



Ministry of Environment and Forestry  
Republic of Indonesia



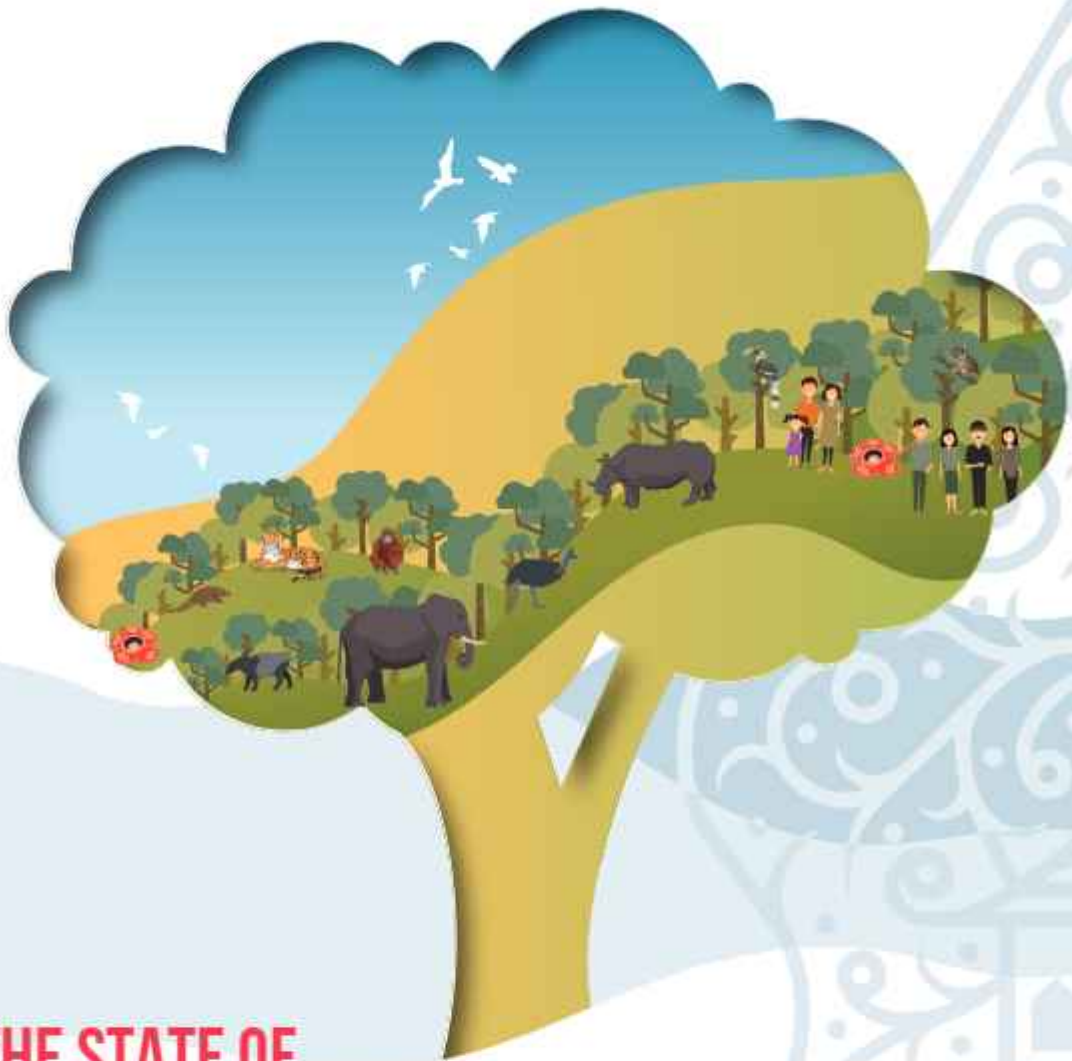
# THE STATE OF INDONESIA'S FORESTS 2024

TOWARDS SUSTAINABILITY OF  
FOREST ECOSYSTEMS IN INDONESIA





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JAKARTA, JULY 2024

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## Preface

**T**he publication of "State of Indonesia's Forests 2024" is a testament to Indonesia's unwavering commitment to forest conservation and the innovative advancements in forest management that have characterized the last decade under President Joko Widodo's leadership, amid major steps towards sustainable forest management and sustainable development. This edition, which builds upon the previous editions in 2018, 2020, and 2022, is in accordance with the theme of the 27<sup>th</sup> session of the FAO Committee on Forestry (COFO) 2024, "Forest and Innovation." It emphasizes the symbiotic relationship between forest stewardship and technical advancement in the preservation of Indonesia's green legacy. The report highlights a number of innovations like the Fire Danger Rating System, improved satellite hotspot monitoring, Near Real-Time Monitoring (NRTM) system, and the national forest monitoring system (SIMONTANA) system for real-time forest condition tracking. The Ministry of Environment and Forestry's Online Single Submission Risk Approach also streamlines licensing and enhances compliance with environmental standards. These advancements demonstrate our commitment to integrating technology into sustainable forest management.

The younger generation in Indonesia is expected to step up to become catalysts for change within their communities. They actively participate in local environmental initiatives, engage in international conferences, and influence public policy. This presents a significant advantage for Indonesia and a noteworthy contribution to the burgeoning global youth movement.

The past decade has been transformative for Indonesia's forests, marking a period of significant challenges, success, and tireless dedication to sustainable forest management and development. Under President Joko Widodo's leadership, Indonesia has boldly navigated the complex balance between economic growth and environmental protection, pioneering initiatives that align with our global commitment to combat climate change and biodiversity loss.

Social forestry programs have led to improvements in productivity, income, jobs, and community knowledge around forests. Legal access reduces conflicts and aims to manage 12.7 million hectares. Proklim (Climate Village Program) was launched in 2015 as a national movement for community-based climate change action that involves active participation of communities in conducting integrated climate change mitigation and adaptation efforts. The objective is to facilitate the reduction of greenhouse gas (GHG) emissions and enhance the resilience of communities to the impacts of climate change.

This publication reflects innovative policies, improved practices, and technical advancements that have propelled Indonesia to the forefront of global forest management. This report tells our journey through increasing community engagement in forest management, implementing corrective and collective actions to prevent deforestation, controlling forest and land fires, and implementing sustainable land-use practices. All of these efforts have made a significant contribution to reducing GHG emissions. Through a firm commitment to

the principles of transparency, inclusiveness and sustainability, Indonesia achieved a significant reduction in deforestation rates and laid the foundation for a thriving bioeconomy based on circular economy principles and eco-friendly innovation. This commitment to sustainable practices has not only curbed deforestation but also strengthened foundation for bioeconomy. By promoting sustainable wood, it will enhance the value chain, supporting both economic growth and environmental stewardship.

The State of Indonesia's Forests 2024 also explores the environmental and social challenges test our resolve and the steps we are taking to overcome them. This highlights our continuous efforts to resolve land tenure conflicts, expand social forestry programs, and foster public-private partnerships that empower local communities and safeguard our forest heritage. These actions confirm our belief in shared responsibility and future for forest sustainability and community well-being.

As we present The State of Indonesia's Forests 2024, we extend our deepest gratitude to all stakeholders, including the private sector, non-governmental organizations, community groups, and international partners, for their invaluable contributions and steadfast support in national development, especially in the field of forestry and environment. Our collective efforts highlight the power of collaboration in achieving a sustainable and resilient future.

This publication is not only a reflection of our journey, but also a blueprint for future generations. It highlights the innovative spirit and ongoing efforts to achieve sustainability that define Indonesia's approach to forest management. We hope it can be a source of inspiration and a call to continue innovating and adapting sustainable forest management.

I express my gratitude to all those who have contributed and actively participated in updating the series of State of Indonesia's Forests in 2024, especially the writing team and all editors involved, as well as multi-stakeholder contributors. We acknowledge the unwavering support of the Food and Agriculture Organization of the United Nations (FAO) and the Association of Indonesian Forest Concessionaires (APHI) in the preparation of this publication. Together, we remain committed to a greener, more sustainable future for Indonesia and the world.

Jakarta, July 2024

**The Minister of Environment and Forestry**



**SITI NURBAYA**

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Prof. Dr. Siti Nurbaya and Dr. Efransjah, as the editors, coordinated the writing and preparation of the publication, with significant input and contributions from a top-echelon team consisting of representatives from various Directorate Generals of the Ministry of Environment and Forestry, including the Directorate General of Forestry Planning and Environmental Governance, the Directorate General of Climate Change, the Directorate General of Pollution and Environmental Degradation Control, the Directorate General of Natural Resources and Ecosystem Conservation, the Directorate General of Sustainable Forest Management, the Directorate General of Environmental and Forestry Law Enforcement, the Directorate General of Social Forestry and Environmental Partnership, the Directorate General of Watersheds Management and Forest Rehabilitation, and the Agency for Standardization of Environment and Forestry Instruments. The Secretariat General of the Ministry of Environment and Forestry through Data and Information Center (Pusdatin) has facilitated necessary coordination.

The Ministry of Environment and Forestry of the Republic of Indonesia expresses its appreciation to all individuals and entities that have contributed to the preparation of this publication.

## ABBREVIATIONS AND ACRONYMS

<b>ABKT</b>	<i>Areal Bernilai Konservasi Tinggi</i> (High Conservation Value Area/HCVA)	<b>BRMC</b>	Broader Market Recognition Coalition
<b>ACCTHPC</b>	ASEAN Coordinating Center on Transboundary Haze Pollution Control	<b>BSP</b>	Benefit Sharing Plan
<b>AJSCC</b>	ASEAN Joint Statement on Climate Change	<b>BUMDES</b>	<i>Badan Usaha Milik Desa</i> (Village-Owned Enterprise)
<b>APBD</b>	<i>Anggaran Pendapatan dan Belanja Daerah</i> (Regional Revenue and Expenditure Budget)	<b>BUMN</b>	<i>Badan Usaha Milik Negara</i> (State-Owned Enterprise)
<b>APL</b>	<i>Areal Penggunaan Lain</i> (Other Use Areas)	<b>CA</b>	<i>Cagar Alam</i> (Strict Nature Reserve)
<b>AP TMA</b>	<i>Alat Pemantau Tinggi Muka Air</i> (Water Level Monitoring Equipment)	<b>CBD</b>	Convention on Biological Diversity
<b>ASEAN</b>	Association of Southeast Asian Nations	<b>CITES</b>	Convention on International Trade in Endangered Species of Wild Fauna and Flora
<b>Bappenas</b>	<i>Badan Perencanaan Pembangunan Nasional</i> (National Development Planning Agency)	<b>CM1, CM2</b>	Countermeasure 1, Countermeasure 2
<b>BBKSDA</b>	<i>Balai Besar Konservasi Sumber Daya Alam</i> (Center for Natural Resources Conservation)	<b>CSO</b>	Civil Society Organization
<b>BNPB</b>	<i>Badan Nasional Penanggulangan Bencana</i> (National Agency for Disaster Countermeasure)	<b>COP</b>	Conference of the Parties
<b>BPPT</b>	<i>Badan Pengkajian dan Penerapan Teknologi</i> (Agency for the Assessment and Application of Technology)	<b>DAS</b>	<i>Daerah Aliran Sungai</i> (Watershed)
<b>BRG</b>	<i>Badan Restorasi Gambut</i> (Peatland Restoration Agency)	<b>DMPG</b>	<i>Desa Mandiri Peduli Gambut</i> (Peat Stewardship Village)
<b>BRGM</b>	<i>Badan Restorasi Gambut dan Mangrove</i> (Peatland and Mangrove Restoration Agency)	<b>DMPM</b>	<i>Desa Mandiri Peduli Mangrove</i> (Mangrove Stewardship Village)
<b>BRIN</b>	<i>Badan Riset dan Inovasi Nasional</i> (National Research and Innovation Agency)	<b>DPG</b>	<i>Desa Peduli Gambut</i> (Peat-Care Village)
<b>BMKG</b>	<i>Badan Meteorologi, Klimatologi, dan Geofisika</i> (Meteorology, Climatology, and Geophysical Agency)	<b>DR</b>	<i>Dana Reboisasi</i> (Reforestation Fund)
		<b>ECSMM</b>	Environment and Climate Sustainability Ministers' Meeting
		<b>ENDC</b>	Enhanced Nationally Determined Contribution
		<b>ERPA</b>	Emissions Reduction Payment Agreements
		<b>ERPDP</b>	Emissions Reductions Program Document
		<b>EU</b>	European Union
		<b>FCPF</b>	Forest Carbon Partnership Facilities

