

FOREST RESOURCES MONITORING **DATA AND INFORMATION**

- Land Cover Recalculation
- Deforestation
- PIPPIB
- Forest Resource Account (NSDH)
- National Forest Inventory
- Policy Related to Forest Monitoring



FOREWORD

We thank God the Almighty for the opportunity to finish this booklet manuscript on Indonesian Forest Resources Monitoring Data and Information. This booklet become one of the Directorate of Forest Resources Inventory And Monitoring, Directorate General for Forestry Planning and Environmental Governance, Ministry of Environment and Forestry publications for disseminating data and information on Indonesian Forest Resources Monitoring.

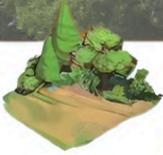
This booklet covering information on Indonesia's land cover, Indonesia's deforestation, and the policy to terminate granting new business license on primary natural forest and the peatlands, a.k.a. the permanent moratorium. Hopefully, these data and information featuring an overview of the state of Indonesia's forests and supported for decision making in the context of forestry management and development.

We would like to extend our gratitude to those who contributed to making this booklet available. We acknowledge for any constructive critics and suggestions for booklet improvement. Hopefully this publication will be worth for the users.

Team of Authors

MONITORING FOREST RESOURCES

1.



**RECALCULATION
INDONESIAN LAND
COVER**

2.



DEFORESTATION

3.



PIPPIB

4.



**FOREST
RESOURCES
ACCOUNT
(NSDH)**

5.



**NATIONAL FOREST
INVENTORY**

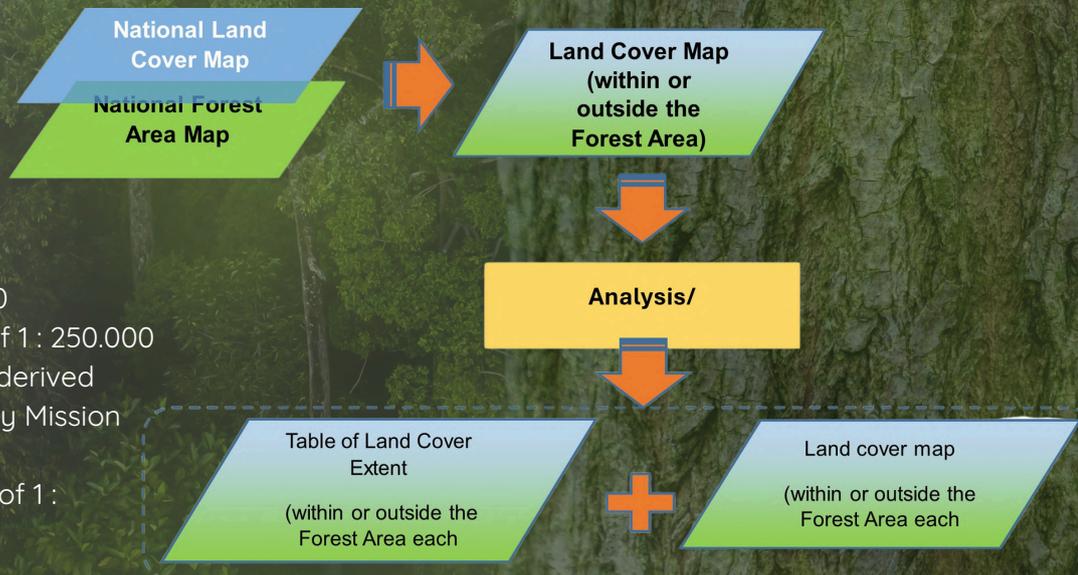
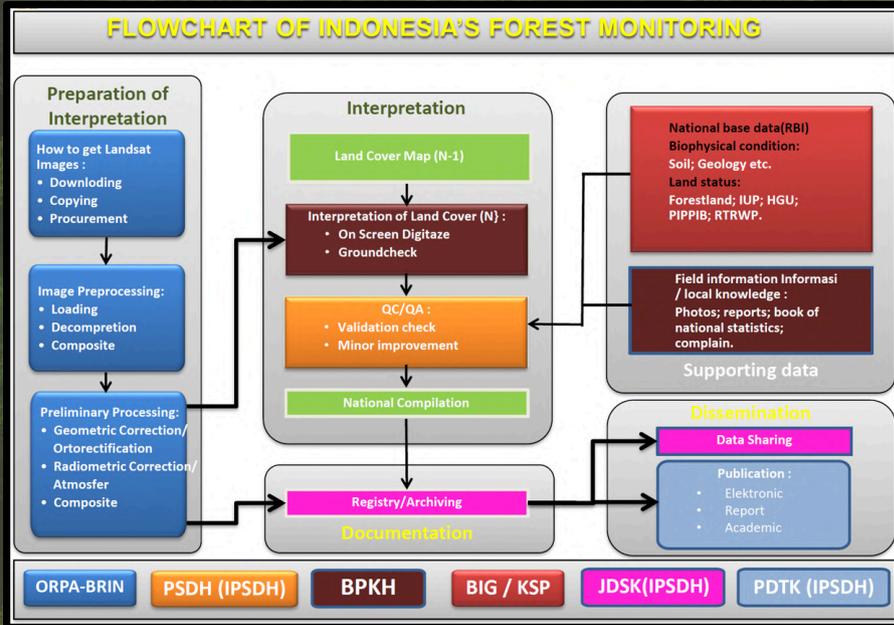
6.



**POLICY RELATED
TO FOREST
RESOURCES
MONITORING**

RECALCULATION OF INDONESIAN LAND COVER FIGURES

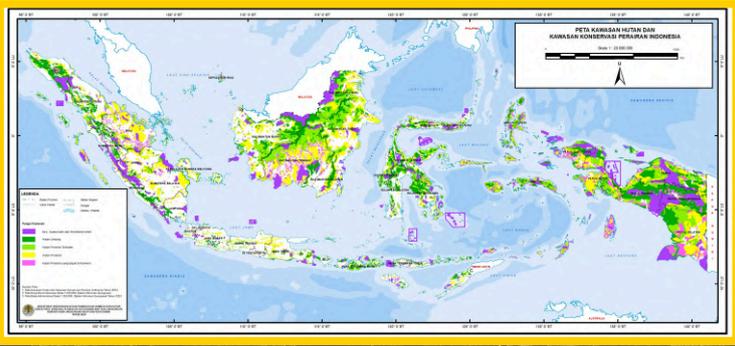
FLOWCHART OF INDONESIA'S FOREST MONITORING



Data sources :

- RBI Basemap scale of 1 : 250.000
- Land Cover Map of 2023 scale of 1 : 250.000 (based on image interpretation derived from the Landsat Data Continuity Mission (LDCM)/Landsat 8 OLI)
- National Forest Area Map scale of 1 : 250.000

Flow Chart of Land Cover Recalculation Process



NATIONAL FOREST AREA MAP



LAND COVER MAP OF INDONESIA YEAR OF 2023

NO.	LAND COVER	STATE FOREST AREA						NON STATE FOREST AREA	TOTAL	
		PERMANENT FOREST					TOTAL			
		HK	HL	HPT	HP	TOTAL		HPK	TOTAL	
1	2	3	4	5	6	7	8	9	10	11
	INDONESIA									
A.	FOREST	17.581,0	24.043,7	21.868,0	19.171,9	82.664,6	5.694,9	88.359,5	7.871,8	96.231,4
	- PRIMARY FOREST	11.715,7	15.501,7	9.401,1	4.640,3	41.258,8	2.212,7	43.471,5	1.683,1	45.154,6
	- SECONDARY FOREST	5.759,5	8.290,6	12.059,9	10.361,8	36.471,8	3.448,3	39.920,1	5.607,8	45.527,9
	- PLANTATION FOREST*	105,9	251,3	407,1	4.169,8	4.934,1	33,9	4.968,0	580,9	5.548,9
B.	NON FOREST	4.263,4	5.252,2	4.918,6	10.006,5	24.440,9	5.392,8	29.833,7	61.873,6	91.707,3
	TOTAL	21.844,5	29.295,9	26.786,6	29.178,5	107.105,5	11.087,7	118.193,2	69.745,5	187.938,7

Notes : HK: Conservation Forest; HL: Protection Forest; HPT: Limited Production Forest; HP:Permanent Production Forest; HPK: Convertible Production Forest; APL: Other Use Area/Non-State Forest Area.

