework 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 Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes project aims to integrate Natural Capital Accounting (NCA) into policy formulation and decision-making processes across key economic sectors at both the national and subnational levels. The project also seeks to promote the conservation of biodiversity and ecosystem services while mitigating the environmental impacts arising from economic production activities. Project implementation focuses on two priority sectors: tourism and water resources management.

Krabi Province has been selected as the pilot implementation area due to its strategic importance as a watershed extending from upstream catchments to coastal and marine ecosystems, all of which are vital to the livelihoods and well-being of local communities. The province is also one of Thailand's premier tourism destinations, making it an appropriate location for demonstrating the application of Natural Capital Accounting to support sustainable development.

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. The project further 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 provincial 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 the effective implementation of the project and foster broad-based stakeholder participation, Sectoral Roundtable Meetings are being convened at both the national level and in Krabi Province. These meetings bring together representatives from government agencies, the private sector, academic and research institutions, and civil society organizations from both central and local levels. The meetings are intended to enhance stakeholders' 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 partnerships and collaboration among relevant stakeholders; and solicit recommendations and feedback to support the continuous refinement and effective implementation of the project.

2. Minutes of the Kick-off Meeting “Ripples of Changes: Harnessing Natural Capital for Sustainability”

Meeting Minutes of the Kick-off Meeting “Ripples of Changes: Harnessing Natural Capital for Sustainability” on **Friday 18th August 2023** 08:30 am - 01:30 pm, Benchasiri Ballroom 3rd floor, Marriott Bangkok Hotel Sukhumvit, Bangkok Thailand

2.1 Principle and Reasons

Office of Natural Resources and Environmental Policy and Planning (ONEP) and United Nations Environment Programme (UNEP) has designated Thailand Development Research Institute (TDRI) as the project consultant for implementation of “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes” which has received budgetary support from Global Environment Facility (GEF) with implementation period of 54 months (between August 2022 and February 2027).

The objective of the “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes” project is to integrate the natural capital into the policy preparation and implementation of major economic sectors both at the local and the national levels, and to enhance the protection and mitigate the impact of the production sector on the biodiversity and ecosystem services by implementing in 2 sectors, i.e., tourism sector and water management sector, with Krabi province as the project implementation area. This is due to its significance as the headwaters covering the coastal and marine areas which are crucial to the livelihood of local population and as the country's major tourism destination. The project success consists of the natural capital accounting in the tourism and water management sectors of Thailand which would lead to the integration of policy preparation at both the national and local levels; enhancing the knowledge, understanding, and awareness of the natural capital, for the sustainable utilisation of biodiversity resources and ecosystem services, including the enhancement of decision-making mechanism and natural resources management planning at the provincial level based on scientific body of knowledge and economic value of the marine and coastal and clean water basin ecosystems.

Therefore, ONEP has organised the kick-off meeting of “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes” project to create the awareness on details, extent, and goals of project implementation together with the dissemination of knowledge, understanding, and awareness related to natural capital, including presentation of the conceptual framework on natural capital accounting with exchange of opinions, and recommendation for development and improvement of project implementation guidelines.

2.2 Objectives

1. To create the awareness of details, extent, and goals of the implementation of natural capital accounting for policy decision-making toward sustainable development.

2. To present the conceptual framework of national natural capital accounting with emphasis on tourism and water resources sectors, and roadmap toward integration of natural capital into preparation of policy and implementation of major economic sectors both at the local and the national levels.

3. Exchange of opinions, with recommendation for development and improvement of project implementation guidelines.

2.3 Implementation Method

1. Kick-off Meeting to clarify details, extent, and goals of project implementation

2. presenting the information of past operation and activities, and conceptual framework for Natural Capital Accounting (NCA) with emphasis on tourism and water resources sectors, and roadmap

3. Collaborating in learning and opinion sharing with recommendation for improvement and development in project implementation guidelines

2.4 Target Group

Representatives from governmental agencies, public enterprises, international organisations, private sector, NGOs, experts, and scholars related to national Natural Capital Accounting (NCA), with emphasis on tourism and water resources sectors, totally about 100 persons

2.5 Minutes of the Kick-off Meeting

The Biodiversity Management Division, Office of Natural Resources and Environmental Policy and Planning (ONEP), in collaboration with The United Nations Environment Programme (UNEP), and Thailand Development Research Institute (TDRI) has organised the kick-off meeting of “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes” “Ripples of Changes: Harnessing Natural Capital for Sustainability” Project, with the objective to create awareness of the detail, scope, and goal in implementation of natural capital accounting in policy decision-making for sustainable development, and presenting the conceptual framework of Natural Capital Account (NCA) by focusing on tourism and water resources sectors, in order to integrate the natural capital into policy preparation and implementation of mainstream economic sector both at the local and the national levels, together with hearing and exchange of recommendations for development and improvement from the related parties both public agencies and private sector, NGOs, international organisations, educational institutions, scholars, and experts. The expected outcome from this meeting are recommendations for development and improvement of project implementation.

The kick-off meeting of “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes” “Ripples of Changes: Harnessing Natural Capital for Sustainability” Project was held on Friday 18th August 2023 08:30 am – 01:30 pm at Benchasiri Ballroom, 3rd floor, The Marriott Bangkok Hotel Sukhumvit with participants from representatives of related agencies such as representatives from both public agencies, public enterprises, private sector, educational institutions, NGOs, international organisations,, scholars, and experts totally 124 persons.

The meeting is divided into 4 sessions as follows:

Session 1 : Reporting, opening , and keynote speech

Dr. Jittinun Ruengverayudh, Director of Biodiversity Management Division, ONEP reported, mentioned the project background, and objectives of the meeting which can be summarised as follows:

- ONEP is the project owner of “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision making for Sustainable Landscapes”, with UNEP as the project manager, and TDRI as the project consultant, and funded by Global Environment Facility (GEF), with the objective to integrate the natural capital into the policy preparation and implementation of the mainstream economy at both the local and the national levels, and to enhance the protection and mitigation the impact from the production sector on the biodiversity and ecosystem services. The goal of the project is the guideline for the policy preparation to support the integration of natural capital into the national accounting system.

- This project emphasises on two sectors, i.e., tourism and water management sectors in which Krabi project was selected as the project implementation area due to its significance as the head waterway covering the marine and coastal areas which is crucial to the livelihood of the local population and a major tourism destination of the country.

- Mr. Jirawat Ratisoontorn, the Deputy Director-General of ONEP gave the opening remarks and delivered the keynote speech “The Importance of Natural Capital and the Sustainable Development” with keypoints as follows:

- There are three interconnected important crises issues which is of global concern, namely : (1) Interconnected Crises - Global crises begin from environmental problem but lead to impact on society and economy interconnectedly; (2) Interconnected Policies - Integrated and comprehensive policy planning with the environment and natural resources as the basis for conceptual process; and (3) Interconnected Solutions - Employing natural capital as the concept and tool for policy planning leading to sustainable development.

