

Final report

**Proposed Framework for Thailand to Report
and Monitor Progress towards
UN Strategic Plan for Forest 2017-2030**

Submitted to

The United Nations Forum on Forests (UNFF)

Submitted by:

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List of Acronyms and Abbreviations

AD	Activity Data
AGB	Above Ground Biomass
ALRO	Agriculture Land Reform Area
B.E.	Buddhist Era
BGB	Below Ground Biomass
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DMCR	Department of Marine and Coastal Resources
DNP	Department of National Parks, Wildlife and Plant Conservation
EFs	Emission Factors
ESMF	Environmental and Social Management Framework
FAO	Food and Agriculture Organization of United Nations
FCPF	Forest Carbon Partnership Facility
FGRM	Feedback and Grievance Redress Mechanism
FIO	Forest Industry Organization
FRA	Forest Resource Assessment
FREL	Forest Reference Emission Level
FRL	Forest Reference Level
FSC	Forest Stewardship Council
GCS	Global Core Set of forest related indicators
GFG	Global Forest Goals
GHG	Green House Gases
GISTDA	Geo-Informatics and Space Technology Development Agency
IFF	Intergovernmental Forum on Forests
IPCC	Intergovernmental Panel on Climate Change
IPF	International Panel on Forests
LULUCF	Land Use, Land Use Change and Forests
MMR	Monitoring, Measuring and Reporting
MNRE	Ministry of Natural Resources and Environment
NFI	National Forest Inventory
NFMS	National Forest Monitoring System
PEFC	Program the Endorsement of Forest Certification

REDD	Reducing Emissions from Deforestation and forest Degradation
RFD	Royal Forest Department
SDGs	Sustainable Development Goals
SESA	Strategic Environmental and Social Assessment
SFM	Sustainable Forest Management
SIS	Safeguard Information System
SLMS	Satellite Land Monitoring System
SOC	Soil Organic Carbon
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	The United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNFI	United Nations Forest Instrument
UNGA	United Nations General Assembly
UNSPF	United Nations Strategic Plan for Forests
VNC	Voluntary National Contributions

Proposed Framework for Thailand to Report and Monitor Progress towards UN Strategic Plan for Forest 2017-2030

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1 Background

The adoption of UN Strategic Plan for Forest (UNSPF) in 2017 required UN member state to make progress in achieving the 6 Global Forest Goals (GFG) and 26 targets¹ and forest-related Sustainable Development Goals (SDGs).

During the first round of UNSPF monitoring and reporting 2019-2020, 52 UN member states submitted their voluntary reports, including Thailand. However, these voluntary reports lacked standardized, and no comparable data and targets challengeable statistic to track progress towards the GFGs. They also did not capture data on forests contribution to the socio-economic development and forest financing.

UNFF Secretariat, therefore, seeks improvement for monitoring and reporting framework that adequately and appropriately covers all aspects of sustainable forest management (SFM) as enshrined in the UN Forest Instrument (UNFI) and UNSPF and the streamline data collection and reporting obligations to minimize the countries' reporting burden.

For Thailand, UNFFS has appointed the national consultant to work closely with the UNFF National Focal Organization (Royal Forest Department: RFD) and key stakeholder to develop the framework. The framework would comprise of national contextual indicators that are based and integrated with the existing global reporting tools. These include the Global Core Set Indicators (GCS), the FAO Global Forest Resources Assessment (FRA), the SDGs, and the UN System of Environmental - Economic Accounting - Ecosystem Accounting (SEEA-EA).

The RFD and key national forest-related stakeholders supported the study by providing information and views on to establish the framework. Three of the 26 targets of the global objectives on forests (GFGs) are not applicable to the framework because Thailand does not report on them.. Seventeen targets can be measured using 20 GCS indicators, 1 target can be monitored through 2 the-SDG indicators. While 5 targets can be monitored using 5 newly proposed indicators.

¹ Listed in Section 4.

2. Objective and tasks

This study aims to develop Thailand's national monitoring and evaluation framework using existing and newly proposed available forest-related indicators in order to ensure that Thailand can systematically track progresses toward achieving the GFGs.

To achieve the above objective, the following tasks were conducted.

1. Prepare a background analytical study on availability of forest data, beyond the biophysical information, including socio-economic forest related data, mapping of existing Gaps and identifying tools to address these Gaps, and the national and international reporting requirements on forests and forest related goals and targets,
2. Liaise with the key forest-stakeholders and assist in mobilizing the country team to
 - map existing national forest related-databases and identify potential data Gaps and tools to address these Gaps
 - develop a monitoring framework for international forest-related goals and targets (serving the UN Forest Instrument, GFGs, SDGs and FRA2020)
 - conduct one national virtual workshop to review and validate available forest data in Thailand attended by a range group of stakeholders from relevant sectors (agriculture, water, energy, finance, nature conservation).
3. Present the findings of the initial background analytical study at the virtual workshop and prepare a report.
4. Finalize the background analytical study based on the feedback and inputs from the virtual national workshop, including comments from UNFFS.

3 Method

The study was conducted through a participatory consultative approach. Because of the COVID-19 pandemic, virtual consultations with key forest-related stakeholders were carried out in February 2022. Further, the following key steps were used to gather information and develop the study report.

3.1 Literature Reviews

A review of secondary information included reports on national statistics on forest-related sectors, the human development index, social and economic development in Thai and English. Statistic data and reports, technical national reports accessed from websites were used to describe gaps and to develop an assessment table that briefly define the data status and their sources.

3.2 Key Informant Interviews

Key informants were selected from agencies responsible for forest related reporting in consultation with the Dr. Preecha Ongprasert, Director of International Convention and

Commitment Division, Ministry of Natural Resources and Environment Royal Forest Department Thailand and the UNFF National Focal Point for Thailand. . Interviews aimed to seek their views on strengths and weakness of their current missions, as well as their views on improving efforts to achieve implementation of the UNSPF and achievement of its global forest goals.. The following were interviewed:

Name	Organization
Dr. Weeraphart Khunrattanasiri	Assistant Professor Faculty of Forestry, Kasetsart University.
Mr. Witsanu, Damrongsujjasi	Director of Forest Resources Inventory and Analysis, Forest Land Management, Royal Forest Department
Mr. Anusorn Rungsipanich	Geoinformatic Expert, GISTDA
Ms. Narissara Chanpet	Statistician, National Statistic Office
Dr. Preecha Ongprasert	UNFF National Focal Point Royal Forest Department

3.3 Analysis of Information

Information collected through literature reviews and stakeholder consultations was analyzed using the assessment framework to identify data/information Gaps and to develop recommendation for improvement. The results of the analysis were used to draw initial conclusions and to draft recommendations.

3.4 Consultation workshop

A half-day virtual National Stakeholder Validation Workshop for 16 participants representing relevant government stakeholder agencies (see Annex iii for the list of participants) was conducted with the support of UNFF Focal Point to present the findings of the study. All relevant stakeholders were convened officially by the UNFF Focal Point. Draft Assessment Table and report of the study were circulated among the participants beforehand, to allow sufficient time for them to study and prepare for the workshop.

After a brief presentation on the objectives the workshop and the background information and rationale, the findings of the study were presented to the participants. They were then requested to provide their suggestions and comments to clarify Gaps/inconsistencies and also to obtain

any missing information. The views expressed during this session were discussed in detailed and adopted accordingly. Participants were also invited to provide their written comments (if any) during a stipulated time period.

3.5 Finalization of the report

The draft report was further improved incorporating comments, feedback, and recommendations obtained at the consultation workshop as well as written inputs of participants. The revised report was submitted to UNFF and Thailand UNFF focal point for their review.

Comments and feedback received from the UNFF Secretariat and UNFF National Focal Point for Thailand were be incorporated to into the final report framework.

4. Results

In 1989, the Thai government imposed a nationwide ban on logging . Approximately 47% of Thailand's total land area was categorized as agricultural land. Non-agricultural land use accounted for 21% and public forest land accounted 32%. About 22% of agricultural land use was attributed to paddy field. In 2005, Thailand's net carbon removal was tremendously increased once para-rubber plantations were included as a parameter for LULUCF (Land Use, Land Use Change, and Forestry). In 2013, the country's net removal from LULUCF sector was 86,101.84 GgCO₂ eq. (ONEP, 2018)²

However, Thailand statistic on forests above forest land does not include planted forest, plantation forest, and Other Land with Tree Cover which growing in the agricultural land. The concept of "All trees count" has not been introduced in Thailand and especially among the forest-related stakeholders. The term forest has rather been rigidly defined as public-natural-forest-cover or by law (Forest Act 1941) forestland means the land that no individual or group has legal ownership.

The concept of SFM has historically been discussed as the stage of success but without a clear definition and measurable or verifiable index. On the other hand, SFM has been referred as the 3rd party certification schemes due to the growing market of the certified natural rubber latex. Hence, the rubber plantations have gradually become part of the 3rd party SFM certification. Nevertheless, Thailand's official definition of forest does not include rubber plantations as defined in the Thailand Report of Global Forest Resources Assessment 2020 (Thailand FRA, 2020) that the term "Forest" is operationally defined as "*Land with vegetation, natural and plantation, cover, and span more than 0.5 hectares which can be classified by satellite imagery.*" Hence, *land that predominantly covered with agroforestry, agriculture and urban land use are not included in the definition of forest.*³

In addition, the definition of forest used in the Thailand FREL and FRL (2018) based on the 3 thresholds. They are the minimum area of 0.5 ha, crown cover of minimum 10%, and no defined tree height (in practice at 2 m.) either inside or outside the management of Royal Forest

² ONEP. 2018. Thailand's Third National Communication. UNFCCC.

³ FAO-FRA. 2020. Thailand Report on Global Forest Resources Assessment 2020.

Department, Department of National Parks, Wildlife, and Plant Conservation, and Department of Marine and Coastal Resources. In the FREL and FRL (2021), grassland and bedrock areas, exotic species plantations (e.g., rubber, eucalyptus, and oil palm) are excluded, and teak forests are considered part of the natural forest complex. Pools of carbon sink were calculated from the aboveground and belowground within the conserved forest (64% of total public forest in Thailand), national reserve forests (34% of total public forest in Thailand), and mangrove forests (25% of total public forest in Thailand). National wide, forests are categorized into 3 types, Deciduous, Evergreen and Mangrove.

Since this study aims to improve national report, the definition of FOREST area in this study is as referred to in the FAO-FRA 2021 Guideline which is as follow:

Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.

Thailand has committed and contributed either, by compulsory or voluntary ways, to ensure achieving the global goals agreed upon under several multilateral agreements and conventions. These reports are sources monitoring both forest biophysical and non-biophysical information for future Thailand report toward UNSPF 2030. These reports are for example,

- UN FAO FRA 2020: Global Forest Resources Assessment 2020
- Forest Reference Emission Level (FREL) and Forest Reference Level (FRL) of Thailand (MoNRE, 2021)
- UN-SDG: the Voluntary National Review on the Implementation of the 2030 Agenda for Sustainable Development,
- UNFCCC: the National Communication (NC),
- UN-CBD: the National Report on the Implementation of the Convention on Biological Diversity,
- UNCCD: Performance Review and Assessment of Implementation System: PRAIS.

The Secretariat of the National Strategy Commission and the Country Reform Commission in collaboration with the Office of the National Economic and Social Development Council , and NECTECNSTDA developed an Electronic Monitoring and Evaluation System of National Strategy and Country Reform, or eMENSCR as a tool to drive the 20-year National Strategy and the National Reform initiatives. eMENSCR serves as a central reporting database that analyses data from government agencies, thus enabling tracking implementation of all national strategies, master plans and projects under the 20-year National Strategy and the National Reform. Data and information in eMENSCR are made accessible to government agencies to facilitate inter-agency cooperation and avoid duplication of projects. An open data portal has been created for public access to data and information created from projects corresponding to the 20-year National Strategy, thus promoting government transparency and engaging people in public policy. (NSTDA, 30 Years Impacts⁴)

Below is some background information on Thailand's monitoring and reporting on GFGs and targets based on the UN forest-related international references, Terms and Definitions, and

⁴https://www.nstda.or.th/en/images/pdf/30th_NSTDA_compressed_final.pdf

guidelines. For those where national level indicators do not exist, defined Gaps including the aspects to be measured, information sets, and their sources are presented briefly in table at the end of each target. Summary of the indicators listed and newly proposed are listed in Table 1.

Table 1: Summary of proposed indicators for Thailand' Reporting and Monitoring Framework

Sources of indicators	Amounts of Indicators	Amounts of Global Targets	List of Targets
Global Core Set	20	17	1.1, 1.2, 1.3, 1.4 2.1, 2.3, 2.4, 2.5 3.1, 3.2, 3.3 4.1, 4.2, 4.5 5.1, 5.2, 5.3
UN SDG	2	1	2.2
Newly proposed	6	5	4.3, 4.4, 5.4, 6.3, 6.4
Not applicable (not report by country level)	-	3	6.1, 6.2, 6.5

GFG 1 Reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation and contribute to the global effort of addressing climate change.

Target 1.1 Forest area is increased by three percent worldwide.

Indicators:

- GCS #.1: Forest area as a proportion of the total land area. (%)
- GCS #.2: Forest area annual net change rate. (%)

Definition: Refers to FAO-FRA 2020 Terms and Definitions, the relevance definition:

Forest means land spanning more than 0.5 ha with tree higher than 5 meters and the canopy cover of more than 10 percent, or tree able to reach these threshold in-situ. It does not include land that is predominantly under agricultural and urban land use.

With the FRA 2020 Terms and Definitions, in Thai context, Forest includes:

Natural Regenerating Forest

- Forest areas which are administered by 3 public agencies: RFD, DNP, DMCR.
- forest road, firebreaks, other small open areas e.g., historical, cultural, or spiritual interest areas.
- mangrove in tidal zones,
- abandoned shifting cultivation land with a regeneration of trees that expected to reach 10% canopy cover and 5 m. height.,
- areas outside the legally designated forest land which meet the above criteria.
- young tree that not reached but which are expected to reach a canopy cover of 10% and tree height of 5 m.,
- windbreaks, shelterbelts, and corridors of trees with an area of more than 0.5 ha and width of more than 20 m.,

Planted Forests

- Rubber-wood tree plantations, bamboo, and wood-purposed-palms that more than 10% canopy cover and 5 m. height, Agro-forestry, where crops are grown only during the first years of the forest rotation.
- Plantations of short rotation species for wood, fiber, and energy.
- Planted trees deliberate seeding that are expected to constitute more than 50% of the growing stock at maturity.
- Coppiced trees that were originally planted or seeded.

Other Wooded Land includes land where tree's canopy covering:

- Between 5-10% with trees higher than 5 m or able to reach 5 m *in situ*.
- less than 5% with shrubs, bushes, and trees more than 10%
- shrubs and bushes where no trees are present.
- Tree that does not reach 5 m. height in situ and with a canopy cover of 10% or more. (e.g., arid zone mangrove)
- The Other Wooded Land, in Thai context, can be implied the following practices or titles including: Khok Nhong Na Style Farm⁵, Tree Banks⁶, and Family Forests⁷

Other land that is not forest, include

- Palms (oil, coconut) and tree orchards (fruits, nuts, oils, etc.)
- Agro-forestry (non-wood purposes) (bamboo)
- Tree in urban settings (Municipal parks, temples, industry estates)
- Agricultural land
- Meadows and pasture
- Built-up areas

Temporarily unstocked and/or recently regenerated forest means forest area with trees shorter than 1.3 m. that have not yet reached 5 m but are expected to reach a

⁵ **Khok Nhong Na** is the term in Thai meaning Dune-Pond-Rice Paddy, which integrated the King Rama IX's Sufficiency Economy Philosophy and the New Theory Agriculture into practical agricultural land-use model. The design of the farm is to be composed of 4 sections:

- 30% dune for mix-perennial-forest trees for wood, non-wood products, as well as soil protection.
- 30% pond and channel for fish, water plants, and water storage,
- 30% paddy for rice or other seasonal crops with wide earthen bund for herbs and vegies
- 10% residential space for house and other farm facilities.

⁶ **Tree Bank** is the program administers and promotes by the Bank of Agriculture and Agricultural Cooperatives (BAAC) for its clients (farmer) to plant trees on their land where these trees' growing stocks are monitored and be calculated for Carbon sequestration. The Bank uses its Corporate Social Responsibility fund from its green bond as financial tool paying for these carbons.

⁷ **Family Forest** is the program administers and promotes by the Biodiversity-Based Economic Development Organization (Public Organization under the Ministry of Natural Resources and Environment). Farmers are encouraged to plant or keep forest-trees at their farmlands or backyards. Ultimate goal is to enhance local biodiversity resource where diverse income can be generated, and family expenditure can be reduced. Carbon sequestrations are alternative sources for BEDO's overall program of Thailand's Voluntary Emission Reduction (T-VER) Credit.

canopy cover of at least 10% and tree height of at least 5 m. This include clear-cutting forest management or natural disasters and expected to be regenerated within 5 years. Longer time frame may be exceptional cases if local condition justifiable. This also include areas converted from other land use and with trees shorter than 1.3 m and unsuccessful plantations.

GAPS:

There are different definitions of terms used in FRA 2020, the Thailand's FREL and FRL report (2021), Thailand' 7th reporting process on Performance Review and Assessment of Implementation System to UNCCD (2018). These terms include, for example, Forest land and Reforestation.

Thailand's 4th Report to UNCCD includes 6 categories of land-use including: Tree-covered areas, Grassland, Cropland, Wetland, Artificial surfaces, and Other land, with the unit of sq.km. The national net area changed between 2002-2013 as shown in Table 2 and the land category change matrix as shown in Table 3 which was analyzed from Trends.

Table 2: Land-use areas and changes 2002 and 2013 (LDD, 2018)

Year	Land cover (sq.km)					
	Tree-covered areas	Grassland	Cropland	Wetland	Artificial surface	Other land
2002	185,768	14,620	280,223	12,900	19,319	1,101
2013	176,693	16,411	268,809	21,639	28,458	1,921
Change	-9,075	1,791	-11,414	8,739	9,139	820

Table 3 Land cover area change matrix in sq.km., (LDD, 2018)

Final class \ Initial class	Tree-covered areas	Grassland	Cropland	Wetland	Artificial surface	Other land
Tree-covered areas	123,168.77	1,165.48	503.07	11.32	11.91	0.0
Grassland	2,061.73	64,080.41	1,201.10	40.18	55.17	0.00
Cropland	845.62	74.21	305,010.63	94.64	2,517.08	0.00
Wetland	2.80	6.19	10.55	3,254.58	10.25	0.00
Artificial surface	0.00	0.00	0.00	0.00	1,461.46	0.00
Other land	0.00	0.00	0.00	0.00	0.72	0.84

To minimize Thailand's investment on reporting and monitoring on land-use categories, these land use categories and definitions should be harmonized for national standard and in line with international definitions. It has been indicated that for UNCCD 4th Report, Forest land means geographical areas dominated by natural tree plants with cover of 15% or more and include mosaic trees and shrub (> 50%), herbaceous cover seasonally and permanently flooded with fresh water.