<b>FDRS</b>	Fire Danger Rating System	<b>IBSAP</b>	Indonesian Biodiversity Strategy Action Plan
<b>FLEGT</b>	Forest Law Enforcement, Governance and Trade	<b>IDR</b>	Indonesian Rupiah
<b>FREL</b>	Forest Reference Emissions Level	<b>INPRES</b>	<i>Instruksi Presiden</i> (Presidential Instruction)
<b>FOLU</b>	Forestry and Other Land Use	<b>IPBPH</b>	<i>Juran Perizinan Berusaha Pemanfaatan Hutan</i> (Forest Utilization Business Licensing Fee)
<b>FPIC</b>	Free, Prior, and Informed Consent	<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>GCF</b>	Green Climate Fund	<b>IPG</b>	<i>Infrastruktur Pembasahan Gambut</i> (Peat Wetting Infrastructure)
<b>GEF</b>	Global Environment Facility	<b>IPPU</b>	Industrial Processes and Product Use
<b>Gemilang</b>	<i>Gerakan Masyarakat Peduli Lingkungan</i> (Environmental Care Community Movement)	<b>IUCN</b>	International Union for Conservation of Nature
<b>GHG</b>	Greenhouse Gas	<b>JAM</b>	Joint Adaptation Mitigation
<b>GRT</b>	<i>Ganti Rugi Tegakan</i> (Stumpage Compensation)	<b>KAN</b>	<i>Komite Akreditasi Nasional</i> (National Accreditation Committee)
<b>GWL</b>	Ground Water Level	<b>Karhutla</b>	<i>Kebakaran hutan dan lahan</i> (forest and land fires)
<b>ha</b>	Hectare	<b>KBA</b>	Key Biodiversity Areas
<b>HA</b>	<i>Hutan Adat</i> (Adat Forest)	<b>KBR</b>	<i>Kebun Bibit Rakyat</i> (Community nursery)
<b>HCVA</b>	High Conservation Value Area	<b>KHDPK</b>	<i>Kawasan Hutan dengan Pengelolaan Khusus</i> (Special Management Forest Area)
<b>HD</b>	<i>Hutan Desa</i> (Village Forest)	<b>KHG</b>	<i>Kesatuan Hidrologis Gambut</i> (Peat Hydrological Unit)
<b>HHBK</b>	<i>Hasil Hutan Bukan Kayu</i> (Non-Timber Forest Products)	<b>KIC</b>	Katadata Insight Center
<b>HHK</b>	<i>Hasil Hutan Kayu</i> (Timber Forest Products)	<b>KK</b>	<i>Kepala Keluarga</i> (Household)
<b>HK</b>	<i>Hutan Konservasi</i> (Conservation Forest)	<b>K/L</b>	<i>Kementerian/Lembaga</i> (Ministries/Institutions)
<b>HKm</b>	<i>Hutan Kemasyarakatan</i> (Community Forest)	<b>KLHK</b>	<i>Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia</i> (Ministry of Environment and Forestry, Republic of Indonesia/ MoEF)
<b>HL</b>	<i>Hutan Lindung</i> (Protection Forest)	<b>KM-GBF</b>	Kunming-Montreal Global Biodiversity Framework
<b>HP</b>	<i>Hutan Produksi tetap</i> (Permanent Production Forest)		
<b>HPK</b>	<i>Hutan Produksi yang Dapat Dikonversi</i> (Convertible Production Forest)		
<b>HPT</b>	<i>Hutan Produksi Terbatas</i> (Limited Production Forest)		
<b>HTR</b>	<i>Hutan Tanaman Rakyat</i> (Community Plantation Forest)		
<b>IBAs</b>	Important Bird Areas		

<b>KPA</b>	<i>Kawasan Pelestarian Alam</i> (Nature Conservation Area)	<b>NEKON</b>	<i>Nilai Transaksi Ekonomi</i> (Economic Transaction Value)
<b>KPH</b>	<i>Kesatuan Pemangkuan Hutan</i> (Forest Management Unit, FMU in Perum Perhutani)	<b>NGO</b>	Non-Governmental Organization
<b>KPK</b>	<i>Komisi Pemberantasan Korupsi</i> (Corruption Eradication Commission)	<b>NKK</b>	<i>Nota Kesepakatan Kerjasama</i> (Memorandum of Understanding/ MoU)
<b>KSA</b>	<i>Kawasan Suaka Alam</i> (Sanctuary Reserve Area)	<b>NPS</b>	Non-Party Stakeholders
<b>KSDA</b>	<i>Konservasi Sumber Daya Alam</i> (Natural Resource Conservation)	<b>NSPK</b>	<i>Norma, Standar, Prosedur, dan Kriteria</i> (Norms, Standards, Procedures, and Criteria)
<b>KTH</b>	<i>Kelompok Tani Hutan</i> (Forest Farmer Group)	<b>PBK</b>	<i>Pembayaran Berbasis Kinerja</i> (Result-Based Payment)
<b>KUPS</b>	<i>Kelompok Usaha Perhutanan Sosial</i> (Social Forestry Business Group)	<b>PB-PJWA</b>	<i>Perizinan Berusaha Penyediaan Jasa Wisata Alam</i> (Business License for Providing Nature-based Tourism Services)
<b>LHK</b>	<i>Lingkungan Hidup dan Kehutanan</i> (Environment and Forestry)	<b>PBPH</b>	<i>Perizinan Berusaha Pemanfaatan Hutan</i> (Business License for Forest Utilization)
<b>LSM</b>	<i>Lembaga Swadaya Masyarakat</i> (Non-Government Organization)	<b>PB-PSWA</b>	<i>Perizinan Berusaha Pengusahaan Sarana Jasa Lingkungan Wisata Alam (PB-PSWA)</i> (Business License for Providing Nature-based Tourism Facilities)
<b>LTS-LCCR</b>	Long-Term Strategy for Low Carbon and Climate Resilience	<b>PCD</b>	Petersberg Climate Dialogue
<b>MaxEnt</b>	Maximum Entropy	<b>Perpres</b>	<i>Peraturan Presiden</i> (Presidential Regulation)
<b>MMR</b>	Measurement, Monitoring & Reporting	<b>PHUs</b>	Peat Hydrological Units
<b>MHA</b>	<i>Masyarakat Hukum Adat</i> (Adat Law Community)	<b>PKKNK</b>	<i>Pemanfaatan Kayu Kegiatan Non Kehutanan</i> (Utilization of Timber Produced from Non-Forestry Activities)
<b>MOCA</b>	Ministerial on Climate Action	<b>PIAPS</b>	<i>Peta Indikatif Areal Perhutanan Sosial</i> (Indicative Map of Social Forestry Area)
<b>MPA</b>	<i>Masyarakat Peduli Api</i> (Fire-Care Community)	<b>PIPPIB</b>	<i>Peta Indikatif Penghentian Pemberian Izin Baru</i> (Indicative Map on the Termination of the Issuance of New Licenses)
<b>MRV</b>	Monitoring, Reporting and Verification	<b>PMN</b>	<i>Peta Mangrove Nasional</i> (National Mangrove Map)
<b>MUK</b>	<i>Multi Usaha Kehutanan</i> (Multi-Business in Forestry)	<b>PNNBP</b>	<i>Penerimaan Negara Bukan Pajak</i> (Non-Tax State Revenue)
<b>Nawacita</b>	<i>Sembilan Prioritas Pembangunan Lima Tahun</i> (Nine Priorities of Five Years Development Plan)		
<b>NDC</b>	Nationally Determined Contribution		
<b>NEK</b>	<i>Nilai Ekonomi Karbon</i> (Carbon Pricing)		

<b>POLRI</b>	<i>Kepolisian Republik Indonesia (Indonesian National Police)</i>	<b>RPJMN</b>	<i>Rencana Pembangunan Jangka Menengah Nasional (National Medium-Term Development Plan)</i>
<b>PPATK</b>	<i>Pusat Pelaporan dan Analisis Transaksi Keuangan (Indonesia Financial Transaction Report and Analysis Center)</i>	<b>RPJPN</b>	<i>Rencana Pembangunan Jangka Panjang Nasional (National Long-Term Development Plan)</i>
<b>PPKH</b>	<i>Persetujuan Penggunaan Kawasan Hutan (Forest Area Use Approval)</i>	<b>RPPEG</b>	<i>Rencana Perlindungan dan Pengelolaan Ekosistem Gambut (Peatland Ecosystem Protection and Management Plan)</i>
<b>PRIMS Gambut</b>	<i>Pranata Informasi Restorasi Ekosistem Gambut (Peat Ecosystem Restoration Information Institution)</i>	<b>RLI</b>	Red List Index
<b>Proklim</b>	<i>Program Kampung Iklim (Climate Village Program)</i>	<b>SDGs</b>	Sustainable Development Goals
<b>PROPER</b>	<i>Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan Lingkungan (Corporate Performance Rating Program for Environmental Management)</i>	<b>SIDAK</b>	<i>Sistem Informasi dan Data Konservasi Sumber Daya Alam Hayati dan Ekosistemnya (Biodiversity Conservation Data and Information System)</i>
<b>PSDH</b>	<i>Provisi Sumber Daya Hutan (Forest Resource Royalty)</i>	<b>SIMATAG</b>	<i>Sistem Informasi Muka Air Tanah Gambut (Peatland Water Level Information System)</i>
<b>PTBAE</b>	<i>Persetujuan Teknis Batas Atas Emisi (Emissions Cap Allowance)</i>	<b>SILIN</b>	<i>Silvikultur Intensif (Intensive Silviculture)</i>
<b>RBP</b>	Result-Based Payment	<b>SLK</b>	<i>Sertifikasi Legalitas Kayu (Certification of Timber Legality)</i>
<b>REDD+</b>	Reducing Emissions from Deforestation and Forest Degradation, and the Role of Conservation, Sustainable Management of Forest and Enhancement of Forest Carbon Stocks	<b>SIPALAGA</b>	<i>Sistem Pemantauan Air Lahan Gambut (Peatland Water Monitoring System)</i>
<b>Renstra</b>	<i>Rencana Strategis (Strategic Plan)</i>	<b>si-PATOK</b>	<i>Sistem Informasi Harga Patokan (Pricing Reference Information System)</i>
<b>RHL</b>	<i>Rehabilitasi Hutan dan Lahan (Forest and Land Rehabilitation)</i>	<b>SiPongi</b>	<i>Sistem Monitoring Kebakaran Hutan dan Lahan (Forest and Land Fire Monitoring System)</i>
<b>RIL-C</b>	Reduced Impact Logging for Climate	<b>SIPNBP</b>	<i>Sistem Informasi Penerimaan Negara Bukan Pajak (Non-Tax State Revenue Information System)</i>
<b>RKUPH</b>	<i>Rencana Kerja Usaha Pemanfaatan Hutan (Forest Utilization Business Work Plan)</i>	<b>SK</b>	<i>Surat Keputusan (Decree)</i>
<b>RPPEG</b>	<i>Rencana Perlindungan dan Pengelolaan Ekosistem Gambut (Peatland Ecosystem Protection and Management Plan)</i>	<b>SLHH</b>	<i>Sertifikasi Legalitas Hasil Hutan (Forest Product Legality Certification)</i>
<b>RPJMD</b>	<i>Rencana Pembangunan Jangka Menengah Daerah (Regional Medium-Term Development Plan)</i>	<b>SM</b>	<i>Suaka Margasatwa (Wildlife Sanctuary)</i>
		<b>SMART</b>	Spatial Monitoring and Reporting Tool