- Interconnected Crises - Global crises begin from environmental problems but lead to impact on society and economy interconnectedly. From Global Risk Report 2023 by World Economic Forum (WEF) the ranking of global risk for the next 10 years has revealed that the environmental issues are the origin of crises which have repercussions on economy, society, and other problem interconnectedly. The top ranking global risks are the biodiversity loss and ecosystem collapse, which was ranked as # 4, and natural resources crisis ranked as #6, with the economic and social system which should be prioritised in transformation to Nature Positive Economy are 1) Food, land, and ocean; 2) Infrastructure and environment created by humans, and 3) Energy. Together these 3 systems are responsible for up to 80% extinction risk of “endangered species” and “near threatened species”.

- Interconnected Policies - Integrated and comprehensive policy planning with the environment and natural resources as the basis for conceptual process. The 15th Conference of the Parties to the Convention on Biological Diversity (CBD COP 15) in December 2022 at Montreal, Canada has adopted “Kunming-Montreal Global Biodiversity Framework” by Year 2030 conforming to the sustainable development with 23 targets implementation guideline covering 3 main aspects 1) Reduce harm to biodiversity, 2) Sustainable utilisation of

biodiversity, and 3) Tool and solutions for implementation and integration as Target # 14 from 23 targets ensure the full integration of biodiversity and its multiple values into policies, planning, strategy, and development processes as appropriate, including integration into national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity.

- Interconnected Solutions - Natural capital concept leading to sustainable development. Biodiversity integration into planning and policy decision-making require tool significantly employing natural resources as the conceptual base including the Natural Capital Accounting (NCA) for value analysis of resources and biodiversity, and feasibility study for integration into national policy decision-making which the tool is not merely top-down policy making, but can drive the appropriate policy locally by including the local information in the assessment process or bottom-up approach.

Session 2 : Presentation of “Natural Capital Accounting Framework for Policy Decision-making Toward Sustainable Development” by Associate Professor Dr.Adis Israngkura, TDRI

- Project implementation comprises of 3 components, namely : (1) Policy preparation and incentive creation to support the integration of natural capital at the national level with outcomes as (1.1) conceptual framework preparation of natural capital accounting at the national level, (1.2) integration natural capital accounting into the policy, planning, and budgetary system, (2) Information integration of natural capital accounting into development planning at the provincial and the local levels (Krabi Province), with outcomes as (2.1) natural capital accounting for tourism and water resources, (2.2) integrate the data collection system of natural capital accounting of the provincial level into the policy, workplan, and budgeting of the local agency level, (2.3) mitigation of environmental impact, and rehabilitation and protection of natural capital resource, (3) Preparation of information for capacity and awareness enhancement, network creation for integration of natural capital accounting, with outcome as, (3.1) dissemination and transfer of information preparation in natural capital accounting system, (3.2) knowledge sharing to enhance the capacity widely for the natural capital accounting system preparation.

- Project implementation comprises of 5 steps as follows: (1) Stock - Data compilation of natural resources quantitatively and qualitatively with Geographic Information System (GIS) Mapping, (2)Flow “Service” from natural resources in terms of quantity, quality, and benefit to the society, (3) value assessment and tool utilisation testing by economic value assessment of tourism and water resources sectors applying market tool to assess economic value integrating into policy level, and employing appropriate tool for pilot testing in Krabi Province, (4) integrate NCA into policy decision-making, as integration of natural capital accounting toward preparation of policy, workplan, and budgeting at the provincial level, and (5) disseminate, produce and sharing the body of knowledge on natural capital accounting system via various communication channels, e.g., website, and publications, etc.

- Presenting the case of Ecosystem Assets in the Philippines, e.g. Closed Forest Open Forest Grass-Land Beach areas Annual Crops Mangrove, etc. including the concept leading to The System of Environmental-Economic Accounting (SEEA)

- Presenting the physical landscape of Krabi Province, water resources (southern watershed on the west coast), land ecosystem (forest resource, wildlife), Krabi River Mouth wetland, rare plant vital to national conservation, classified wildlives, river mouth ecosystem (migrating birds), marine and coastal ecosystem (coral, seagrasses, rare marine creatures)

- Presenting the environmental value assessment, comprising of (1) Market-based valuation Techniques, i.e. Cost of Illness (Cost of curing foot diseases), Change in Productivity (Increase in cost of doing business), Mitigation Cost (Cost of relocating people), Defensive Expenditure (Cost of sandbags), Replacement Cost (Repairing from Flooding), and (2) Non-market Value Techniques, i.e. Travel Cost Method (TCM), Hedonic Price Method (HPM), Contingent Valuation Methods (CVM), Benefit Transfer Method (BT)

Session 3 : Forum “Policy Design for Sustainable Development : Krabi Province”

by Dr. Wiparat Tharatheeraparn (Deputy Director-General of Tourism Department), Dr. Sasithorn Kitithornkul (representative from Krabi Province), and facilitated by Dr.Phet Manopawit (Green World Foundation and advisor to international environmental organisations)

(1) Dr.Wiparat Tharatheeraparn, Deputy Director-General of Tourism Department

Question Issue #1 : Policy concept of Tourism development with awareness to environmental cost issue

- Tourism revenue accounts for 18% of Gross Domestic Product (GDP) both directly and indirectly from 12 branches of the tourism industry. In Year 2019, the highest international tourist arrival is 40 million with revenue from tourism sector 3,000 billion baht (domestic Thai tourists 1,000 billion baht, and overseas tourists 2,000 billion baht) but this revenue still has not accounted for the cost of natural resources and environment.

- In Year 2019, The Economics Tourism and Sports Division under the Office of Permanent Secretary of Tourism and Sports has initiated the preliminary study of “Tourism Satellite Account System of Environmental Economic Accounting (TSA-SEEA)” or “Tourism Satellite Account (TSA)” It found that from the GDP in the tourism sector of 1,000 billion baht in 2017, after deduction of 200 billion baht in cost of natural resources and environmental utilisation, or accounted for about 18% of GDP in the tourism sector. From the same study, it also found that hotel/accommodation is the sector with highest water utilisation.The next phase of study will begin in Year 2023 to scrutinise the TSA continuously to get up-to-date information, including the study of both positive and negative impacts from the Covid’19 pandemic of which tourists have vanished. However, the balancing in economic and environment has to be considered for policy implementation to see which type of policy is appropriate in Thailand context.