Status and source of data or information set. Describe in Table 4

Table 4 Status and Source of data for Target 1.1 indicators

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 1 Forest area as a proportion of the total land area (%) Tier 1	Naturally regenerating forest	Reclassification <ul style="list-style-type: none"> • Naturally regenerating • semi-planted for restoration in public land, • planted for ecosystem restoration. 	National specific value (National Forest Inventory - NFI)	Thailand's FRA 2020 (RFD)
	• Plantation forest	Rubber plantation	Existing online	<ul style="list-style-type: none"> • Rubber Authority of Thailand • FIO
		Private timber-based plantation	Scatter	<ul style="list-style-type: none"> • RFD (registered plantation) • FIO • LDD
	• Other planted forest	<ul style="list-style-type: none"> • Khok-Nhong-Na Style Farm • Tree Bank • Family Forests • Other sustainable agricultural farms 		<ul style="list-style-type: none"> • Ministry of Agriculture and Cooperatives (LDD, DoEA Farmer Book Program) • BAAC's Tree Bank Program • Community Development Department • BEDO
GCS# 2 Forest area annual net change rate (%) Tier 1	<p>A. Net Change is the difference in forest area between the last observed reference years and the reporting year. The net change can be either</p> <ul style="list-style-type: none"> - Positive (gain), - Negative (loss) or - Zero (no change). <p>B. Annual net change, refers to FAO-FRA 2020 Guideline and Specifications, can be calculated as follow:</p> <ul style="list-style-type: none"> - Time difference between observation (e.g., 5 years) - Difference between observed value (data from A. which can be positive, negative, or zero. (e.g., the different is the gain of 55,000 ha) - Annual net change will be $+55,000 / 5 = +11,000$ ha/year. <p>C. Annual net change rate is the percentage of the annual net change areas with the total Forest Area (e.g., $11,000$ ha/year = $+ 0.0021\%$ of the total forest area)</p>			

Target 1.2 The world's forest carbon stocks are maintained or enhanced.

Indicators:

GCS#3: Net greenhouse gas emissions (source)/ removals (sink) of forests, and carbon balance of harvested wood products. (Kt CO₂/Y)

Definition: the following are FAO-FRA 2020 Terms and Definitions,

Growing stock

- Volume over bark of all living trees with a minimum diameter of 10 cm at 1.3 m above ground level or at breast height (or above buttress if these are higher". Includes laying living trees, the stem from ground level up to a top diameter of 0 cm. excluding branches, twigs, foliage, flowers, seeds, and roots.

Native tree species

- A tree species occurring **within** its past or present natural range (referring to the country border) and dispersal potential (i.e., within the range it occupies naturally or could occupy without direct or indirect introduction or care by humans). Beyond 250 years of original introduction, the species can be considered naturalized.

Introduced tree species

A tree species occurring **outside** its past or present natural range (referring to the country border) and dispersal potential (i.e., outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans). Introduced up to 250 years from the date of original introduction.

Five Categories of forest Carbon pools are:

1. Carbon in above-ground biomass (ton/ha) means carbon in all living vegetation biomasses both woody and herbaceous above the soil including stems, stumps, branches, bark, seeds, and foliage. Excluding relatively small forest understorey biomass is accepted, where this is consistently excluded throughout the inventory time series.
2. Carbon in below-ground biomass (ton/ha) means carbon in all biomasses of live roots. This includes below-ground stump and excludes fine roots that are less than 2 mm diameter as they often cannot be distinguished empirically from soil organic matter of litter. If more than 2 mm fine root threshold to be used, the defined threshold valued must be documented.
3. Carbon in dead wood means carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil This includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter threshold defined and be documented.
4. Carbon in litter means carbon in all non-living biomass with a diameter less than the minimum diameter for dead wood (e.g., 10 cm), lying dead in various states of decomposition above the mineral or organic soil. Smaller than threshold sized-fine roots above mineral or organic soil are included.
5. Soil carbon means organic carbon in mineral and organic soils (including peat) to a specific depth chosen by the country and applied consistently through the time series. Smaller than threshold sized-fine roots below-ground are included. Thailand's TVER method has defined soil depth range at 0-30 cm.

Carbon removal equals carbon sequestration rate multiplied by total forest carbon stock. Default Carbon Friction at 0.47 is advised, and it was used in Thailand's FRA Report 2020.

The total annual forest growing stock is calculated from the annual growing stock (in m³/ha over bark) multiply by total areas (ha) of each FRA Forest Categories as follow.

- a. Naturally Regenerating Forest:
- b. Planted Forest comprises of 2 sub-components:
 - Plantation forest
 - Other planted forest.
- c. Other Wooded Land.

GAPS:

In Thailand’s FRA Report 2020, the annual biomass rate of Naturally regenerating forest and Planted Forest was 94.16 and 100 m³/ha over bark, respectively. There is no data on Other Wooded Land. For more accurate analysis of Thailand’s growing stock, this study recommends revisiting the data on Growing Stock for Planted Forest filled in Thailand’s FRA Report 2020 in 3 steps:

- Determine the growing stock over bark of the Planted Forest. The figure of 100 m³/ha over bark was referred to in FAO 2001. More recent data on growing stock of non-native species (e.g., para-rubber, eucalyptus, and Acacia spp.) should be available for this calculation step.
- A list of the country’s 10 most common native tree species and 5 most common introduced tree species. This data were not included in Thailand’s FRA 2020 Report.
- There is a need to revisit the figure reported as Percentage of Growing Stock of the 3 IPCC forest types (Broadleaved humid, Broadleaved dry, and Coniferous) for the 3 FRA forest categories (Naturally Regenerating Forest, Plantation Forest, and Other Planted Forest). This should be done in consultation with national experts to ensure accuracy particularly in the Biomass stock of each forest categories in the FAO-FRA’s Biomass Excel Calculator. Table 5 below demonstrates the possible change of the percentages between the Thailand’s FRA 2020 report and the proposed figure which are reflected by the researchers’ own expertise.

Table 5. Comparing percentages of Growing Stock by IPCC forest type of the FRA forest categories.

IPCC Forest Types	% of Growing Stock					
	Naturally Regenerating Forest		Plantation Forest		Other Planted Forest	
	Thailand FRA 2020	Proposed figure	Thailand FRA 2020	Proposed figure	Thailand FRA 2020	Proposed figure
Broadleaved humid	99	38	100	10	0	5
Broadleaved dry	0	60	0	90	0	95
Coniferous	1	2	0	0	0	0
Total = 100%	100	100	100	100	100	100

Once revisiting the 3 aspects listed above, Thailand’s Growing Stock Composition (namely Table 2b in the FRA 2020 Guideline and Specifications) would be more accurately reported.

The report on carbon sequestration calculation should be in line with the FAO-FRA 2020 Guidelines and Specifications as well as the use of an online provided Biomass Excel Calculator. There is good advice in the guideline for standardize reporting, such as if the inventory data does not specify species, tree's genera can be substituted and the year 2015 is the reference. The provided Biomass Excel Calculator would be promptly calculated Tier 1 data on Aboveground and Belowground biomass (tonnes/ha), Biomass Conversion and Expansion Factor (BCEF), as well as weighted BCEF.

Proposed of native species growing stock can be selected from the most common species found in natural forest for example, *Dipterocarpus alatus*, *Dipterocarpus tuberculatus*, *Dipterocarpus obtusifolius*, *Shorea obtusa*, *Shorea siamensis*, *Lagerstroemia spp.*, *Diospyros spp.*, *Azalia spp.*, *Terminalia spp.*, *Artocarpus spp.*, *Castanopsis spp.*, *Quercus spp.*, *Lithocarpus spp.*, *Pinus merkusii*, *Pinus kesiya*, *Tectona grandis*, *Xylia kerrii*, *Pterocarpus macrocarpus*, *Azalia xylocarpus*, *Dalbergia cochinchinensis*, *Rhizophora spp.*, *Avecennia spp.*, *Bruguiera spp.*, *Casuarina spp.*, *Azadirachta spp.* (Neem) etc.

The most popular introduced planted species can be determined from commercial plantations, especially *Eucalyptus spp.*, *Hevea brasiliensis*, *Acacia mangium*, *Swietenia macrophylla* (Brazilian Mahogany), *Swietenia mahogany* (Dominican Mahogany), and *Terminalia ivorensis*.

The IPCC (2006) indicates that for Tier 1, Dead Organic Matter (DOM means litter and dead wood) can be calculated as following.

- In case of no change of land-use (Forest Land remain Forest Land), DOM is zero.
- In case of change in land-use category, default value of 2.1 tones C per ha for mature broadleaf deciduous and 5.2 tones C per ha for mature Needleleaf evergreen (namely Table 2.2 in IPCC 2006: Chapter 2), in the following circumstances:
 - o Forest to Non-Forest Land: all DOM carbon loss occurs in the year of conversion. This means using default value and divided by 1 years for the carbon emission.
 - o Non-forest to Forest Land: DOM carbon gains start from zero, linearly, over the default transition period of 20 years, and after 20 years the DOM is no change. This means using default value and divided by 20 years for annual carbon removal.

For carbon stock in soils tremendously affected by the change in Land-use and management activities; Tier 1 method, soil organic Carbon Stock for mineral soils are computed at default depth of 30 cm. Deeper than 30 cm can be used for Tier 2, if data are available. Tier 1 and 2 method, net change of Inorganic Carbon Stock is assumed to be Zero.

In addition, due to Thailand's national-wide ban on logging concession from natural regenerating forest (since 1989), wood-removals from these natural regenerating forests are prohibited, and hence not merchantable. On the other hand, reporting of species that are planted on the Land Converted to Forest Land where are merchantable wood-removals such as teak, para-rubber, introduced fast-growing species (e.g., eucalyptus and acacia spp.) are crucial to be defined as described in the above paragraph. These areas could be considered as intensive managed forest, as their sites are prepared and for specific targeted species, even though fertilizing is uncommon but weeding in the first few years is common.

According to the FAO-FRA definition, data on forest loss either illegal logging or forest fires is not reported as deforestation, since, although they both cause forest degradation, the forest land is not converted to other land use. Deforestation means forest land is changed to other land use permanently. If the areas where encroachment happened, and they aimed to be reforestation or restoration, these lands are no deforestation. As the land uses are not change from forest land. Similarly, due to different in definition of Forest Land, the findings on Carbon Emission and Removals presented in Thailand's FREL and FRL (as shown in Table 6) would not be immediately referable for the higher Tier calculation for UN-SFS Target 1.2. It is, therefore, recommended to harmonize on these terms and scopes before adoption of the FREL findings.

Table 6. Thailand's FREL and FRL 2006-2016 for natural forest land (MoNRE, 2018).

		E/R over reference period (tCO ₂ e)	Average annual E/R (tCO ₂ e)	95% Confidence Interval (%)
Deforestation (Forest – Non-Forest)		153,260,563	15,326,056	39
Enhancement (Non-Forest – Forest)		-26,314,503	-2,631,450	90
Degradation (Forest – Forest)	Net Change (Forest – Forest) ²	-288,801,988	-28,880,199	80
Enhancement (Forest – Forest)				
FREL (Total Emissions)			15,326,056	39
FRL (Total Removals)			-31,511,649	74

¹ The FREL includes activities which reduce emissions. The scope of the FREL includes reduced emissions from deforestation and/or forest degradation. The FRL includes activities which increase removals. The scope of the FRL includes enhancement of forest carbon stocks. In this first FREL and FRL submission Net change is reported for forest remaining forest

² A stock difference approach has been used to assess the net removals or emissions from forest remaining forest. Since Thailand's forest have accumulated on average more biomass than what was lost over the reference period, the resulting net change is removals

Status and source of data or information set. Describe in Table 7.

Table 7: Status and Source of data for Target 1.2 indicator

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 3 Net greenhouse gas emissions (source)/ removals (sink) of forests, and carbon balance	Naturally regenerating forest	Biomass stock = 94.16 m ³ /ha.	National specific value (National Forest Inventory - NFI)	Thailand's FRA 2020 (RFD)
		Carbon fraction = 47%	Default value	FAO-FRA 2020 Guideline and Specification
		Average annual Carbon Emission and Removal from aboveground and belowground Carbon pools	National specific value.	Thailand' FREL and FRL Report 2021 (DNP)

of harvested wood products (Kt CO ₂ /Y) Tier 2		<ul style="list-style-type: none"> • FREL = 15,326,056 tCO₂e (95% confidence interval 39%) • FRL = -31,511,649 tCO₂e (95% confidence interval 74%) 		
		Carbon change in Dead Organic Matter (litter and dead wood = 0)	Default value	IPCC (2006)
		Soil Organic Carbon Stock (SOC) for Tree-covered areas <ul style="list-style-type: none"> • In 2003 = 103.5 t/ha • In 2010 = 89.9 t/ha 	National specific value,	Thailand's report to UNCCD 2018 (LDD)
	Planted forest	Biomass stock = 100.0 m ³ /ha.	Refer to FAO 2001 information	Thailand's FRA 2020 (RFD)
	- Plantation - Other planted forests	Revisit biomass stock of 10 native tree species and 5 planted introduced species	Further discussed to follow FRA's Online calculator	Total areas of each planted 10 native species and 5 planted introduced species, in Target 1.1. FAO-FRA 2020 Guideline and Specification
		FAO-FRA 2020 Guideline and Specification	Carbon fraction = 47%	Default value
		Carbon change in Dead Organic Matter (litter and dead wood in Tropical region) <ul style="list-style-type: none"> • broadleaf deciduous = 2.1 tones C per ha, if emission is divided by 1 year and if removal is divided by 20 years • Needleleaf evergreen = 5.2 tones C per ha, if emission is divided by 1 year and if removal is divided by 20 years 	Change of land-use change either Carbon emission or removal	IPCC (2006)
	Soil Organic Carbon Stock (SOC) for Cropland <ul style="list-style-type: none"> • In 2003 = 67.4 t/ha • In 2010 = 39.3 t/ha 	Further discuss for accurate value and definition of planted forests	LDD	

Alternative to FAO-FRA 2020 and all above listed status and source, for Planted Forests (Plantations and Other Planted Forest) might conduct the national calculate forest carbon sequestrations for calculating for Plantation Forest. These calculations can be done using methodologies endorsed by Thailand' Greenhouse Gas Management Organization (TGO). There are 3 methods related to carbon calculation in forestry sector. They are T-VER-TOOL-FOR/AGR-01 Version 04 for planted forest/trees both for aboveground and in belowground carbon removal, T-VER-TOOL-FOR/AGR-02 Version 03 for soil carbon, and T-VER-TOOL-FOR/AGR-03 Version 02 for dead wood and litter. However, using these T-VER methods, Thailand must completely describe and document all the applied methods.

Target 1.3 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

Indicators:

- GCS#5: Change in area of primary forests (% from previous observed year)
- GCS#7: Area of degraded forests (ha)

Other 2 indicators that related to Target 1.3 are GCS#19: Proportion of forest area under a long-term forest management plan and GCS#20 Forest area under an independently verified forest management certification scheme. As they directly indicate the Target 3.2 and 3.3 in Goal 3, their definitions, Gaps and the status will be described in Goal 3.

Definition: Refers to FAO-FRA Terms and Definitions 2020, addition to the definitions i

Primary forest means naturally regenerating forest of native tree species, where there are no clearly visible indications of human activities, and the ecological processes are not significantly disturbed.

Includes forest where:

- both pristine and managed forests that meet the definition.
- forests where indigenous peoples engage in traditional forest stewardship activities that meet the definition.
- forest with visible signs of abiotic damages (such as storm, snow, drought, fire) and biotic damages (such as insects, pests, and diseases).

Excludes forests where hunting, poaching, trapping, or gathering have caused significant native species loss or disturbance to ecological processes.

Key characteristics of primary forests are:

- Those that show natural forest dynamics, such as natural tree species composition, occurrence of dead wood, natural age structure, and natural regeneration processes.
- Where the area is large enough to maintain its natural ecological processes.
- Where there has been no known significant human intervention, or the last significant human intervention was long enough ago to have allowed the natural species composition and processes to have become re-established

Degraded forests: According to FAO-FRA 2020 Terms and Definitions, this term is to be defined by the country where the country should document definition or description of degraded forest and provide information on how this data is being collected.

According to Thailand's FRA Report (2020), the term has no country specific definition. The report indicated of no monitoring of the degraded forest.

Referred to Thailand's FREL and FRL Report (2021), the term was defined as:

Forest areas with canopy cover equal to, or above, 10% but in which canopy cover has been reduced but remained forest land, were considered as degraded forest. In practice Degradation was defined when forest type changed from a higher carbon stock forest type to a lower carbon stock forest type, or when a stable forest type had its carbon stock decreased.

Deforestation means the conversion of forest to other land use independently whether human-induced or not.

Includes forest lands where:

- permanent reduction of tree canopy cover below the minimum 10% threshold,
- impacts from disturbance, over-utilization, environmental effects affect the forest to an extent that it cannot sustain a canopy cover above the 10% threshold,
- converted to agriculture, pasture, reservoirs, mining, and urban areas.

Excludes: Forest lands where tree removed as the result of harvesting or logging, and where the forest is expected to regenerate naturally or with the aids of silvicultural measures.

Referred to Thailand's FREL and FRL Report (2021), the term was defined as:

Forest areas where the tree canopy cover has been reduced to below 10% by the drivers are defined as deforestation. The forest areas converted for settlement and agricultural purposes are also consider as deforestation.

Reforestation means re-establishment of forest through planting and/or deliberate seeding on land classified as forest. This implies no change of land use.

Includes planting/seeding of temporarily unstocked forest areas as well as of forest covered areas, and coppiced trees that were originally planted/seeded.

Excludes natural regeneration

Forest expansion means the expansion of forest on land that, until then, was under a different land use, implies a transformation of land use from non-forest to forest (e.g., agricultural land). It can be divided into 2 sub-categories:

- *Afforestation*: expanded through planting and/or deliberate seeding
- *Natural expansion of forest*: expanded through natural succession.

GAPS:

Primary Forest: According to the FAO-FRA 2020 definition, Thailand's national park, wildlife sanctuary, non-hunting area, and forest park can be categorized as primary forest. They are legally established and aim to protect large ecosystem for in-situ biodiversity conservation with minimum of human intervention. The other 2 types (arboretum and botanical garden) are not counted as primary forest. This is because they are mix with ex-situ conservation where exotic trees are planted and maintained for education purposes.

Reporting and monitoring on the change of primary forest can be referred to as the areas of these 4 DNP's managed legal protected areas (national park, wildlife sanctuary, non-hunting areas, and forest park). Table 8 shows the existing DNP data of areas during 2018-2020. The online data is accessed at DNP's website at <http://it2.dnp.go.th/th/statistic-2563/>. However, it is crucial to note that these areas are include inland and marine water bodies. Therefore, subtracting water bodies is needed when reporting under the UN-SPF scope.

Table 8: Thailand's protected areas type and areas.

Types of Thailand's Protected Areas	2018		2019		2020	
	Sites	Area (ha)	Sites	Area (ha)	Sites	Area (ha)
National Park	132	6,319,616.80	133	6,353,248.80	133	6,353,248.80
Wildlife Sanctuary	60	3,737,711.56	60	3,737,711.56	60	3,737,711.56
Non-Hunting Area	73	573,638.63	75	607,047.67	88	651,375.87
Forest Park	93	115,312.54	91	114,305.64	91	105,194.08
Total of Primary Forest	358	10,746,279.53	359	10,812,313.67	372	10,847,530.31
Botanical Garden	18	4,944.00	18	4,944.00	16	4,926.56
Arboretum	53	4,066.72	53	4,066.72	52	3,434.72

In addition to the DNP's responsible primary forest, Thai primary forests can be found in a national reserve forest, which are administered by RFD and DMCR (mangrove forest). Some of these primary forests have been designated as core zones of the UNESCO Biosphere Reserves such as Ranong Mangrove Biosphere Reserves, Sakaerat Biosphere Reserve.

In Thailand most of the core zone of forest land listed on UNESCO's World Heritage Convention, UNESCO's Man and Biosphere Program (MAB), and RAMSAR Conventions are under the administration of legally established protected areas. In order to avoid double counting of forest areas, these international recognized areas are not counted as primary forest areas. Information on these areas is as follow.