<b>SPBE</b>	<i>Sistem Pemerintahan Berbasis Elektronik (Electronic-based Governance System)</i>	<b>TWA</b>	<i>Taman Wisata Alam (Nature Recreation Park)</i>
<b>SPE</b>	<i>Sertifikat Pengurangan Emisi (Emissions Reduction Certificate)</i>	<b>UAE</b>	United Arab Emirates
<b>S-PHL</b>	<i>Sertifikasi Pengelolaan Hutan Lestari (Sustainable Forest Management Certification)</i>	<b>UMKM</b>	<i>Usaha Mikro Kecil Menengah (Micro, Small, and Medium Enterprises)</i>
<b>SRN</b>	<i>Sistem Registri Nasional (National Registry System)</i>	<b>UN</b>	United Nations
<b>STAR</b>	System for Transparent Allocation of Resources	<b>UNEP</b>	United Nations Environment Programme
<b>SVLK</b>	<i>Sistem Verifikasi Legalitas dan Kelestarian (Sustainability and Legality Assurance System)</i>	<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>Tahura</b>	<i>Taman Hutan Raya (Grand Forest Park)</i>	<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>TB</b>	<i>Taman Buru (Hunting Park)</i>	<b>UPT</b>	<i>Unit Pelaksana Teknis (Technical Management Unit)</i>
<b>TGHK</b>	<i>Tata Guna Hutan Kesepakatan (Forest Boundary-Setting Consensus)</i>	<b>UUD</b>	<i>Undang-undang Dasar (The Constitution of the State of the Republic of Indonesia)</i>
<b>TK-PPEG</b>	<i>Tim Kerja Perlindungan dan Pengelolaan Ekosistem Gambut (Working Team on Protection and Management of Peat Ecosystem)</i>	<b>USD</b>	United States Dollar
<b>TMAT</b>	<i>Tinggi Muka Air Tanah (Water Table)</i>	<b>WCPA</b>	World Commission on Protected Areas
<b>TMC</b>	<i>Teknologi Modifikasi Cuaca (Weather Modification Technology)</i>		
<b>TN</b>	<i>Taman Nasional (National Park)</i>		
<b>TNI</b>	<i>Tentara Nasional Indonesia (Indonesian National Armed Forces)</i>		
<b>TORA</b>	<i>Tanah Objek Reforma Agraria (Lands for Agrarian Reform)</i>		
<b>TPB</b>	<i>Tujuan Pembangunan Berkelanjutan (Sustainable Development Goals/SDGs)</i>		
<b>TPT-KB</b>	<i>Tempat Penampungan Terdaftar Kayu Bulat (Round Wood Registered Shelter)</i>		
<b>TSL</b>	<i>Tumbuhan dan Satwa Liar (Wild Plant and Animal)</i>		

## GLOSSARY

<b>Adat Forest (<i>Hutan Adat</i>)</b>	A forest that is located in an Adat Law Community's area.
<b>Adat Law Community (<i>Masyarakat Hukum Adat, MHA</i>)</b>	A group of people settled in a certain geographical area, demonstrating ancestral ties to that area and strong relationships with the environment, as well as practicing value systems that underlie economic, political, social, and legal institutions; therefore they are entitled to a recognition in accordance with the provisions of national legislation.
<b>Biodiversity</b>	Short for biological diversity, means the diversity of life in all its forms, including the diversity of species, genetic variations within species, and ecosystems.
<b>Cloud seeding</b>	A weather modification that technique aims to change the amount or type of precipitation from clouds by dispersing substances into the air that serve as cloud condensation or ice nuclei, which alter the micro-physical processes within the cloud.
<b>Co-management</b>	The sharing of authority, responsibility, and benefits between government and local communities in managing of natural resources.
<b>Community Forest (<i>Hutan Kemasyarakatan, HKm</i>)</b>	A type of social forestry license that provides access to a part of the Forest Area for local communities, so that they can be economically empowered.
<b>Community Plantation Forest (<i>Hutan Tanaman Rakyat, HTR</i>)</b>	A social forestry license that allows communities to establish timber plantations in a Production Forest.
<b>Conservation Forest (<i>Hutan Konservasi</i>)</b>	One of three main administrative classifications of the Forest Area aimed at conserving the diversity of flores and faunas, and their ecosystems.
<b>Convertible Production Forest (<i>Hutan Produksi yang Dapat Dikonversi, HPK</i>)</b>	Parts of the Production Forest that can be converted into uses other than forestry.
<b>Deforestation</b>	The permanent alteration of forested area to a non-forested area as a result of human activities.
<b>Economic Growth</b>	The increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percentage rate of increase in real gross domestic product (GDP).
<b>Ecosystem Restoration</b>	Efforts to restore both the biological (flora and fauna) and non-biological (soil and water) elements of an area of land to its original state to facilitate the achievement of biological and ecosystem balance.
<b>Ecotourism</b>	Travel to areas of unique natural or ecologic quality, or the provision of services to facilitate such travel that have the least impact on biological diversity and the natural environment.

<b>Forest</b>	Under the Indonesian Forestry Act of 1999, defined as a unified ecosystem in a landscape dominated by tree communities found in the natural world.
<b>Forest and Land Rehabilitation</b>	Efforts to restore, maintain and promote the functions of forests and land so that their capacity, productivity and role in supporting systems of life will be sustained.
<b>Forest Area (<i>Kawasan hutan</i>)</b>	Area designated by the government as a permanent forest, currently covering more than 60 percent of Indonesia's terrestrial area.
<b>Forest Degradation</b>	Decline in forest cover and carbon stocks over a specific period, as a result of human activities
<b>Forest Law Enforcement, Governance and Trade (FLEGT)</b>	The EU published the EU FLEGT Action Plan in 2003. The Action Plan aims to reduce illegal logging by strengthening the sustainability and legality of forest management, improving forest governance and promoting trade in legally produced timber.
<b>Forest Legality and Sustainability Assurance System (<i>Sistem Verifikasi Legalitas dan Kelestarian, SVLK</i>)</b>	A system to ensure the legality of forest status and forest products from Indonesia's forest for which the forest products are legally guaranteed and certified as sustainably managed.
<b>Forest Resource Royalty (<i>Provisi Sumberdaya Hutan, PSDH</i>)</b>	A levy that allows the State to capture a portion of the intrinsic value of forest products removed from the Forest Area.
<b>Forestry Partnerships (<i>Kemitraan Kehutanan</i>)</b>	Partnerships among local communities, forest managers, concession holders, service providers, holders of forest land-use rights and/or holders of primary forest industry business licenses.
<b>Grand Forest Park (<i>Taman Hutan Raya</i>)</b>	A type of nature conservation area intended to provide a variety of indigenous and/or introduced plants and animals for research, science, education, breeding enhancement, culture, recreation and tourism purposes.
<b>Gross Deforestation</b>	A loss of only natural forest cover, excluding the dynamic change (harvesting) of the man-made forest.
<b>Habitat Degradation</b>	The diminishment of habitat quality, which results in a reduced ability to support flora and fauna species. Human activities leading to habitat degradation include polluting activities and the introduction of invasive species. Adverse effects can become immediately noticeable, but can also have a cumulative nature. Biodiversity will eventually be lost if habitats become degraded to the extent that species can no longer survive.
<b>Indonesia's FOLU Net Sink 2030</b>	A systematic and integrated approach in the management of forest and other land-use sector toward emissions levels to -140 million tons of CO <sub>2</sub> e or net sink by 2030, which summarizes three fundamentals, namely sustainable forest management, environmental governance, and (forest) carbon governance.

<b>Limited Production Forest</b> ( <i>Hutan Produksi Terbatas, HPT</i> )	Parts of the Production Forest that have specific characteristics such as steep slopes, sensitive soil types, and high precipitation intensity that require less intensive management compared to the Permanent Production Forest ( <i>Hutan Produksi Tetap</i> ).
<b>National Park</b> ( <i>Taman Nasional</i> )	The most common type of nature conservation area. They possess native ecosystems managed through a zoning system and are intended to facilitate research, science, education, breeding enhancement, recreation, and tourism.
<b>Nature Conservation Area</b> ( <i>Kawasan Pelestarian Alam</i> )	A specific terrestrial or marine area whose main function is to preserve the diversity of plant and animal species, as well as to allow for the sustainable utilization of living resources and their ecosystems.
<b>Nature Recreation Park</b> ( <i>Taman Wisata Alam</i> )	A type of nature conservation area mainly intended for recreation and tourism purposes.
<b>Net Deforestation</b>	The change/reduction of forested land cover classes (natural and man-made forest) over a period of time that accounts for forest re-growth and forest plantations detected by satellite imagery over the same period of time.
<b>Non-tax State Revenue (PNBP)</b>	A levy paid by individuals or entities who obtain direct or indirect benefits from services or the utilization of resources and rights obtained by the State based on statutory regulations. It becomes Central Government revenue outside tax revenue and grants and is managed in the APBN mechanism.
<b>Other Use Area</b> ( <i>Areal Penggunaan Lain, APL</i> )	Public lands which are not designated as Forest Area.
<b>Peat</b>	A naturally occurring organic material produced from imperfectly decomposed plant residues that accumulates in swamp land, with at least 50 centimeters of thickness.
<b>Peat Ecosystem</b>	An area both in and around a peat swamp, which form a unity as a whole, and are necessary for maintaining balance, stability, and productivity.
<b>Peat Hydrological Unit</b> ( <i>Kesatuan Hidrologis Gambut, KHG</i> )	Peat ecosystem located between two rivers, between a river and the sea, and/or in a swamp area.
<b>Permanent Production Forest</b> ( <i>Hutan Produksi Tetap, HP</i> )	Production Forest that has characteristics such as fewer steep slopes, less sensitive soil types and less precipitation intensity, and may therefore be selectively logged or intensively managed through plantation forests.
<b>Production Forest</b> ( <i>Hutan Produksi</i> )	One of the three main classifications found in the Forest Area. Its main function is to provide forest products.
<b>PROPER</b> ( <i>Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan Lingkungan/</i> <i>Corporate Performance Rating Program for Environmental Management</i> )	A regulatory mechanism that can promote and enforce compliance with pollution control standards, encourage pollution reduction, introduce the concept of "clean technology", promote an environmental management system, and conduct business ethically through the implementation of community development.

<b>Protection Forest (<i>Hutan Lindung</i>)</b>	One of the three main types of Forest Areas. Its main function is to serve as buffer system, so that water systems can be regulated, floods can be prevented, erosion can be controlled, sea water intrusion can be prevented, and soil fertility can be maintained.
<b>REDD+</b>	Reducing Emissions from Deforestation and Forest Degradation, Role of Conservation, Sustainable Management of Forest and Enhancement of Forest Carbon Stock.
<b>Reforestation</b>	Forest and land rehabilitation in which the activity is carried out inside the Forest Area.
<b>Reforestation Fund (<i>Dana Reboisasi, DR</i>)</b>	Name of a volume-based fee collected on timber felled by natural forest timber concession holders, as well as the name of a Fund into which these fees are placed. The Reforestation Fund is used to finance reforestation and rehabilitation activities.
<b>Sanctuary Reserve Area (<i>Kawasan Suaka Alam</i>)</b>	A terrestrial or marine Conservation Area that has sanctuary as its main function and is intended to preserve plant and animal biodiversity, and ecosystems.
<b>Social Forestry</b>	Community-based sustainable forest management systems implemented within the Forest Area or titled forest/Adat Forest lands by members of local communities or Adat community groups, intended to facilitate improvements to the welfare, environmental balance and socio-cultural dynamics through establishment of Village Forests, Community Forests, Community Plantation Forests, Private Forests, Adat Forests and Forestry Partnerships.
<b>Strict Nature Reserve (<i>Cagar Alam</i>)</b>	A sanctuary reserve area where its plants, animals and ecosystems must be protected to allow natural interaction.
<b>Sustainable Development</b>	Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
<b>Village Forest (<i>Hutan Desa, HD</i>)</b>	A type of social forestry license that is managed by village-level authorities for the benefit and welfare of the village community.
<b>Wildlife Sanctuary (<i>Suaka Margasatwa</i>)</b>	An area that has a high level of species diversity and/or unique animal species, in which habitat management may be conducted in order to assure the continued existence of these species.

NOTE: The Glossary provides definitions for easy reading of this publication.

A photograph showing President Joko Widodo and Minister of Environment and Forestry Siti Nurbaya walking through a modern mangrove nursery. They are surrounded by rows of young mangrove plants in raised beds. The President is on the right, wearing a white polo shirt with a logo and blue jeans, gesturing towards the plants. The Minister is on the left, wearing a white button-down shirt, black pants, and sunglasses, also looking towards the plants. The background is a dense forest of mature mangrove trees under a blue sky with light clouds.

**President Joko Widodo and Minister of Environment and Forestry Siti Nurbaya visiting a modern mangrove nursery.**

**LOCATION**  
Ngurah Rai Forest Park, Denpasar, Bali

**PHOTO BY**  
Simon Dnggo (2022)



## CHAPTER 1

# Introduction

Indonesia is the largest archipelago in the world, with 63 percent of the total land area, or approximately 120.4 million hectares, designated as Forest Area. Despite only occupying 1.3 percent of the world's land area, Indonesia has the third-largest tropical rainforest after Brazil and Congo and an exceptionally high level of biodiversity, with 21 ecosystem types and 75 different vegetation types.