- In addition to the above-mentioned study, The National Science and Technology Development Agency (NSTDA) in collaboration with The Ministry of Tourism and Sports have further studied the economic value of natural resources in marine and coastal ecosystem with reflection of value in the next 20 years, e.g. mangrove forest as of now is valued at 211 billion baht but will be valued at 2,360 billion baht in the next 20 years, coral is valued at 3.94 billion baht as of now but will be valued at 44 billion baht in the next 20 years. This is the reflection that the tourism sector is the industry using natural resources and intellectual resources both tangible and intangible. Moreover the water usage in tourism accounts for 5% of the total water usage in the industrial sector

of the country. The energy usage in the tourism sector accounts for 13% of the total energy usage in the industrial sector of the country. The GHG emission of the tourism sector accounts for 3.11% of the total GHG emission in the industrial sector of the country, while the tourism sector accounts for 12.68% of solid waste generated in the country.

- From mentioning above, the Ministry of Tourism and Sports has undertaken study and research of which the question is how to extend the result into the local implementation which is quite difficult as 80% of the tourism industry is in community enterprises and small-and-medium enterprises (SME), but in order to proceed to policy it has to be implemented for all parties.

- Question Issue #2 : What would be the prospects of tourism in Krabi province for the next 10 - 20 years, and what factors would contribute to make Krabi a high-quality travel destination?

- In the next 10 years, we would need to address the trend of global tourism which is expected to be growing at 3.3% annually. There are 1,400 million tourists in Year 2019 and will be increased to 1,800 million tourists by Year 2030. The policy preparation is usually based on the number of tourists, but at the same time is inclined to see a policy of Green GDP and sustainability.

- Many countries in the world are no longer talking in terms of “volume”, which Thailand still needs both “volume” and “value”, but requires more “value” than “volume”. However, it could be worse if there are less tourists and less spending. The policy of the government is to expedite income creation which requires collaboration with the National Economic and Social Development Board (NESDB) which encourages the Department of Tourism to promote sustainability. The question is how to come up with a policy that ensures the preferred GDP type has the necessary tools to achieve the goal.

- The tourism sector contributes to 5% of CO2 emission which 75% comes from the transportation sector. There is a tendency to come up with small aircraft which would reduce the emission, and campaign to use less fuel, and beginning to utilise Sustainable Aviation Fuel

- The measurement of CO2 emission by various tourism activities is difficult and creates impact due to its complexity and numerous stakeholders involved. There were attempts to measure CO2 created or carbon footprint at travel destinations and measuring tools need to be identified, studied, and shared in the future.

- Over the past several year, the governmental sector has policy to promote the local resources utilisation to create or add value, e.g. Krabi saline hot water spring which Institute of Small and Medium Enterprises Development (ISMED) has undertaken in the Khlong Thom area, Krabi Province which the management is difficult because majority of the area is private land. If the governmental sector has policy to promote local resource utilisation to create/add value by designating Krabi Province as a world spa or wellness destination, the local population might view their land as asset for exploration of saline hot water, and lead to the issue of local land ownership or even the land under the Local Administrative Organization. If there is any commercial extension, issue would arise whether the water can be proven for commercial exploitation which would require cooperation from many parties concerned.

- E.g. Onsen in Japan has specific laws in management which Thailand still does not have any. The resource extracted for utilisation from the land is subject to taxation by beneficiary with benefit sharing to the

local population which Thailand has yet to come to this. Therefore, feasibility and natural cost study is necessary to have cooperation from the related agencies, not specific to a single ministry.

- In Year 2023, there is a study into the routing of hot water spring and the design in activities for 3 provinces, i.e. Ranong, Krabi, and Phang-Nga to see how to manage and provide recommendations in terms of policy to the local agencies how to oversee the resources utilisation and include the resource cost, and give due attention to the routing design conforming to sustainable development. The next step is the discussion with ONEP to see how to support this project.

- On the national policy level, a tourism capacity indicator would be developed which the World Economic Forum (WEF) has ranked Thailand in Year 2017 on resources capacity among 140 countries as #10 on biodiversity, but ranked #130 on sustainable management. Therefore, this is a challenge for Thailand to expedite.

(2) Dr. Wimonpak Bumbatsaparok Kumkanya, Expert in Economics Analysis of Water Basin Development Project, Office of The National Water Resources

Question Issue #1 : What are Thailand's water management guidelines and how to assess the value of water resources in the country?

- Office of The National Water Resources (ONWR) has a 20 year (2017 - 2036) Master Plan on Water Resources Management and Water Resources Act with numerous subordinate laws classifying water basins, which Krabi is in Water Basin# 22 and the announcement of the National Water Resources Board (NWRB) prioritising the water distribution into 9 levels, the top priority as Level 1 of water distribution is “potable and non-potable” which each water basin can be prioritised from Level 2 to 9 subject to suitability.

- Most of the water resources for the tourism sector is consumed by accommodation or hotels but the usage can not be separated into potable (treated for human consumption - drinking and cooking) or non-potable (untreated, not for human consumption.) ONWR has carried out Strategic Environmental Assessment (SEA) to identify the “carrying capacity” of the water basins and how to manage to balance the supply and demand without causing harm to the environment.

- From the SEA, water basins in the west coast of the southern region were found to have two crucial problems, i.e. flood and drought. Drought is in the up-stream, mid-stream, and down-stream. Upstream is a narrow area with heavy rain. Due to the changing watershed area utilisation pattern, e.g. from national park to rubber plantation, the water slow down capacity is lower. For the mid-stream area, the storage capacity is minimal due to the short river, and therefore cannot function as a water storage or check dam, including changing community land utilisation and economic area resulting in water drainage blockage causing flooding. Down-stream is adjacent to the sea area which is subject to ocean tide, and water draining is difficult due to physical limitation and causing flooding.

- Drought is also a physical problem due to the geographical condition of Krabi province as it is long, narrow, and steep where large water reservoirs cannot be built. As of now, there are medium and small water reservoirs with storage capacity of 82 million cubic meters, but the annual water demand is 4,000 million cubic meters. However, the southern region has been raining all year around which would replenish the storage

reservoirs several times. The agriculture sector is the highest water user, but with perennial plants which do not require too much water, the balance of water demand and supply can be maintained during the period.

- The water basins on the west coast of the southern region has potential in 3 dimensions, i.e. economic, social, and environment, but the constraint of water supply is posing a challenge for livelihood improvement, e.g. the building of new water source and the issue of violation of natural park area, or if detention pond (Kam-Ling) will infringe on private land.

- Majority of the people are not aware of the value of water, except the price. However, such price may not reflect its true value because of a subsidy from the government, just a reflection of part of the cost in acquiring it.

- Moreover, ONWR is attempting to study the water value and water distribution by looking into productivity of water, the higher the better, which is a matter of policy.