* Data of timber estate (plantation forest) is calculated based on interpretation result for the object of human induced forest cover (man-made), and it includes all types of planted forests, e.g. Industrial Plantation Forest/IUPHHK-HT and planted forest from reforestation/afforestation within or outside the Forest Area; Timber estate is determined on appearance as a regular cropping patterns on relatively flat areas, and/or depicting distinctive colours to surrounding areas. (SNI 8033:2014, Method for forest cover change calculation based on visual optical remote sensing imagery interpretation)

Indonesia has a total terrestrial (land) area of 187.9 million ha, of which the condition of 96.2 million ha (51,2 %) being forested and the 91.7 million ha (48,8%) non-forested land.

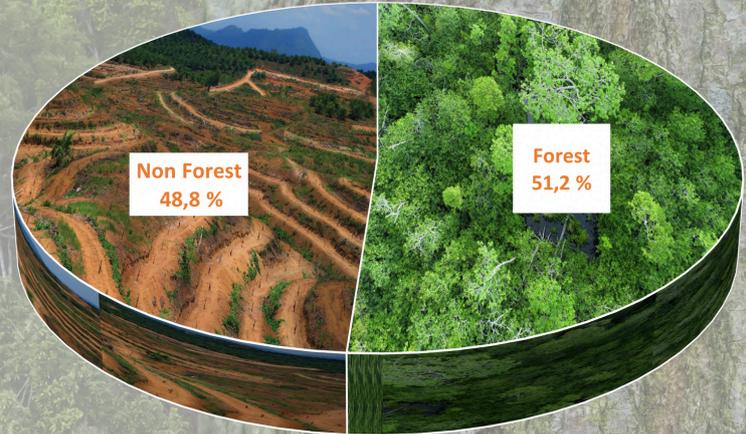
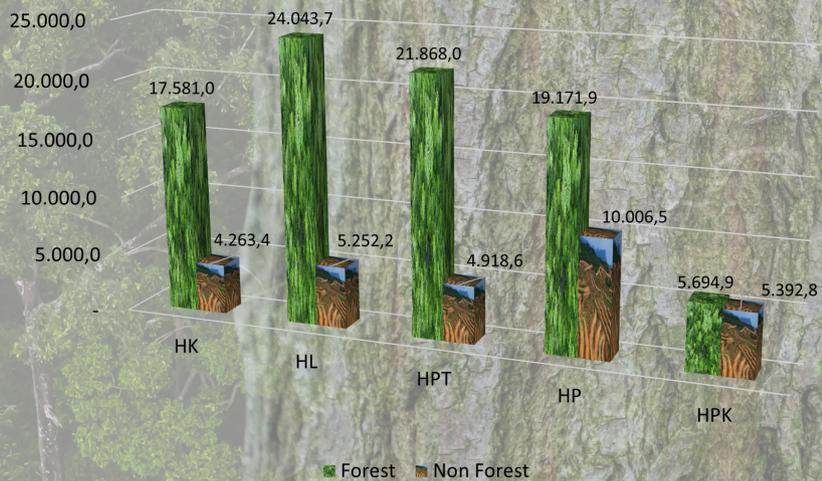


Diagram of Land Cover (forest and non forest) in Indonesia inside and outside State Forest Area (APL)



Diagram of Land Cover (forest and non forest) in Indonesia for each Forest Area Function



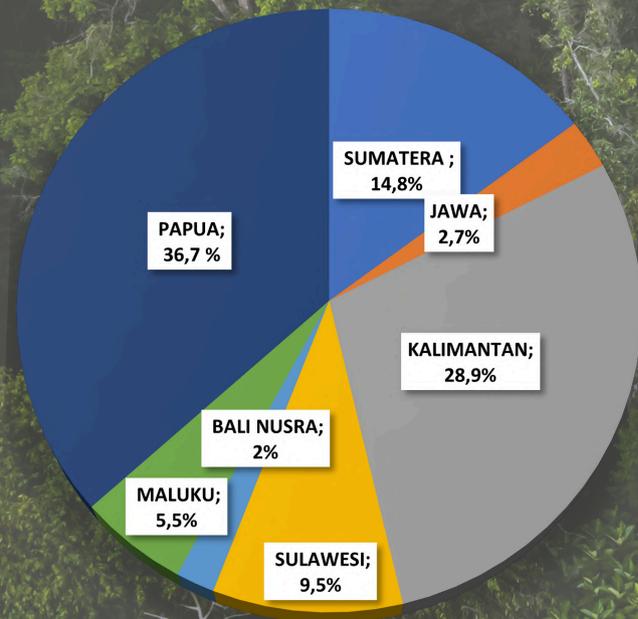
Within the terrestrial Forest Area, we would found of 88.6 million ha (74.8%) are still forested and 29.8 million ha (25.2%) are non-forested land

Based on Forest Area Function, forested area mostly found in Protected Forest area (HL), i.e. 24.0 million ha (27.2%)

FORESTED LAND COVER OF 7 (SEVEN) LARGE ISLANDS/ISLAND GROUPS (THOUSAND HA) IN 2023

NO.	ISLAND/ISLAND GROUP	FORESTED AREA (IN MILLION HA)										TOTAL
		STATE FOREST AREA					NON STATE FOREST					
		PERMANENT FOREST					HPK	Total	%	Area	%	
		HK	HL	HPT	HP	Total						
1	SUMATERA	3.908,1	3.761,6	1.246,8	3.953,8	12.870,4	182,2	13.052,6	13,6	1.095,1	1,1	14.147,7
2	JAWA	440,1	504,4	319,9	1.114,0	2.378,4	0,0	2.378,4	2,5	400,8	0,4	2.779,2
3	KALIMANTAN	3.864,1	5.903,7	9.113,6	6.032,7	24.914,1	586,4	25.500,5	26,5	2.420,4	2,5	27.921,0
4	SULAWESI	1.513,3	3.526,7	2.473,9	737,7	8.251,5	167,1	8.418,7	8,7	833,8	0,9	9.252,5
5	BALI NUSATGR	265,6	875,3	326,5	254,1	1.721,5	20,8	1.742,2	1,8	948,1	1,0	2.690,3
6	MALUKU	586,1	1.006,6	1.341,5	816,9	3.751,2	1.126,1	4.877,3	5,1	287,3	0,3	5.164,6
7	PAPUA	7.003,8	8.465,4	7.045,7	6.262,6	28.777,6	3.612,2	32.389,8	33,7	1.886,4	2,0	34.276,1
	Total	17.581,0	24.043,7	21.868,0	19.171,9	82.664,6	5.694,9	88.359,5	91,8	7.871,8	8,2	96.231,4

The Papua Island Group is the largest forested land cover. It covers of 32.3 million hectares, or 33.7% of the total terrestrial forested land cover in Indonesia (96.2 million hectares). This is followed by the Kalimantan Island Group, which covers of 25.5 million hectares (26.5%). Meanwhile, the least forested land cover is in the Bali and Nusa Tenggara Island Group, of which covers of 1.7 million hectares (1.8%).