Indonesia's forests have become an integral component of the nation's identity and natural wealth, delivering a multitude of benefits to society, including ecological, economic, social, and cultural benefits. Forests play crucial role in microclimate regulation, such as temperature and humidity control, prevention of soil erosion, regulation of water and nutrient cycles, carbon sequestration and storage, oxygen generation, and maintaining ecosystem balance. Forests also provide production resources and environmental services that enable economic centers to expand businesses, absorb manpower, reduce inequality, and alleviate poverty, including the timber industry (such as furniture) and various non-timber products (such as resin, rattan, and agar wood), as well as a clean water supply and natural beauty (ecotourism). The existence of forests and their biodiversity, as well as the customs and local wisdom associated with nature, possess significant spiritual and cultural values. It teaches harmony and responsibility for God's creation, and protecting them is a form of respecting the Creator.



### Danau Kelimutu

#### LOCATION

Kelimutu National Park

#### PHOTO BY

Henggono Bayu (2023)

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Additionally, Indonesia's forests contribute greatly to the development of the non-forestry sector by providing space to fulfill national development needs such as infrastructure, food, medicine, and energy. Indonesia boasts a rich historical legacy of forest management, yet it grapples with a myriad of challenges that demand thoughtful and effective solutions to safeguard its forests for the benefit of both current and future generations.





## 1.1 History of Forest Management in Indonesia

The history of forest management in Indonesia is inseparable from the long journey of the Indonesian nation to understand and manage its natural resources. It is a complex struggle that involves various periods, policies, and changes to preserve forests, meet economic needs, and protect local communities. The historical journey reflects the transformation of policies and paradigms in natural resource management that continue to evolve.

Forest management in Indonesia has undergone several periods as follows: the pre-colonial era to the independence period, the new order era to post-reform, and the transition era to the present, which prioritizes the principles of sustainable forest management and job creation. Each period

was characterized by various changes in policies and approaches to forest resource management. This often represented the political, economic, and social dynamics of society at the time. From the pre-colonial era to the current era, policies, and approaches to forest management have undergone significant changes, which provide historical records and important lessons in the management and utilization of forest resources.

### Pre-Colonial Era

Before Dutch colonialism, which lasted for centuries, Indonesian society already had a traditional forest management system called *adat* (customary) forests or community forests under royal rule. This system was based on local values, *adat*, and tradition that governed the sustainable use of natural resources. The dominance of *adat* law was powerful as a reference in determining social relations between community members and in regulating how communities manage forests.

### Colonial Era

During the colonial era until 1945, the Dutch colonial government dominated power in natural resources management. In the early 19<sup>th</sup> century, the Dutch initiated the management of forests within their colonies, including those in Java, to meet their needs of timber for ships, buildings, and forts. During this period, deforestation occurred as a result of policies that permitted the conversion of natural forests for shipbuilding and permits to clear forest land for agricultural purposes. As a result, forests were transformed into sugarcane, coffee, and rubber plantations. Conflicts arising from forest management were resolved in accordance with the regulations of the Dutch colonial government.

### Post-Independence Era

After Indonesia gained independence in 1945, the Indonesian government inherited the Dutch colonial forest management system. However, there was a paradigm shift that emphasized the control and management of natural resources by the State. Forest management as part of natural resources management is based on the mandate of the Constitution<sup>1</sup>, which states that “the earth and water and the natural resources contained therein shall be controlled by the State and utilized for the greatest prosperity of the people”. The laws still used colonial-era regulations as long as they did not

contradict the ideals of independence. In this era, the politics of selling forest products during the colonial era was transformed into the politics of socializing the distribution of forest products. Forest management policy in this era was economically oriented to meet the requirements of both the State and the nation’s development interests. This system resulted in the marginalization of traditional forest management by communities around the forest.

The process of State control over forests continued with forestry planning activities, and in 1961, a government entity was established to manage land issues related to forests throughout Indonesia, namely a subsection of Forestry Planning, which in turn spawned a subsection of measurement and mapping (Department of Forestry, 1986). Since the forest area became the basic capital of the Forestry Service (the government organ dealing with forest issues), it required legal legitimization for its extent and status. The forest area was initially established on the basis of the Ministerial Decree of Agriculture<sup>2</sup> in 1962, with a designated forest area of 144.6 million hectares, encompassing distribution in Java of 2.9 million hectares (886 thousand hectares of teak forest and 2 million hectares of jungle forest) and beyond. According to the Forestry Almanac 1962/1971 published by the Ministry of Forestry in 1986, the designated forest area outside Java was 122.7 million hectares, with distribution in Sumatra (29.2 million ha), Kalimantan (43.5 million ha), Sulawesi (10.5 million ha), Bali (127 thousand ha), Lombok (144.6 thousand ha), Sumbawa (665.6 thousand ha), Flores (170 thousand ha), Sumba (110 thousand ha), Timor (200 thousand ha), Maluku (6.3 million ha), and West Irian (31.7 million ha).

### New-Order Era

During the New Order administration (1966-1998), the government issued a law<sup>3</sup> providing legal legitimacy to the State in exercising political control over forest areas.

<sup>1</sup> 1945 Constitution, Article 33 section (3)

<sup>2</sup> Ministerial Decree of Agriculture Number 73/Um of 1962

<sup>3</sup> Act Number 5 of 1987 on Basic Provisions on Forestry.

Forests that could not be proven to belong to anyone were considered State forests. Similar to the politics of forest management during the colonial era, the politics of forest management that the constitution mandated evolved into the politics of forest ownership. This law divides forests according to their property right regimes. State forests were considered 'forests' that grow on land under state property, while private forests are designated as forests that grow on land under private property.

The law established the foundations for forest management by the State, including the formulation of general plans, the determination of forest areas, and forest inventories. These fundamentals were then elaborated in a Government Regulation<sup>4</sup>, and a 1982 Ministerial Regulation of Agriculture to establish a forest boundary-setting consensus (TGHK). Based on the TGHK (1983), the land area in the province covered 193 million hectares. Forest areas were allocated as (1) 15.7% Protection Forest, (2) 9.7% Nature Protection and Preservation Area, (3) 18.81% Limited Production Forest, (4) 17.55% Permanent Production Forest, and (5) 15.61% Convertible Production Forest (Ministry of Forestry, 1986). The TGHK policy was the basis for the use of land space under State decrees and became a tool to implement the power agenda in forest management for the sake of development.

Government Regulation<sup>5</sup>, which marked forest utilization outside of Java and gave forest concession rights' permit holders a mandate and assurance of the implementation of forest concessions to increase State revenue, also strengthened the State's control over forests. At that time, the government also introduced the concept of forest conversion, which authorized the use of natural forests for non-forestry purposes, such as for agriculture, plantations, and housing. As a consequence, there was a massive acceleration of forest conversion to agricultural land and plantations outside Java.

Programs such as transmigration and the construction of transmigration roads outside Java also expanded access to inland areas and encouraged the conversion of natural forests.

### Post-Reform Era

After the fall of the New Order regime in 1998, there were efforts to reform forest management. In 1999, a law was issued<sup>6</sup> that authorized the government to regulate and manage all aspects related to forests, forest areas, and forest products (including planning, allocation, provision, and use of forests per their functions in providing benefits to the community and the State). The law also authorized the government to broadly regulate forest management, regulate legal interactions between people and forests, and regulate legal actions over forests.

In this era, State management of forests demonstrated an increased sense of justice for communities. The government recognized the significance of involving local communities in forest management through community-based forest management and the entitlements of *adat* forests. This era also brought about modifications pertaining to the decentralization of power from the central government to the local government. This grant the local government authority in forest management within their boundaries, including the issuance of forest utilization business licenses.

### Transition and Post-Job Creation Law (UUCK) Era

The governance of forest resource has undergone a fundamental transformation since 2015. The major change was the merger of the Ministry of Forestry with the Ministry of Environment into the Ministry of Environment and Forestry (MoEF). This integration has streamlined forest resource management with environmental management into a cohesive natural resource management system.

During this time, a landscape-based paradigm served as the foundation for the natural resource management system. Alignment with the community also expanded with a political commitment to

<sup>4</sup> Government Regulation Number 33 of 1970 on Forest Planning

<sup>5</sup> Government Regulation Number 21 of 1970 on Forest Concession Rights and Forest Product Levy Rights

<sup>6</sup> Law Number 41 of 1999 on Forestry

allocate legal access for the community. This period saw a fundamental reconfiguration of forest management through three basic principles, namely: (1) strengthening legal access for communities, (2) sustainable forest management and environmental approval management, and (3) multi-business in forest resource management.

In the first period of President Joko Widodo's administration, nine priorities of the five-year development plan known as Nawacita were established as a reference for future development. The priorities are outlined in the National Medium-Term Development Plan (RPJMN). One of the Nawacita priority programs in the RPJMN is to allocate 12.7 million hectares of forest area for social forestry, namely for community forests, village forests, community plantation forests, *adat* forests, and forestry partnerships.

The Job Creation Law (UUCK)<sup>17</sup>, has catalyzed changes in forestry governance. The UUCK clearly places social forestry as the forestry sector's flagship program related to the creation of new jobs and is expected to be a significant solution to unemployment at local levels. In the UUCK, social forestry is specifically regulated in Articles 29A and 29B. Thus, social forestry has entered a new phase of recognition by the State in terms of regulations, in which it is now regulated at the law level whereas previously it was regulated by government and ministerial regulations.

## 1.2 Environmental and Social Challenges during the Last Decade

Forest management, which is a crucial component of natural resource management in Indonesia, has encountered a variety of environmental and social challenges for nearly a decade since 2015. If the challenges are not addressed appropriately, they can have a substantial impact on the sustainability of the forest and its utilization.

### Environmental Challenges

Both globally, and in Indonesia, the main environmental issues putting pressure on forest resources and ecosystem sustainability are known as the triple planetary crisis: climate change, biodiversity loss, and environmental pollution. All three are interrelated and urgently need to be addressed. As an archipelago country with high forest resources and biodiversity, not to mention its strategic geographical and climatological location in the tropics, Indonesia is highly vulnerable to the impacts of climate change. Climate change significantly reduces biodiversity. Increasing temperatures, changing rainfall patterns, and rising sea levels can disrupt natural ecosystems and lead to migration, population decline, or even extinction of certain species. Climate change also impacts ecosystem balance and species interactions. Pollution, especially in the form of industrial waste, domestic waste, and agricultural waste, can harm biodiversity. Water and soil pollution can damage ecosystems and threaten the existence of aquatic species and biota, while air pollution can influence habitat quality and the health of flora and fauna.

Deforestation and forest degradation are major factors affecting climate change and biodiversity decline. Forest and land fires are also a serious challenge every year in Indonesia, especially when they occur on peatlands. In addition to causing economic and public health losses, fires also cause large GHG emissions, which contribute to global climate change and biodiversity loss.

Unsustainable logging, such as for agricultural expansion and infrastructure development, leads to the loss of natural

<sup>17</sup> Law Number 6 of 2023 on the Stipulation of Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law, replacing Law Number 11 of 2020 on Job Creation (UUCK) which was later repealed by Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law

habitats for numerous species of flora and fauna. Uncontrolled conversion and land use alteration have a detrimental impact on ecosystems, resulting in habitat destruction that can result in isolated populations of species, disruption of migration routes, and restricted access to resources required by flora and fauna. Excessive exploitation can threaten the viability of biodiversity, ultimately causing harm to the national economy.

Natural resource exploitation, such as mining and large-scale plantation expansion, continues to threaten the sustainability of forests and their ecosystems. Land clearing for these economic activities is frequently conducted without consideration for sustainable environmental consequences. Additionally, conflicts between economic interests and environmental conservation can lead to tensions between private sector, local communities, and other stakeholders.

Animal trafficking, poaching, and the illegal trade in plant and wildlife species contribute significantly to biodiversity loss. Many species, such as Sumatran tigers, Javan rhinos, and endangered birds, are subject to illegal poaching to satisfy the demand for illegal markets, both within Indonesia and abroad. This practice is destructive to populations of these species and threatens their survival.

### Social Challenges

The issue of agrarian conflict between the *adat* communities, local farmers, and corporations continue to pose a serious challenge to forest management in Indonesia. For example, competition for land use between plantation companies and the *adat* community, as well as local communities, frequently results in complex social conflicts. The varying interests of the parties involved in forest management pose a distinct obstacle. There are numerous instances in which local communities encounter injustice in the recognition of their land rights and are embroiled in disputes with corporations claiming land for agricultural or plantation development.

On the contrary, numerous local communities situated within the vicinity of forests continue to experience impoverishment. They often rely on forests for their livelihood and daily needs. Unsustainable forest management may put their survival in danger.

Furthermore, only a limited number of communities around forests have direct access to forest management. Their involvement in forest management is usually limited to empowerment programs, through which the welfare of the community has not been fully rewarded. Their income is still not enough to improve their welfare. It is very common for some of them to feel excluded from their living environment. This not only leads to potential forest tenure conflicts, but it can also lead to encroachment of forest areas, which may trigger deforestation and illegal conversion of forest areas to other uses.