- Water circulation in nature gives rise to the ecosystem service which is a natural capital. Withdrawal of one unit of underground water for agriculture will cause soil subsidence which is a challenge in determining if soil subsidence is worth the output from agriculture.

- Moreover, ONWR is in technical cooperation with Australia and the Food and Agriculture Organization (FAO) which has an ongoing study of water accounting to find out the amount of water extracted from the system to produce what product and in what quantity, and how to allocate water to achieve the best productivity.

Question Issue #2 : How would water accounting connect with other contexts such as headwater or cost in protection of watershed forest?

- The 20-year Master Plan on Water Resource Management (2018-2037) is revised every 5 years with the first revision due this year (2023). With collaboration with ONEP, Climate Change has been integrated, and after the project completion of "Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes", it shall be integrated into the Master Plan on Water Resources Management for better sustainable management.

- A water challenge is the quality of wastewater from municipal waste or untreated wastewater which ONWR view the solution with 3 R : Reduce, Recycle, and Reuse, to maximise the use value from the existing quantity, and provide wastewater treatment at the appropriate location to apply with Polluter Pays Principle as an economic tool.

- One other challenge of water quality is the unusable water, e.g. brackish water, muddy water, which are a physical constraint due to inadequate water supply or insufficient water budget to clean or dilute. This is difficult as Thailand's irrigation system is an open system and therefore cannot identify who withdraws water along the channel.

- Australia has a closed irrigation system which water accounting is easier than Thailand because the flow of water can be tracked where and who takes what quantity, and the amount returned, which is quite a challenge for Thailand including also data retrieval.

- In the future the function of ONWR is sourcing water for people in cooperation with various agencies with consideration of flood, drought, and wastewater, and also maintaining water supply in the system.

- Regarding the issue of dam mentioning by the Deputy Director-General, Mr.Jirawat Ratisoontorn, we can say that the “grey policy” e.g. the infrastructure as building is still necessary for Thailand because it is still under control, but the “green policy” is also needed as appropriate tool, by properly applying to work with the engineering structure or building in that particular water basin.

- ONWR attempted to apply “Nature-based Solution (NBS)” or “Ecosystem-based Adaptation (EBA)” into the water Master Plan because NBS or EBA are believed to enhance the diversity in the water basin as well.

- A challenge on the demand side is how to ensure valuable water utilisation as water is viewed as a public good, but the quality of water is continuously poorer with the usage, as well as the decreasing amount available. Water in a bottle is a private good, but if we fill the bottle with water passing in front of the house and claim the right of use, this is where Thailand still has yet to come to the point, because water right still has not been clearly defined as posing a problem in the future. In theory it is possible if the buyer and seller exist, but in reality Thailand still does not have any law or lacks a perfect market to implement this.

- Water accounting consists of 3 accounts, the first account is “flow”, i.e. inflow, outflow, return flow from the system, with several levels from the farm level to the water basin level. Initially, ONWR need to clarify where the inflow of water come from and where the outflow go to, and for what use. The flow comes from the environment system to the economic system and returns to the environment system. It can be seen that ONWR attempt to connect to the environment system, e.g. water in the forest system because the service provided by forest is purifying the water and water in turn provide moisture to the forest which is a symbiosis relationship.

- The second account is “stock”, the water in the storage area. The water basin on the west coast of the southern region can only store 82 million cubic meters, but the utilisation demand is 4,000 million cubic meters. How to prevent water shortage? By management of storage area systems which require forecasts and preparation of systematic management tools.

- The third account is “economic”, water withdrawing from the natural system which is a “provisional service” from the water extract for utilisation in the economic sector, from the surface water to underground water, which is provided into the system as drinking water or agricultural usage in the irrigation system to reinforce the economy of the country, with water flow from environment system to economic system. As per the UN study, we apply to study the water accounting of the Pa Sak Water Basin because the area has usage in various sectors.

- For Krabi Province, the study of water accounting should be “from source to sea”, i.e. from headwater to the sea and covering the ecosystem from the headwater forest to the sea area as full cycle.

- What ONWR is monitoring now is how much water has been withdrawn from the system, and lead to how much in the production system. This perspective is to answer SDGs, Goal # 6 : “Clean Water and Sanitation” to see how much production value can be derived from one unit of water. In economist’s view there should be other dimensions aside from productivity which is the priority of water use, e.g. Should we allocate the same amount of water for agriculture and industry? Is it appropriate? This is another challenge as in each water basin, there should be prioritisation, and water shortage should be solved by negotiation.

- ONWR reckons that water accounting will be used as a tool for making decisions in management which has two issues, in theory and data compiling as policy recommendation, but in policy implementation there are many issues to consider.

(3) Miss Sasithorn Kittithornkul, Chairman of Krabi Tourism Business Association

Question Issue # 1 : How important is the natural resources strategy for Krabi Province?

- Krabi is a small province with only 8 districts in the central part of the southern region on the Adaman coast. Despite the size of the province, in 2019 its tourism income was ranking as # 4 of the country amounted to 120 billion baht. However, as the country has just reopened the income from January to August 2023 is just 16 billion baht. The number of tourists for Krabi has decreased from 6.9 million to just 1.2 million which still need stimulation continuously with the support from the Ministry of Tourism and Sports, and Krabi has the advantage of the travel facility by air, land, and water.

- As for Green GDP, it is quite a new issue in the tourism sector, especially on the business side, which previously only touched on the sustainability and Corporate Social Responsibility (CSR), many of which were undertaken by Krabi, such as Krabi Provincial Development Plan, and Vision of Krabi Province as a travel destination, high-quality, universal standard, sustainable agro-industry, “charming society, keep-pace with changes”.

- 30% of Krabi income comes from tourism, with the main source of income from agriculture which helped the tourism business to sustain during the Covid’19 pandemic.

- In 8 districts of Krabi Province, there is biodiversity, with 130 islands and 13 inhabited islands, e.g. Phi Phi Islands, Lanta Island, etc.

- Phi Phi Islands, or Maya Bay which reopened to tourists recently has introduced carrying capacity and utilised a system on application and manually limiting to 375 visitors with no more than one hour per round. After the Tsunami, the government has declared Phi Phi Island to be a pollution control area which is not allowed for new construction especially in the form of hotels.

- Islands in Krabi Province encountered a water problem which requires utilisation of underground water, and would have to purchase water from mainland if there is any shortage. ONWR has a project to install a reverse osmosis (RO) public water supply on the Phi Phi Island, Krabi District, which is under budget allocation for study.

- Presently, the people and enterprises in Maya Bay, Krabi Province have been aware of the carrying capacity of Maya Bay which limits the number of visitors and duration, and also phobiting tourists from swimming in the beach area, with a penalty up to 100,000 baht.