- All 3 UNESCO's Natural World Heritage Sites⁸ are overlaid on the land that designated as national parks and wildlife sanctuaries.
- Among the 5 UNESCO Biosphere Reserves⁹, core areas of the 3 biosphere reserves are overlaid on the land of national parks and wildlife sanctuary and core areas of the 2 biosphere reserves are overlaid on the national reserve forests.
- Among the 15 Ramsar Sites¹⁰, listed by RAMSAR Convention, majority are overlaid on the land of national parks, wildlife sanctuaries, and non-hunting areas. Some of them are overlaid on the national reserve forests.

Deforestation: Global definition clearly states that deforestation means change in land-use category from Forest to Other land use, permanently, as well as the forest land that affected from environmental impact or disturbance till the land cannot sustain a canopy cover above the 10% threshold. Forest land where log-removal or impact of forest disturbance with restorations or reforestations are not considered as deforestation. It is crucial to ensure Thai key stakeholder understand and are acquainted with this global definition.

Forest land under the administration of a public agency (e.g., RFD, DNP, DMCR, Treasury Department, ALRO), any changes from forest land-use to other land uses (e.g.,

⁸ <https://whc.unesco.org/en/statesparties/th>

⁹ <https://en.unesco.org/biosphere/aspac#thailand>

¹⁰ <https://www.worldatlas.com/articles/ramsar-wetlands-of-thailand-importance-in-conservation.html>

mining, reservoir, settlement, port, estate development, as well as agricultural land, must secured positive public opinion and approval from the Cabinet. Even these data are scattered in either departmental or provincial level, they can be collected accurately.

Beside this public land, deforestation on private own (referred to individuals or private business entities and institutions) forest land (plantations and other planted forest) would totally rely on remote-sensing-methodologies with local socio-economic context assumptions. Reporting and monitoring on deforestation in these private forest land considerably more challenge than the public forest land. It is, therefore, recommended to further discuss among the Thai expert for seeking appropriate solution in term of tool and personnel involved.

Degraded forest: Gaps to monitor and report on degraded forest include no clear operational definition. While the Thailand's FREL and FRL Report indicated degraded forest means the reduction of carbon stock in that forest type, either reduce from higher to lower or reduce from stable level. However, observing of carbon stock reduction are annually monitor, so this definition is rather not operationalized.

Definition of degraded forest (ITTO, 2005) sound more operational monitored and reported. It says:

Degraded forest is A direct loss of forest values likely to be characterized by a reduction of tree crown cover over long term. Routine management from which crown cover will recover within the normal cycle of forest management operations is not included.

If referring to ITTO 2005 definition, forest values of conservation forest on regulating watershed or habitat loss once trees removed or forest land encroached. Their causes (illegal logging and encroachment) have been regularly reporting by on-the-ground staff of DNP and RFD whose missions are to protect the primary forest. If this definition is adopted by Thai's stakeholders, monitoring and reporting data on degraded forest are online available whereas reflect from on-the-ground to national level. Data are exist and available as follow:

- Encroachment and forest fire monitored and reported by RFD: <http://forestinfo.forest.go.th/Content.aspx?id=9>
- Encroachment and forest fire happened inside conservation forests, monitored and reported by DNP: <https://www.dnp.go.th/statistics/dnpstatmain.asp> or <http://it2.dnp.go.th/th/statistic-2563/>

Data available from the 2 departmental websites (RFD and DNP) started from 2000 also available. As indicated in Thailand's FRA Report 2020 which only report the forest land affected by fire. Sample of total degraded forests (both encroachment and fire) during 2016-2020 are accumulated and presented in Table 9.

Table 9: Total degraded forest by encroachment and forest fires in the year 2016-2020.

Degraded forest land (ha)	2016	2017	2018	2019	2020
Encroachment					
Conserving Forest	7,997.09	5,697.25	3,494.30	2,643.96	3,958.82
National Reserve Forest	17,005.35	8360.25	7474.39	5518.56	5684.65
Sub-total	25,002.44	14,057.50	10,968.69	8,162.52	9,643.47
Forest Fire					
Conserving Forest	20,143.38	12,067.04	8,922.62	24,283.58	27,970.14
National Reserve Forest	10,013.44	6,034.24	2,808.96	10,224.08	10,141.76
Sub-total	30,156.82	18,101.28	11,731.58	34,507.66	38,111.90
Total of degraded forest	55,159.26	32,158.78	22,700.27	42,670.18	47,755.37

Moreover, the supplement to the 2 departmental missions, national digital monitoring and reporting on forest encroachment and illegal loggings are being operated and publicly accessed by the national collaboration program calls *PITAK PRAI* (means forest protecting). Pitak Prai is co-hosted by the RFD and the public organization namely Geo-Informatics and Space Technology Development Agency (GISTDA). Pitak Prai allows on-the-ground officers systematically reporting and monitoring illegal activities recorded, national wide with filter tools, status of cases, locations, responsible officer and unit, printable maps and data, digital reporting. Officers can access and use the program from both web-application and mobile application. Further information is at <https://change.forest.go.th/>

Status and source of data or information set. Describe in Table 10.

Table 10. Status and Source of data for Target 1.3 indicators

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 5 Change in area of primary forests (% from previous observed year) Tier 1	Naturally regenerating forest	Compare any difference in areas of the naturally regenerating forest between the last observed reference years and the reporting year. The net change can be either - Positive (gain), - Negative (loss) or - Zero (no change).	Exist online but need to subtract waterbodies out from the total areas of • National Park • Wildlife Sanctuary • Non-hunting Area • Forest Park. • Community Forest • Mangrove Forest	DNP https://www.dnp.go.th/statistics/dnpstatmain.asp or http://it2.dnp.go.th/h/statistic-2563/

			Need to select the primary forest section of <ul style="list-style-type: none"> • national reserve forests • community forests 	RFD DMCR
GCS# 7 Area of degraded forests (ha) Upgrade from Tier 3 to be Tier 1	All types of forest land: Natural Forest & Plantations	Observable loss of tree canopy cover in primary forest. (No change in forest land, but reduction or loss in forest value.)	Available online, annual forest statistic	RFD, DNP, and RFD-GISTDA's Pitak Prai Program at https://change.forest.go.th/

Target 1.4 The resilience and adaptive capacity of all types of forests to natural disasters and the impact of climate change is significantly strengthened worldwide.

Indicators:

- GCS#6: Proportion of forest areas disturbed (% of forest area)
- GCS#11: Forest area with a designated management objective to maintain and enhance its protective functions. (ha)

Definition: Refers to FAO-FRA 2020 Terms and Definitions, relevant definitions are as follow,

Disturbance means damage caused by any factor (biotic or abiotic) that adversely affects the vigor and productivity of the forest and which is not a direct result of human activities.

- Includes:** insect pests, diseases, severe weather events, and other
- Excludes:** forest fires

Designated management objective means forest areas that managed for a specific objective. FAO-FRA Terms and Definitions categorizes the management objectives as follow.

- Production of wood, fiber, bioenergy and/or non-wood forest products, **include** subsistence collection.
- Protection of Soil and Water **includes:**
 - allowance with specific restrictions for harvesting of wood and non-wood forest products to maintain the tree cover and not damaging the vegetation that protects the soil.
 - buffer zones along rivers and may restrict wood harvesting on slopes exceeding certain steepness.

- forest areas managed for combating desertification and
 - protection of infrastructure against avalanche and land slides
- c) Conservation of Biodiversity **includes but is not limited to** areas designated for biodiversity conservation within the protected areas, wildlife reserves, High Conservation Values, key habitats, and areas for wildlife habitat protection
- d) Social Services:
- **Includes:** recreation, tourism, education, research, and cultural/spiritual sites.
 - **Exclude:** subsistence collection of wood and/or non-wood forest products.
- e) Multiple use for several purposes and where none of them is significantly more important than the other.
- **Includes:** production of goods, protection of soil and water, conservation of biodiversity and provision of social services and where none of these alone is considered as the predominant
- f) Other than production, protection, conservation, social services, or multiple use, the specific objective must be indicated (e.g., armed force practices, national security, carbon sequestration, etc.)
- g) None/Unknown of primary management objective.

Total area with designated management objective means the total areas managed for a specific objective. Management objectives are not exclusive, forest areas can be counted more than once. For example:

- Areas where for multiple use should be counted once of each specific management objectives, include multiple use.
- Areas with primary management objective can be counted more than once if other management objectives have been considered.

Primary designated management objective means the primary designated management objectives assigned to a management unit.

- That objective is significantly more important than other objectives
- Be exclusive for just one management object, not be reported for other primary objectives
- Nation-wide objective should not be considered as management objectives.

GAPS:

Disturbance According to FRA Guideline and Specifications 2020, reporting on disturbance are divided into the following 3 parts which are 5a: Disturbances, 5b: Areas affected by Fire and 5c: Table on Definition and monitoring on degraded Forest. The defined Gaps on monitoring and reporting of Degraded Forest which cover (land encroachment and forest fires) are presented in the Target 1.3, so it will not be repeated in this section.

Gaps defined in this section will be focus on Forest Areas Disturbed based on Table 5a. However, reporting toward Target 1.4 data on degraded forest and forest fires earlier explained must be integrated with the Forest Areas Disturbed Table as well.

Thailand's forests are regularly affected by disturbances caused by natural disasters including: the pests/insects, diseases, severe weather events, and Other (e.g., earthquake, tsunami, landslides, sinkhole). This is especially the case on the para-rubbers and teak plantations which experience attacks by insects. Although support from entomologists was sought, the damage and disturbance have not been systematically monitored and reported on. This is a good opportunity for the Thailand Forest Sector to establish a mechanism for monitoring and reporting on all these disturbances. The design monitoring framework/mechanism should include other relevant aspects on the cause and effects of these disturbances. These are, for example, type of tree species and cultivating pattern, location, period, cause of disturbance, and curing measures and people involved both expert and affected farmers.

Management objectives: referring to the FAO-FRA Terms and Definitions 2020 and the FAO-FRA Guideline and Specifications, two tables are provided: Primary designated management objectives and Total area with designated management objective. Adapt the FAO-FRA guidelines and terms into Thailand's context, the primary designated management objectives are proposed in Table 11. The list in each management objective should be used as a dummy for defining each forest consulted with national experts to verify their rational again.

Table 11 Proposed cluster of primary designated management objectives of the Thai's forest management title

Management objectives	Primary designated management objective	Designated management objective
Production	1) Plantation forest 2) Community forest 3) Family forest 4) Khok Nhong Na Style Farm (sufficiency economy)	1) Plantation forest 2) Community forest 3) Family forest 4) Khok Nhong Na Style Farm (sufficiency economy) 16) Tree Banks (CO2) 19) Other planted (Land Tax Reduction)
Protection of soil and water	5) Watershed Protection Units	2) Community forest 3) Family forest 5) Watershed Protection Units 6) National Park 7) Wildlife Sanctuary 8) Non-hunting Area 9) Forest Park 12) Biosphere Reserves 17) Temples forest (religion)
Conservation of biodiversity	6) National Park 7) Wildlife Sanctuary 8) Non-hunting Area	6) National Park 7) Wildlife Sanctuary 8) Non-hunting Area 10) Arboretum

		11) Botanical Garden 12) Biosphere Reserves 17) Temples forest (religion)
Social services	9) Forest Park 10) Arboretum 11) Botanical Garden 12) Biosphere Reserves 13) Urban forest (Funeral space)	1) Plantation (FIO) 6) National Park 8) Non-hunting Area 9) Forest Park 10) Arboretum 11) Botanical Garden 12) Biosphere Reserves 13) Urban forest (Funeral space) 16) PTT's Wang Chan (CO2) 17) Temples & Forest (religion)
Multiple use	14) National Reserve Forest (subtract community forest)	Others:
Other	15) Tree Banks (CO ₂) 16) PTT's Wang Chan (CO ₂) 17) Temples & Forest (religion) 18) Plantations for Celebrating of Royal Events 19) Other planted (Land Tax avoidance)	14) National Reserve Forest (subtract community forest) 15) Tree Banks (CO ₂) 16) PTT's Wang Chan (CO ₂) 17) Temples' forest (religion) 18) Plantations for Celebrating of Royal Events 19) Other planted (Land Tax Reduction)
None/unknown		
Total forest area (must equal to National Total Forest Land)		

Status and source of data or information set. Describe in Table 12

Table 12. Status and Source of data for Target 1.4 indicators (Based on FAO-FRA Guideline and Specification 2020)

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 6 Proportion of forest areas disturbed (% of forest area) Tier 2	All types of forest land: Natural Forest & Plantations No change in forest land, but reduction or loss in forest value.	Area (ha) of forest disturbed by insects, diseases, severe weather events, and Other (e.g., earthquake, tsunami, landslides, sinkhole)	Not exist Need to establish a monitor and report mechanism	Department of Agriculture DNP and RFD Department of Disaster Prevention and Mitigation

GCS# 11 Forest area with a designated management objective to maintain and enhance its protective functions (ha) Tier 1	All types of forest land: Natural Forest & Plantations	Area (ha) of forest in each forest management Titles defined by its primary designated management objectives and Total areas of designated management objective.	Scattered exist Need expert consultation to verify the proposed cluster	RFD, DNP, DMCR, DoEA
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GFG 2 Enhance forest-based economic, social, and environmental benefits, including by improving the livelihoods of forest-dependent people.

Target 2.1 Extreme poverty for all forest dependent people is eradicated.

Indicators: The proposed indicators is:

GCS#13: Number of forest dependent people in extreme poverty. (Number of people)

Definition: FRA 2020 FAO-FRA 2020 Terms and Definitions does not provide specific definition for the term Forest-dependent people as well as Poverty. The GCS#13 is classified as a tier 3 indicator, which requires additional development of the methodology.

Forest dependency People can be variously interpreted such as for livelihoods, material products, sense of place and identity which are intangible. the term “Forest Proximate People” is suggested (FAO GCS, 2022). Forest Proximate People covers the people who live in or near forests which are more operational and calculation.

Extremely poverty refers to income that is below the international poverty line at USD 1.90 a day (2011 PPP terms). Other 2 international poverty income classes are low income is at USD 3.20, and the Upper-middle-income is at USD 5.50.

GAPS:

Extreme Poverty, reporting and monitoring of Target 2.1 with the indicator of application of GCS#13, Thailand needs to further define the definition of forest dependency people. In Thailand, there is no definite distance from the boundary The term Forest Proximate

People (FAO GCS, 2022) suggests using distance of 5 km from boundary of the forests. Even there is no definite agreement on how far the protected area buffer zone be, there are

Thailand could refer to the existing data available at World Bank: Poverty and Inequality Platform. In 2020, Thailand reports to have 0.04% of total population (or 30,400 people) under the international extreme poverty (USD 1.90 a day), 0.35% of total population as lower income (USD 3.20 a day), and 6.38% of total population as upper-middle-income (USD 5.5 a day)¹¹ as shown in the Figure 1. These data are calculating from the Thailand's Socio-Economic Survey (SES) which is conducted annually by the National Statistic Office of Thailand (NSO).

POVERTY	Number of Poor (thousand)	Rate (%)	Period
National Poverty Line	4,774.3	6.8	2020
International Poverty Line 26.2 in Thai baht (2020) or US\$1.90 (2011 PPP) per day per capita	30.4	0.0	2020
Lower Middle Income Class Poverty Line 44.2 in Thai baht (2020) or US\$3.20 (2011 PPP) per day per capita	241.3	0.3	2020
Upper Middle Income Class Poverty Line 75.9 in Thai baht (2020) or US\$5.50 (2011 PPP) per day per capita	4,450.9	6.4	2020
Multidimensional Poverty Measure		0.2	2020
SHARED PROSPERITY			
Annualized Consumption Growth per capita of the bottom 40 percent		2.15	2014-2019
INEQUALITY			
Gini Index		35.0	2020
Shared Prosperity Premium = Growth of the bottom 40 - Average Growth		1.17	2014-2019
GROWTH			
Annualized GDP per capita growth		3.08	2014-2019
Annualized Consumption Growth per capita from Household Survey		0.98	2014-2019
MEDIAN INCOME			
Growth of the annual median income/consumption per capita		1.54	2014-2019

Sources: WDI for GDP, National Statistical Offices for national poverty rates, POVCALNET as of April 2022, and Global Monitoring Database for the rest.

Figure 1: Summary of Thailand's Poverty and Equity Report (World Bank, 2022)¹²

Notably, Thailand's national poverty is differed from the international World Bank one. Thai poverty line reflects **minimum expenditures of a people per month**.

The Thai National Poverty line is 2,762 B/Person/Month in 2020 and was at 2,763 B/Person/Month in 2019. This is about 3.5 times of the World Bank's extremely poverty line (26.2B/day). Referring to Thailand's National poverty line, Thai poverty people was increased from 6.24% of total population (4.33 m people) in 2019 to be 6.84% of total population (4.75 m. people) in 2020. Among these 4.75 m poor, the extremely poor was

¹¹ <https://pip.worldbank.org/country-profiles/THA>

¹² https://databank.worldbank.org/data/download/poverty/987B9C90-CB9F-4D93-AE8C-750588BF00QA/current/Global_POVEQ_THA.pdf

1.609 m and the moderate poor was 3.144 m. The highest ratio of the poverties found to be people who work for family business without payment and who are self-employ without employee. Among employed people, poverty found most in the sector of agriculture, forestry, and fisheries. Poverties in this sector found repeated with a raising trend. (NESDB, 2021¹³)

Thailand's poverty lines are divide into urban and rural population, which in 2020 were 2,975 and 2,502 B/person/month. There were 5.44% of total population (2.081 m people) and 8.55% of total population (2.672 m. people) were categorized as poverty in urban and rural population, respectively. In 2020, the top ten provinces that poverty people ratio high were Pattani, Mae Hong Son, Nara Thiwas, Kalasin, Ranong, Nakon Ratch Sima, Nakon Phanom, Tak, Yala, and Sri Saket. Among them, Mae Hong Son, Pattani, Nara Thiwas, Kalasin, and Tak were repeatedly reported to be the top highest poverty population ratio. (NESDB, 2021).

The data on the household average income are annually collected by the National Statistic Office of Thailand. It is the national socio-economic development indicator with the Code PT_01. With the clear population scopes, of which is defined as forest-dependent both the public forest land and private forest planted land, specific data sets can be extracted from the overall national available data.

Empirical data of the income of the communities close to the forest: The four following studies show empirical data of people incomes and their additional income from different types of Non-Timber-Forest-Products collected from the forest areas. In the Table 13 The first three studies were conducted in 2016, 2017, and 2018, at the community forests that provide alternative livelihoods of local communities. The last study in 2007 was conducted on the bamboo plantations on highland forest that provide additional incomes for targeted indigenous people.