Over the past decade or so, the management of forests in Indonesia has demonstrated an ongoing struggle to implement corrective measures to address intricate environmental and social challenges.

Social forestry is one of the government's programs that aims to alleviate poverty in communities situated around forests through a policy of equitable access to forest resources for groups of communities around the forest, utilizing agroforestry patterns. The implementation of agroforestry patterns serves to enhance land cover, optimize the productivity of forests and agricultural commodities, develop product processing to add value for farmers, and thereby contribute to community welfare. The initial challenge of the social forestry program is to alter public perception of the program's importance and its potential for successful State forest management, as it was previously granted to corporations, but is now being extended to communities.

### 1.3 Policy Development in Forest Management

Forest management policy by the State has a long and complex history since it also regulates the access of business actors and communities to forests. Forests, as natural resources that support people's lives, have provided various benefits for people's needs. Forest management by the State is an effort to allocate forest utilization and use of forest areas to obtain benefit from forest resources. Eventually, regulating and managing forests will result in achieving forest sustainability.

In response to increasingly complex environmental and social challenges and to provide optimal benefits to the community from forests, the Government of Indonesia has made several forest-related policy changes. Forestry development over the past decade has undergone many transformations, both at the level of basic and operational policies, as well as on-site implementation within the framework of good governance. Corrective actions and collective actions have also become stronger in environmental and forestry development.

The policy transformation reflects the government's efforts to improve sustainable forest management, protect the environment, and overcome various challenges. However, the implementation of these policies often faces challenges related to cross-sectoral coordination and effective law enforcement.

The government continues to strive to improve the effectiveness of forest management through various new policies. These policies include a moratorium on new licenses for primary natural forest and peatland clearing, the cautious prevention of forest and land fires, forest landscape management through multi-business in forestry, the social forestry program, peat and mangrove governance, and efforts to reduce GHG emissions from the forestry sector, including the Indonesian's FOLU Net Sink 2030 initiative.

#### Moratorium on New Licenses for Primary Natural Forest and Peatland Clearing

To curb deforestation and forest degradation, the Government of Indonesia enacted a moratorium policy that temporarily freezes new logging licenses in primary natural forests and peatlands, allowing time to evaluate forest conditions and develop more sustainable management plans. The policy has been in place since 2011 under Presidential Instruction<sup>3</sup>, which was later extended by several Presidential Instructions<sup>4</sup>.

In 2019, the President decided to make the moratorium permanent by issuing Presidential Instruction<sup>5</sup>. The policy aimed to complete various efforts to improve and refine ongoing forest and peatland governance. Continuous efforts were needed to save the existence of primary natural forests and peatlands and to reduce emissions from deforestation and forest degradation.

#### Prevention of Forest and Land Fires

At the beginning of President Joko Widodo's administration, the government issued a Presidential Instruction<sup>6</sup>, to prevent, suppress, and handle post-fire or forest and land recovery. In addition, the President also encouraged the strengthening of cross-agency coordination (central and local), increased community/stakeholder participation, and law enforcement against perpetrators involved in land and forest burning, whether individuals or legal entities.

Five years later, another Presidential Instruction<sup>7</sup> was issued, which became a reinforcement for ministries/institutions and local governments to reduce the spike

<sup>3</sup> Presidential Instruction Number 10 of 2011 on Moratorium of the Issuance of New Licenses and Governance Improvement of Primary Forests and Peatlands

<sup>4</sup> Presidential Instruction Number 6 of 2013; Presidential Instruction Number 8 of 2016; Presidential Instruction Number 8 of 2017

<sup>5</sup> Presidential Instruction Number 5 of 2019 on Termination of the Issuance of New Licenses and Governance Improvement of Primary Forests and Peatlands

<sup>6</sup> Presidential Instruction Number 11 of 2016 on Improvement of Forest and Land Fire Control

<sup>7</sup> Presidential Instruction Number 3 of 2020 on Forest and Land Fire Management

in the number of forest and land fires. The President also directed that permanent forest and land fire prevention efforts be realized. This included three main efforts. The first was to always conduct climate and weather analyses by monitoring weather movements, then develop them in regional analyses in locations prone to forest and land fires to determine the operational location of weather modification (artificial rain). Second, conduct operational control through an integrated task force involving MoEF, BNPF, BPPT/BRIN, BMKG, TNI, POLRI, Ministry of Home Affairs, local governments, and neighboring communities. The task of this task force is to conduct early detection as well as to perform readiness to suppress, both on the ground and in the air, including dissemination and law enforcement.

The third effort is through landscape management or land use, such as coaching land concession owners and forestry businesses, including engaging traditional agriculture that often sets fires for land clearing or post-harvest. There is also consideration for controlling peatlands in industrial plantation forest concessions and palm oil plantations, which are typically the largest locations for forest and land fires, especially in Sumatra and Kalimantan. MoEF is also working with the Peat Restoration Agency for non-concession areas.

### Forest Landscape Management through Multi-Business in Forestry

The government continues to improve forestry governance to optimize the use of forest areas. This step continues to be carried out through a paradigm shift in forest resource management from timber-oriented to landscape management. This is as stipulated in the UUCK, Government Regulation on Forestry Management<sup>25</sup>, and relevant ministerial regulation of environment and forestry<sup>26</sup>. In implementing the paradigm

shift in forest resource management, the concept of "five pillars" of sustainable forest management must be adhered to, namely: (1) area certainty, (2) business assurance, (3) productivity, (4) product diversification, and (5) competitiveness.

Multi-business in forestry is a new policy innovation in forest management as a strategic measure to optimize forest area utilization and improve the investment climate. It simplifies business licensing from one permit for one activity to one business license with multi-business. Forestry multi-business activities include area utilization, environmental service utilization, timber forest product utilization, non-timber forest product utilization, levy of timber forest product, and levy of non-timber forest product.

Multi-business in forestry is believed to be able to maintain land cover while increasing the economic value of forests to increase forest productivity, increase non-tax State revenue (PNBP), increase exports of forest products, and create jobs.

### Social Forestry Programs

Community-based forest management is an important focus in forest management policy, by providing recognition and support for local communities, especially *adat* communities, to manage forests traditionally and sustainably. This is stated in the UUCK, government regulations, and ministerial regulations<sup>27</sup>. The social forestry program is a sustainable forest management system implemented in the State forest area or *adat* forest, carried out by local communities or *adat* law communities as the main actors to improve community welfare in the governance of synergies between economy, ecology, and social in the form of schemes: village forest, community forest, community plantation forest, *adat* forest, and forestry partnership.

Social Forestry is a national priority program to utilize forests sustainably for the welfare of the people. The President's directive on land rights and access assurance under

<sup>25</sup> Government Regulation Number 23 of 2021 on Forestry Management

<sup>26</sup> Ministerial Regulation of Environment and Forestry Number 8 of 2021 on Forest Administration, Formulation of Forest Management Plan, and Forest Utilization in Protection and Production Forests

<sup>27</sup> Ministerial Regulation of Environment and Forestry Number 8 of 2021 on Social Forestry Management

social forestry is the basis for resolving land tenure issues. The key is legalizing access to forest management by communities. Social forestry is not only a solution to tenure issues, but also a catalyst for community economic development. The program is anticipated to absorb labor, increase income through forest product businesses, and create economic centers, both local and regional.

In addition, the government has issued a Presidential Regulation<sup>46</sup> to accelerate social forestry management. The point is to facilitate collaboration and synergy between various parties in achieving the target of distributing access to social forestry management. It includes support from the governor/regent to include the social forestry program in the RPJMD so that the APBD can allow funding for social forestry. Likewise, village funds are now available to support funds for social forestry.

There are several new policies related to increasing community participation in forests. Such as the special management forest area (KHDPK) program in Java and forestry partnerships for community activities within PBPH management areas (concession partnerships), where legal access has improved the economic and social conditions of the community.

### Peat and Mangrove Governance

The government launched a peatland restoration program to restore damaged peatland ecosystems and reduce the risk of fires, covering the rehabilitation of degraded peatlands, restoration of hydrological functions, and sustainable peat management. In addition, the Peatland Restoration Agency (BRG) was established through Presidential Regulation<sup>47</sup> with the main role to accelerate peatland restoration due to forest and land fires.

In addition to peat, mangroves are wetland ecosystems that are essential for climate change mitigation. To protect and restore the function of mangrove ecosystems,

the government then extended the BRG's tenure and added its duties to rehabilitate mangrove ecosystems by issuing the Presidential Regulation<sup>48</sup> on the Peat and Mangrove Restoration Agency (BRGM). The establishment of BRGM is an important step in the effort to protect and restore Indonesia's fragile peat and mangrove ecosystems. It is hoped to contribute significantly to environmental conservation and ecosystem sustainability.

### Indonesia FOLU Net Sink 2030

To encourage policy implementation and concrete measures to reduce GHG emissions, Indonesia set a target to achieve a net sink condition in the forestry and other land use (FOLU) sector by 2030. The target is also to fulfill the Nationally Determined Contribution (NDC) as a manifestation of the Paris Agreement and support net-zero emissions as a contribution to the global climate change agenda. This is in line with Indonesia's more ambitious vision in the Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR) 2050.

Indonesia's FOLU Net Sink 2030 is mandated in a Presidential Regulation<sup>49</sup>, underscoring forestry as the main sector to support GHG emissions reduction. Forestry serves as a carbon sink through a carbon net sink approach.

This program implements four main strategies: (1) avoiding deforestation, (2) conservation and sustainable forest management, (3) peatland protection and restoration, and (4) increased carbon sequestration. To support the implementation of FOLU Net Sink 2030, the government issued a ministerial decree<sup>50</sup> for climate change control.

<sup>46</sup> Presidential Regulation Number 120 of 2020 on the Peatland and Mangrove Restoration Agency

<sup>47</sup> Presidential Regulation Number 99 of 2021 on the Implementation of Carbon Pricing to Achieve the Nationally Determined Contribution Target and Control Over Greenhouse Gas Emissions in the National Development, Article 3 section (4)

<sup>48</sup> Ministerial Decree of Environment and Forestry Number 388 of 2022 on Indonesia's Forestry and Other Land Use (FOLU) Net Sink 2030 for Climate Change Control

<sup>49</sup> Presidential Regulation Number 28 of 2023 on Integrated Planning for the Acceleration of Social Forestry Management

<sup>50</sup> Presidential Regulation Number 1 of 2018 on the Peatland Restoration Agency



The FOLU sector will achieve a net sink with sequestration of 140 million tons of CO<sub>2</sub>e, continuing to increase up to 304 million tons of CO<sub>2</sub>e. This sector plays a crucial role in offsetting emissions from other sectors that face constraints in reducing their emissions, particularly the energy sector. The FOLU sector's ability to maintain the net sink from 2030 onwards is vital for Indonesia to achieve its net zero emissions (NZE) target by 2060 or sooner.

#### 1.4 Dynamics of Economic and Social Issues

Over nearly a decade of environmental and forest development, there have been significant economic, ecological, and social results and impacts on the progress of the Indonesian nation. The indicators of the accomplishment of environmental and forestry development include, among others, the decreasing rate of deforestation (the rate of deforestation recently has been the lowest in the history of Indonesian forestry), controlled forest and land fires, a decrease in tenorial conflicts, an increase in investment value and state revenue from the forestry sector, strengthened and increased community access and involvement in forest management, and an enhanced contribution of Indonesia to global climate change efforts.

##### Economic Development

The non-tax state revenue (PNBP) generated by the forestry sector is of considerable magnitude, amounting to IDR 20.7 trillion or USD 1.7 billion between 2018 and 2023. The sources of PNBP in the forestry sector stem from the payment of the reforestation fund (DR), forest resources provision (PSDH), forest utilization business licensing fee (IPBPH), fines for forest exploitation violations, and stumpage compensation (GRT). From 2018 to 2023, the foreign exchange from timber forest products was recorded at USD 75.3 billion dominated by paper, pulp, veneer, wood furniture, and handicrafts. Meanwhile, non-timber forest products were valued at IDR 171.6 billion during 2018 to 2023, primarily comprised of fruits and tubers, forest gum,

seeds, among others.