- On the Green GDP, this is a new issue in the tourism business because we need to be aware of cost and return on investment. Although this is a good policy, awareness and understanding have to be made to drive the economy toward a sustainable environment. The business sector needs to be aware of how to invest to be worthwhile because the businesses that can afford green investment would be those with substantial capital.

- Koh Ngai is planned to be a Green Destination because it has a low carbon footprint due to being car-free and road-free, with only just over ten enterprises.

- The use of electric boats still has not addressed the problem of seawave in the Andaman Sea as safety might be a concern. It would be feasible with technological progress in the future.

- Koh Hong has banned single use plastic on the island and also banned certain sun protection creams harmful to the coral. Moreover, the Khlong Thom saline hot spring has been upgraded to be a wellbeing travel destination.

Question Issue # 2 : How does Krabi Province view the challenge of balance under sustainable development?

- There are quite a number of challenges for Krabi Province because it needs to create awareness and understanding of Green GDP among the investment managers both from inside and outside the province, including the community. Consideration should be given to the cost of natural loss, e.g. the release of wastewater from hotels, and non-standard restaurants. However, there are some enterprises which have undertaken.

- Moreover, on the social cost which Krabi Province has previously spent substantial budget with the CSR, but might not have continuity, e.g. forest planting, etc.

- Obstacles and problems on the other hand is System of Environmental Economic Accounting (SEEA) which is believed that 90% of the people in Krabi Province still do not understand how to calculate, and Sweden, which is the country with high ranking on this, is Krabi's number 3 tourist group.

- Krabi Office of Tourism and Sports have been to Sweden to promote the Green Destination, which set up "Tung Yee Peng Community" as Koh Lanta community implementing Green Tourism.

- Why Krabi Province still has not succeeded in terms of sustainable economy. The answer is high cost because out of 8 districts, the main travel destinations are Muang District and Koh Lanta District. The other districts are not adjacent to the coastal area. Nua Klong District has beaches with Krabi International Airport, but tourists arrive and leave for other travel destinations.

- Krabi has a declaration banning the activities with engines, e.g. water sports jet ski or banana boat, and no beach umbrella. Therefore, Nua Khlong District which has a beautiful beach by the name "Had Yao (Long Beach)" but cannot have any beach activities, has no coral in the area. It is under consultation if Had Yao Beach should be exempted as a special case, because the people cannot capitalise economically from the existing natural resources in term of tourism, and if such activities in Had Yao Beach will decrease or increase the Green GDP?

- The saline hot spring and hot waterfall in Khlong Thom are managed by Local Administration Organization (LAO), with the saline hot spring managed Huay Nam Kao LAO, and hot waterfall managed by Khlong Thom Nua LAO, with different management patterns, of which the latter is better while the former one has several limitations due to LAO regulations but have received assistance from Designated Areas for Sustainable Tourism Administration (DASTA). However, what is worrisome is when DASTA pulls out and transfers back to the LAO on the personnel and financially, whether the LAO can handle it or not is a question. Moreover the public transportation still has not been up to the standard.

- Whether future energy sources in the Krabi Province area such as solar panels or wind turbines can be of any help depend on the case study because the lignite power plant might not be sustainable. Therefore it is necessary to search for replacement natural energy sources which is a question of how to reduce the cost.

Session 4 : Opening for hearing and recommendations from meeting participants facilitated by Dr. Phet Manopawit

(1) Mr.Por Bunyaratapan - advisor, Sustainable Water and Environment (The Federation of Thai Industries - FTI)

Question Issues and recommendations

- The Environmental Fund has a major problem of fund allocation which is a policy that the government should resolve.

- Most of the wastewater is viewed as coming from the industrial sector but instead come from agricultural sector without any measurement, be it fertiliser or pesticide which pollutes the water sources in general. This is a major problem still without any solution.

- FTI has attempted to implement Smart Agriculture Industry (SAI) and there is a question as to why we do not do agriculture just like industrial parks.

- Marine trash should be traced back to the current carrying, and fish in the Krabi Province area had plastic parts inside the stomach as trash from the Philippines and Indonesia. How to reckon the cost of this problem, and how to claim or prevent it?

(2) Miss Nirun Nirunnuj - Project Manager of BIOFIN Thailand (UNDP Thailand)

Question Issue and Recommendations :

- The budget that reflects monitoring of biodiversity of the country is only 0.08% of the national budget which is very minimal.

- Tourism Fund, partly for the ecosystem which is in line with the spending that reflects tourism. Could it be possible to have a policy allocating “one baht for biodiversity” or to create an awareness for tourists in contribution to the environmental conservation effort. Therefore it would be appreciated for considering this policy.

- Policy change to “repurposing subsidy” or reduction in subsidy that create a negative impact on biodiversity and water resources.

- There is a meeting of leaders from Koh Lanta in “Sustainable Island Tourism” and with joint-declaration from dwellers of 21 islands that this declaration should be included to be a part of the country’s policy reflecting the island management of Thailand as everyone has prepared costing which expects to be extended from this.

- For the monetary mechanism to be employed in the natural capital accounting project, it should be review to see what is appropriate, e.g. Tourist User Charge collection of 20 baht at Koh Tao which the law does not permit to collect more than this amount. This fund is utilised in the municipal budget and the community can obtain the fund to conserve the coral reef or trash management. Therefore financial mechanisms are recommended to drive these activities, as tourists are willing to pay to contribute to resolve the problems.

(3) Dr. Chuwit Mitchop - Deputy Director of Designated Areas for Sustainable Tourism Administration (DASTA)

Question Issues and Recommendation :

- Green GDP should be adopted vigorously by agencies at the national level as Thailand is focused mostly on the demand side, but neglected the supply side. How much of the tourism revenue of 3,000 billion baht has

been spent on rehabilitation, even in the negative figures. Therefore the supply side has long been neglected and this project is hoping to be answering this supply side seriously.

- There is not much correlation between the number of tourist arrivals and revenue as the revenue was not a prominent figure despite the growth in tourism. At the same time the figures recorded in tourism were an illusion economically because several types of revenue have flowed out of Thailand.

- A challenging question is how to distribute the revenue rather than merely increasing the revenue, especially at the grassroot economy, and also the limitation in databases, as DASTA is party member of “Global Sustainable Tourism Council” as sustainable tourism has “Global Sustainable Tourism Criteria (GSTC)” which is a clear scientific measurement criteria and has problem of nature capital inventory, data access in fieldwork. If natural resources can be classified, e.g. household water consumption, an area under DASTA has limitations in identifying household water consumption from tourism sector water consumption, including the three branches of GDP, i.e. agriculture, industry, and service, although tourism is in the service sector.