Table 13 Findings of the average incomes and additional NTFPs

Year	References	Study Title	Study Location	Characters of forest or people	Findings in B/HH/Y		USD/person/Day (30 B=1 USD, 1 HH =5 person, 1Y=365D)
2018	Thanandorn Petchdee & Santi Suksard	Non-timber Forest Products Utilization Value of Nong Khoo Sivilcultural Research Station.	Surin om Thaun, Nhong Rong	Community Forest, Huay Saphan Samakkee	Income	139,825.67	2.892
					NTFP net value	14,645.71	0.267
					Expenditure	103,881.85	1.897
2017	Santi Suksard & Wassamon Chaosin	Dependency and Value-added on Forest Resource of Villagers at Ban Huay Sapan Samakkee Community Forest.	Kanchana Buri, Phanom Thaun, Nhong Rong	Community Forest, Huay Saphan Samakkee	Income	158,350.48	2.892
					NTFP net value	894.10	0.016
					Expenditure	157,983.02	2.886
2016	Santi Suksard & Maneenuch Chaipunya.	Dependency on Forest Resources of People in Ban Nongphakrai.	Nakorn Rajsima, Pak Thong Chai	Community Forest, Ban Nhong Pak Rai	Income	126,757.60	2.315
					NTFP net value	2767.47	0.0505
					Expenditure	77,572.73	1.417

¹³ NESDB. 2021. Situation Analysis of Thailand's Poverty and Inequality Report 2020. Can be downloaded at <http://www.nesdc.go.th>

2007	Piti Kantangkul	Analysis of Factors Affecting the Dependency on Bamboo Resources and Bamboo Plantation of Household at the Royal Project Areas.	6 northern provinces: Chiang Mai, Chiang Rai, Mae Hong Son, Phayao, and Lamphun.	IPs of Karen, Hmong, Lahu, and Mussur	Income	111,681.86	2.04
					NTFP net value	629.86	0.0115
					Expenditure	78,362.53	1.431
					Debt	33,319.33	0.609

Forest Dependency People: Since there is no global agreement on application of the term Forest Proximate People, this report has adapted the concept of Forest Proximate People into Thai context for the term Forest Dependency People. Its operational term, therefore, means the following:

- Communities who are either local or indigenous people residing within or surround public forest land.
- Communities who are either local or indigenous people residing surround a registered community forest.
- Individuals, companies, or cooperatives who own or work at a forest plantation or other planted forest (i.e., Khok Nhong Na Style Farm, Tree Bank, and Family Forest.)

Communities in buffer zone of public forests: There is no official definition on the distance to be accounted as buffer zones of a protected area or public forests (i.e., national park, wildlife sanctuary, non-hunting area, national reserved forests). There was a pilot project used 5 km from the boundary of wildlife sanctuary, however this concept of 5 km buffer zone was not adopted. On the other hand, 1 km. or 3 km. from the boundary of a protected area were used to define number of communities or villages when developing a management plan of these public forests. Nevertheless, these distances have not been adopted for buffer zone management of these forests.

Community Forests: In 2022, RFD reports in total of 1,007,314.9 ha that registered as community forests which some have been naturally regenerated or artificial reforestation. These protections and restorations have mainly been initiated by adjacent communities with or without supporting of government interventions. These registered community forests disperse throughout the country and being managed as 13,029 sites locating in 2,633 villages, 673 districts, in 68 provinces. Total of 168,582 peoples who involved as the member as well as management board. (RFD, 2022)¹⁴

Indigenous People: While the Princess Maha Chakri Siridhorn Anthropology Center (SAC)¹⁵ lists of 57 ethnic groups, the Indigenous Peoples Data Sovereignty (IDS Thailand) reports of 42 ethnic groups throughout the country¹⁶. According to IDS Thailand, these indigenous people distribute in 39 provinces located in 3,949 villages with the populations of 1,638,644 peoples or 414,736 households. Total number of IP villages situate in these public forests are 3,294 villages/sub-villages as follow:

¹⁴ <https://www.forest.go.th/ppd/sum-network/>

¹⁵ https://www.sac.or.th/databases/ethnic-groups/ethnicGroups/index?view=grid&EthnicGroups_page=3

¹⁶ <https://ids.thaiportal.info/ips-villages>

- 2,905 are in national reserved forests. 34 villages hold official community forest admissions.
 - 262 in national parks, and
 - 127 are in wildlife sanctuary. These within public forest villages,
- The largest IP population (595,202 people) in Thailand is PAKKNO whose settlements are in total of 1,905 villages or sub-villages in 15 provinces throughout the country. Among these villages, 1,678 are in the boundary of public forests of which 1,456 villages in national reserved forests, 137 villages in national parks, and 85 villages in wildlife sanctuaries.

Status and source of data or information set. Describe in Table 14.

Table 14. Status and Source of data for Target 2.1 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS #13 Number of forest dependent people in extreme poverty (Number of people) Tier 3	Naturally regenerating forest	Number of people and average HH income of the people reside in all communities within 5 km from a public forest boundary	<ul style="list-style-type: none"> • Existing with NSO • Percentage of people under the poverty line (National's indicator code: PT_01) • Need collaboration to extract data according to defined scopes or targeted population 	National Statistics Office (NSO) from SES: Socio-Economic Survey
		Number of people and average HH income of the people surround all registered community forests		
	Forest Plantations	Number of people and average HH income of the owners and workers at forest plantations		
	Other planted forest	Number of people and average HH income of the owners and workers at Khok Nhong Na Style Farm, Tree Bank, and Family Forest		

Target 2.2 Increase the access of small-scale forest enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.

Indicators: There is no GCS indicator suggested in UNFF (2021) the Global Forest Goals Report 2021¹⁷. The study, thus, proposed the following 2 indicators which are

¹⁷ United Nation Department of Economic and Social Affairs, United Nations Forum on Forest Secretariat (2021). *The Global Forest Goals Report 2021*.

derived from SDG's Indicators 9.3.1 and 9.3.2 that adapted to forest-based enterprises. They are:

- SDG 9.3.1 Proportion of small-scale forest enterprises in total forest industry value added. (%)

Method of computation:

$$\frac{\text{Manufacturing value added of "Small-scale Forest Enterprises"}}{\text{Total forest manufacturing value added}} * 100$$

- SDG 9.3.2 Proportion of small-scale forest industries with a loan or line of credit. (%)

Method of computation:

$$\frac{\text{The number of Small-scale Forest Enterprises with Loan or Line of credit}}{\text{Total number of "small-scale industries"}} * 100$$

Definition: Definitions are referred to 2 sources: FAO (2005)¹⁸ and UNSDG Metadata. The relevant terms and definitions are as follow.

Small-scale forest enterprise (FAO, 2005) means the enterprises whose economic activities are undertaken mainly at the individual or household level, usually employing members of the family or close relatives and neighbors, and where salaried labor is *negligible*. Most small-scale forest enterprise operate their forest-based activities jointly with other processing, service, and agricultural activities.

UNSDG's Metadata-09-03-01 refers the term "Total numbers of person employed" means employee who work in or for the enterprise whether full-time or part-time including working proprietors, active business partners, unpaid family workers, paid employees. Threshold of average employee number during the reference period could be discussed. referred to UNIDO proposal to be less than 20 employees.

Enterprise activities (FAO, 2005) include harvesting and processing of wood forest products (timber, fuelwood) and non-wood forest goods (fruits, herbs and plants, bamboo, rattan and resins), as well as other forest services (tourism and environmental services).

Value added (UNSDG Metadata 09-03-01) derived as the different between gross output or census output and intermediate consumption or census input. The value added at basic prices is calculated as the difference between the gross output at basic prices and the intermediate consumption at purchaser's prices. The valuation of value added closely corresponds to the valuation of gross output. If the output is value added at basic prices, the valuation of value added is also at basic prices (the valuation of intermediate consumption is always at purchaser's prices).

¹⁸ FAO. 2005. Microfinance and forest-based small-scale enterprises. Forestry Economics and Policy Division, FAO Forestry Paper.

Financial tools (FAO, 2005) include savings, credit, leasing, insurance, and cash transfers. These can be provided by banks, NGOs, Credit and saving cooperatives and associations, and non-financial and informal sources.

Micro-financial services include savings, microcredit, leasing (4 types: Financial or full-payment lease, Hire-purchase lease, Operational lease/more like rental, Leaseback or retro lease), equity finance/venture capital, and micro-insurance (Loan insurance, health insurance, annuities-endowment and life insurance, crop insurance, property insurance, a death insurance fund)

Loan (UNSDG Metadata 09-03-02) creates when a creditor lends funds directly to a debtor and receives a non-negotiable document as evidence of the asset. This includes overdrafts, mortgage loans, loan to finance trade credit and advances, repurchase agreements, financial assets and liabilities created by financial leases.

Lines of credit (LC) (UNSDG Metadata 09-03-02) and loan commitments provide a guarantee that undrawn funds will be available in the future, but no financial liability/asset exists until such funds are actually provided. Undrawn lines of credit and undisbursed loan commitments are contingent liabilities of the issuing institutions, generally banks.

GAPS:

Presently, monitoring and reporting of the SDG's global Target 9.3¹⁹ was on Indicator #9.3.1 and Indicator #9.3.2 which prepared by Thailand's National Economic and Social Development Board (NESDB)²⁰. To modify of these 2 global indicators into forest sector requires further step to define the following aspects related to forest enterprises.

- *What threshold is considered as small-scale?*
The proposed threshold is less than 20 persons employed. Alternatively, number of horsepower registered could be for mills and wood processing enterprises.
- *What activities are considered as forest enterprise?*
Referred to FAO's definition, enterprises or service providers on harvesting and processing of timber and non-timber forest product are included as forest enterprise. Collectors and processors of NTFPs (honey, mushroom, insect, bamboo and rattan collectors and processors normally are not considered as forest enterprises. If these are finalized, their production value added and financial services accesses are to be accounted for these indicators.
- *What financial services are considered counted?*
Since the SDG global indicator (9.3.2) are focus on loan and line of credit, however, there are more diverse financial tools that provided to Thai small-scale enterprises. Agencies that are relevant are for example OSMEP (Office of Small

¹⁹ SDG's Target 9.3 states that increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

²⁰ <https://sdgs.nesdc.go.th/exhibitions/brightleapforward2021/report2016-2020/>

and Medium Enterprise Promotion) and several specific financial institutes (e.g., Bank of Agriculture and Agricultural Cooperatives, Government Saving Bank) and supporting financial mechanism to SMEs arranged by both government and non-government organizations (e.g., Royal Forest Department, Agricultural Land Reform Office, Royal Projects Foundation, Community Development Department (CDD)²¹, Community Organization Development Institutes (CODI)²², the Office of Farmer’s Reconstruction and Development Fund (FRD)²³ and a number of CSR’s projects from private enterprises to local communities.

Status and source of data or information set. Describe in Table 15.

Table 15. Status and Source of data for Target 2.2 indicators.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
SDG 9.3.2 Proportion of small-scale forest enterprises in total forest industry value added (%) Tier 1	Not relevant	Percentage of manufacturing value added of “Small-scale Forest Enterprises” to the total forest manufacturing value added.	Need agreed definition on small-scale, forest activities, and financial tools. Need collaboration to collect data according to defined scopes or targeted population (small-scale forest enterprises).	<ul style="list-style-type: none"> • NESDB • Office of SME (Promotion OSMEP) • BAAC
SDG 9.3.2 Proportion of small-scale forest industries with a loan or line of credit. (%) Tier 1	Not relevant	Percentage of the number of Small-scale Forest Enterprises with Loan or Line of credit Total number of “small-scale industries”		<ul style="list-style-type: none"> • Bank of Thailand (BOT) • BAAC • CODI • CDD • FRD Fund

Target 2.3 The contribution of forests and trees to food security is significantly increased.

Indicators: The GFG Report (2020) list 1 indicator which is:

GCS#14 Contribution of forests to food security

Definition: Referred to FAO (Tanzania, 2020) and FAO (2020)²⁴

Food security exists “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food

²¹ <http://cddata.cdd.go.th/apps/bigdata/>

²² https://web.codi.or.th/development_project/20190425-805/

²³ <https://frdfund.org/th/>

²⁴ FAO. 2020. *Forests for human health and well-being: Strengthening the forest-health-nutrition nexus.* Forestry Working Paper No. 18. Rome.

preferences for an active and healthy life”. This definition comprises of following 4 dimensions.

- **Availability:** addresses whether food is actually or potentially physically present, including aspects of production, food reserves, markets and transportation, and wild foods.
- **Access:** If food is actually or potentially physically present, the next question is whether or not households and individuals have sufficient access to that food.
- **Utilization:** If food is available and households have adequate access to it, the next question is whether or not households are maximizing the consumption of adequate nutrition and energy. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, dietary diversity and intrahousehold distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
- **Stability:** If the dimensions of availability, access and utilization are sufficiently met, stability is the condition in which the whole system is stable, thus ensuring that households are food secure at all times. Stability issues can refer to short-term instability (which can lead to acute food insecurity) or medium- to long-term instability (which can lead to chronic food insecurity). Climatic, economic, social and political factors can all be a source of instability.

Gaps:

Thailand’s SDG Voluntary Report 2020 (NESDB, 2021) indicates that Thailand has improve its rank in the Global Food Security Index²⁵ from 58.3 and 58.9 out of total of 100 in 2017 and 2018 to be 65.1 in 2019. Thailand has reduced number of people who are unable to access sufficient food in the past 3-5 years, had greater access to food, number of people under the food poverty line was also reduced from 0.54% in 2016 to be 0.37% in 2019. However, this GFSI rank is focus on overall food affordability, availability, quality and safety, and natural resources and resilience, so that it does not reflect the level of contribution of forest resources to food security.

Reporting and monitoring on this Indicator defined as Tier 3, which means there are challenges in both methodology and information to verified. Currently, most of the data on forest resources focus on Thailand are on availability for food, but not on the other 3 dimensions of food security. Data collected on forest resources (both plants and edible insects) consumption are on what, when, how many, and how the utilization are. In addition, most of these studies conducted only once at a

²⁵ The Global Food Security Index (GFSI) considers the issues of food affordability, availability, quality and safety, and natural resources and resilience across a set of 113 countries. The index is a dynamic quantitative and qualitative benchmarking model constructed from 58 unique indicators that measure the drivers of food security across both developing and developed countries.

certain forest site and time. These available data are not continuity or represent changes due to time.

Samples of potential information that reporting on this indicator are in FAO (2020) Report on Forests for Human Health and Well-being. These include the proportion of household collecting wild forest food (animal, plant, and mushrooms) for their subsistence uses.

To modify these samples for Thailand, where the law permits, this study proposes 2 verification aspects to monitor this GCS indicator as follow.

- *Percentage of household collecting forest food for their subsistence consumption*

While the forest food means mushrooms, and flora and fauna from both land and water ecosystems. The computing method is proposed to be

$$\frac{\text{Number of households collected forest food for subsistence consumption}}{\text{Total household number}} * 100$$

- *Percentage of household collecting firewood for their subsistence consumption*

$$\frac{\text{Number of households that collected forest food for subsistence consumption}}{\text{Total household number}} * 100$$

Status and source of data or information set. Describe in Table 16.

Table 16. Status and Source of data for Target 2.3 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS#14 Contribution of forests to food security Upgrade from Tier 3 to be Tier 2	Naturally regenerating forest <i>Only where collection is legality and only with permission</i> e.g., Community Forest	<ul style="list-style-type: none"> • Percentage of household collecting forest food for their subsistence consumption • Percentage of household collecting firewood for their subsistence consumption 	<ul style="list-style-type: none"> • Not exist • Need to agree on the proposed reporting aspects • Need collaboration to collect data only with legalized land used and population 	<ul style="list-style-type: none"> • NSO • RFD • DMCR • MoAC
	Forest Plantations			
	Other planted forest			

Target 2.4 The contribution of forest industry, other forest-based enterprises and forest ecosystem services to social, economic, and environmental development, among others, is significantly increased

Indicators: The GFG Report (2020) listed 2 indicators which are:

GCS #9 Volume of wood removals (m³)

GCS #12 Employment related to the forest sector (Number of full-time equivalent)

Definition: Referred to FAO and CPF (2022)²⁶

Wood removal comprises of the volume of **all living and dead trees that are felled and removed** from forests and other wooded land and felling sites from **all sources within a country**, including public, private, and informal.

It included

- unsold roundwood stored at forest roadsides,
- natural losses that are recovered (i.e., harvested),
- removal during the year of wood felled in earlier periods,
- removal of non-stem wood such as stumps and branches (where these are harvested), and
- removals of trees killed or damaged by natural causes (e.g., fire, wind, insects, and diseases)

It excludes

- bark and other nonwoody biomass and any wood that is not removed (e.g., stumps, branches, and treetops, where these are not harvested) and felling residues (harvesting waste).

Data on wood removal of each country is collected at the Joint Forest Sector Questionnaire (JFSQ) issued by FAO, Eurostat, ITTO, and the UN Economic Commission for Europe (UNECE) where annual reports and historical reports are maintained in the FAOSTAT database. Wood removals are reported as roundwood (in cubic meter solid volume underbark) and be divided into 2 categories²⁷:

- Wood Fuel, including wood for charcoal, can be the main stems, branches, and other parts of tree, round or split. Production ratio of 1 metric ton of charcoal is converted from 6 cubic meters of solid round wood.
- Industrial roundwood be divided into 3 types:
 - Sawlogs and veneer logs
 - Pulp wood, round & split
 - Other industrial roundwood (e.g., poles, piling, posts, fencing, pitprops, shingle and shakes, wood wool, tanning, distillation, shitake mushroom growing, and match blocks.

²⁶ FAO and CPF. 2022. *Status of and Trends in, the Global Core Set of Forest-Related Indicators*. Rome, FAO. <https://doi.org/10.4060/cb9963en>.

²⁷ FAO, Eurostat, ITTO, and UNECE. 2016. *Joint Forest Sector Questionnaire Definition*. 10 pages. <https://www.fao.org/forestry/37537-0192cab302795d2aed9baa79b4d0bb040.pdf>

Detail on the Joint Forest Sector Questionnaire (JFSQ), manual, and reports can be accessed from <https://unece.org/forestry-timber/documents/2021/04/informal-documents/jfsq-2020-questionnaire>.

Employment means employment in Forestry and logging, which referred to the following terms and definitions (FAO FRA Terms and Definitions, 2020).

Full-Time Equivalent (FTE) refers to a measurement equal to one person working full-time during a specific reference period. Example is One fulltime employee is 1 FTE and 2 half-time employees is 1 FTE.

Employment in Forestry and Logging refers to an employment in activities related to production of good derived from natural or planted forests is defined as Activity A02 in ISIC/NACE Rev. 4. There are divided into 4 categories:

- 0210 Silviculture and other forestry activities. This includes
 - o Growing of standing timber: planting, replanting, transplanting, thinning, and conserving of forests and timber tracts.
 - o Growing of coppice, pulpwood, and firewood
 - o Operation of forest nurseries.
- 0220 Logging. This includes
 - o Production of roundwood for forest-based manufacturing industries.
 - o Production of roundwood used in an unprocessed form e.g., pit-props, fence posts, and utility poles.
 - o Gathering and production of firewood.
 - o Production of charcoal in the forest (using traditional methods)
Outputs of this activity can take the form of logs, chips, or firewood.
- 0230 Gathering of non-wood forest products. This includes
 - o Non-wood forest product and other plant growing in the wild.
 - o Wild growing materials e.g., mushroom, truffles; berries; nuts; balata and other rubber-like gums; cork; lac and resins; balsams; vegetable hair; eelgrass; acorns, horse chestnuts; mosses and lichen.
- 0240 Support services to forestry. This includes employment in carrying out part of the forestry operation on a fee or contract basis.
 - o Forestry services are for example Forestry inventories; forest management consulting services, timber evaluation, forest fire fighting and protection, forest pest control.
 - o Logging services activities are e.g., transport of logs within the forest.

Gaps:

Wood removal: To reduce country workload, data on national wood removal are identically with for this UNSFP Target 2.4 and the Joint Forest Sector Questionnaire (JFSQ). It is notably, however, that Thailand data in the FAOSTAT will be extracted to be reporting and monitoring for GCS indicator #14. However, according to the FAOSTAT accessed in May 2022, data on these wood removals

are not reported by country official data. They were available on the FAOSTAT by FAO estimate, unofficial figure, and estimated data based on imputation methodology. Understanding on reporting to JFSQ would allow Thailand to provide such data actively.

Employment in forestry and logging: Thailand FAO FRA Report in 2020 reported the total number of 216,550 FTE in 2015, which compiled data on employments in public sectors from RFD, Office of Civil Services Council (OCSC) and DNP, and employment in private sector from NSO. Missing data was from the Forest Industry Organization (the state enterprise on forestry).