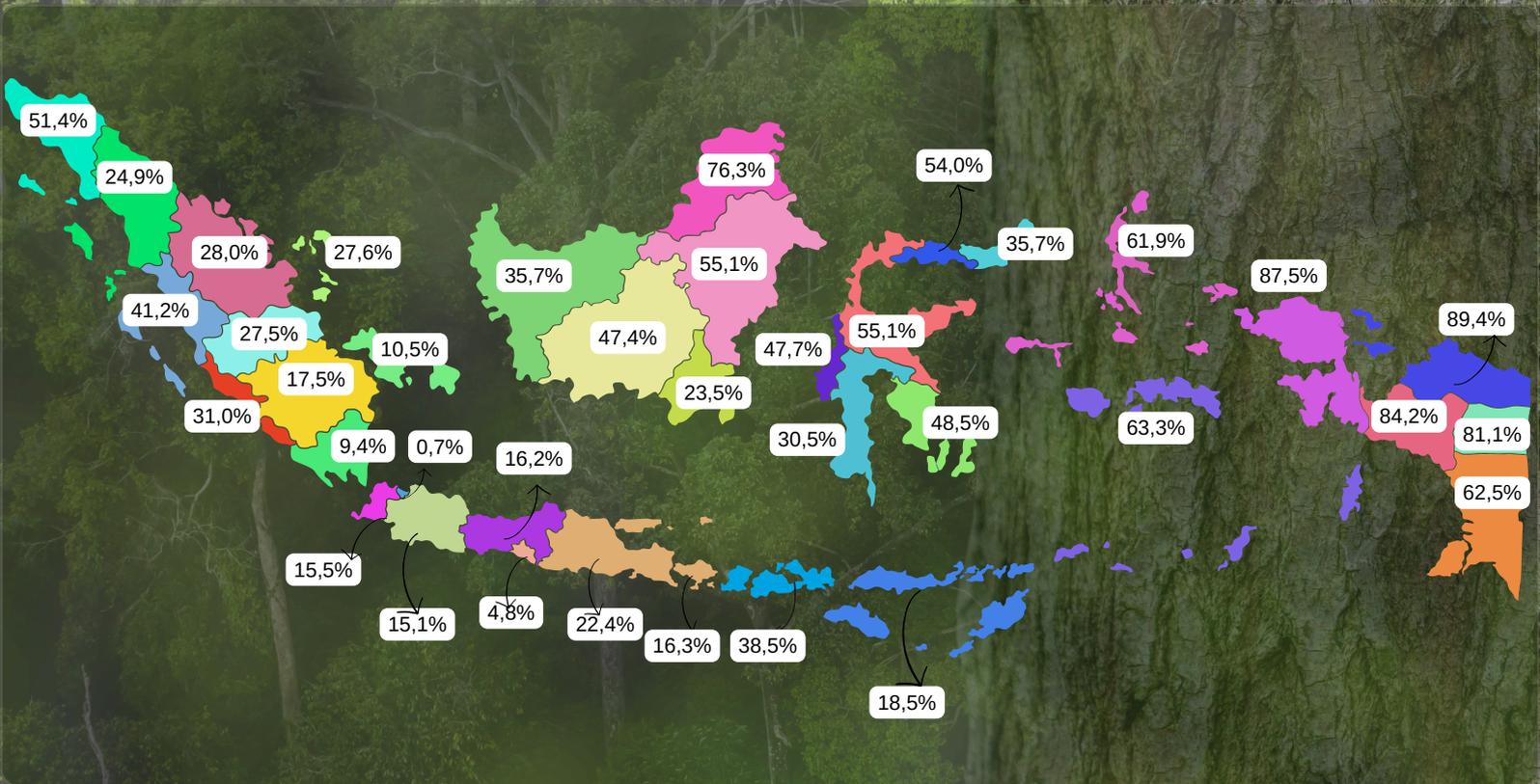


Forested Land Cover within Forest Area of Each Large Island/Island Group in 2023 (in thousand ha)

ISLAND/ISLAND GROUP	Forest within State Forest Area	Terrestrial Area	%
SUMATERA	12.857,1	47.076,9	27,3
JAWA	2.349,2	13.394,3	17,5
KALIMANTAN	25.229,2	52.990,4	47,6
SULAWESI	8.378,7	18.446,6	45,4
BALI NUSA	1.751,2	7.306,9	24,0
MALUKU	3.705,5	7.775,2	47,7
PAPUA	32.441,3	40.948,3	79,2

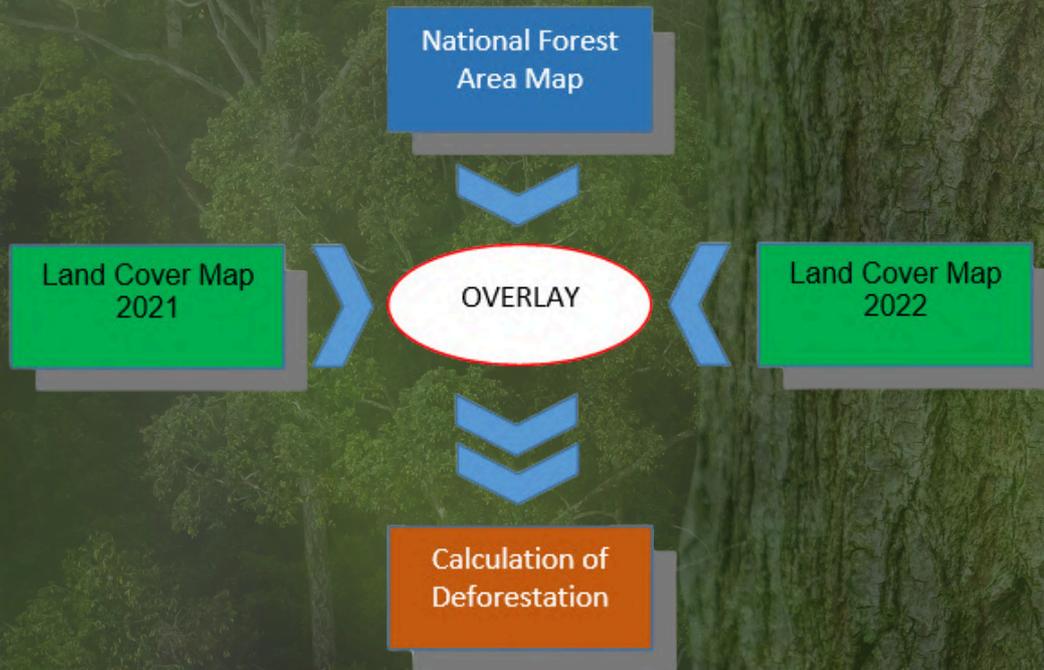
Percentage of Forested Land Cover Within Forest Area of Each Large Island/Island Group in 2023

PERCENTAGE OF FORESTED AREA WITHIN FOREST AREA TO TOTAL TERRESTRIAL LAND BY PROVINCE IN 2023



DEFORESTATION

Deforestation in Indonesia has been calculated periodically commenced in 1990 period until present. Based on this data, forest cover change and deforestation are monitored sustainably. The increase of deforestation figures may obtained from dynamic changes of land cover as a result of human uses of land, while a decrease in deforestation figures may obtained from reforestation activities. Meanwhile, additions to the extent of forested cover area may result from planting activities in plantation forest concession areas and/or from afforestation and reforestation activities as well as natural regrowth.



Flow Chart of Deforestation Calculation Process

DATA SOURCES:

- RBI Basemap scale of 1 : 250.000
- Land Cover Map 2022-2023 scale of 1 : 250.000 (based on image interpretation derived from the Landsat Data Continuity Mission (LDCM)/Landsat 8 OLI)
- Map of National Forest Area scale of 1 : 250.000

Please note that the deforestation information includes of gross deforestation, reforestation, dan net deforestation. Readers need to comprehend the fact to avoid misperceptions to understand the methods and presented information.