- For natural capital, there are two options, i.e. first option : to be conserved only, and second option : to be capitalised. However, no matter which option to choose, there is the cost of public and private sectors, which if the cost can be reflected by the research, GDP can be expedited clearly.

- The National Tourism Board has approved for DASTA to study the capacity of Khlong Thom and connecting areas to be a sustainable travel destination according to GSTC. Moreover, DASTA is pleased to support “Integration of Natural Capital Accounting in Public and Private Sector Policy and Decision-making for Sustainable Landscapes” project and shall be a user of this research.



Kick-off Meeting
Integration of Natural Capital Accounting in Public and Private Sector Policy
and Decision-making for Sustainable Landscapes

“Ripples of Changes: Harnessing Natural Capital for Sustainability”

Friday 18th of August 2023 08:45 am - 01:30 pm

At Benchasiri Ballroom, 3rd Floor, Bangkok Marriott Hotel Sukhumvit

08:45-09:15 am	Registration
09:15-10:00 am	Opening Ceremony of the Meeting addressed by Dr. Jittinun Ruengverayudh Director of Biodiversity Management Division Meeting Opening and Keynote Address “The Significance of Natural Capital on Sustainable Development” by Mr. Jirawat Ratisoontorn Secretary-General - Office of Natural Resources and Environmental Policy and Planning
10:00-10:05 am	Photo - Opportunity
10:05-10:30 am	Presentation of “Natural Capital Accounting Framework for Policy Decision-making Towards Sustainable Development” by Associate Professor Dr. Adis Israngkura na Ayutthaya (Project Leader) Thailand Development Research Institute
10:30-10:45 am	Coffee break
10:45 am-12:05 pm	Discussion and Exchange of Opinions “The Policy Design for Sustainable Development : Krabi Province” by (1) Dr.Wiparat Tharatheeraparn Deputy Director-General of Tourism Department (2) Dr.Wimonpak Bumbatsaparok Kumkanya Expert in Economics Analysis of Water Basin Development Project, Office of The National Water Resources (3) Miss Sasithorn Kittithornkul Chairman of Krabi Tourism Business Association Discussion facilitated by Dr.Petch Manopawitr - Secretary-General of Green World Foundation and advisor to international environmental organisations
12:05-12:20 pm	Opinion hearing and recommendations
12:20-12:30 pm	Summary and closing of the meeting and souvenir session
12:30-13.30 pm	Lunch



3. 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

3.1 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.

3.2 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

3.3 Target Group

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

3.4 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 2 The Focus Group for recommendations on the Conceptual Framework of Natural Capital Accounting (NCA)



4. 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 Kosawieng 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 Manorom 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 Rakthuam 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 1.5 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 3 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)



5. Joint Public and Private Sector Committee for Economic Problem Solving (JPPCC) in Krabi Province

Meeting Minutes of Joint Public and Private Sector Committee for Economic Problem Solving (JPPCC) in Krabi Province on **26 May 2026** (10.00 – 12.00 AM) at Phanom Bencha Conference Room, 5th Floor, Krabi Provincial Hall , Krabi Thailand, **Attendees: 46 agencies**

1. Governor of Krabi Province
2. Deputy Governor of Krabi Province (assigned)
3. Chairman, Krabi Chamber of Commerce
4. Chairman, Krabi Federation of Thai Industries
5. Chairman, Krabi Tourism Industry Council
6. Chairman, Krabi Thai Bankers' Association
7. Krabi Provincial Treasury Office
8. Krabi Provincial Commerce Office
9. Krabi Provincial Industry Office
10. Krabi Provincial Agriculture and Cooperatives Office
11. Krabi Provincial Tourism and Sports Office
12. Krabi Provincial Local Administration Office
13. Krabi Provincial Public Relations Office
14. Mr. Wattana Thanasakcharoen, Expert in Economics
15. Mr. Chuan Phukaoluan, Expert in Social Affairs
16. Deputy Rector, National Sports University, Krabi Campus
17. Krabi Provincial Public Works and Town & Country Planning Office
18. Director, Marine Department Regional Office, Krabi Branch
19. Chief, Krabi Provincial Office
20. Secretary-General, Krabi Chamber of Commerce
21. Secretary-General, Krabi Federation of Thai Industries
22. Secretary-General, Krabi Tourism Industry Council
23. Secretary-General, Krabi Thai Bankers' Association
24. Head, Strategic and Provincial Development Planning Group, Krabi Provincial Office
25. Permanent Secretary of Krabi Province
26. Provincial Chief Medical Officer, Krabi
27. Director, Krabi Hospital
28. Director, Krabi Provincial Office of Natural Resources and Environment
29. Director, Krabi Rural Highway District
30. Director, Krabi Highway District
31. Krabi Provincial Transport Office

32. Director, Krabi Irrigation Project
33. Treasury Office, Krabi Area
34. Krabi Provincial Energy Office
35. Director, Krabi Airport
36. Director, Provincial Waterworks Authority, Krabi Branch
37. District Chief, Mueang Krabi District
38. President, Krabi Tourism Business Association
39. President, Krabi Hotel Association
40. Director, Tourism Authority of Thailand (TAT), Krabi Office
41. President, Krabi Provincial Sports Association
42. Mr. Phuwatip Prechanon
43. President, Krabi Provincial Administrative Organization
44. Mayor, Krabi Municipality
45. President, Ao Nang Subdistrict Administrative Organization
46. President, Thailand Development Research Institute (TDRI)

Main Discussion

Participation in the JPPCC meeting of Krabi Province was undertaken with the objective of communicating the results of natural capital accounting to stakeholders involved in provincial economic development, including government agencies, private sector representatives, and actors engaged in tourism and natural resource management. The meeting served as an important platform to demonstrate that natural capital accounts can be employed as evidence-based inputs for strategic provincial planning, particularly in relation to nature-based tourism, water security, wastewater management, and the conservation of ecosystems that constitute the province's revenue base. TDRI was honored to be invited to participate in this meeting, with the official invitation letter from the Krabi Provincial Office presented in Appendix 1.

The discussions highlighted the necessity for Krabi Province to employ information that systematically integrates economic, social, and environmental dimensions in order to support provincial development planning and the prioritization of future projects. This need arises from the province's economic structure, which is directly dependent on natural resources and ecosystems, especially the tourism sector that relies on the quality of natural attractions, coastal ecosystems, marine resources, freshwater bodies, and landscapes as critical factors in attracting visitors and generating income. Within this context, degradation of natural resources and ecosystems—whether of natural tourist sites, coastal and nearshore marine systems, or water quality and wastewater issues—would inevitably affect the province's capacity to accommodate tourists, the revenues of local enterprises, the quality of life of residents, and the long-term image of Krabi as a premier nature-based tourism destination. Consequently, Natural Capital Accounting (NCA) plays a vital role as an informational instrument that enables the province to clearly perceive both the economic benefits of ecosystems and the costs or risks associated with natural resource degradation.