Status and source of data or information set. Describe in Table 17.

Table 17. Status and Source of data for Target 2.4 indicators.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS #9 Volume of wood removals (m ³) Upgrade from Tier 3 to be Tier 1	Naturally regenerating forest	As removal of roundwood is prohibited, reporting is on <ul style="list-style-type: none"> confiscated timber natural losses trees 	<ul style="list-style-type: none"> Existing Need data compilation 	<ul style="list-style-type: none"> RFD DNP DMCR
	Forest Plantations	<ul style="list-style-type: none"> Wood Fuel Sawlogs and veneer logs Pulp wood, round & split Other industrial roundwood 	<ul style="list-style-type: none"> Scatter Need data compilation 	<ul style="list-style-type: none"> RFD FIO FTI: Federation of Thai Industries Provincial MoNRE RAOT
	Other planted forest	<ul style="list-style-type: none"> Wood Fuel Sawlogs and veneer logs Pulp wood, round & split Other industrial roundwood 	<ul style="list-style-type: none"> Scatter Need data compilation 	<ul style="list-style-type: none"> DoEA, OAE-Office of Agricultural Economy BAAC
GCS #12 Employment related to the forest sector (number of full-time equivalent) Tier 2	Naturally regenerating forest	<p>0210 Silviculture and other forestry activities:</p> <ul style="list-style-type: none"> Conserving of forests and timber tracts. Operation of forest nurseries <p>0240 Support services:</p> <ul style="list-style-type: none"> forest fire fighting and protection 	<ul style="list-style-type: none"> Existing Need data compilation 	<ul style="list-style-type: none"> DNP RFD DMCR
	Forest Plantations	<p>0210 Silviculture and other forestry activities</p>	<ul style="list-style-type: none"> Scatter 	<ul style="list-style-type: none"> NSO FIO

	Other planted forest	<ul style="list-style-type: none"> - Growing of standing timber: planting, replanting, transplanting, thinning, and conserving of forests and timber tracts. - Growing of coppice, pulpwood, and firewood - Operation of forest nurseries. <p>0220 Logging</p> <ul style="list-style-type: none"> - Roundwood for manufacturing industries. - Roundwood for used in an unprocessed form e.g., fence posts, and utility poles. - Gathering and production of firewood. - Traditional charcoal production <p>0230 Gathering of non-wood forest products.</p> <ul style="list-style-type: none"> - NWFP and other wild plants - Wild growing materials e.g., mushroom, truffles; berries; nuts; rubber etc. <p>0240 Support services (fee or contract basis)</p> <ul style="list-style-type: none"> - inventories; consulting services, timber evaluation, forest fire fighting and protection, forest pest control. - Logging services activities 	<ul style="list-style-type: none"> • Survey is needed to collect data 	<ul style="list-style-type: none"> • DIW: Department of Industrial Works
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Target 2.5 The contribution of all types of forests to biodiversity conservation and climate change mitigation and adaptation is enhanced, taking into account the mandates and on-going work of relevant conventions and instruments

Indicators: The GFG Report (2020) listed 2 indicators which are:

GCS# 8 Above-ground biomass stock in forest (tones/ha)

Definition: Referred to FAO FRA Terms and Definitions (2020), the term

Above-ground biomass means all biomass of **living** vegetation, both woody and herbaceous, above the soil including stems, stumps, branches, bark, seeds, and foliage. In cases where forest understorey is a relatively small component of the aboveground biomass carbon pool, it is acceptable to exclude it, provided this is done in a consistent manner throughout the inventory time series.

Gaps:

As describe in sector on Target 1.2, the FAO-FRA’s Excel Biomass Calculator is available for national focal organization to report the above-ground biomass

(tones/ha), annually. The Gaps for Thailand to enhance quality of the national report is to define the component of national growing stocks both native and introduced species to be filled in the FAO-FRA Template in Table 2b. The template required the lists of native and introduced species that ranked top 10th of top 5th in term of the growing volume in Thailand. Filling this information would enhance completeness of the calculation of Above-ground Biomass in Thailand.

Status and source of data or information set. Describe in Table 18

Table 18. Status and Source of data for Target 2.5 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source	
GCS #8 Above-ground biomass stock in forest (tones/ha) Tier 1	a	Naturally regenerating forest	Based on the FAO-FRA Biomass Excel Calculator, define the 10 th ranked of native species in the Table2b: Growing Stock Composition.	<ul style="list-style-type: none"> • Scatter • Need expert consultation to define the list. 	DNP RFD DMCR KU-FF
	b	Forest Plantations	Based on the FAO-FRA Biomass Excel Calculator, define the 5 th ranked of introduced species in the Table2b: Growing Stock Composition	<ul style="list-style-type: none"> • Scatter • Need expert consultation to define the list. 	RFD KU-FF
Other planted forest					

GFG 3 Increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests.

Target 3.1 The area of forests worldwide designated as protected areas or conserved through other effective area-based conservation measures is significantly increased.

Indicators: The proposed indicator is:

GCS# 4: Proportion of forest area located within legally established protected areas (% of the total country area)

Definition: Refers to FAO-FRA 2020, the term is defined as follow.

Forest area within legally established protected areas independently of the purpose for which the protected areas were established.

Includes an area where is categorized as IUCN Categories I-IV²⁸

²⁸ IUCN Protected Area Management Categories are as follow:

Excludes an area where is categorized as IUCN Categories V-VI.

Gaps

As described in Target 1.3, Thailand has 6 types of legally established protected areas namely national park, wildlife sanctuary, non-hunting area, forest park, botanical garden, and arboretum. Management objectives of these legal protected areas have been categorized into different IUCN's management categories by Thai experts. It is, therefore, crucial for the country to revisit which IUCN Categories of these 6 legally established protected areas.

These differs are compared in Table 19. Thai's legally protected areas are governed by public authorities, DNP. None of them are owned and governed by private individuals or enterprises, communities either be local or indigenous people.

The current total areas reporting in the departmental websites covers both terrestrial and aquatic ecosystems. The areas of aquatic ecosystem need to be subtracted from the total areas of the legally protected areas before calculation to be percentage of total country area.

In addition, as describe in Target 1.3, most of the international recognized areas (i.e., Natural World Heritage sites, UNESCO Biosphere Reserves, and Ramsar Sites) are overlaid on the existing legal protected areas. Forest areas of these international sites are not double counted into the report.

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- Ia Strict nature reserve:** Strictly protected for biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values.
 - Ib Wilderness area:** Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition.
 - II National park:** Large natural or near-natural areas protecting large-scale ecological process with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.
 - III Natural monument or feature:** Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove.
 - IV Habitat/species management area:** Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category.
 - V Protected landscape or seascape:** Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.
 - VI Protected areas with sustainable use of natural resources:** Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resources management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims.

Table 19: Thailand's protected areas type and areas.

Types of Thailand's legally protected areas	IUCN Management Category		Total areas in 2020	
	DNP Wildlife Management Plan 2021	Emphandhu & Chettamart 2003 ²⁹	Sites	Total terrestrial and aquatic area (ha)
National Park	II National Park	II National Park	133	6,353,248.80
Wildlife Sanctuary	Ia Strict Nature Reserve IV Habitat/species management area	Ia Strict Nature Reserve	60	3,737,711.56
Non-Hunting Area	IV Habitat/species management area	VI Protected areas with sustainable use of natural resources	88	651,375.87
Forest Park	V Protected Landscape/ Seascape	III Natural monument or feature	91	105,194.08
Botanical Garden	Not relevant to IUCN categories due to are ex-situ conservation	Not listed	16	4,926.56
Arboretum		Not listed	52	3,434.72

Status and source of data or information set. Describe in Table 20.

Table 20. Status and Source of data for Target 3.1 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source	
GCS #4 Proportion of forest area located within legally established protected areas (% of total country area) Tier 1	a	Naturally regenerating forest	Revisit the appropriate category of Thai legally established protected area into appropriate IUCN's category.	Need expert consultation	RFD DNP DMCR
			Subtract all area of aquatic ecosystems out from the total area of all legally protected areas total area.	<ul style="list-style-type: none"> Existing data Need collaboration to the calculation 	RFD DNP DMCR
	b	Forest Plantations	Not relevant		
	c	Other planted forest	Not relevant		

Target 3.2 The area of forests under long-term forest management plans is significantly increased.

Indicators: The proposed indicator is:

²⁹ Emphandhu, D. and Chettamart, S. 2003. Thailand Experience in Protected Area Management.

GCS# 19 Proportion of forest area under a long-term forest management plan (% of total country area)

Definition: Refers to FAO-FRA 2020, the term is defined as follow

Forest area with long-term forest management plan means forest areas that has a long-term (10 years or more) documented management plan, aiming at defined management goals, and which is periodically revised.

Includes details on

- operation planned for the individual operational unit (stands or compartments) but also may be limited to provide general strategies and activities planned to reach the management goals.
- Forest areas in protected areas with management plan (10 or more years)
- Continuously updated management plan.

Gaps:

Forest area with long-term management plan. The term “long-term” is indicated to be 10 years or more and “management plan” means documented management plan, so to monitor and report on this aspect need to be further explore with the relevant agencies both public and private identities. This is in line with the gap defined in the Thailand’s FRA 2020 Report which stated of insufficient data.

Officially, Thailand’s each national park, wildlife sanctuary, non-hunting area, as well as community forest to have its management plan. This requirement has been legalized in 2019 by the new amended related laws. However, these plans mean to be for 5 years with renewal periodically. Even though these designated areas are doing their mission and continuing for their long-term biodiversity conservation goals, they normally do not have 10 years management plan.

Similarly, the forest-based industrial private sector or forest management entities, e.g., Forest Industry Organization who normally have their forest management plans for 5 years with regularly revision periods as needed. In term of small-holder farmers or forest grower cooperatives, e.g., para-rubber and other fast-growing tree species, their forest management plan are not at all expectable.

Monitoring and reporting on the proportion of forest area under a long-term management plan needs to communicate clearly on the global definitions. Baselines on this aspect as well as mechanism for data collection should be installed before the UN-SPF next reporting round.

Status and source of data or information set. Describe in Table 21.

Table 21. Status and Source of data for Target 3.2 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 19	a Naturally regenerating forest	Number of forest entities who has 10 year or more management plan, which	Unknow where clear definition must be communicated,	DNP RFD DMCR

Proportion of forest area under a long-term forest management plan (% of total country area) Tier 1			are Public administrative conservation forest: <ul style="list-style-type: none"> • National Park • Wildlife Sanctuary • Non-hunting Area • Forest Park. • Arboretum • Botanical Garden • Community Forest • Mangrove Forest 	Not exist Need to establish a monitor and report mechanism	
	b	Forest Plantations	Private entities for both conservation and production forest <ul style="list-style-type: none"> • Forest Industry Organization • Rubber Authority of Thailand 	Scatter status Need a collaboration to survey for the existence and number of their long-term plans.	FIO RFD DMCR Private entities.
	c	Other planted forest	<ul style="list-style-type: none"> • Private registered plantations • Forest cooperatives • Wang Chan PTT Forest Plantation Institute • Suan Kittii Plantation • etc. 		

Target 3.3 The proportion of forest products from sustainably managed forests is significantly increased.

Indicators: The proposed indicator is:

GCS#20 Forest area under an independently verified forest management certification scheme (ha)

Definition: Refers to FAO-FRA 2020, the term is defined as follow

Independently verified forest management certification scheme is a voluntary tool for promoting sustainable forest management (SFM) and the trade of products originating in sustainable managed forests.

Globally, there are 2 SFM independent certification schemes, which are the Forest Stewardship Council (FSC) and the Program for the Endorsement of Forest Certification (PEFC).

Gaps

There is no gap to report on this indicator. Number of forest areas that hold forest management certificates from either FSC or PEFC schemes can be accessed from their secretariats as follow.

- FSC
<https://app.powerbi.com/view?r=eyJrIjojIn2U3NGMyNWEtZTAxNS00MzVhLWExNmMtOTlhZjdiYjQ4MWNkIiwidCI6IjEyNGU2OWRiLWVmNjUtNDk2Yi05NmE5LTVkNTZiZWVxZWZDI5MSIsImMiOiI9>

- PEFC <https://www.pefc.org/find-certified>

Status and source of data or information set. Describe in Table 22.

Table 22. Status and Source of data for Target 3.3 indicator.

Indicator	Land-use type		Reporting Aspects	Status	Data Source
GCS# 20 Forest area under an independently verified forest management certification scheme (ha) Tier 1	a	Naturally regenerating forest	Not relevant due to timber production is prohibited	-	-
	b	Forest Plantations	Areas (ha) that certified on Sustainable Forest Management by independently verified certification bodies.	Exist online publicly available	The secretariats of 3 rd party certification schemes
	c	Other planted forest			

GFG 4 Mobilize significantly increased, new and additional financial resources from all sources for the implementation of sustainable forest management and strengthen scientific and technical cooperation and partnership.

Target 4.1 Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.

Indicators: The forest-related Global Core Set indicator is:

GCS#15: Financial resources from all sources for the implementation of sustainable forest management (USD).

Definition:

Financial resources: There is no specific definition by UNFF or FAO. On the other hand, UN GCS report (FAO and CPF, 2022)³⁰ referred the term as financial resources that contribute directly or indirectly, explicitly or implicitly, to the sustainable management of any type of forest and of trees outside forests.

Source of SFM Finance: UNFF's Generic guide and modular training package to assist countries in developing national forest financing strategies (Blaser, et al., 2018) divided SFM financing sources into 5 categories, as follow.

³⁰ FAO and CPF. 2022. Status of, and trends in, the global core set of forest-related indicators. Rome, FAO. <https://doi.org/10.4060/cb9963en>

- 1) International public or multilateral/bilateral (e.g., ODA, GEF, FAO, EU, World Bank's Forest Carbon Partnership Facility-FCPF, Asian Forest Cooperation Organization-AFoCO, ITTO, etc.)
- 2) International private (e.g., foreign direct investments)
- 3) Domestic public (e.g., governmental budgets and fundings)
- 4) Domestic private (e.g., individuals, Toyota Thailand, PTT Global Chemical, RATCH Group, Siam Cement Group-SCG, Charoen Pokphand-CP, commercial and specific purpose banks, etc.)
- 5) Blended and innovative mechanisms (e.g., PES, Forest Fund, REDD+)

Gaps

Forest financing mapping in the National Forest Financing Strategies (NFFS) of Thailand (RFD, 2019) found that the largest SFM investment in Thailand was from domestic public source: government budget. It was estimated to be about 645.09 m USD/year through MoNRE's 8 key agencies and 12.73 m. USD/year through other ministries. Next were the international public financing (both bilateral and multilateral donors, e.g., GEF, FAO, EU, World Bank-FCPF, AFoCO, ITTO) and the domestic private sectors which were about 35.63 and 17.38 m. USD in 5 years, respectively. Information on international private contributions or investments to SFM in Thailand was not available. The development of other innovative financial schemes has been proposed, in particularly the performance-based-incentives e.g., REDD+, PES, certifications, etc.

Closing these Gaps, NFFS Thailand proposed for establishing a national committee or formal working group which would serve as a mechanism to further develop national forest financing plan and mechanisms, including their relevant reporting and monitoring mechanisms.

Since the international and domestic private investments tend to be channelized to Thailand via several independent individuals, clubs, communities, and registered non-governmental organizations. Their interests can focus on elaborating market values, improving social circumstance, and strengthening conservation, where the scale can be very locally, regionally, and nationally. Gathering this information, at least those related to SFM and forest functions, need national wide mechanism on financing disciplines. Efforts on the overall improvement of financial system³¹ both formal banks and non-bank organizations by the Bank of Thailand and Ministry of Finance would allow better reporting and monitoring on international private finance source contributing to Thailand's SFM.

In addition, the government (by the Department of Social Development and Welfare, Ministry of Social Development and Human Security) has been working on the new law on the Procedures of Non-Profit Organization. The final draft act has been under the public consultation process started in January 2022 and its closing date was extended to 30 April 2022³². The existing draft

³¹ Financial Institution Supervision in Practice. Bank of Thailand.

<https://www.bot.or.th/English/FinancialInstitutions/Policy/Pages/default.aspx>. accessed 02 April 2022.

³² Ministry of Social Development and Human Security provided 4 channels for public hearing the Draft Act on Controlling NGOs. <https://today.line.me/th/v2/article/BEZXm5G>. Updated on 03 February 2022, accessed 02 April 2022.

text legally requires all NPOs to have their annual financial account, publicly accessible. All incoming funds, both domestic and international, including SFM-based-philanthropic contributions are items to be publicly accessible and be documented for audition within 3 years. If it is enacted, it would enhance Thailand’s national mechanism on reporting and monitoring of international private financing for SFM in Thailand.

Status and source of data or information set. Describe in Table 23.

Table 23. Status and Source of data for Target 4.1 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS#15: Financial resources from all sources for the implementation of sustainable forest management (USD) Tier 3	a	Naturally regenerating forest	Regular and systematic reporting at national level for all 5 sources is absent. 1) International public: - comprehensive data 2) International private: - data not available 3) Domestic public: - comprehensive data 4) Domestic private including individual or institutional philanthropy: - scattered data, but compliable 5) Blended & innovative mechanisms: - no common term, enabling environment and mobilizers.	<ul style="list-style-type: none"> • NEDDB • Bank of Thailand • Revenue Department • Ministry of Finance • Department of Social Development and Welfare • Stock Exchange of Thailand (SET)
	b	Forest Plantations		
	c	Other planted forest		

Target 4.2 Forest-related financing from all sources at all levels, including public (national, bilateral, multilateral, and triangular), private and philanthropic financing, is significantly increased.

Indicators: The forest-related Global Core Set indicator is:

GCS#15: Financial resources from all sources for the implementation of sustainable forest management (USD) Tier 3

Definition: In addition to the Target 4.1, the term Philanthropic financing need to be clearly defined at national level.

Philanthropic: giving money to help people who are poor or sick, or to pay for things such as museums or schools that are good for society (Cambridge Dictionary, business English³³).

Gaps

As Target 4.2 shares the same indicator (GCS#15) with Target 4.1, its Gaps are therefore described in Target 4.1. Data gathered for reporting and monitoring Target 4.1 will be present in USD per year. Comparing the baseline for Target 4.2, whereas the referral indicator are the same.

Status and source of data or information set. Describe in Table 24.

Table 24. Status and Source of data for Target 4.2 indicators.

Indicator	Land-use type		Reporting Aspects	Status	Data Source
GCS#15: Financial resources from all sources for the implementation of sustainable forest management (USD) Tier 3	a	Naturally regenerating forest	Change in USD per year with the previous reported period, divided into 5 financing sources: 1) International public 2) International private 3) Domestic public 4) Domestic private 5) Blended & innovative mechanisms	Similar to Target 4.1	Target 4.1
	b	Forest Plantations			
	c	Other planted forest			

Target 4.3 North-South, South-South, North-North, and triangular cooperation and public-private partnerships on science, technology and innovation in the forest sector are significantly enhanced and increased.

Indicators: No specific Global Core Set indicator defined. The study, therefore, proposed 2 new indicators as:

International cooperation and public-private partnership in science, technology, and innovation for new knowledges on forest-based bio-physical properties, functions, and ecosystem services. (Tier 3)

Definition: No specific term defined.

Gaps:

The terms “North” and “South” in international cooperation context are not widely understood by forest-based officers and stakeholders. This report, therefore, means to clarify them.