To enhance the competitiveness of Indonesian forestry products in the international market, the government has devised a national assurance system for timber legality that is affordable, accountable, credible, and acceptable to the global market, which is known as Sustainability and Legality Assurance System (SVLK). The system is designed to strengthen the export performance of forest products and promote national certification system in facing global trade challenges. To maintain and improve the forestry industry's well-conditioned performance, the government encourages the forestry industry to immediately acquire timber legality certificates (SLK), especially for those who do not yet have SLK. SLK is expected to increase competitiveness in the global market. The government has the authority to provide financial assistance for timber legality certification for forestry Micro, Small, and Medium Enterprises (MSMEs) in groups, as mandated by the ministerial regulation<sup>24</sup>. Up to the end of 2023, the MoEF has provided SVLK facilitation to 1,075 MSMEs.

Besides the forestry industry, conservation areas can also support national economic interests while maintaining their main function as protection areas. The economic achievement of conservation areas can be measured by the amount of PNBP from the utilization of environmental services and wild plants and animals (TSL). As of 2023, the revenue of this PNBP was IDR 185.75 billion. The export value of TSL utilization from captive breeding in 2023 was IDR 1.73 trillion. Within the period of the last ten years, conservation areas have contributed economic value through PNBP of IDR 1.32 trillion from the utilization of environmental services, with the total economic value in a multiplier effect estimated to far exceed this value. Over the last ten years, the state foreign exchange revenue from the utilization of TSL has exceeded IDR 79 trillion, or an average of IDR 7.9 trillion per year.

<sup>24</sup> Ministerial Regulation of Environment and Forestry Number 8 of 2021 on Forest Administration, Formulation of Forest Management Plan, and Forest Utilization in Protection and Production Forests

### Social Development


Social forestry is a community empowerment program designed to promote economic equality. It seeks to reduce inequality through three pillars: distribution of land access, business opportunities, and community capacity building. Forest farmer groups can be involved in the utilization of forest areas through social forestry agreements. There are several types of social forestry, including community forest, village forest, community plantation forest, *adat* forest, and forestry partnership. The provision of access to social forestry areas is based on the indicative map and social forestry area (PIAPS), which has been allocated 15.4 million hectares. Until December 2023, the achievement of social forestry was 6.4 million hectares, with 9,719 units for 1.2 million households.

The government continues to encourage business development in groups that have received management approval. It is intended to increase independence and welfare by establishing business groups (KUPS), following the potential of each area. The KUPS is a success criterion for social forestry business governance. A total of 10,249 KUPS have been formed with blue (46.1%), silver (44%), gold (9.4%), and platinum (0.5%) criteria, with total economic transactions

reaching IDR 1.1 trillion.

Forestry partnership activities provide legal access for communities to carry out activities in the forest, in compliance with laws and regulations. Communities may carry out agricultural, plantation, fishing, and other activities, as long as they do not decrease the land cover. Forestry partnership activities aim to enhance the economic viability and standard of living of the community while safeguarding the forest.

Socially, conservation areas provide many contributions with intangible values. The provision of diverse goods and services from conservation areas may not necessarily be deemed economically valuable. However, these achievements can be seen through the participation and improvement of the community's productive economy. Village communities around conservation areas are provided with assistance and access to the utilization of conservation area services. Furthermore, since 2018, there has been a scheme to utilize goods and services from conservation areas for the community under social forestry in the form of a conservation partnership.



**A baby of Long-tailed Macaque  
(*Macaca fascicularis*).**

Despite being classified as globally endangered by the IUCN Red List, macaques in Indonesia are facing issues of overpopulation.

**LOCATION**  
Baluran National Park, Situbondo Regency, East Java

**PHOTO BY**  
Iskandar (2021)

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## CHAPTER 2

# Indonesia's Forest Landscape and Biodiversity

### 2.1 Current State of the Indonesia's Forests

Indonesia is the 14<sup>th</sup> largest country in the world, with land area of 191.4 million hectares. In Indonesia, there are 17,504 islands, the largest archipelago country in the world. Sixty-three percent of its total land area, or about 120.4 million hectares, is forest area. The remaining land is a non-forest area, known as other use area (APL) (Figure 2.1).

**Figure 2.1**  
Indonesia's Forests by Use Designation



KSA	Kawasan Suaka Alam (Sanctuary Reserve Area)
KPA	Kawasan Pelestarian Alam (Nature Conservation Area)
HL	Hutan Lindung (Protection Forest)
HP	Hutan Produksi Tetap (Permanent Production Forest)
HPT	Hutan Produksi Terbatas (Limited Production Forest)
HPK	Hutan Produksi yang Dapat Dikonversi (Convertible Production Forest)

SOURCE: KLHK, 2019, Data up to December 2017



### View of Plawangan Senaru of Mount Rinjani

**LOCATION**  
Rinjani National Park, West Nusa Tenggara

**PHOTO BY**  
Zulfayandi (2023)



Forest and marine conservation zones are established in accordance with the Ministerial Decree of Environment and Forestry on the Forest and Marine Conservation Areas in Indonesia. Indonesia's forest and marine conservation areas are approximately 125.7 million hectares. Indonesia's forest area is classified into production forest (HP) of 68.8 million hectares, conservation forest (HK) of 22.1 million hectares (including an additional 5.3 million hectares of water/marine conservation areas), and protection forest (HL) of 29.5 million hectares based on their functions.

Conservation forests are classified into sanctuary reserve areas (KSA) and nature conservation areas (KPA). Sanctuary reserve areas (KSA) consist of strict nature reserves (CA) and wildlife sanctuaries (SM), while nature conservation areas (KPA) consist of national parks (TN), nature tourism parks (TWA), and grand forest parks (Tahura). Both sanctuary reserve areas and nature conservation areas encompass land-based and aquatic regions collectively; these KSA/KPA cover a land area of approximately 22.1 million hectares, while their aquatic regions cover an area of around 5.3 million hectares.

One of the famous conservation areas in Indonesia is Komodo National Park, which is home to the Komodo dragon (*Varanus komodoensis*), a rare and unique species, and a UNESCO World Heritage Site. Among Indonesia's famous marine conservation areas are Bunaken Marine National Park, Wakatobi Marine National Park, and Raja Ampat Marine Conservation Area.

Of the total 125.7 million hectares of forest area, approximately 106 million hectares have been designated as Forest Area. The Ministry of Environment and Forestry plans to complete the designation of the remaining 20 million hectares to reach 100 percent forest area, as mandated by the law<sup>22</sup>.

The Indonesian Government has been working through the Agrarian Reform Program to resolve forestry conflicts and increase public participation in forest management. The target resource provision of Lands for Agrarian Reform (TORA) in the Forest Area is 4.1 million hectares, with progress and realization currently reaching 2.9 million hectares.

Production forests consist of 29.2 million hectares of Permanent Production Forests (HP), 26.8 million hectares of Limited Production Forests (HPT), and 11.1 million hectares of Convertible Production Forests (HPK). Indonesia's forest monitoring data for 2022 show that the forested land area of the entire Indonesian landmass is 96 million hectares or 51.2 percent of the total land area, of which 92 percent or 88.4 million hectares is within the forest estate. More information on Indonesia's area covers in 2023 can be seen in Table 2.1.

Analysis of forest cover change from 1990 to 2023 shows that while deforestation rates in Indonesia have been highly dynamic, they have been steadily declining in recent periods. This promising trend reflects significant progress in reducing net deforestation rates over the decades. A more detailed explanation of deforestation is discussed in Chapter 3.

## 2.2 Biodiversity of Indonesia's Forests

Biodiversity is defined as life forms at all levels of an ecosystem, from molecules to species (DeLong, 1996). This includes the diversity of taxonomy, function, genetics, kinship of living things (phylogenetics), and the chemistry of types of living things. The Convention on Biological Diversity defines biodiversity as the different levels of organization and interaction of organisms. Each species has diverse functions contributing to a delicate ecological balance (Dasgupta, 2021).

Nash (2022) used the Global Biodiversity Index to assess and rank the richness of biodiversity in 201 countries worldwide. According to the publication, Indonesia ranks second as the most biodiverse country. Based on data compiled from various sources, Indonesia has 1,723 bird species, 383 amphibians, 4,813 species of fish, 729 mammals, 773 reptile species, and 19,232 vascular plant species.

**Table 2.1**  
Indonesia's Forests Cover in 2023

No.	Land Cover	Forest Area (thousand hectares)							Non-Forest Area	TOTAL	%
		Permanent Forest					HPK	TOTAL			
		HK	HL	HPT	HP	TOTAL					
I	Forested	17,581	24,043.7	21,888.0	19,171.9	82,664.6	5,604.9	88,369.5	7,871.8	96,231.4	51.2
	A. Primary forest	11,715.7	15,501.7	9,401.1	4,640.3	41,258.8	2,212.7	43,471.5	1,883.1	45,354.6	24.0
	B. Secondary forest	5,759.5	8,290.6	12,059.9	10,361.8	38,471.8	3,448.3	39,920.1	39,920.1	45,527.9	24.2
	C. Plantation forest	105.9	251.3	407.1	4,169.8	4,934.1	33.9	4,968.0	580.9	5,548.9	3.0
II	Non-Forested	4,263.4	5,252.2	4,918.6	10,008.6	24,440.9	5,392.8	29,833.7	61,873.6	91,707.3	48.8
	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	100.0

<sup>22</sup> Law Number 6 of 2023 on the Stipulation of Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law

**BOX 2.1 | Moyo Satonda National Park, a Pristine Gem Nestled in Indonesia's Natural Treasures**

Embark on an adventure through the captivating landscapes of Moyo Satonda National Park, located within the SAMOTA Biosphere Reserve encompassing Moyo Island in Sumbawa District, West Nusa Tenggara Province, Indonesia, under purview of the Ministry of Environment and Forestry. Spanning over 31,200.15 hectares, this natural wonderland serves as a sanctuary for many life forms. Moyo Island is a haven for 30 bird species, nine of which are classified as protected species.

Enter the park's interior to experience its rich biodiversity and see exotic animals roaming freely among the lush vegetation. Encounter majestic Timor deer, elusive wild boars, and agile gray monkeys while above, the skies come alive with the graceful flight of Bondol and Hawk Eagles.

The mesmerizing Mata Jitu Waterfall, a cascading masterpiece that graces the land with its ethereal beauty, is enchanting you. Its waters, said to fall precisely into seven pristine pools below, have attracted visitors from far and wide, including the esteemed Princess Diana, who bestowed the title of 'Queen's Waterfall.'

Dive deeper into the park's mysteries to discover the tranquil waters of Satonda Island's Crater Lake. Amidst the verdant splendor, this lake lies a living testament to ancient microbial life, silently documenting the passage of millennia.

Delve into the secrets of Satonda's Crater Lake, where ancient stromatolites whisper tales of a bygone era. Witness the gradual formation of these remarkable structures, crafted over millennia through the delicate dance of coccoid cyanobacteria.

Explore the lake's intriguing metamorphosis as it undergoes a transformation marked by increasing alkalinity and dwindling calcium content. Unravel the intricate web of geological and biological interactions that shape its unique ecosystem, offering a window into the primordial seas of ancient times.

As you stand in awe before the still waters of Satonda's Crater Lake, contemplate the mysteries of nature and the timeless rhythm of existence. Let the echoes of ancient life guide you on a journey of discovery, where every ripple tells a story of creation and evolution. [Contributed by the MoEF/UNDP-GEF CONSERVE Project]

The biogeographical position and tropical climate of Indonesia contribute to its extensive species diversity. Indonesia is located in the Malesiana, a floristic region with the highest number of flowering plants in the world (Whitmore, 1984). This region is rich in animal species, including Oriental (mainland Asian) animals of the Sunda Shelf, Australian animals of the Sahul Shelf, and animals of the Wallacea Sub-region (Raes & van Welzen, 2009).

As a country with high levels of biodiversity, Indonesia supports and is committed to preventing the extinction of various types of flora and fauna. Through the Act on Conservation of Biological Natural

Resources and Their Ecosystems<sup>23</sup>, the Government of Indonesia seeks to ensure the preservation of ecological processes that reinforce life support systems for sustainable development and human welfare, to ensure the preservation of the diversity of genetic resources and ecosystem types, and to control the use of biological natural resources while ensuring sustainability.

The Indonesian government determines the protection status of species diversity for the protected species. Species protection is determined based on the Ministerial

<sup>23</sup> Act Number 5 of 1990 on Conservation of Biological Natural Resources and Their Ecosystems.

## BOX 2.2 | Protecting Wildlife: Concrete Steps for Species Conservation

New identifications of wild plants and animals' species are refreshing news in the world of biodiversity conservation. Three exciting new species have been announced: *Hanguana sitinurbayai*, *Myzomela irianawidodoae*, and *Bulbophyllum wiratnoi*.