Deforestation (Gross) :

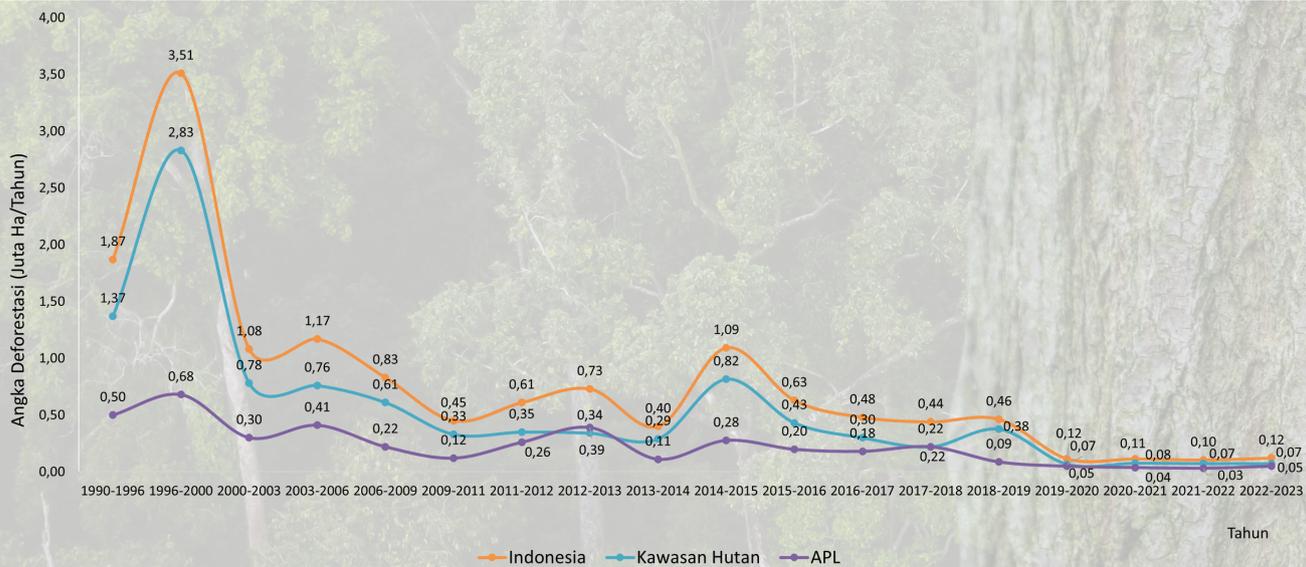
Change of land cover condition from forested to non-forested land cover class, both natural and plantation/man-made forest (regardless of reforestation occurs).

Reforestation :

Change in land cover classes from non-forested area to forested cover class.

Deforestation (Net) :

Changes/reductions from the forested cover class in a certain period of time which obtained from calculation of deforestation (bruto) area reduced by reforestation area.



The information of deforestation area ever since the 2011–2012 period is calculated for the net deforestation that considering the magnitude of reforestation. The calculations of previous periods still used gross deforestation. The highest deforestation occurred during the 1996–2000 period and then decreasing subsequently.

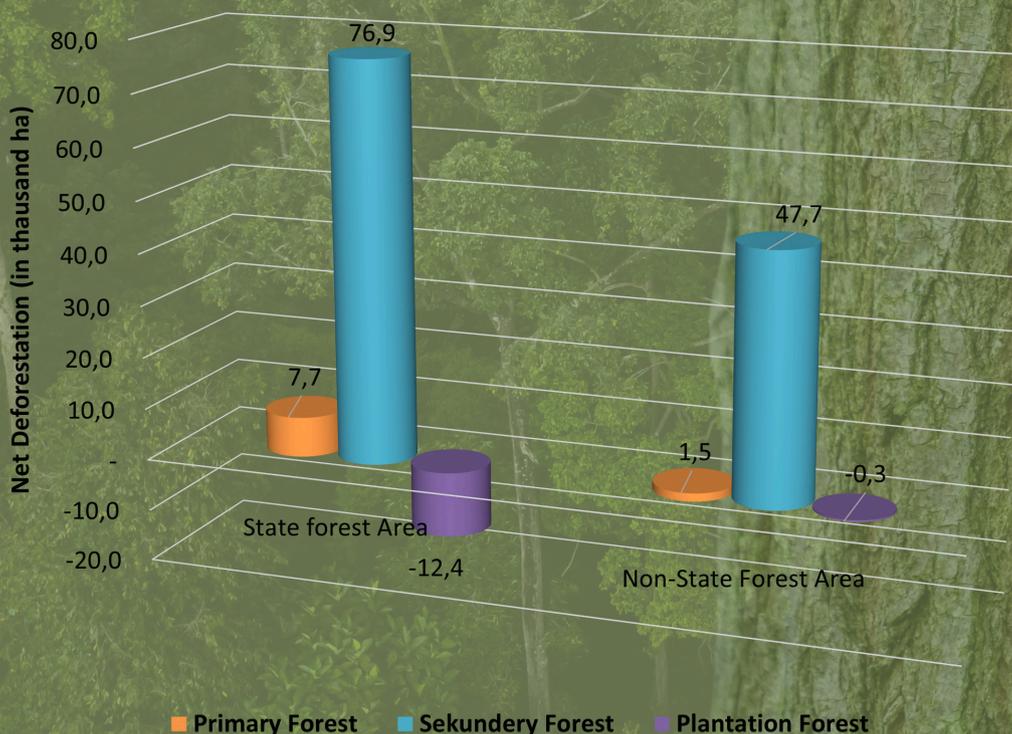
The net deforestation figure in Indonesia in 2023 is 121.1 thousand hectares, that is depicting a slight increase this year but remains lower than the average value of deforestation of the last ten years, especially when compared to the El Niño events in 2015 and 2019 which were more or less similar to this year.

The deforestation reduction indicates a result of various efforts have conducted by the Ministry of Environment and Forestry in recent years, including: Forest and Land Fire Control, the implementation of Presidential Instruction on the Termination of Granting New Business License and Improvement of the Management of Primary Natural Forests and Peatlands, Peatland Damage Control, Climate Change Control, Restrictions on Forest Area Reallocation Policy to become non-forestry usage (HPK), Resolution of Forest Area Tenurial Problems (PPTKH/TORA), Sustainable Forest Management, Social Forestry, as well as Forest and Land Rehabilitation

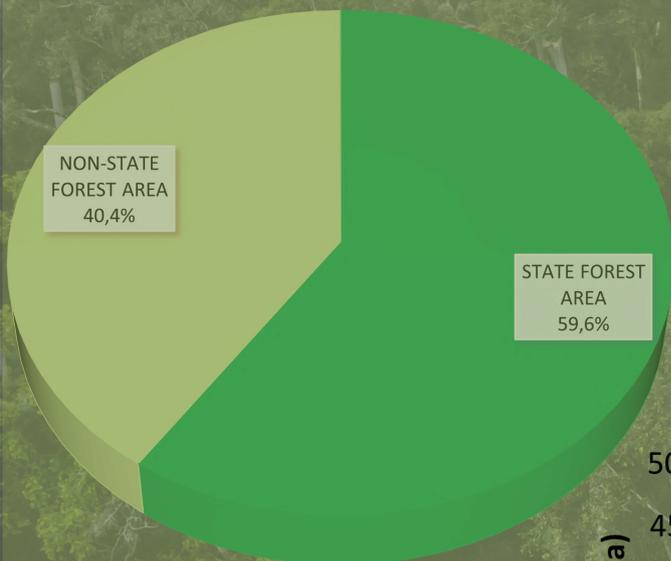
DEFORESTATION IN INDONESIA (THOUSAND HA) IN 2023

NO.	NET DEFORESTATION ON FOREST TYPE	STATE FOREST AREA							NON-STATE FOREST AREA	TOTAL
		PERMANENT FOREST					HPK	Total		
		HK	HL	HPT	HP	Total				
1	2	3	4	5	6	7	8	9	10	11
INDONESIA										
	A. Primary Forest	857,5	1.849,5	2.850,2	1.889,8	7.447,0	248,4	7.695,4	1.539,1	9.234,5
	B. Sekundery Forest	3.640,7	4.224,0	15.112,6	48.418,3	71.395,6	5.507,5	76.903,1	47.695,8	124.598,9
	C. Plantation Forest*	- 9,8	28,2	- 501,1	- 12.006,0	- 12.488,8	54,8	- 12.434,0	- 295,9	- 12.729,9
	TOTAL	4.488,4	6.101,7	17.461,6	38.302,1	66.353,8	5.810,7	72.164,5	48.939,0	121.103,5

Deforestation figures of Indonesia in 2023 of 0.121 million ha (within and outside of State Forest Areas) which was calculated from a gross deforestation of 0.145 million ha subtracted by reforestation of 0.024 million ha. Based on forest types, most deforestation occurred in secondary forests 0.132 million ha or 90.8%, with 84.3 thousand ha (63.8%) occurring within the Forest Area, and the remaining of 47.8 thousand ha (36.2%) on APL.