Following the presentation of Krabi's natural capital accounts under the SEEA framework, together with related activities such as youth birdwatching camps, seagrass conservation and restoration, conservation diving, and the wastewater issues particularly in Ao Nang Subdistrict, as well as five project proposals, feedback and recommendations were received from participants. Several key points emerged. First, experts and participants emphasized that the research findings on Krabi's natural capital accounts are highly significant, as they reveal both the economic benefits derived from ecosystems and the degradation of natural resources that may undermine the province's revenue base, particularly tourism income. Such information can therefore be used to inform rational and evidence-based approaches to the conservation and restoration of Krabi's natural resources.

Second, the meeting recommended that research results be communicated and disseminated in more accessible formats to reach wider audiences, such as through visual summaries or infographics, thereby enabling government agencies, private sector actors, communities, and the general public to understand the importance of natural capital accounts and to recognize practical ways of applying this information in resource management and provincial development.

Third, the Governor of Krabi observed that the establishment of natural capital accounts has already provided the province with a critical data foundation, and stressed the importance of continuing and expanding this work to ensure that the information becomes comprehensive and can sustainably support provincial development planning in the long term. This perspective underscores the need for natural capital accounts to evolve beyond being a temporary research output into a permanent information system integrated with provincial planning and budgeting processes.

Fourth, the meeting discussed water resource challenges in Krabi, encompassing both wastewater discharged into the sea and seasonal water shortages. Observations were made regarding groundwater flows into the sea that remain underutilized. The research team clarified that relevant agencies, particularly the Royal Irrigation Department, have plans to implement projects that will enhance the capacity of medium-scale water sources, which are expected to significantly improve water storage potential. This discussion highlighted the necessity of considering water resource management holistically, including water quantity, quality, utilization, and impacts on coastal ecosystems.

Fifth, the research team explained that TDRI can support Krabi Province in drafting project proposals for budget allocation requests, as the team possesses data on the costs, benefits, and economic efficiency of natural resources and ecosystem services, and has received guidance from budgetary agencies on how to prepare proposals with clarity to increase the likelihood of approval. Such support would enable provincial project proposals to be grounded in robust data, articulated with clear policy rationale, and reflective of the necessity of investment in conservation and restoration of natural resources.

Sixth, the meeting inquired about the approximate budgetary requirements of the five proposed projects. The research team clarified that the projects involve estimated budgets in the range of tens of millions of baht. The Governor of Krabi remarked that this level of funding is feasible for provincial budgetary support, indicating that

project proposals derived from natural capital accounts are practically implementable and can be integrated into the provincial budgeting process.

Seventh, in relation to wastewater management, particularly the proposed inspection of wastewater in key areas, recommendations were made that such activities should adopt constructive and advisory approaches with enterprises rather than punitive measures. This approach would foster collaboration among government agencies, private sector actors, and communities in addressing wastewater problems, especially in major tourism areas such as Ao Nang and Phi Phi Island, which are vital to both the tourism economy and coastal ecosystems of the province.

In conclusion, the meeting underscored that Krabi's natural capital accounts have strong potential to serve as a critical instrument for shaping provincial development directions, prioritizing projects, and supporting budget allocations for the conservation and restoration of natural resources. This is particularly relevant to tourism, water resources, upstream ecosystems, coastal ecosystems, and nearshore marine ecosystems. Applying this information in provincial development plans and the Medium-Term Expenditure Framework will enable Krabi Province to formulate policies and projects that are consistent with its natural capital base and will support sustainable economic development in the long term.

Figure 4 Joint Public and Private Sector Committee for Economic Problem Solving (JPPCC) in Krabi Province



Image source by the author

6. Convening a focused expert consultation to gather feedback on linking natural capital accounts to the provincial development plan and the Medium-Term Expenditure Framework (MTEF) on 5 June 2026

Meeting Minutes of the convening a focused expert consultation to gather feedback on linking natural capital accounts to the provincial development plan and the Medium-Term Expenditure Framework (MTEF) **on 5 June 2026** (10.00 – 12.00 AM) at the Aree Meeting Room, 2nd Floor, Centara Ao Nang Beach Resort & Spa, Krabi Province, Thailand **Attendees: 28 people**

Krabi Provincial Energy Office

1. Ms. Sirikan Kongthong Energy Officer, Senior Professional Level

Krabi Provincial Local Administration Office

2. Mr. Thammarat Mengbut Local Administration Promotion Officer, Professional Level

Krabi Technical College

3. Ms. Jirapha Boonchuay Deputy Director

Krabi Provincial Industry Office

4. Ms. Metta Somrup Industrial Technical Officer, Professional Level

Krabi Land Development Station

5. Mr. Supakorn Chusongsaeng Agricultural Technical Officer

Hat Noppharat Thara–Mu Ko Phi Phi National Park

6. Ms. Supawadee Wangsap Forestry Technical Officer
7. Mr. Phichaya Sonsrisang Forestry Technical Officer

Krabi Provincial Office

8. Mr. Anuchit Watruchikrit Policy and Plan Analyst

Tourism Authority of Thailand (TAT), Krabi Office

9. Ms. Natthaya Onniam Deputy Director

Krabi Provincial Fisheries Office

10. Ms. Benrat Kaewkampang Fisheries Technical Officer

Provincial Waterworks Authority, Ao Luek Branch

11. Mr. Wittaya Kamphon Manager

Office of Marine and Coastal Resources No. 10

12. Acting Sub Lt. Chonthis Saethan Boat Master

Marine Security Center, Krabi Province

13. Mr. Wanurahon Hempatama General Administrative Officer

Krabi Provincial Public Works and Town & Country Planning Office

14. Mr. Kulpat Ruekjunong Town Planning Analyst, Senior Professional

Krabi Provincial Office of Tourism and Sports

15. Ms. Hasniya Damhai Krabi Tourist Assistance

Ao Nang Subdistrict Administrative Organization

- | | |
|----------------------------|---|
| 16. Mr. Apisit Suknui | Environmental Technical Officer |
| 17. Ms. Afnee Chaladoh | Intern |
| 18. Ms. Yasmeen Usen | Intern |
| 19. Ms. Merisa Sribuathong | Assistant Environmental Technical Officer |

Krabi Provincial Agriculture and Cooperatives Office

- | | |
|-------------------------|-----------------------------|
| 20. Ms. Atchara Sukkerd | Analyst, Professional Level |
|-------------------------|-----------------------------|

Krabi Provincial Community Development Office

- | | |
|--------------------------|---|
| 21. Mr. Amarin Kaewpitak | Community Development Officer, Professional Level |
|--------------------------|---|