In another significant advancement, a baby Sumatran rhino (*Dicerorhinus sumatrensis*) was born, marking an important milestone in wildlife conservation efforts. The female calf was born to a mother named Ratu at the Sumatran Rhino Sanctuary in Way Kambas National Park (SRS TNWK) on Saturday, 30 September 2023. This brings the total number of successfully breeding Sumatran rhinos in SRS TNWK to four, including Andatu (2012), Delilah (2016), Sedah Mirah (2022), and Ratu's third calf, Andalas (2023).

The Ministry of Environment and Forestry through the East Kalimantan Natural Resources Conservation Centre (East Kalimantan BKSDA) is committed to conserving Sumatran rhinos in Kalimantan, using the latest Assisted Reproductive Technology (ART). The process of retrieving eggs (oocytes) from a female rhino named Pahu, based in the Kalimantan Rhino Sanctuary in Kelian Kutai Barat, East Kalimantan, was carried out on Tuesday, 31 October 2023, with the next step being delivery to the IPB University Laboratory in Bogor, West Java.

Regulation of Environment and Forestry Regulation<sup>24</sup>, which lists 904 species of wild plants and animals as protected species.

The protection of plants and wildlife habitats is carried out by establishing conservation areas. Currently, there are 568 conservation areas covering an area of around 27 million hectares, which is the last bastion of biodiversity protection. Various conservation efforts outside natural habitats (ex-situ conservation) are carried out, such as captive breeding of wild plants and animals, the establishment of wildlife rescue institutions, and ongoing efforts to maintain

wildlife pathways (animal corridors) outside conservation areas, especially in an area with forest utilization permits (PBPH). The Indonesian government is also pursuing semi-natural conservation management for some critically endangered species, such as the Sumatran Rhino. This effort is implemented in natural areas, i.e., the Sumatran Rhino Sanctuary facility in Way Kambas National Park.

Indonesia continues to develop conservation efforts through scientific research and increase the identification of new species through exploration and expeditions in blank spots. Further exploration and expeditions are needed to identify and catalogue the potential of biodiversity in Indonesia.

<sup>24</sup> Minister of Environment and Forestry Regulation Number 108 of 2018 on the Second Revision of Ministerial Regulation of Environment and Forestry Regulation Number P.20/MENLHK/SETJEN/KUM.1/8/2018 on Types of Protected Species of Plants and Animals





### A new species of *Hanguana sitinurbayai*

Identified by Agusti Randi, Wiwied Widodo, and Sadtata Noor in 2023, the species was named after the Minister of Environment and Forestry of the Republic of Indonesia, Siti Nurbaya.

#### LOCATION

Gunung Nyiut Strict Nature Reserve, West Kalimantan

#### PHOTO BY

BKSDA West Kalimantan (2023)

More than 90 new species of wild plants and animals were identified between 2021 and 2023 through a collaboration between the Ministry of Environment and Forestry (MoEF) and the National Research and Innovation Agency (BRIN). The identification of several new species, including *Hanguana sitinurbayai* from Gunung Nyiut Nature Reserve, West Kalimantan, specifically named after the Indonesian Minister of Environment and Forestry, Siti Nurbaya, has been published in the international journal *Phytotaxa*. This gives hope to the species conservation amid the threat of deforestation to the existence of plants and animals.

### Biodiversity Management and Environmental Protection

Indonesia's high biodiversity is found in its various ecosystems, including terrestrial, marine, and aquatic ecosystems, which display complex ecological diversity, including diversity within species, between

species, and its ecosystems. However, conservation challenges are increasingly pressing. Therefore, strong efforts are needed to manage biological resources maintaining effectively, their existence while also caring for and improving the quality of their diversity and values. The goal of the conservation of biological resources and ecosystems is to realize the sustainability of these natural resources and maintain the balance of the ecosystem, which later will support the improvement of community welfare and the quality of human life.

In order to safeguard the ecological functions and diversity of wild plant and animal species, conservation efforts within protected areas should consider carrying capacity and long-term sustainability.

The forest utilization permits (PBPH) mechanism allocates a portion of the area for protection, which accounts for approximately 20 percent of Indonesia's total PBPH area. The arrangement of PBPH working areas cover cultivation or production areas, including

protected areas. According to government regulation<sup>25</sup>, protected areas are designated with the main function of protecting natural resources and related infrastructure.

Protected areas include various types of areas designed to protect the environment, including protected forest areas, peat land, water catchment, coastal borders, rivers, lakes, and reservoirs. They also include wildlife and marine reserves, and nature reserves, mangrove forests, national and marine parks, botanical forest parks, and nature and marine tourism parks. Cultural and scientific reserves, geological reserves, groundwater recharge areas, and germplasm protection areas are also included. In addition, there are also animal refuge areas, coral reefs, as well as coastal conservation areas, small islands, maritime waters, and corridors for protected species of animals or marine biota. The total protected area allocated by PBPH is 5.3 million hectares, equivalent to about 20 percent of PBPH working area in Indonesia of 33.6 million hectares.

To ensure the status and sustainability of forests, PBPH holders are subject to administrative sanctions for violations, following the provisions of relevant laws and regulations, including written warnings, administrative fines, suspension of license, and revocation of license. These provisions are stipulated under the law<sup>26</sup> and its derivative regulation, the Ministerial Regulation of Environment and Forestry<sup>27</sup>.

### 2.3 Challenges in Biological Diversity Conservation in Indonesia

Conservation efforts are observed through protection, preservation, and utilization activities, covering almost all aspects, efforts,

**Figure 2.2**

Proboscys monkey or Bekantan (*Nasalis larvatus*)



**LOCATION**

Rantau Buta, Pasir District - East Kalimantan

**PHOTO BY**

Fandy Muhammad (2022)

and activities of biodiversity conservation. Protection of life-support systems is carried out through the establishment and management of conservation areas, biosphere reserves, and other forms of ecosystem protection. Biodiversity preservation efforts are carried out based on species diversity and genetic diversity. Sustainable utilization is carried out on the existing biodiversity potential, and by promoting the SSU (save, study, use) approach. Utilization efforts are carried out with great care, given the irreversible existence of biological resources. Species utilization and genetic policy are defined jointly with the scientific authorities in Indonesia.

Conservation area designation in certain areas is an implementation of the protection, preservation, and utilization strategy. Conservation areas are divided into Sanctuary Reserve Areas (KSA) and Nature Conservation Areas (KPA). The difference in both areas can be seen in their functions. KSA covers protection and preservation functions, while KPA covers all three functions, including utilization. Therefore, KPA is a conservation area that can be utilized for economic purposes. The protection aspect of the life-support system can be applied by

<sup>25</sup> Government Regulation Number 22 of 2021 on the Implementation of Environmental Protection and Management

<sup>26</sup> Law Number 41 of 1999 on Forestry and Law Number 18 of 2013 on Prevention and Eradication of Forest Destruction, as amended by Law Number 8 of 2023 on the Stipulation of Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law

<sup>27</sup> Minister of Environment and Forestry Regulation Number 8 of 2021 on Forest Administration, Formulation of Forest Management Plan, and Forest Utilization in Protection and Production Forests

adopting the biosphere reserve system, where the conservation area is the core and the surrounding cultivation area is a buffer area that is interrelated with the core area.

In terms of human life, biodiversity is a provider of essential ecosystem services, such as energy, water, air, food, aesthetics, culture, and economic interests. Optimizing conservation efforts is expected to have a positive impact on the preservation of nature, as well as improving the welfare and quality of human life. Conservation efforts also greatly impact microclimate stability, and climate change mitigation generally. In terms of biodiversity, conservation efforts have an impact on reducing the rate of extinction and destruction of nature.

Inadequate economic circumstances may render potential conservation area resources susceptible to exploitation, particularly if accessibility is high. The success of conservation efforts is highly dependent on the community's economic welfare, which is reflected in their level of economy and education. In addition, equitable regional development, especially infrastructure, is also an important supporting factor in conservation. A concrete problem that is still faced on-site is the illegal utilization of natural resources, such as poaching, illegal logging, and illegal land use.

In general, anthropogenic factors—particularly the human population, economic conditions, educational attainment, and culture—have a significant impact on the challenges of biodiversity protection in

Indonesia. Tenure conflicts, human-wildlife interactions, lack of landscape-based management, and lack of infrastructure at the site level are some of the challenges that must be overcome. In 2023, there were 749 documented cases of wildlife conflict management, with a focus on five specific species: Sumatran elephants (273 cases), estuary crocodiles (127 cases), Sumatran tigers (75 cases), sun bears (65 cases), and long-tailed monkeys (57 cases). The overlap of animal habitats with human-occupied areas and habitat degradation as a result of resource extraction were the main causes of conflicts.

In conservation area management, various conservation partnerships and community empowerment efforts involve local communities as management partners. Academic institutions, non-governmental organizations, and individuals who actively participate in supporting these initiatives all support conservation knowledge development efforts. Citizen science is also growing in Indonesia, especially in campaigning, awareness-raising, and biodiversity mapping. In the meantime, the community makes extensive use of biological natural resources for commercial purposes through licensing and cooperation programs.

A penta-helix strategy that involves the government, academics, communities, businesses, and the media also strengthens conservation efforts. This approach is necessary given the complexity of conservation aspects. Conservation efforts must be directed through collective



**Sugar Cane Orchid  
 (*Grammatophyllum  
 speciosum*)**

**LOCATION**

Rantau Buta, Pasir District - East Kalimantan

**PHOTO BY**

Fandy Muhammad (2022)

awareness and collective action. An increased level of concern for nature conservation will ease the cost burden on the government in conservation efforts with minimal costs. Some successes in conservation efforts have been achieved through the penta-helix approach, such as the management of the Bukit Tiga Puluh Ecosystem in Jambi and efforts to address the impacts of economic development on biodiversity in Riau Province. Across Java, the level of community awareness of conservation has improved considerably.

Now and in the future, biodiversity conservation priorities will soon be aligned with the goals and targets of the Kunming-Montreal Global Biodiversity Framework (KM-GBF), as the strategic plan of the UN Convention on Biological Diversity (UN-CBD). This scheme has bound the Indonesian

government to achieve it until 2030. There are four goals and 23 targets that CBD-ratifying countries must fulfill by 2030. Simultaneously, the Indonesian government is finalizing the formulation of the Indonesian Biodiversity Plan and Action Plan (IBSAP), the national guidance for implementing KM-GBF. The Indonesian government will soon officially publish the post-2020 IBSAP. One of the main indicators of the success of the Indonesian government's conservation efforts is the expansion of conservation areas to cover 30 percent of the total administrative area, as well as an increase in scores on the Red List Index. The hope for the future of Indonesia's biodiversity conservation is to preserve Indonesia's nature for future generations.

### BOX 2.3 | Legacy of Giants: Elephant Conservation in Aceh

In Aceh, the northernmost province of Sumatra, there is an inspiring story of elephant conservation in its fertile landscape. Aceh is home to around 600 of the surviving 924 to 1,359 surviving Sumatran elephants, providing protection for this Sumatran elephant population. With an area of 3.5 million hectares, Aceh's forests are an essential habitat for wildlife, including tigers, rhinos, and orangutans.

The Ulu Masen and Leuser Ecosystem is home to the famous Leuser National Park, an important landscape in Aceh's conservation efforts. These areas are global centers of biodiversity, demonstrating the importance of Aceh's role in preserving wildlife. However, the analysis shows an urgent need to address human-elephant conflict, with around 63 percent of elephant habitats showing the potential for conflict.

Despite facing many challenges, Aceh remains steadfast in its conservation commitment. The 17-year moratorium on deforestation shows substantial effort to protecting elephant habitat. Presidential Instruction Number 1 of 2023 marks a historical milestone in conserving Indonesia's biodiversity, particularly by benefiting efforts to conserve Aceh's elephants.

In Aceh, 1,700 forest rangers and 18 community forest guard organizations lead conservation efforts alongside the Aceh BKSDA to mitigate human-elephant conflicts and protect wildlife. Despite facing challenges, Aceh adapts strategies, including crop cultivation and advanced technology. The Ministry of Environment and Forestry (MoEF) manages the CONSERVE project, promoting landscape management and engaging stakeholders across sectors.