³³ <https://dictionary.cambridge.org/dictionary/english/philanthropic>

Referring to Wikipedia³⁴, the concept of Global North and Global South is used to describe a grouping of countries along socio-economic and political characteristics where:

- **Global North** is often equated to developed countries which are the countries that have a high quality of life, developed economy and advanced technological infrastructure relative to other less industrialized nations.
- **Global South** is often used to identify the regions of Latin America, Asia, Africa, and Oceania, mostly low-income and often politically or culturally marginalized countries or the newly industrialized or in the process of industrializing and are frequently current or former subjects of colonialism.

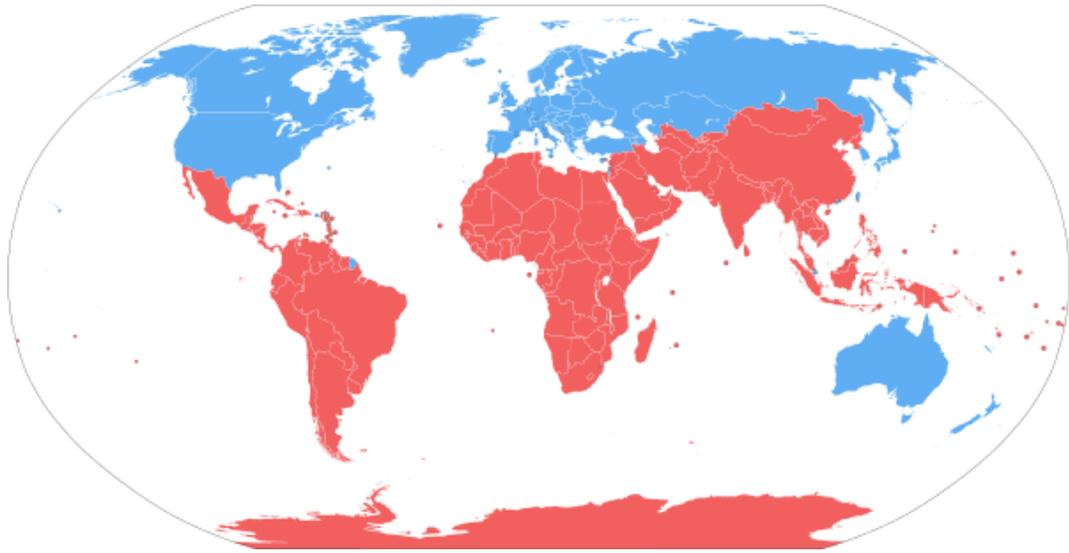


Figure 2 World map showing a traditional definition of the North-South divide. Red countries are grouped as Global South, blue countries as Global North.

Source: https://en.wikipedia.org/wiki/Global_North_and_Global_South

Scope of Target 4.3, it should be clear with all stakeholders that reporting and monitoring of this target **focus** on science, technology, and innovation related to quality and quantity of biophysical forest resources, materials, and their utilizations. This is **not including** the cooperation on science, technology, and innovation on SFM e.g., institution, legal, policy, administration, financing, human resources, which covered in Target 4.1 and 4.2.

Thailand national focal organization on international cooperation is Thailand International Cooperation Agency (TICA) under the Ministry of Foreign Affairs. TICA coordinates with other ministries and experts to ensure Thailand roles in global technical and financial contributions and collaboration. However, defining which programs or projects are forest-based and forest services to socio-economic development must be clarified for GFG

³⁴ https://en.wikipedia.org/wiki/Global_North_and_Global_South

reporting and monitoring. to partners country. Programs or projects where Thailand being involved or supports can be summarized in the below Table 25³⁵.

Table 25 Thailand's International Cooperation in 2018 reported by TICA

Types	Sub-types	Value (m. Baht)
Cooperation categories	Bilateral	345.11
	Annual international training courses (AITC)	90.86
	Thailand international postgraduate program (TIPP)	28.87
	Trilateral cooperation	22.05
	Cooperation under sub-regional and regional framework	10.51
Total		499.10
Development fields	Education	127.42
	Public health	105.44
	Agriculture	56.41
	Social development and welfare	38.26
	Natural resources and environment	32.26
	Public administration	24.37
	Sustainable community development	23.84
	Trade, Service & investment	21.88
	Science & Technology	17.28
	Tourism	11.33
Other	40.31	
Bilateral	CLMV - Cambodia (131.9 m. baht) - Laos PDR (65.7 m. baht) - Myanmar (59.3 m. baht) - Vietnam (13.8 m. baht)	270.66
	South Asia and Middle East (Bhutan = 52.4 m. baht) Bangladesh, Sri Lanka, Nepal)	82.72
	Africa (Mozambique, Lesotho, Benin, Kenya)	59.79
	Latin America (Fiji, Argentina, Chile, Peru, Colombia, Mexico)	19.11
	Other countries	26.39
Trilateral	Development partners with - 15 countries - 13 international organizations.	
Financial contribution to International Organizations	UNDP	15.46
	Fulbright	15.00
	IAEA	0.99
	Peace Corp.	0.88
	Others	0.62

³⁵ <https://tica-thaigov.mfa.go.th/en/page/overview-on-oda-2018?menu=5f477253fddf6e10407062d2>

Public-Private Partnerships on science, technology, and innovation. The National Science and Technology Development Agency (NSTDA), the government agency under Ministry of Higher Education, Sciences, Research, and Innovation (MHESI) is main authority that responsible for development of the Bio-circular and Green Economy (BCG). It also administers the Thailand’ Science Park and fee-based service for research for new knowledge and innovate for solutions. Significantly, NSTDA has operated the public-private partnership program calls ITAP (Innovation and Technology Assistance Program) since 2000. It stimulates and allows Thai small and medium sized enterprises (SMEs) unlock their potential with the application of technology and innovation and build their long-term competitiveness.

The ITAP program reimburses expenses for technical experts from universities, and science and technology agencies up to 50% of project cost with the maximum of 400,000 Th Baht while SMEs is required to contribute for their project as well. ITAP supports wide ranges technology and innovation for product design, product development, product/process certification and qualification on industry standards, process improvement, and digital transformation. More than 10,000 SMEs have participated in ITAP– majority found to be in food and agriculture sector. (NSTDA, 2021)³⁶

It is further needed to explore how much of these ITAP projects are on wood or non-wood-based products to report for this Target.

Status and source of data or information set. Describe in Table 26.

Table 26. Status and Source of data for Target 4.3 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
Proposed: International cooperation and public-private partnership in science, technology, and innovation for new knowledges on forest related biophysical and ecosystem services. Tier 3	a	Naturally regenerating forest	Data are scattered in different ministries and private business enterprises.	<ul style="list-style-type: none"> • Thailand International Cooperation Agency (TICA) • NSTDA • ITAP program
	b	Forest Plantations		
	c	Other planted forest		
		Change in number of project and amount of fund in USD where Thailand partners with or supports in the form of <ul style="list-style-type: none"> a. international cooperation b. international public-private partnership c. domestic public-private partnership 		

³⁶ NSTDA. 2021. 3 Decades of impacts. Patum Thani. National Science and Technology Development Agency. 60 pages. https://www.nstda.or.th/en/images/pdf/30th_NSTDA_compressed_final.pdf

Target 4.4 The number of countries that have developed and implemented forest financing strategies and have access to financing from all sources is significantly increased.

Indicators: There is no GCS indicator suggested in UNFF (2021) the Global Forest Goals Report 2021 for Target 4.4. The study, thus, proposed 2 new indicators as follow:

- National Forest Financing Strategy was developed and regularly reviewed.
- Proportion of all sources of forest finances increased.

Definition: Refers to UNFF's GFFN Guideline (Blaser et al., 2019)³⁷,

National Forest Financing Strategy (NFSS) is a document that strategically sets the stage for the mobilization of financing for SFM and improvements in the effectiveness of resource use, within a given national and sub-national (jurisdiction) perimeter.

Primary outcomes of the NFSS development process is

- (i) informs on the background of the relevant forestry and forest economy contexts,
- (ii) describes the current state of forest financing, and
- (iii) analyses the problems in implementing SFM and mobilizing financing.
- (iv) Providing national action with implementing arrangements.

Forest finance: any type of financing, regardless of the sources, that has a positive impact on sustainable forest management. Where not all forest related investment and forest necessarily are in support of SFM objectives.

Sustainable Forest Management: is concerned with managing and conserving intact natural forests (both in large-forested areas and in fragmented and mosaic landscapes), restoring degraded forests, planting new forests, and sustaining trees in open landscapes. It is permanent forest estate (PFE) where can either be public or private, secured by law and kept under permanent forest cover including both for production of timber and other forest products, forest for soil and water protection, and for biodiversity conservation, and land intended to fulfill a combination of these functions. This covers both protection PFE and production PFE.

GAPS:

Since 2015, the Global Forest Financing Facilitation Network (GFFFN)³⁸ has been established by UNFF to facilitate access to and effective use of funding for forests, to share data and best practices on forest financing and ultimately, to contribute to the achievement of the GFGs. Not only supporting member countries in mobilizing, accessing, and enhancing

³⁷ Blaser, J., Zabel, A. and Pfannkuch, M. (2019). Generic guide and modular training package to assist countries in developing national forest financing strategies: In support to the Global Forest Financing Facilities Network (GFFFN) <https://forest-finance.un.org/content/generic-guide-and-modular-training-package-assist-countries-developing-national-forest>

³⁸ <https://forest-finance.un.org/content/about-gfffn>

the effective use of existing financial resources, GFFFN Network serves as a clearing house and database on SFM financing opportunities. It has worked with 35 countries, including Thailand, to help in the design of national forest financing strategies, to contribute to the development of project proposals for submission to funding institutions, and to provide capacity development and training to over 1,000 forestry professionals around the world.

The GFFFN provides a guide and training package modules for countries to use for developing their national forest financing strategies: Generic Guide and Modular Training Package to Assist Countries in Developing National Forest Financing Strategies. The guide summarized the characteristic of SFM finance providers, interests and goals, which listed in the below Table 27 (Blaser, et al., 2019).

Table 27: Characteristics of SFM Finance Providers

Interests	Goals for investment
<ul style="list-style-type: none"> • elaborate market values • improve social circumstance • strengthen nature conservation. 	<ul style="list-style-type: none"> • enabling the environment • up-grading forest management • up-scaling forest management • Value-chain integration

Formulating a National Forest Financing Strategies Plan, the countries are advised to follow the 4 step-approaches, which shown in Figure 2, and are listed as follow.

1. Mapping SFM Priorities
2. Mapping financing sources
3. Matching priorities with financing sources
4. Drawing up a resource mobilization plan



Figure 3 Four step approach to develop a national forest financing strategies (Source: Singer 2018, referred by Blaser et al, no dated)

Thailand (RFD, 2019) has completed its national forest financing strategy and submitted to UNFF in 2019. In total of 23 activities in the Forest Master Plan for Forestry were defined as high SFM priorities. Among these 23 activities, 8 are related to Forest Management, 7 related to the utilization of forest produces, ecosystem services and economic forest, and 8 related to the development of forest administration and organization.

Boscolo, et al. (2009)³⁹ concluded from their experiences in Latin America that raising finance for implementation of the NFFS found to be more effective if the development of NFFS has been under the following conditions.

- based on negotiation and agreement amongst all major stakeholders in countries (including representatives of the financial sector),
- promote diversification in and synergies across financing sources and mechanisms, responding to the variety of forest management conditions and needs of different forest users,
- ensure that a supportive institutional, legal and socio-economic environment for investment and market development is in place; and
- include the multiple benefits of forests as management objectives in appropriate locations and circumstances.

Status and source of data or information set. Describe in Table 28.

Table 28. Status and Source of data for Target 4.4 indicators.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
Proposed: NFFS was developed and regularly reviewed.	Not relevant	Status of NFFS. <ul style="list-style-type: none"> • Developed • Reviewed every 5 years • Implemented <ul style="list-style-type: none"> ○ Effectively ○ Moderated ○ Poorly ○ Ignored 	<ul style="list-style-type: none"> ○ Existing NFFS was in 2019 ○ NFFS 2019 is not widely known among relevant forest agencies. 	RFD
Proposed: Proportion of all sources of forest finances increased	a	Naturally regenerating forest	All 5 sources need systematic and consistency reporting mechanism at national level. <ul style="list-style-type: none"> ○ International public, domestic public and private sources have been monitored and reported in NFFS 2019. ○ International private have never been tracked. ○ Blended and innovative mechanisms have not been defined and monitored. 	<ul style="list-style-type: none"> • NEDDB • Bank of Thailand • Ministry of Finance • Department of Social Development and Welfare • Stock Exchange of Thailand (SET)
	b	Forest Plantations		
	c	Other planted forest		
		Proportion or amount of SFM investments, from all 5 financing sources: <ol style="list-style-type: none"> 1. International public 2. International private 3. Domestic public 4. Domestic private 5. Blended and innovative mechanisms 		

³⁹ Boscolo, M, Whiteman, A., Herman, S. and Dijk, K.V. 2009. Financing Sustainable Forest Management.

Target 4.5 The collection, availability and accessibility of forest-related information is improved through, for example, multidisciplinary scientific assessments.

Indicators: The forest-related Global Core Set indicator is:

GCS# 17: Existence of national or subnational forest assessment process.

GCS# 18: Existence of national or subnational stakeholder platform for participation in forest policy development

Definition: No specific terms and definition required.

Gaps

1. National forest assessment process.

RFD is the host agency to report and monitor public forest resources in Thailand. Today, RFD has collaborated with Faculty of Forestry at Kasetsart University to regularly monitor and report the forested area base on the official definition of forest, which was explained in Target 1.1. The para-rubbers and eucalyptus plantations are not included.

The assessment has been annually conducted in the last 10 years. Data on forest areas and forest types are not only from the GIS interpretation, but it has also been ground truthing in systematic manner by RFD's regional and local officers.

2. National forest information accessibilities:

2.1. Public forest:

RFD has been Thailand's national host agency on forest-related information for a century. Legal protected areas (managed by DNP) are included in the RFD's annual forest areas assessment and reports. In the digital era, RFD has developed online accessible data and mobile application on all forest-based aspects. These are, for example,

- the *registered private forest plantations* under the Forest Plantation Act (No. 2) B.E. 2558,
- the *E-Tree registration platform* which allows any individual or enterprise to register either individual trees or plantation plots.
- The *registered community forests* which are under the National Reserve Forest Act B.E. 2558 and the Community Forest B.E. 2562.

These RFD's digital platforms with other forest-based statistic information, e.g., forest areas, number of mills, volume of import and export, etc., are publicly accessible. Harvesting timbers in community forests are prohibited with exemption for community and household use with permission. Currently, platform for registered private forest plantation and a E-tree registration report planted areas, identity of all entries, number of trees in

each block. However, these data needs ground-checking process as some data have been transferred from registered plantations in 2-3 decades ago. These ground-check process to update data are to ensure accuracy of the registered standing stock. This is part of the procedure to upgrade these RFD's platforms to serve as verification sources for legality self-declared timbers before entering supply chain.

Geo-Informatics and Space Technology Development Agency (GISTDA)⁴⁰ is a public organization in Thailand responsible for space research, remote sensing, and technology development. GISTDA regularly update relevant news and statistic on environment and forestry as an information and statistic hub on the Forest Monitoring system platform. GISTDA has developed the following open-source applications to assist the government on related Satellite Land Monitoring System, which include monitoring on forest restoration activities, illegal logging, and forest encroachment.

GISTDA's Mae Suk Map⁴¹ is a pilot portal provides communities access to GIS mapping on conservation of forest area and utilization of the allocated public forest lands. The application strengthens land tenure rights, forest and land-use planning and facilitated communities and the local offices for land demarcation process. It allows accessibility to local member a documentation to prove legality and traceability of timber and non-forest product which harvested from legally allocated public land.

Forest-information collaboration Pitak Prai⁴² is an operating system for near-real time monitor and analyze forest encroachment, illegal logging, and forest fire through mobile and web-based applications. It developed by the collaboration among GISTDA, DNP, RFD, and the MoNRE. It allows public usage to notify online with precise coordination point utilizing Sentinella-2AB and Landsat-8 satellite, which records every 5 days on 16m resolution. The analysis features hotspots help to estimate the density level of encroachment in the targeted areas (with scaling of 1:4000). These hotspots are signaled to local authorities and forest rangers for ground-check investigation in timely manner.

DMCR data on mangrove area dataset. Monitoring and reporting on intact mangrove forest, restoration, plantation areas, and encroachments. These data is a central database system, data standard of DMCR, and managed by the DMCR headquarter and regional offices.

2.2. Trees outside forest

Ministry of Agriculture and Cooperatives (MoAC). MoAC has developed digital national land-use data calls **AGRI-MAP**. It aims to monitor and update the production agricultural productions. Data is collected, analyzed, and reported publicly by Land Development Department (LDD). It includes water resources, soil types, cooperatives, suitable area for plantation and livestock, including boundary line of Agriculture Land

⁴⁰ Source: <https://gfms.gistda.or.th/main>

⁴¹ Source: <https://gistdaportal.gistda.or.th/maesuk/maesukmap>

⁴² Source: <https://change.forest.go.th/>

Reform Area (ALRO) and public forest area. Currently, data on planted economic trees is only the para-rubber plantations. (Source: <http://agri-map-online.moac.go.th/>).

Other forest species (e.g., teak, casuarina, etc.) and fast-growing tree species (e.g., eucalyptus, acacia, etc.) are not publicly accessible online. However, these forest-based tree species are collected at the ground-level which are not being reported online.

Other two sources of publicly accessible data on trees outside forest are

- **Rubber Authority of Thailand (RAOT)** is a state enterprise under the Ministry of Agriculture and Cooperatives (MoAC). Rubber farmers who are RAOT member are accessible for support measures, financial assistance, and welfares through the Rubber Development Fund which is according to the Rubber Authority of Thailand Act of BE. 2558. Rubber plantations that registered with RAOT database are overlapped with MoAC's Agri-map or land-used data.
- **Bank of Agriculture and Agricultural Cooperatives (BAAC)** is a specific objective bank under Ministry of Finance. BAAC has established BAAC's Tree Bank program where the farmers registered planted or existing forest trees in their farms into the Tree Bank database. These registered trees can be used as collateral assets where BAAC Tree Bank Network would assess their species, number of trees, and growing rates and sizes. These data also aim to be calculated for carbon sequestration in the future carbon credit market. Therefore, data recording and reporting are subject to be reliable, verifiable, and traceable.

3. National Forest Policy Development.

Thailand's first national forest policy was formally declared in 1985 which drafted by the national committee comprised of several involved ministries in 1984. Revision of the national forest committee was in 2017 comprised of 9 concerned ministries (e.g., education, agriculture, commerce, interior, energy, human development and security, sport and tourism, foreign affairs), sectorial national agencies (national security, economic and social development, police, geo-information), individual experts on social, forest resources, economic, environment). It is chaired by the Prime Minister or appointed Deputy Prime Minister and is secretariat by MoNRE Permanent Secretariat. The committee meets regularly twice a year and as required.

In 2018, the National Forest Policy Committee has appointed the drafter sub-committee who appointed the working group that comprised of representative from forest-based organization, individual professionals, and NGOs. The drafting and consultation process took one year. The current Thailand's National Forest Policy was endorsed by the Cabinet and issued on 6 November 2019. It is crucial to note that the current national forest policy does not include rubber, eucalyptus, bamboo, and trees outside forest. In addition, even the National Forest Policy activates, this Sub-Committee is still active.

Cascading the national forest policy to implementation have been done via responsible agencies (i.e., mainly are RFD, DNP, DMCR), and be monitored by the Monitoring National Sub-committee.