Krabi Provincial Statistical Office

- | | |
|--------------------------|----------------------------|
| 22. Ms. Juthamas Sangnoi | Senior Statistical Officer |
|--------------------------|----------------------------|

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

- | | |
|----------------------------------|-------------------------|
| 23. Ms. Wannapha Maneekul | Policy and Plan Analyst |
| 24. Ms. Supravee Kuhatanasathien | Policy and Plan Analyst |

Thailand Development Research Institute (TDRI)

- | | |
|--------------------------------------|---------------------|
| 25. Assoc. Prof. Dr. Adis Israngkura | Project Leader |
| 26. Ms. Thippawan Kaewmeesri | Senior Researcher |
| 27. Mr. Peerawat Suriyaburaphakul | Researcher |
| 28. Ms. Ramida Hansaward | Project Coordinator |

Main Discussion

During the consultation, participants from relevant agencies provided additional comments on the application of natural capital accounts to support the development of Krabi's provincial plan and the Medium-Term Expenditure Framework (MTEF), as well as the preparation of environmental project proposals. The feedback covered issues of waste management, wastewater treatment, island ecosystem conservation, national park management, provincial planning and budgeting, and institutional and legal constraints.

The research team shared lessons learned from environmental projects in Krabi, particularly in waste and wastewater management in major tourism areas. These experiences underscored that addressing environmental problems in tourism destinations requires a combination of empirical data, management measures, and legal considerations.

On waste management, reference was made to a pilot project modeled on Japanese practices, which introduced semi-transparent garbage bags with specific logos in Ao Nang to encourage waste separation and facilitate source identification. However, the project was discontinued due to legal and enforcement limitations. Local governments could not fully mandate the use of designated bags, while still being responsible for collecting general waste in standard black bags. This reduced incentives for some operators to adopt the system. The lesson highlighted the need to design waste management measures in tourism areas with careful consideration of legal feasibility, incentive mechanisms, and the roles of local authorities.

On wastewater treatment in Ao Nang, the research team emphasized the urgency of addressing wastewater discharged into the sea, which threatens marine water quality, coastal ecosystems, the image of tourist destinations, and long-term tourism capacity. Collaborative work with the Krabi Provincial Office of Natural Resources and Environment involved site inspections and advisory visits to 40 hotels, using a cooperative approach to encourage environmental improvements rather than punitive enforcement. In partnership with King Mongkut's University of Technology Thonburi, water sampling revealed that BOD levels in some areas exceeded the standard of 4 mg/L by several times, confirming the severity of the issue. This evidence can strengthen wastewater management project proposals for inclusion in provincial plans and annual budgets.

Regarding island-level conservation, plans were discussed for small-scale wastewater treatment systems in Koh Sriboya to prevent community and tourism-related wastewater from affecting seagrass meadows and dugong habitats, which are ecologically valuable and culturally significant. Similar plans were proposed for Koh Lanta to accommodate future increases in tourist numbers, particularly after the completion of a connecting bridge. These initiatives illustrate that wastewater management should be viewed as preventive investment to support economic and tourism development without damaging nearshore marine ecosystems.

Representatives from Hat Noppharat Thara–Mu Ko Phi Phi National Park provided information on measures for managing high-value natural tourism areas. These included zoning, defining carrying capacity, and developing data systems to support management. The park has implemented seasonal closures, such as closing Koh Yung and Maya Bay for two months during the monsoon season, to allow ecosystems to recover from tourism pressures. This reflects the necessity of managing natural attractions based on ecological limits rather than maximizing visitor numbers.

For carrying capacity, the park set a limit of 375 visitors per round at Maya Bay. Once the quota is reached, boats must wait offshore until the current group departs. This mechanism exemplifies controlled access to balance tourism with ecosystem conservation. The park is also developing an online ticketing system (E-ticket) and QR code scanning checkpoints to improve visitor management and data accuracy. Such systems can support tourism-related natural capital accounts and future assessments of the relationship between visitor numbers, tourism revenues, and ecosystem pressures.

On local fisheries, the park designated zones where communities may harvest resources or conduct small-scale fishing, provided activities remain at least one kilometer away from coral reefs. This approach reflects efforts to balance marine conservation with local livelihoods, a key dimension of sustainable coastal and island development in Krabi.

Representatives from the Krabi Provincial Office highlighted constraints and opportunities in advancing environmental projects within provincial plans and budgets. They noted that environmental projects are often ranked lower in priority compared to tourism or infrastructure projects. To secure funding, conservation, wastewater management, or ecosystem restoration projects must be clearly incorporated into provincial development plans. Natural capital accounts can elevate environmental projects by linking them directly to economic development goals, framing them not merely as conservation expenditures but as investments in

maintaining the resource base that generates provincial income, particularly through tourism and quality of life improvements.

They also emphasized that land tenure and legal permissions are major obstacles in implementing environmental infrastructure projects such as wastewater treatment systems, nature trails, or conservation facilities. Projects in public lands, forests, national parks, or multi-agency jurisdictions require early verification of land status and legal permissions to avoid delays or risks of non-implementation despite budget approval.

Representatives from the Krabi Local Administration Office and Ao Nang Subdistrict Administrative Organization provided insights into waste management, particularly efforts to develop cluster-based waste transfer and disposal infrastructure. A key initiative is the waste transfer station in Ban Klang Subdistrict, designed to handle waste from Ao Luek and Plai Phraya districts before disposal at a private waste-to-energy facility. This reflects the need for inter-local cooperation and private sector involvement in final waste treatment. However, Krabi Municipality still bears responsibility for waste from 23 local governments, prompting attempts to establish additional cluster-based disposal centers. Some projects have faced public opposition, resulting in reliance on private landfills that do not meet scientific standards. These challenges reveal that waste management in Krabi is not merely technical but involves governance structures, system capacity, public acceptance, and environmental oversight. From the perspective of natural capital accounts, inadequate waste management can affect coastal ecosystems, water resources, tourism image, and long-term environmental costs.

In summary, participants agreed that advancing the use of natural capital accounts in Krabi must proceed alongside urgent local problem-solving, including wastewater management in tourism areas, island wastewater treatment systems, waste management, defining tourism carrying capacity, and balancing conservation with community livelihoods. To achieve policy impact, NCA data must be integrated into provincial planning and budgeting processes from the outset, particularly through project proposals supported by evidence on costs, benefits, efficiency, ecosystem impacts, and alignment with provincial development strategies. At the same time, legal conditions, land tenure, stakeholder participation, and local agency readiness must be considered to ensure effective implementation.

Figure 5 consultation to gather feedback on linking natural capital accounts to provincial plans



Image source by the author

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