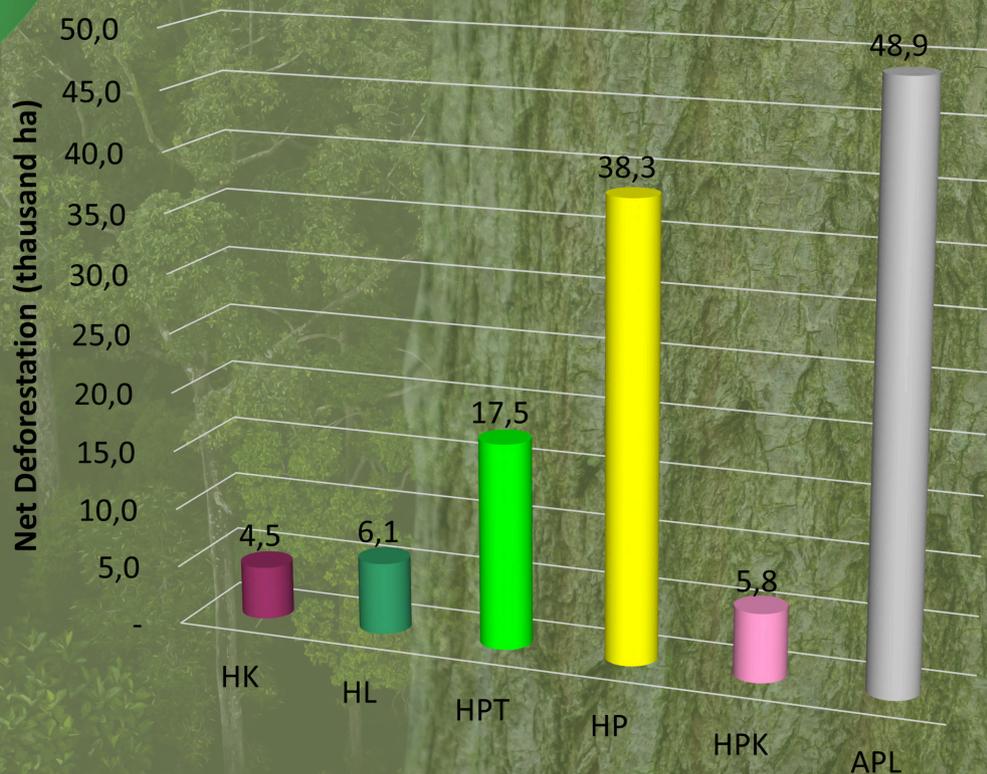


Indonesia's Net Deforestation 2023 (thousand ha)



Deforestation Within and Outside of Forest Areas by Function in 2023 (Thousand Ha)

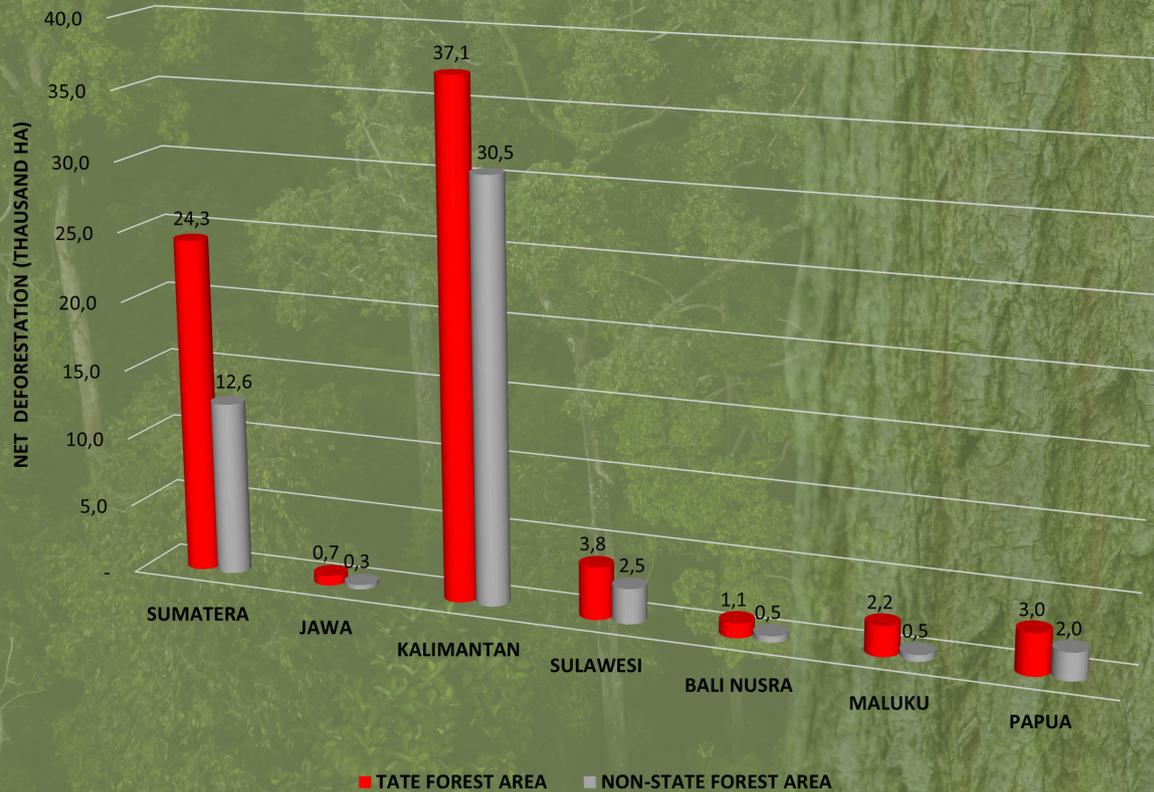
NO.	STATE FOREST AREA/ NON-STATE FOREST AREA	NET DEFORESTATION	
		Area (In Thousand ha)	%
1	Conservation Forest (HK)	4,5	3,7
2	Protection Forest (HL)	6,1	5,0
3	Production Forest (HP)		
	a. Limited Production	17,5	14,4
	b. Permanent Production	38,3	31,6
	c. Convertible Production	5,8	4,8
	sub Total	61,6	50,8
	Total State Forest Area (1+ 2 + 3)	72,2	59,6
4	Non-State Forest Area (APL)	48,9	40,4
	Total (1+ 2 + 3 + 4)	121,1	100,0



In 2023, deforestation most occurred in Non-Forest Area (APL) of 48.0 thousand ha compared to the other function.

IN 2023, DEFORESTATION MOST OCCURRED IN NON-FOREST AREA (APL) OF 48.0 THOUSAND HA COMPARED TO THE OTHER FUNCTION.