Without specific forest-related sub-national committee, implementations and feedback information are collected through routine platforms. At least there are 3 existing platform which perform as the key channels for multidisciplinary discussion, collection, and problem solving related to forest resources both on conservative and productive forests. These 3 platforms are

- *Provincial Public and Private Co-committee for Economic Problem Resolution.* This co-committee has been established and function in every province (except Bangkok), and at provincial clusters. These co-committees are chaired by provincial governors. These are the core mechanisms for mobility of governmental policies implementation. These policies include forest land allocation for the poor and conservation of protected forest and their tourism function.
- *Natural Resources and Environment Volunteer Provincial Committee.* This committee has been established and function in every province (except Bangkok). These provincial platforms are chaired by MoNRE provincial director, membered by government, private sector, and active community's leaders. The provincial committee level has regular meetings
- *Protected Area Advisory Committee (PAC).* This committee is formal stakeholder involvement platform for a protected area i.e., national park, wildlife sanctuary, non-hunting area. Each PAC is composed of local stakeholders and secretariat by protected areas managers. Individual PAC meets at least twice a year.

These 3 sub-national level committees are good platforms where localities are reflected, and two-way communications occurred regularly. They are the main channel for feeding-in information for developing of national forest policy as well as being a tool for policy effectiveness assessment. However, how effectiveness of these 3 sub-national level committees and their vertical communications to the national forest policy committee need to be further explored.

Status and source of data or information set. Describe in Table 29.

Table 29. Status and Source of data for Target 4.5 indicators.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 17 Existence of national or subnational forest	a	Naturally regenerating forest	RFD is the host for assessment forest on public land.	RFD, DNP, DMCR, GISTDA
	b	Forest Plantations	Scattered with response agencies	MoAC RAOT BAAC

assessment process.	c	Other planted forest		MoAC is the host for assessment trees outside forest.	MoAC
GCS# 18 Existence of national or subnational stakeholder platform for participation in forest policy development.	a	Naturally regenerating forest	How effective the two-ways communication between the national forest policy committee and the provincial forest committee are.	The national forest policy committee and the provincial committees and protected areas (PAC) are existing. But their involvement and communication need to be further explored.	MoNRE (RFD, DNP, DMCR) as the secretariat team of the national forest policy committee
	b	Forest Plantations		Main plantations (i.e., Rubber and Eucalyptus) are excluded from the national forest policies. Policy. Hence, plantation key players are not involved in forest policy development at all levels.	RAOT, FTI (Rubber Industry Association. Pulp and paper industry association) Ministry of Industries.
	c	Other planted forest		Trees outside forest are excluded from the current national forest policy. Hence, Tree outside Forest's stakeholder are not involved in both national forest policy at all level.	MoAC BAAC

GFG 5 Promote governance frameworks to implement sustainable forest management, including through the UNFI, and enhance the contribution of forests to the 2030 Agenda for Sustainable Development.

Target 5.1 Number of countries that have integrated forests into their national sustainable development plans and/or poverty reduction strategies is significantly increased.

Indicators: The UNFF (2020) indicated that GCS# 16 Indicator is to be used for measuring progress towards GFG 5.

GCS# 16: Existence of national or subnational policies, strategies, legislation, regulations, and institutions that explicitly encourage sustainable forest management.

Definition: No specific term that requires definition.

Gaps

Thailand's 20 Years National Strategies (2017-2936) has fully adopted the 17 UN SDG to be integrated into the country goals. The 20 Ys National Strategies has been cascading into actions through the five-year National Economic and Social Development Plans, (which is currently the 12th plan), sectoral development plans, ministerial plans, provincial clusters development plans, and the development plan at provincial, district, and sub-district levels. All government offices, public organization, and state enterprises, at all levels, access to fiscal budgets only if their programs or projects attribute to the missions and tasks stated in the 20 Ys National Strategies.

The 20 Ys National Strategies vision Thailand to become a developed country with security, prosperity, and sustainability in accordance with the Sufficiency Economy Philosophy. It comprises of 6 strategies: National security, Competitiveness Enhancement, Human Capital Development and Strengthening, Social Cohesion and Equity, Eco-friendly Development and Growth, and Public Rebalancing and Development. These 6 national strategies have their clear goals which to be achieved by implementing in total of 23 master plans by leded ministerial and sectoral agencies.

Forest and sustainable forest management has been referred as core missions in the Master Plans No. 18, Ecofriendly Growth which is related to all 6 national strategies. At the same time, the National Strategy on Eco-friendly Development and Growth has been integrated into 10 sectoral master plans at different degree of relationship. It has a direct relation with 5 master plans (Foreign Affair, Smart City and Space, Eco-friendly Growth, Integrated Water Management, and Research & Innovation) and has indirect relation with 5 master plans (Agriculture, Industrial & Services for the Future, Tourism, Value & Culture Adjustment, Thai People Well-being Enhancement). Their relations are listed in the Table 30.

Table 30 Thailand 20 Years National Strategies and Cascading Master Plans for Implementation

Topic of the Master Plan 2018-2037	6 National Strategies in Thailand's 20 Ys National Strategies (2018-2037)					
	National security	Competitiveness Enhancement	Human Capital Development & Strengthening	Social Cohesion & Equity	Eco-friendly Development & Growth	Public Rebalancing & Development
1. Security	DR	n	n	n	n	n
2. Foreign Affairs	DR	DR	DR	DR	DR	DR
3. Agriculture	n	DR	n	IR	IR	IR
4. Industrial & Services for the future	IR	DR	IR	n	IR	n
5. Tourism	IR	DR	IR	IR	IR	IR
6. Smart city & Space	n	DR	n	DR	DR	n
7. Infrastructure, logistics & Digital System	n	DR	n	n	IR	n

Topic of the Master Plan 2018-2037	6 National Strategies in Thailand's 20 Ys National Strategies (2018-2037)					
	National security	Competitiveness Enhancement	Human Capital Development & Strengthening	Social Cohesion & Equity	Eco-friendly Development & Growth	Public Rebalancing & Development
8. Smart Entrepreneurs & SMEs	n	DR	IR	IR	n	IR
9. Special Economic Zones	n	DR	IR	IR	n	IR
10. Value & Culture Adjustment	IR	0	DR	IR	IR	IR
11. Human Capability for all age of life	n	IR	DR	IR	n	n
12. Learning Development	n	n	DR	n	n	n
13. Thai People Well-being Enhancement	n	n	DR	IR	IR	n
14. Sport Capability Improvement	n	n	DR	n	n	n
15. Social Empowerment	IR	n	IR	DR	n	n
16. Local Economy Development	IR	n	IR	DR	n	n
17. Equity & Social Protection	n	n	IR	DR	n	n
18. Eco-friendly Growth	IR	IR	IR	IR	DR	IR
19. Integrated Water Management	IR	IR	n	n	DR	n
20. Public Administration for the People	IR	IR	n	IR	n	DR
21. Anti-corruption & Misconduct	IR	IR	n	IR	n	DR
22. Laws and Justice Procedures	IR	n	n	n	n	DR
23. Research & Innovation	DR	DR	DR	DR	DR	DR

Source: NESDB (2019) Presentation at Meeting on Thailand's 20 Year National Strategy and Collaboration with International Development Partners, at Siam Design Hotel, Bangkok.

Remark: DR = Direct Relation IR = Indirect Relation n = No relation

Status and source of data or information set. Describe in Table 31.

Table 31. Status and Source of data for Target 5.1 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 16: Existence of national or	a Naturally regenerating forest	Conservation forests and their non-extraction ecosystem services indicated in Master Plan, e.g., - No.5 Tourism	Exist online and publicly available	NESDB

subnational policies, strategies, legislation, regulations, and institutions that explicitly encourage sustainable forest management. Tier 1			<ul style="list-style-type: none"> - No.13. Thai People Well-being Enhancement - No.18 Eco-friendly Growth - No.19 Integrated Water Management - No. 23 Research & Innovation 	
	b	Forest Plantations	Productive forests and their value chains on both extraction and non-extraction ecosystem services indicated in Master Plan, e.g., <ul style="list-style-type: none"> - No.2 Foreign Affairs - No.3 Agriculture - No.4 Industrial & Services for the future - No.5 Tourism - No.10 Value & Culture Adjustment - No.13. Thai People Well-being Enhancement - No.16 Local Economy Development - No.18 Eco-friendly Growth - No.19 Integrated Water Management - No. 23 Research & Innovation 	
	c	Other planted forest		

Target 5.2 Forest law enforcement and governance are enhanced, including through significantly strengthening national and subnational forest authorities, and illegal logging and associated trade are significantly reduced worldwide.

Indicators: The UNFF (2020) indicated to use GCS# 21 Indicator for measuring progress towards Target 5.2.

GCS# 21: Existence of traceability system(s) for wood products

Definition: Refers to FAO FRA Term and Definition (2020),

Traceability system for wood products: A system that provides the ability to trace the origin, location, and movement of wood products by means of records identifications. This involves two main aspects: (1) identification of the product by marking, and (2) the recording of data on movement and location of the product all the way along the production, processing, and distribution chain.

Gaps

Sources of timber for wood products can be grouped into 3 sources:

1. Timber harvesting in Thailand. This can be divided by type of landowners: public land or private land.
 - a. Public land: Timber harvested from permit holders can be subdivided into 2 groups.
 - i. Permit to lease land of a national reserved forest plantations (e.g., Forest Industrial Organization: FIO).
 - ii. Permit to use public land (e.g., Agricultural Land Reform Office)
 - b. Private land: Timber harvested from plantation on private land in which a person acquires ownership and land tenure under a land code.
2. Imported timber: This is not include transit timber.
3. Reclaimed timbers: This means wood of a restricted species from the old construction or equipment, or wood that had been used previously and it is intended for reuse. Threshold of used time is more than 10 years for teak, and more than 5 years for other species.

Timber traceability system has been installed by the Forest Act B.E. 2484 (1941) and administered by RFD with regional and local offices and the Check Points throughout the country. The law oversees legality requirement for the whole value chain of timber industry, e.g., harvesting, transporting, processing, and trading. However, Thailand's logging ban in 1981 had eliminated the logs from naturally regenerating forest to zero, except for logs from development projects (conversion forest to other land-use) where only authorize to FIO. Wood raw material in Thai supply chain have shifted to be totally relied on imported and planted forest or trees. Planted timbers is mainly eucalyptus and para-rubber, which are not in the list of forest trees by the Forest Act 1941. These trees and plantations have not been considered as forestry sector and at the same time not an agriculture. Existing traceability systems by Forest Act, as a result, have been modified to capture these changes, as well as linkage with other laws such as the Custom Laws, the National Reserve Forest B.E. 2507 and its amendments, and Forest Plantation B.E. 2535 (1992).

Development of Thai Timber Legality Assurance System (TH-TLAS) has been on-going since 2013. It was when Thailand has officially been in the Voluntary Partnership Agreement (VPA) negotiation with European Union (EU) for FLEGT licensing and the Thai timber legality assurance system⁴³. The process allowed Thailand to define the gaps of existing traceability system and seek for procedures or mechanisms to close such gaps. Additional mechanisms include:

- Self-declaration for planted timbers harvested from a private land. This has been officially declared as voluntary mechanism by RFD.
- Other 3 mechanisms under discussion are:
 - Due Diligence System for imported timber.
 - Self-Declaration for timber harvested from an authorized public land
 - Self-declaration for reclaim woods.

⁴³ More detail can be accessed at <https://tefso.org/en/home-en/>.

Noticeably, these mechanism’s conceptual developments, field-tests, and consultation processes have been made possible by the financial support from FAO-EU FLEGT Program. The program also supports other aspects that required improvement. This financial and technical support has allowed RFD, related government authorities, and key stakeholders truly working together to ensure that the TH-TLAS) will be practical for all. Thailand has articulated that TH-TLAS is not only to issue EU-FLEGT license for EU market, but it is for entire domestic and other exporting markets.

Status and source of data or information set. Describe in Table 32.

Table 32. Status and source of data for Target 5.2 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 21: Existence of traceability system(s) for wood products Tier 2	a	Naturally regenerating forest	Not relevant	
	b	Forest Plantations	Progress in TH-TLAS on additional traceability system and their effectiveness or rooms for improvement. Sources of timbers are: <ul style="list-style-type: none"> • Planted timber • Imported timber 	System is in place with on-going improvement
	c	Other planted forest		

Target 5.3 National and subnational forest-related policies and programmes are coherent, coordinated and complementary across ministries, departments, and authorities, consistent with national laws, and engage relevant stakeholders, local communities, and indigenous peoples, fully recognizing the United Nations Declaration on the Rights of Indigenous Peoples.

Indicators: The UNFF (2020) indicated that GCS# 16 Indicator is to be used for measuring progress towards **GFG 5**.

GCS# 16: Existence of national or subnational policies, strategies, legislation, regulations, and institutions that explicitly encourage sustainable forest management.

GCS# 18: Existence of national or subnational stakeholder platform for participation in forest policy development.

Definition: Refers to FAO FRA Term and Definition (2020), explain

Indigenous people: People regarded as indigenous on account of their descent from the population which inhabited the country, or a geographical region to which the country

belongs, at a time of conquest or colonization or the establishment of present state boundaries and who, irrespective of their legal status, retain some or all their own social, economic, cultural, and political institutions.

Tribal people: are people whose social, cultural, and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partly by their own customs or traditions or by special laws and regulations.

Gaps

1. Existing Tools:

Platforms, policies, and plans that promote cross-sectoral coordination have been described in Target 4.5 and Target 5.1. The 3 sub-national platforms listed in Target 4.5 including the Provincial Public and Private Co-committee for Economic Problem Resolution, Natural Resources and Environment Volunteer Provincial Committee, and Protected Area Advisory Committee: PAC) are exist and provide such function at every province and every legally established protected area.

In 2021, MoNRE issued 2 ministry notifications on official procedures for public hearing to be applied for legally established protected areas. One is for wildlife sanctuaries and wildlife non-hunting areas. Another one is for national parks, forest parks, botanical gardens, and arboretums. These notifications elaborate the public-hearing to be a compulsory mechanism when establishing a new protected area and when developing management plans of a protected area or when extending or withdrawing of a protected area. Participation and engagement of local and tribal people as well as other key stakeholders are foreseeing to be enhanced immensely.

More than 14,000 registered community forests are expected to be expanded to promote local community, as well as tribal groups, right to manage and access to forest-non-timber products. Each community forest management board comprise of the representative from RFD, representatives of the community, and selected key stakeholders. These boards are permanent platform where sustainable forest management plan are to be approved and implemented, and evaluated. Their representatives are member in the Provincial Community Forest Committees who will feedback and forth the implementation achievement and limitation to the Community Forest Policy National Committee that chaired by Deputy Prime Minister and secretariat by RFD.

Tribal or ethnic group's livelihoods have been improved through not only the Royal Projects but also the governmental works through the community developments and social welfare departments for more than 60 years. Nevertheless, the key problems and challenges facing ethnic groups found to be the lack of a comprehensive policy addressing the needs and problems on them, and their rights to land and resources have still been ignored (NLA, 2020).⁴⁴ To improve the situations, new laws have been drafted and proposed to the Secretary of the Parliament House. The 6 draft laws List of the draft laws and contents can

⁴⁴ National Legislative Assembly, Government of Thailand. 2020. Study Report.

be accessed at www.parliament.go.th/section77/index.php. Their summaries and updates can be found at <https://imnvoices.com/?p=2926>

2. Opportunities to incorporate with UN Declaration on the Rights of Indigenous Peoples.

Thailand's constitution uses the term ethnic groups, not Indigenous People (IWGIA, online)⁴⁵. This confirms how interchangeable term use for indigenous that mentioned in the UN Fact Sheet on Indigenous People⁴⁶. These terms include tribes, first peoples/nations, aboriginals, ethnic groups, *adivasi*, *janajati*, as well as the terms that refers to their occupational and geographical settles such as hunter-gatherers, nomads, peasants, hill people.

The Declaration addresses both individual and collective rights, cultural rights and identity, rights to education, health, employment, language, and others. Its goals are to ensure their rights to live in dignity, to maintain and strengthen their own institutions, cultures, and traditions and to pursue their self-determined development, in keeping with their own needs and aspirations.

Thailand voted support the UN Declaration on the Rights of Indigenous Peoples in 2007 (IWGIA, online)⁴⁷. However, the exposition to information and understanding on the declaration found to be very limited. This is in particular to the forest-based agencies, e.g., DNP, RFD, and DMCR. Exposing these responsible officers, especially the policy makers and the on-the-ground officers, to the Declaration would enhance effectiveness of the above public hearing procedures.

Status and source of data or information set. Describe in Table 33.

Table 33. Status and Source of data for Target 5.3 indicators.

Indicator	Land-use type	Reporting Aspects	Status	Data Source
GCS# 16: Existence of national or subnational policies, strategies, legislation, regulations, and institutions that explicitly encourage sustainable forest management.	a	Naturally regenerating forest	No systematic assessment and records, which could be collected by independent agencies.	Sirindhorn Anthropology Centre (SAC) Indigenous Peoples' Foundation for Education and Environment (I.P.F) ⁴⁸
	b	Forest Plantations		
	c	Other planted forest		
		Satisfaction level of ethnic groups toward their communal rights (คทท รายนคน และแปลงรวม) that have been recognized by forest related authorities.		

⁴⁵ <https://iwgia.org/en/thailand/4658-iw-2022-thailand.html>

⁴⁶ https://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf

⁴⁷ <https://iwgia.org/en/thailand/4658-iw-2022-thailand.html> : International Work Group for Indigenous Affairs. Denmark.

⁴⁸ www.thai-ips.org : The Indigenous Peoples' Foundation for Education and Environment (I.P.F). Chiang Mai, Thailand.

<p>GCS# 18: Existence of national or subnational stakeholder platform for participation in forest policy development.</p>	a	Naturally regenerating forest	<ul style="list-style-type: none"> Level of participation of ethnic groups in PAC and community forests Frequency of the public hearings by protected areas authorities related to ethnic groups 	No systematic assessment and records by DNP, RFD, DMCR.	RFD, DNP, DMCR, Provincial MoNRE
	b	Forest Plantations	Number of ethnic groups communities being involved or owned the productive forest plantations.	No record but can be gather from scatter response agencies	MoAC RAOT BAAC
	c	Other planted forest			

Target 5.4 Forest-related issues and the forest sector are fully integrated into decision-making processes concerning land use planning and development.

Indicators: No specific Global Core Set indicator defined. The study, therefore, proposed new indicators as:

- Forest-related agencies have been involved in the land-use planning and development at national and regional level.

Definition: No specific term defined.

Gaps:

1. Land use planning and development

Town Plan Act (No.5) B.E. 2562 (2019) is the country’s master law for land use planning. It divides the land-use plans into 2 categories

- Area-use policy plans: laying down of framework policies and strategies for national development with the respect to the use of areas for operation by state agencies. This is classified into 3 types:
 - national policy plan,
 - regional policy plan,
 - provincial policy plan.
- Land-use plans: laying down of framework directions and action plans for the use of land in any specific area for urban development and the maintenance of towns, related areas, and the countryside. This is classified into 2 types:
 - Unitary Town Plan,
 - Specific Town Plan.

Formulating and preparing of each draft of these plans must be conducted in participatory process in accordance with the regulatory requirements. The draft plans must be publicized and consultation before finalized. Regular reviewing of these plans is mandatory within 5

years or as needs. Development and preservation of natural resources and the environment is one of main purposes of these land-use policies and town plans.

Department of Public Works and Town Plan has been formulating the regional policy plans as well as their public hearings process for all 6 regions (Bangkok and cluster, Eastern, Central, Northern, North-eastern, and Southern) since 2020. Forest land-used that are the established protected areas, important areas for ecological corridors, water management, transportation, and agricultural, tourism, renewable energy industries have been well incorporated as inputs into these 4 drafts. However, the wood-based industries found to be neglected.