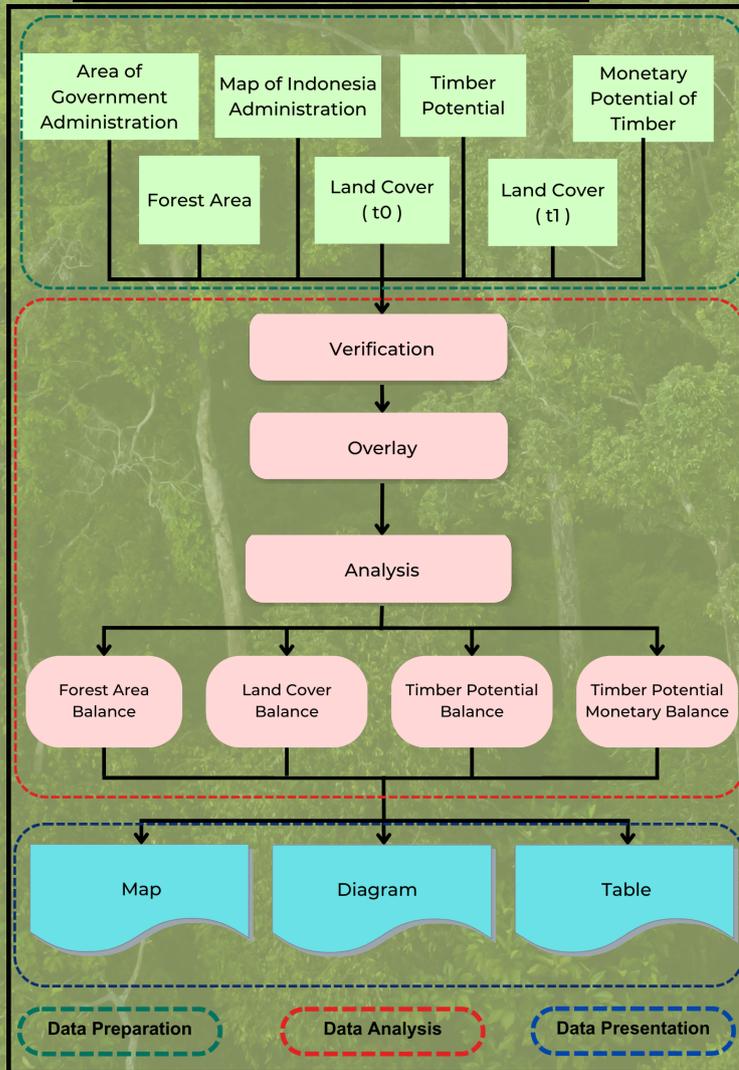
NO.	ISLAND / ISLAND GROUP	STATE FOREST AREA								Non-State Forest Area	TOTAL
		PERMANENT FOREST					HPK	Total			
		HK	HL	HPT	HP	Total					
1	SUMATERA	4,8	4,5	9,1	3,7	22,2	2,1	24,3	12,6	36,9	
2	JAWA	0,0	0,0	0,0	0,6	0,7	-	0,7	0,3	1,0	
3	KALIMANTAN	0,8	0,5	5,6	30,6	35,0	2,1	37,1	30,5	67,6	
4	SULAWESI	0,1	0,9	1,4	1,0	3,8	0,3	3,8	2,5	6,4	
5	BALI NUSRA	0,0	0,3	0,1	0,6	1,1	0,0	1,1	0,5	1,5	
6	MALUKU	0,0	0,1	0,6	0,8	1,5	0,7	2,2	0,5	2,7	
7	PAPUA	0,2	0,6	0,6	1,0	2,4	0,6	3,0	2,0	5,0	
Total		4,5	8,1	17,5	38,3	66,4	5,8	72,2	48,9	121,1	



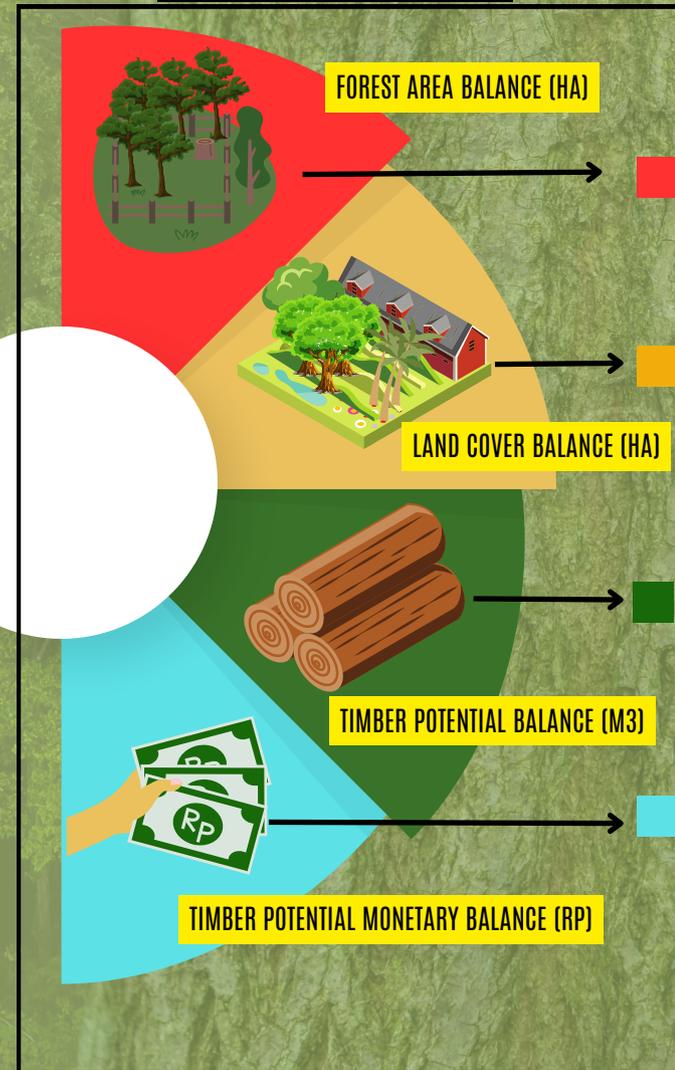
FOREST RESOURCES ACCOUNTS (NSDH)

Forest Resources Accounts (NSDH) is a piece of information that depicts the amount of reserves, losses, and additions of forest resources resulting from forest management activities, thereby allowing us to determine at a specific point in time whether there is a surplus or a deficit compared to previous periods.

THE PROCESS FLOW FOR NSDH CALCULATION



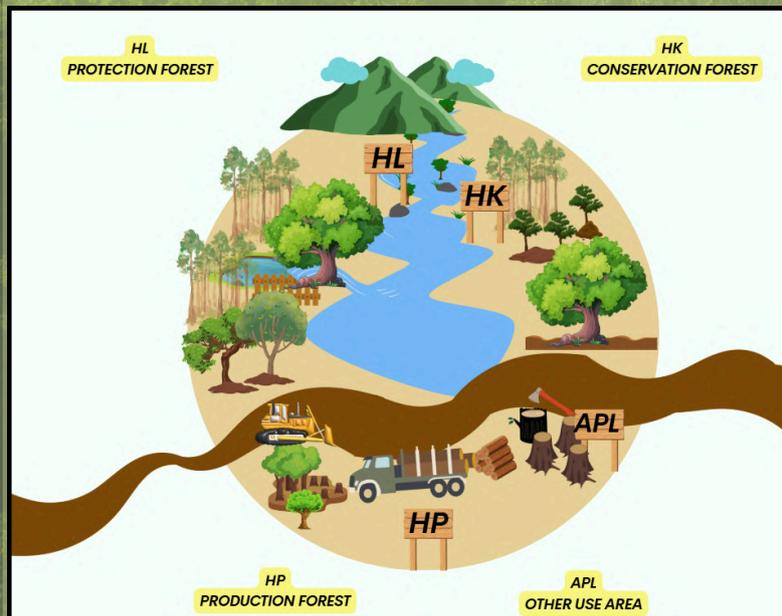
COMPONENTS OF NSDH CALCULATION



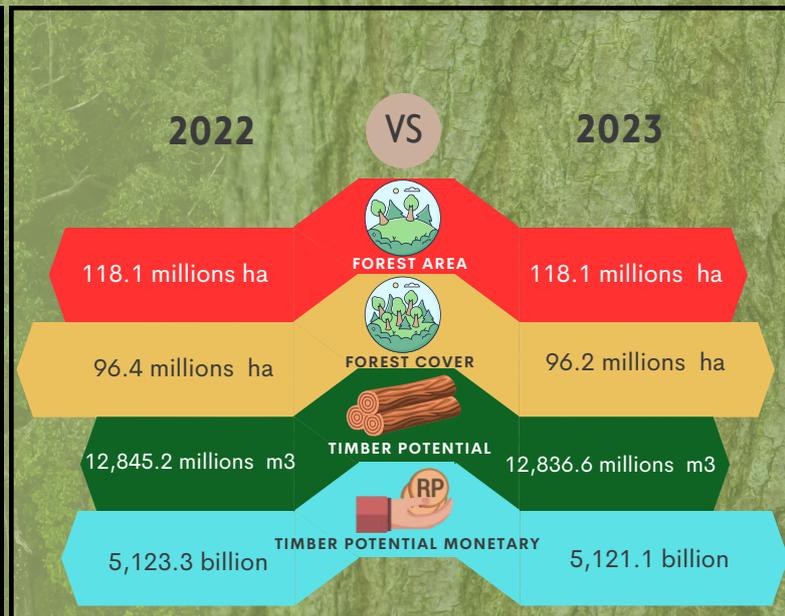
FOREST RESOURCES ACCOUNTS (NSDH)

NSDH for 2024 means presenting and comparing data and information relating to forest area accounts, forest cover accounts, timber estimation accounts (in volume) and timber estimation accounts (in monetary) from 2022 to 2023. The presentation of the data is in accordance with the function of each forest area consisting of conservation forest (HK), protection forest (HL), production forest (HP) and areas outside the forest area or commonly referred to as other use areas (APL).

SCOPE OF NSDH



CALCULATION DATA OF NSDH 2024



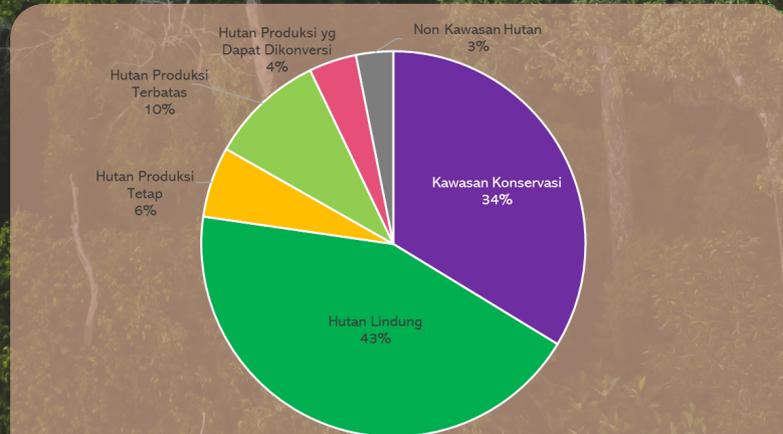
Disclaimer:

- Numbers or values are indicative and subject to change at any time based on updates or improvements in data accuracy.
- Wood potential is timber estimation resulted from calculation of forest cover and volume timber estimation per area of the woody vegetation cover.

PIPPIB

PIPPIB is acronym of Indicative Map for the Termination of Granting New Business License, Forest Area Usage Approvals, and Forest Area Reallocation Approvals on Primary Natural Forest and the Peatlands

PIPPIB mandated by the Presidential Instruction Number 5 of 2019 concerning Termination of Granting New Business License and Improvement the Governance on Primary Natural Forest and the Peatland. The most recent PIPPIB stipulated by Ministry of Environment and Forestry Decree Number SK. SK.12764/MENLHK-PKTL/IPSDH/PLA.1/11/2023 of 22 November 2023 concerning 2nd Period PIPPIB of 2023.



PIPPIB covers Forest Area and Non Forest Area. Most of PIPPIB located in State Forest Area at almost 97%, meanwhile 3% of it located Other Land Use Area.



NATIONAL FOREST INVENTORY



History

Colonials - 1980's

In Indonesia, forest management began during the Dutch colonial era, focusing on managing plantation forests on the island of Java. Meanwhile, forest management outside Java only started in the late 1970s. At that time, the national interest in forests was still closely related to timber production and the use of forest land to meet development needs

Late 1980's - 1996

- In 1989, the NFI project funded by the World Bank and implemented by FAO together with the Forestry Department (now MoEF) began to be carried out including development (preparation of the NFI design) and implementation at the Old NFI (NFI Ver 1.0) method was published
- The NFI project is part of the Forestry Institution and Conservation Project with loan funds of 14.1 million USD, aimed at increasing the capacity of the Forestry Department in carrying out forest inventories and producing forest resource information for policy development and strategic planning at the national and provincial levels.
- The NFI system built includes four components, namely (1) forest resource assessment-FRA, (2) forest resources monitoring-FRM, (3) GIS and (4) user service. FRA is carried out to monitor the actual forest status, while FRM is conducted to monitor forest changes. Therefore, the implementation of FRA is carried out by developing temporary sample plots (TSP), while FRM is by developing permanent sample plots (PSP).
- The NFI sampling design applied is single-stage systematic sampling with post-stratification. Two-stage sampling was not carried out due to the limited availability of cloud-free and inexpensive sensing image data at the time. Cluster distribution is carried out systematically on a 20 km grid or can be detailed if necessary.
- A total of 2,735 cluster plots were measured during the period 1990 to 1996, most of which were in Kalimantan (1,025 clusters), Sumatra (695 clusters) and Irian Jaya (437 clusters). Most of the clusters were built and measured in 1992 (603 clusters), 1993 (825 clusters), and 1994 (590 clusters). The smallest number of clusters measured was at the beginning and end of the measurement year, namely 1990 (4 clusters) and 1996 (50 clusters).

1997 - 2024

The implementation of the old NFI (NFI Ver 1.0) continues and is carried out with budget sources from the Government (DIPA) by adopting methods developed by the NFI project by FAO. However, unfortunately, because the sampling method is complex and requires very expensive costs, the old NFI method cannot be applied thoroughly within 5 years. It requires redevelopment/redesign NFI

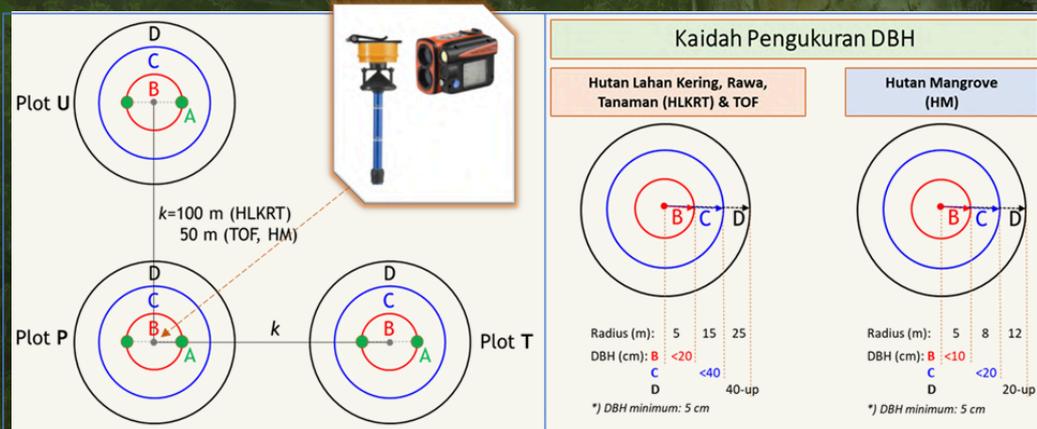
Pengembangan Selanjutnya

With the development of existing regulations, the need for accurate and reliable data and information, the utilisation of technology as well as considerations of efficiency and effectiveness of activities, the old NFI method requires redesign. Starting in 2020, FAO and MoEF have developed a new National Forest Inventory (NFI) method introduced as 'NFI 2.0' that will be applied starting in 2025.

IHN 2.0

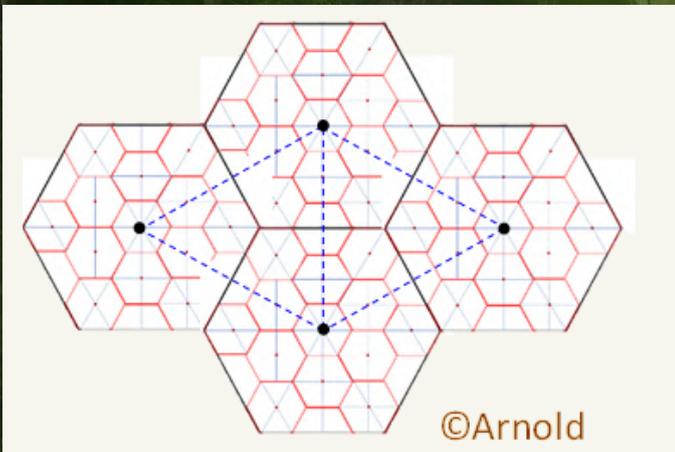
Cluster-plots are more efficient:

- Small size => max. 0.6 ha (3 x 0.2 ha)
- Nested-subplots => small, medium, large trees
- Applicable for dryland forests, swamps, plants, mangroves, TOF (Trees Outside Forest, Trees Outside Forest (PDLH))