Once these regional policy plans finalized, they will be gradually imposing to the existing unitary town plans and specific town plans to ensure achievement to sustainable development of the country. Town plans indicate deeper detail on zones for each land-use patterns where certain development and management measures are required. Each land use patterns are clearly defined in a unitary (provincial) and specific town plan and are visualized in color codes. The legally established protected area is indicated Light green with white diagonal stripes.

2. Land management and distribution

Thailand's law defines land into 2 main categories: private and public land. Private land is owned by individuals, groups, or entities. It is calculated to be 39.68% of the country (NSO, 2019). Public land include land used by state, land open to the public, land reform plan, and forest land. Department of Lands, Ministry of Interior, is responsible for private land administration as well as some type of use rights.

Land tenures can be divided into 3 types:

1. Ownership: *Cha-Node* or *NS-4* is the freehold title deed. The landowners have freehold rights to exclusive posses with freely transferable and mortgageable.
2. Leasehold: Lease can be done from private and public land with the terms subject to negotiation between the parties. Leaseholds terms may be up to 30 years; leases over three years must be registered.
3. Occupancy and use rights: Majority types of these rights can be divided as follow.
 - a. Exploitation testimonial certificate (NS-3K) and Certificates of Use (NS-3): The occupied and user have the right to use, possess, sell, and transfer their land. These can be mortgaged and further apply for *Cha-Node* (NS-4).
 - b. Preemptive certificate (NS-2): holder have only temporary use right. Transfer of right is limited to inheritance.
 - c. Claim Certificate (SK-1): holder is being acknowledged for land used. Non-transferable. New holder must apply for their own rights.
 - d. Certificate of right to farm (SPK 4-01): holder is allocated and registered with Agriculture Land Reform Office (ALRO). Transfer is limited to inheritance. The land under SPK could be either public or private land.

However, these land registration and tenures did not completely captured entire population and their actual usages of land for settlements, cultivation, as well as their dependencies.

Resolving conflicts on land and to ensure equity land distribution has always been spotlighted by every ruled government.

The Act on Land Policy National Board was enacted in 2019 and hence the establishment of the Office of Land Policy National Board. The board comprises of 8 concerned ministries (Interior, Natural Resources and Environment, Defense, Agriculture and Cooperatives, Social Development and Human Security, Transportation, Finance, Office of the Prime Minister), national experts in diverse field, and chaired by the Prime Minister.

The Board's main roles and functions are to ensure effectiveness, equity distribution, resolving public land conflict, monitoring and evaluation on land and soil management policies and plan. The forest-based agencies under MoNRE (RFD, DNP, and DMCR) were strongly involved in both policy discussion and taking responsive actions. They are members of all 9 national sub-committees⁴⁹ and 2 sub-national level committee⁵⁰.

Status and source of data or information set. Describe in Table 34.

Table 34. Status and Source of data for Target 5.4 indicator.

Indicator	Land-use type	Reporting Aspects	Status	Data Source	
Proposed Forest-related agencies have been involved in the land-use planning and development at national and regional level.	a	Naturally regenerating forest	Integration of legally established protected areas in the regional policy plans.	Data exist, but no reporting mechanism in place.	Department of Public Works and Town Plan (DPT)
			No forest encroachment in the leasehold and use rights tenures in forestland	Data exist but not focus to specific scope.	RFD, DNP, DMCR, Office of National Land Policy Board
	b	Forest Plantations	Large scale forest plantations being integrated into Regional Policy Plans, as raw material for bioenergy and wood-based industries,	No data and no reporting mechanism in place.	Department of Public Works and Town Plan (DPT)
c	Other planted forest				

⁴⁹ The 9 sub-committees of National Land Policy Board include the Land Acquisition, the Land Allocation, the Marketing and Occupational Development, the Legal Screening for Land and Soil Management, the Land and Soil Management Measurement and Policies, the Regulating, Monitoring, and Evaluation, the Land and Soil Information System, the Integrated Reframing the Public Land Maps into 1:4000 Scale (One Map) and Resolving Public Land Boundary, and the Aerial Photo Interpretation.

⁵⁰ The 2 sub-national (provincial level) committees are the Provincial Land Policy and the Provincial Land Right Investigation,

GFG 6: Enhance cooperation, coordination, coherence, and synergies on forest-related issues at all levels, including within the United Nations system and across member organizations of the Collaborative Partnership on Forests, as well as across sectors and relevant stakeholders.

Target 6.1 Forest-related programmes within the United Nations system are coherent and complementary and integrate the global forest goals and targets, where appropriate.

This target is not reported by country level.

Target 6.2 Forest-related programmes across member organizations of the collaborative Partnership on Forests are coherent and complementary and together encompass the multiple contributions of forests and the forest sector to the 2030 Agenda for Sustainable Development.

This target is not reported by country level.

Target 6.3 Cross-sectoral coordination and cooperation to promote sustainable forest management and halt deforestation and forest degradation are significantly enhanced at all levels.

Indicators: No specific Global Core Set indicator defined. The study, therefore, proposed new indicators as:

- Average duration of justice process on the crimes related to forestland encroachment reduced.

Definition: Definitions of term “deforestation” and “degraded forest” are described in Target 1.3. In brief,

Deforestation means the conversion of forest to other land use independently whether human-induced or not. Exclude the area that harvesting for timber and forest is expected to be regenerate naturally or with the aids of silvicultural measures.

Degraded forest means the forest where its canopy cover has been reduced but remained forest land.

Gaps:

Halting deforestation: Agricultural expansion reports to be the most common drivers for deforestation in Thailand FREL&FRL (MoNRE, 2020).⁵¹ Lists of direct and indirect

⁵¹ MoNRE. 2020. Forest Reference Emission Level and Forest Reference Level Thailand: Thailand’s Forest Reference Emission Level and Forest Reference Level for REDD+ under the UNFCCC.

causes of deforestation and forest degradation stated in Thailand National Forest Policy 2019 are in the Table 35.

Table 35: Causes of deforestation and degraded forest in Thailand (National Forest Policy, 2019)

Symptom	Causes defined in Thailand's National Forest Policy 2019	
	Direct	Indirect
Deforestation	<ol style="list-style-type: none"> 1. Encroachment for agriculture and recreational resorts development 2. Infrastructure development (Irrigation, road, mines, etc.) 	<ol style="list-style-type: none"> 1. Unclear forest boundary and land-utilization zones 2. Lack of society awareness and knowledge 3. Lack of government integration 4. Poverty 5. Contradicting among conservation policy VS implementation of economic development strategies 6. Lack of long-term forestland conflict resolutions and practices 7. Population increased 8. Concessioner or authorities abuse the regulation and laws.
Degraded forest	<ol style="list-style-type: none"> 1. Illegal logging 2. Uncontrolled forest fire 	<ol style="list-style-type: none"> 1. Weak law enforcement 2. Very high market prices 3. Lack of society awareness and knowledge 4. Population increase 5. Poverty 6. Demand of NTFP

Abused regulation and law is one of the indirect causes led to deforestation (change of land-use pattern). Even the anti-corruption law and justice systems have been well established both within the responsible MoNRE, other ministries, as well as independent authorities. Beyond, organizations under Ministry of Justice, the 2 independent organizations are the Office of National Anti-Corruption (NACC) and Office of Public Sector Anti-Corruption Commission (PACC).

However, the slow progress on the arrested cases has led to public's ignorance to law broken events and demoted the on-ground officers. A good sample is the criminal case over land-tenure on Koh Por Da in Haad Nopparat Thara-Mu Koh Pee Pee National Park, which took almost 33 years for endings.⁵² Fastening the justice processes would enhance proactive approach anti-corruptions and possibly halt any new intruder.

Status and source of data or information set. Describe in Table 36.

Table 36. Status and Source of data for Target 6.3 indicators.

Indicator	Land-use type		Reporting Aspects	Status	Data Source
Proposed Average duration of justice process	a	Naturally regenerating forest	Total number of months for the arrested forest encroachment till the case closed by court.	Scatter at the courts and responsible agencies.	RFD, DNP, DMCR, NACC,

⁵² <https://news.thaipbs.or.th/content/274037>

on the crimes related to forestland encroachment reduced. Tier 3				Need to establish a reporting platform	PACC.
	b	Forest Plantations	Not relevant	Not relevant	Not relevant
	c	Other planted forest			

Target 6.4 A greater common understanding of the concept of sustainable forest management is achieved and an associated set of indicators is identified.

Indicators: No specific Global Core Set indicator defined. The study, therefore, proposed new indicators as:

- Sustainable forest management standard for Thailand that comprises of set of auditable indicators is in place.

Definition: No specific term and definition needs.

Gaps

Since the devastating floods in southern Thailand in 1988 and logging ban in 1989, Thailand has been focused its forest management onto no-use philosophy. Majority of existing natural forests have been declared as legally protected areas, community forests, and being under certain protection measures. Policies and measures on production forests have been left behind and not being promoted. Controls and commands referring to the Forest Act 1941 were the main mechanisms imposing to wood industries. Native species mainly were listed as restricted species, transporting required permission. For Teak and Yang-na (*Dipterocarp alatus*) were more stringent, every harvest required official permission even they were grown in private land. The strict control over restricted species, including Teak and Yang-na, harvested from a private land has just been removed in 2019. Earlier, sourcing domestic grown native trees were seen to be too rigid for industries. Consequently, several timber operators (mill, processor, and traders) shifted to other business or to use imported timbers or planted exotic species. Majority of Thai industries, therefore, are on exotic species (eucalyptus and para-rubber).

The financial supports from FAO-EU FLEGT Program that allowed timber industrial operators through their representatives been involving with national regulators (RFD and other ministries) to improve Thailand timber governance system. Baseline for sustainable forest management is timber’s legality assurance where the FLEGT has been focused on. Improving legality system and traceability would accommodate the operators’ first step to

international forest management standard either PEFC (the Programme for the Endorsement of Forest Certification) or FSC (Forest Stewardship Council).

PEFC: The PEFC's principles, criteria, and indicators were the framework to the 1st National FM Standard, Thai Standard Industry 14061. It was endorsed by Thailand Industrial Standard Institute (TISI), Ministry of Industry in 2016. Thailand Forest Certificate Council (TFCC), Federation of Thai Industries (FTI) performs as its national governing body. The 2016 version was endorsed by PEFC in 2019. It, then, has been in regular reviewing process in 2021 and is expected to be finalized and endorsed by the end of 2022 or earlier.

FSC: FSC has (i.e., FSC and PEFC) has formed Thailand's Standard Development Group to either adopt or adapt the FSC's international general indicators FSC Forest Management Standard into Thai context. The adapt indicators can be proposed if they are verifiable, auditable, and maintain outcomes of FSC's principle and criteria. This process has started since 2018. The field-tested version has been reviewed and waiting for the 2nd public consultation. The final draft is expected to be submitted to FSC International for consideration within 2022. The FSC FM standard for Thailand is, therefore, expected to be launched in 2023.

Both PEFC's endorsed national standard (TSI 14061) and the FSC Standard for Thailand will be produced in Thais and be promoted through diverse channels. Readiness of Thai version standards would enhance related agencies (e.g., RFD, FTI, and forest operators) clear understanding on the SFM standard.

Status and source of data or information set. Describe in Table 37.

Table 37. Status and Source of data for Target 6.4 indicators.

Indicator	Land-use type		Reporting Aspects	Status	Data Source
Proposed Sustainable forest management standard for Thailand that comprises of sets of auditable indicators in place.	a	Naturally regenerating forest	Not relevant due to timber production is prohibited	Not relevant	Not relevant
	b	Forest Plantations	<ul style="list-style-type: none"> • TSI 14061 (Version#2) endorsed by PEFC 	Data exists	<ul style="list-style-type: none"> • TISI & TFCC • FSC-SDG
	c	Other planted forest	<ul style="list-style-type: none"> • FSC Forest Management Standard for Thailand has been approved by FSC-International. 		

Target 6.5 The input and involvement of major groups and other relevant stakeholders in the implementation of the strategic plan and in the work of the Forum, including intersessional work, is strengthened.

This target is not reported by country level.

5. Recommendation for next steps

Annex 1 assessment table is a summary of the indicators propose to be in Thailand's reporting and monitoring framework. Several challenges remain in monitoring and reporting its sustainable forest management efforts. They include lack of institutional capacity including insufficient financial and human resources, inadequacy of comprehensive forest monitoring and assessment programs/mechanisms, lack of critical skills in socio economic impact assessments, and absence of consistent approaches for determining certain biophysical indicators.

To move forward from these proposed indicators, the following recommends can be implemented.

- Seek a common understanding on this UN-SPF 2017-2030 Reporting and Monitoring Framework within the RFD and key forest-related agencies.
- Establish a cross-sectoral working group to have an official mandates on designing and define appropriate report platforms.
- Seek strategic partners (e.g.. GISTDA, National Statistic Office, NESDB) mprehensive information source/dataset on the employment related to forestry sector need a close collaboration with National Statistic Office (NSO). Fforestry sector has never been conducted by RFD. systematically.
- Xx
- Xx
- xx

6 Conclusions

Based on the study findings, following general conclusions can be made;

- Most forest sector data in Thailand, except for some biophysical data, are scattered and dispersed among stakeholders. Dedicated efforts are required to collect and consolidate them for measuring progress and international reporting.
- Although the Global Core Set of Indicators do provide useful guidance to monitor certain achievements of Global Forest Goals and targets, more work is needed to develop a comprehensive set of indicators to explicitly monitor all the goals and targets specified in the UNSPF.
- Majority of Global Core Set of Indicators cannot be measured in Thailand using the existing datasets and information sources. There are several data Gaps and challenges that requires to be addressed for the development of effective assessment and monitoring framework.
- Majority of forest sector stakeholders are not sufficiently aware about the UNSPF, and its Goals and Targets.

- More work is needed in Thailand to define definitions, methodologies, and develop mechanisms to gather accurate and up-to-date socio-economic information in the forestry sector to better understand the significant role played by forests to support the livelihoods as well as the national economy.
- Although Thailand has the largest area of Rubberwood plantations and being the main exporters of rubberwood products. The country does not account its Rubberwood plantation areas into the national forest cover estimates. That means Thailand does not incorporate its largest source of wood production into its forestry sector. The same applies to the short rotation pulpwood (mainly Eucalyptus) plantations as well.
- National Statistic Organization (NSO) has established Th-SIC for the SEEA into 5 digits which bases on the 4 digits ISIC (International Standard Industrial Classification of all Economic Activities, Rev. 4). In order to collect data on workers It has been agreed among RFD and NSO that

These Gaps are hindering the capture and report on the full contribution of the forest sector to national development. Therefore, it is firstly recommended that these identified Gaps to be discussed in detail through forest sector stakeholder platforms and views sought to address each of them. The outcome of this task could form the basis for the development of common monitoring framework.

In addition, following general recommendations are made to facilitate the development of a monitoring system in Thailand to measure progress towards SFM, implementation of the UNFI, GFGs and forest related SDGs.

- All forest sector stakeholders shall be adequately made aware about the UNSPF, GFGs and its targets highlighting the importance of national commitment to contribute to those in the context of sustainable forest management.
- Forest sector stakeholders shall be encouraged to develop projects and programs to achieve the national targets that are in line with GFGs and global targets.
- Design and develop a dedicated platform for collection and sharing forest related data/information among all stakeholders.
- Design an online data management system which supports the reporting framework and facilitate multiple users.
- Capacity building programs targeting all sections of the stakeholder agencies shall be conducted for the assessment and integration of values of ecosystem services in the forestry sector.
- Ensure the appropriate integration of ecosystem service values into the national accounting system to reflect the full values of forest goods and services to the national economy through capacity building for natural resources accounting.
- It is worthwhile to reconsider the national forest definition of Thailand to be in par with the internationally recognized FAO forest definition. By doing so, Thailand can include its extensive areas of Rubberwood and pulpwood plantations into the national forest cover

estimates, and thereby enhance the forestry sector's contribution to the national economy.

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Annex 1: Summary of indicators for Thailand's monitoring and reporting framework.

Global Forest Goal	Global Target	UN-SPF's Reporting and Monitoring Framework			Table No. (Status & source of data)
		Amount	Reference	Indicator	
Goal 1	1.1	2	GCS# 1	Forest area as a proportion of the total land area (%)	4
			GCS# 2	Forest area annual net change rate (%)	
	1.2	1	GCS# 3	Net greenhouse gas emissions (source)/ removals (sink) of forests, and carbon balance of harvested wood products (Kt CO ₂ /Y)	7
	1.3	2	GCS# 5	Change in area of primary forests (% from previous observed year)	10
			GCS# 7	Area of degraded forests (ha)	
	1.4	2	GCS# 6	Proportion of the forest area disturbed (% of forest area)	13
GCS#11			Forest area with a designated management objectives to maintain and enhance its protection functions (ha)		
Goal 2	2.1	1	GCS#13	Number of forest dependent people in extreme poverty. (Number of people)	15
	2.2	2	SDG 9.3.1	Proportion of small-scale forest enterprises in total forest industry value added (%)	16
			SDG 9.3.2	Proportion of small-scale forest industries with a loan or line of credit. (%)	
	2.3	1	GCS#14	Contribution of forest to food security	17
	2.4	2	GCS# 9	Volume of wood removals (m ³)	18
			GCS#12	Employment related to forestry sector (Number of full-time equivalent)	
2.5	1	GCS# 8	Above-ground biomass stocks in forests (tones/ha)	19	
Goal 3	3.1	1	GCS# 4	Proportion of forest area located within legally established protected areas (% of the total country area)	21
	3.2	1	GCS#19	Proportion of forest areas under a long-term forest management plan (% of total country area)	22

Global Forest Goal	Global Target	UN-SPF's Reporting and Monitoring Framework			Table No. (Status & source of data)
		Amount	Reference	Indicator	
	3.3	1	GCS#20	Forest area under an independently verified forest management certification scheme (ha)	23
Goal 4	4.1	1	GCS#15:	Financial resources from all sources for the implementation of sustainable forest management (USD).	24
	4.2	1	GCS#15	Financial resources from all sources for implementation of sustainable forest management (USD)	25
	4.3	1	Proposed	International cooperation and public-private partnership in science, technology, and innovation for new knowledges on forest-based bio-physical properties, functions, and ecosystem services. (Tier 3)	27
	4.4	2	Proposed	National Forest Financing Strategy was developed and regularly reviewed.	29
			Proposed	Proportion of all sources of forest finances increased.	
	4.5	2	GCS#17	Existence of national or sub-national forest assessment process	30
			GCS# 18	Existence of national or subnational stakeholder platform for participation in forest policy development	
Goal 5	5.1	1	GCS# 16	Existence of national or subnational policies, strategies, legislation, regulations, and institutions that explicitly encourage sustainable forest management.	32
	5.2	1	GCS#21	Existence of traceability systems of wood products	33
	5.3	2	GCS# 16	Existence of national or subnational policies, strategies, legislation, regulations, and institutions that explicitly encourage sustainable forest management.	34
			GCS# 18	Existence of national or subnational stakeholder platform for participation in forest policy development.	

Global Forest Goal	Global Target	UN-SPF's Reporting and Monitoring Framework			Table No. (Status & source of data)
		Amount	Reference	Indicator	
	5.4	1	Proposed	Forest-related agencies have been involved in the land-use planning and development at national and regional level.	35
Goal 6	6.1	N/A*	-	-	
	6.2	N/A*	-	-	
	6.3	1	Proposed	Average duration of justice process on the crimes related to forestland encroachment reduced.	37
	6.4	1	Proposed	Sustainable forest management standard for Thailand that comprises of set of auditable indicators is in place.	38
	6.5	N/A*	-	-	

* N/A = Target is not reported by country level.