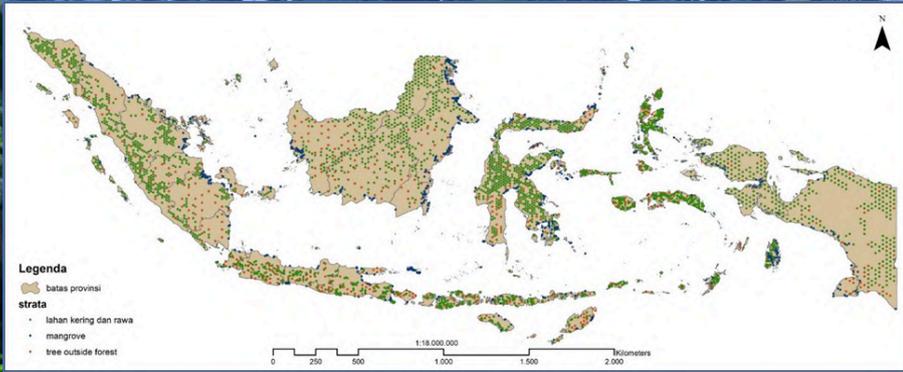


Distribution

Systematic aligned : grid hexagon



NFI 2.0 Cluster Distribution



Total: 3632 Cluster

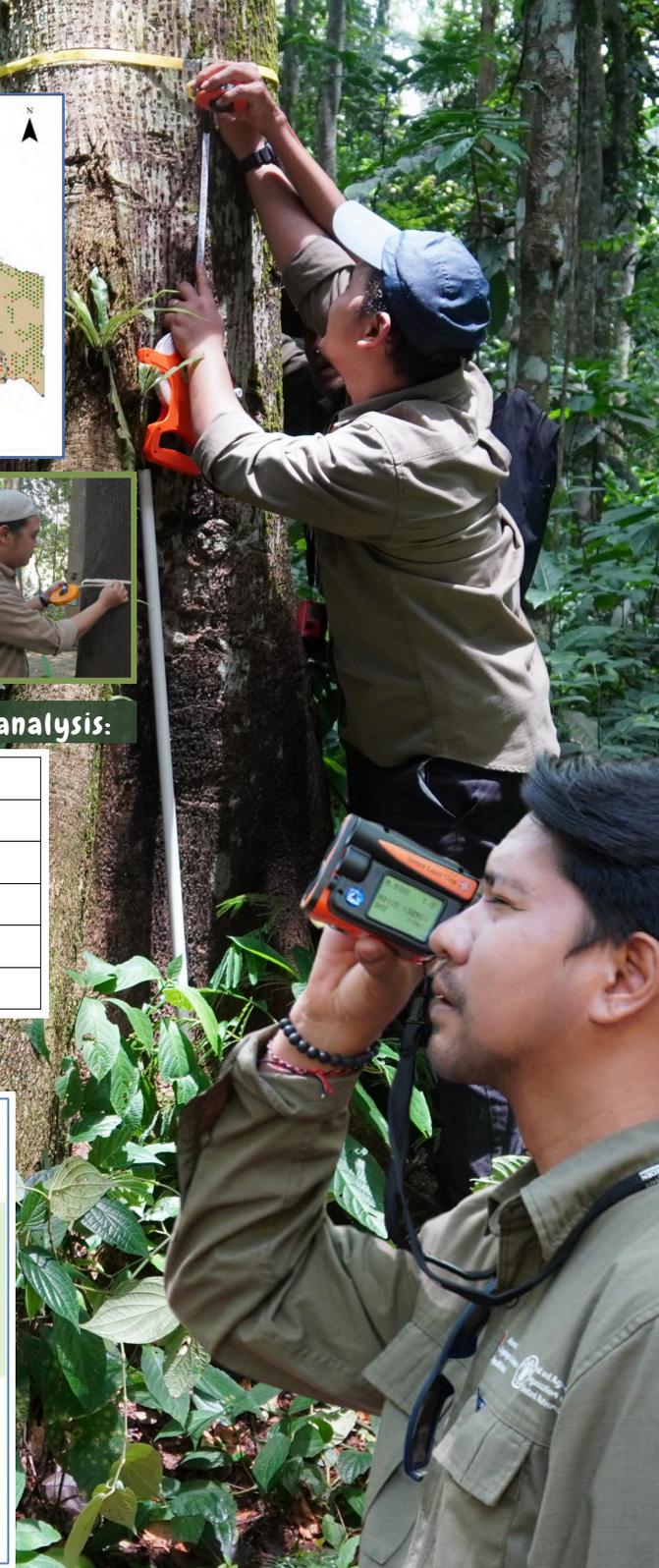
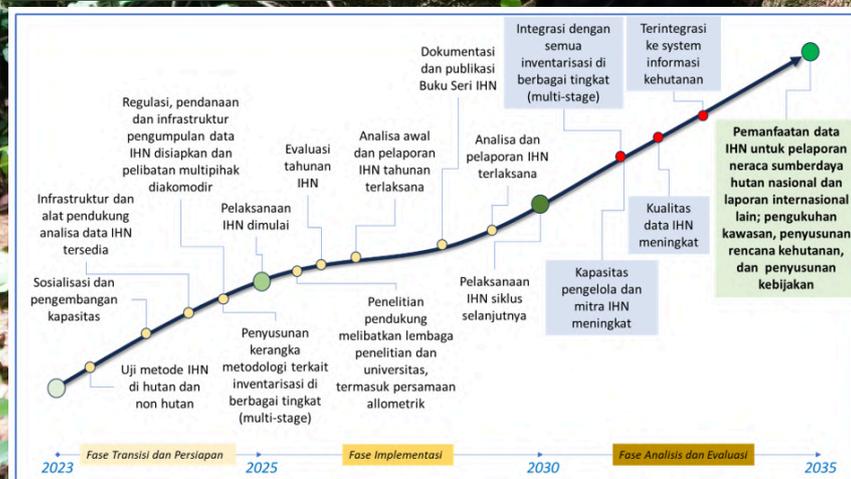
- Dryland forest, swamp, plantation forest : 2512 cluster plot (69%)
- Trees Outside Forest: 517 cluster plot (14%)
- Mangrove: 603 cluster plot (17%)



Final sample sizes (number of clusters) after iterative plot analysis:

Stratum	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5	Total
HLKRT	199	638	640	640	395	2512
TOF/PDLH	67	143	152	146	95	603
Mangrove	99	119	108	114	77	517
Total	365	900	900	900	567	3632
Persentase (%)	10	25	25	25	15	100

Roadmap NFI 2.0



POLICY RELATED TO FOREST RESOURCES MONITORING

Documentation of Forest Resources Monitoring Analytics Result has an important role in preserving and providing related documents of field data series, periodical analytics, and rules/policies, complemented with maps and books/reports enclosed. Furthermore, these documents that may be published for public information as well as recitals of national and regional policies.

REGULATIONS RELATED TO FORESTRY THEMATIC MAPPING

- Regulation of the Director General of Forestry Planning No. P.1/VII-IPSDH/2015, of May 26, 2015 concerning Guidelines for Monitoring Land Cover.
- Regulation of the Director General of Forestry Planning and Environmental Governance No. P.1/PKTL/IPSDH/PLA.1/1/2017, of January 26, 2017 concerning Technical Guidelines for the Inventory of Social and Cultural Aspects of Communities in Protected Forest Management Units (KPHL) and Production Forest Management Units (KPHP).
- Regulation of the Director General of Forestry Planning and Environmental Governance No.P.1/PKTL/IPSDH/PLA.1/1/2017, of January 26, 2017 concerning Technical Guidelines for Forest Inventory in Protected Forest Management Units (KPHL) and Production Forest Management Units 1 (KPHP)
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- Regulation of the Director of Forest Resources Inventory and Monitoring concerning Technical Guidelines for the Interpretation of Medium Resolution Satellite Imagery to Update National Land Cover Data No.: Juknis 1/PSDH/PLA.1/7/2020 dated July 6, 2020.
- Regulation of the Director of Forest Resources Inventory and Monitoring concerning Technical Guidelines for the Interpretation of Remote Sensing Imagery to Produce of 1:50,000 Scale Land Cover Data in the Management Unit Area No. Juknis 1/PSDH/PLA.1/8/2021, of August 9, 2021.



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