As for the long-term solution, Aceh also established an elephant sanctuary in a controlled in-situ habitat, and landscape-based conservation strategies offering hope for the future. This initiative aims to foster harmony between humans and elephants while preserving natural heritage. Amid adversity, Aceh shines as a glimmer of hope, where conservation and community welfare unite for a brighter future. [Contributed by the MoEF/UNDP-GEF CONSERVE Project]

## 2.4 Social and Economic Contributions of Forest Resources

Forest resources management through social forestry programs, particularly community forests (HKm), has affected positively on the social and economic conditions of communities around the forest. The program has contributed to increased production, income, labor absorption, and knowledge of surrounding communities. Through HKm, the production of forest products and environmental services increases, which in turn helps forest farmers escape poverty and increases labor absorption. Research by Kuncoro et al. (2018) highlights the positive economic effects of social forestry practices in Lampung and Yogyakarta, such as increased production, income, and labor absorption, and decreased levels of farmer poverty. In social terms, social forestry programs have also improved community knowledge about community forests and encouraged the development of local institutions, especially cooperative institutions, while also promoting positive behaviors within the community.

The distribution of legal access to social forestry has a significant economic impact by involving thousands of groups and hundreds of thousands of households. Socially, it helps reduce conflicts and gives farmers legitimacy in utilizing forests legally, thus increasing comfort in doing business, and providing hope for sustainable economic benefits.

Social forestry programs aim to improve access to forests, which were previously dominated by private companies and state-owned enterprises. Prior to 2015, private businesses and state-owned enterprises controlled the majority of forest access while communities only had access to four percent. The social forestry program has set a goal of increasing the amount of community-managed forest to 12.7 million hectares, which would represent 30 percent of Indonesia's total forest area. The success of the social forestry program is largely determined by factors such as the legalization of access to forest management by communities, support and facilitation from the government, partnerships between the government, communities, and the private sector; and the adoption of sustainable management models.

The objective of the social forestry program is to enhance community welfare through empowerment based on forest sustainability. Social forestry, in principle, is a means of poverty eradication for forest communities, with a model that creates harmony between welfare improvement and environmental conservation. To support this, the government grants legal access to communities, allowing them to utilize forest resources for a period of 35 years.

This is in line with the government's program to increase village capacity in the Village Development Index (IDM). The role of Social Forestry Business Group (KUPS) contributes to increasing the IDM value. For example, Wanagiri village in Buleleng improved from the developing category to advanced, and Kalirejo village in Kulonprogo improved from advanced to independent. The factor causing the increase in IDM scores in these two villages is the role of KUPS in advancing the economy.

Despite its positive impacts, the program faces challenges such as limited access to raw materials, tenurial conflicts, and technological limitations. In order to overcome these challenges, it is necessary to implement measures to improve access to capital and technical facilities, resolve tenurial conflicts, and adopt more efficient technologies. As part of the effort to accelerate social forestry management, the government has issued a policy innovation by issuing a Presidential Regulation<sup>28</sup>.

Social forestry aims to preserve forest sustainability, with over 10,964 KUPS actively managing this effort. MoEF has not only streamlined the licensing process but also enhanced the efficiency of environmental monitoring. It is achieved by shifting the burden from entrepreneurs to the government and incorporating standardization into the Online Single Submission Risk Approach system. The government has also implemented an environmental approval system that uses standard forms to simplify documentation and ensure compliance with environmental standards.

<sup>28</sup> Presidential Regulation Number 28 of 2023 on Integrated Planning for the Acceleration of Social Forestry Management

MoEF facilitates licensing for low- and medium-risk activities, enabling completion of the automated process in less than two hours. By 2023, 848,802 such permits had been issued. Monitoring 1,247 business entities across various regions has resulted in recommendations for improvements and initiatives to enhance compliance. MoEF, through the Agency for Standardization of Environment and Forestry Instruments, also classifies environmental management standards in social forestry as low or medium-low risk.

## 2.5 Revenue from Forest Sectors

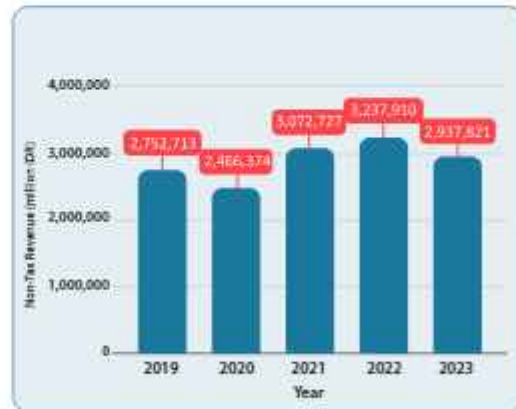
### Non-Tax State Revenue and Sustainability and Legality Assurance System in Forestry

The Ministry of Environment and Forestry plays a pivotal role in contributing to State revenue, which in turn supports national development. This is achieved, among other ways, through Non-tax State Revenue (PNBP). In accordance with the law<sup>22</sup>, the PNBP from MoEF, among others, is derived from the Forest Resources Provision (PSDH) and Reforestation Fund (DR). This fund is the consequence of the utilization of timber forest products, non-timber forest products, and environmental services derived from forests. The Business actors, such as permit holders for forest utilization (PBPH), timber-product utilization from non-forestry activities (PKKNK), and social forestry, are responsible for paying this state revenue.

The Non-Tax State Revenue (PNBP) received from the utilization of forest resources (PSDH and DR) in the last five years (2019 to 2023) amounted to IDR 14,467.55 billion. This indicates the significant role of forest resources in Indonesia's development, especially in the forestry sector (see Figure 2.3).

**Figure 2.3**

Non-Tax State Revenue from PSDH and DR



One source of PNBP from forest utilization for environmental services is through carbon trading imposed on carbon sequestration and storage activities in forest areas. The value of PNBP is regulated by the government regulation<sup>23</sup> at 10 percent of the carbon transaction value. This PNBP is deposited through the Non-Tax State Revenue Information System (SIPNBP). The management and organization of the carbon levy from the forestry sector are effective and allow for reuse for Indonesia's forestry development. The flow diagram of PNBP from carbon trading in the forestry sector is shown in Figure 2.4.

Carbon trading transactions involve two main types of trading—emissions offset and emissions trading. Carbon trading can be conducted by parties having business licenses for forest utilization. Each trading transaction must be reported and is liable to pay PNBP based on the government regulation.

Payment of forest utilization PNBP is online based through self-assessment using Non-Tax State Revenue Information System (SIPNBP), and the payment amount is based on a reference price regulated under government

<sup>22</sup> Law Number 9 of 2019 on Non-Tax State Revenue and Law Number 11 of 2021 on Job Creation, as later amended by Law Number 6 of 2023

<sup>23</sup> Government Regulation Number 12 of 2014 on Types and Tariffs of Non-Tax State Revenue Applicable to the Ministry of Forestry

**Figure 2.4**  
The Flow Diagram of Non-Tax State Revenue from Carbon Trading



regulation and Minister of Environment and Forestry Regulation<sup>24</sup>.

PNBP payments from carbon trading transactions are made through the SIPNBP application with billing issuance. Parties with forest utilization business permits can make payments through various methods, including bank tellers, ATMs, mobile phones, or internet banking. In the future, these transactions will be included in the PNBP of Forest Resources Revenue (PSDH and DR), which can later be shared between the producing local government and the central government and eventually used for forestry sector development.

A significant challenge has been the unsatisfactory forest product reference prices since 2017 due to the lack of reliable and continuous data on market prices. Therefore, it is necessary to develop a web-based payment system using the latest market price data to improve efficiency and transparency. The

Presidential Regulation<sup>25</sup> mandates the use of a web-based pricing reference (si-PATOK) as a means of providing a sense of justice for business actors and the government, thereby enabling an equitable optimization of PNBP.

The Ministry of Environment and Forestry is responsible for optimizing PNBP and monitoring economic activities in the forestry sector. This includes determining Forest Resources Provision and Stumpage Compensation, creating norms, standards, procedures, and criteria tools for reference prices used to evaluate forest utilization PNBP, developing a user-friendly pricing reference information system, mapping out how PNBP goals will be spread out by region or province, and making predictions on how much forest utilization PNBP will be achieved through the si-PATOK. Changes to the market intelligence-based pricing reference information system were carried out in stages: short-term (three months), medium-term (up to 12 months), and long-term (more than one year), with optimal results achieved in the long-term stage. The use of si-PATOK

<sup>24</sup> Ministerial Regulation of Environment and Forestry Number P.64/MENLHK/SETJEN/KUM.1/12/2017 on Establishment of Forest Product Pricing Reference for the Calculation of Forest Resource Provisions and Stumpage Compensation

<sup>25</sup> Presidential Regulation Number 95 of 2018 on Electronic-based Government System (SPBE)

enables the Ministry of Environment and Forestry to monitor economic activities in the forestry sector with greater efficiency and accuracy, thereby facilitating the optimization of PNBP collection in accordance with the predetermined price reference.

The development of sustainability and legality assurance system (SVLK) is founded upon three main principles: good governance, representativeness, and credibility. The government assumes the role of regulator, with a multitude of stakeholders engaged in the assessment and verification procedures, including the National Accreditation Committee (KAN), business entities and their representative organizations, and independent observers, including non-governmental organizations and academic institutions. SVLK comprises two distinct certifications: the Certification of Sustainable Forest Management (S-PHL) and the Certification of Forest Product Legality (SLHH). Those who have obtained a PBPH for natural forest timber utilization activities have been awarded the S-PHL certification for sustainable forest management. The objective of the timber legality certificate (SLK) is to ensure that timber products are legally sourced, from the point of extraction through to the point of sale. This encompasses the timber industry, log yards/TPT-KB, handicraft, and household industries, as well as exporters.

SVLK implementation has improved forestry governance in Indonesia, including increasing transparency and availability of public information, deregulating permits in local government, increasing management practices, and achieving better compliance. As of December 2023, 3,756 enterprises have obtained certificates of the legality of forest products.

Since its inception in 2013, SVLK has significantly contributed to Indonesia's forestry sector, reaching its highest export value of USD 14.21 billion in 2022, then USD 13.17 billion in 2023. Micro, Small, and Medium Enterprises (MSMEs) have been required to follow the SVLK since 2013. To increase their participation, MSMEs have been assisted by donor agencies, NGOs, and community associations. Indonesia remains the first and

still the only country to implement a legality verification system and is fully compliant with the European Union-Forest Law Enforcement, Governance and Trade (EU-FLEGT).

The development of SVLK is inseparable from the role of local governments in encouraging SVLK implementation. Several districts have issued district-level regulations related to the implementation of the system, including Jepara, Jombang, Klaten, and Buleleng. China, Laos, Myanmar, Malaysia, Thailand, Cambodia, Vietnam, Ghana, and Japan are just a few of the nations that have acknowledged the system's efficacy. SVLK, which initially focused on timber legality verification, has evolved into the Forest Legality and Sustainability Verification System, reflecting Indonesia's commitment to sustainability. This significant enhancement, launched at UNFCCC COP 26 in 2021, serves to illustrate the government's commitment to ensuring the long-term sustainability of the forestry sector. The implementation of SVLK not only supports PNBP revenue fairly and sustainably, but also increases exports of processed forest products. SVLK implementation contributes to increasing demand for certified forest products, encourages responsible and sustainable business practices, and strengthens regulatory compliance.

### **Economic Growth and PNBP Contribution from the Conservation Forest**

The export value of forest products from TSL and Bioprospecting in 2023 reached IDR 9.9 trillion, with an upward trend in export value averaging IDR 8.8 trillion (about USD 571.4 million) per year over the previous decade. Figure 2.5 presents the export value of TSL utilization over the past ten years.

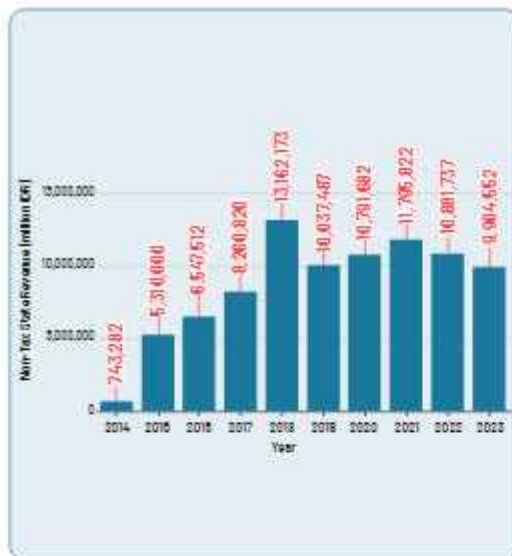
In addition to exports, the conservation forest also contributes to the economy through the generation of PNBP from environmental services and TSL. The total PNBP in 2023 reached IDR 185.7 billion (about USD 12 million), comprising IDR 157.4 billion (about USD 10.2 million) from the utilization of environmental services in conservation areas and IDR 28.3 billion (about USD 1.8 million) from the utilization of TSL. Revenue



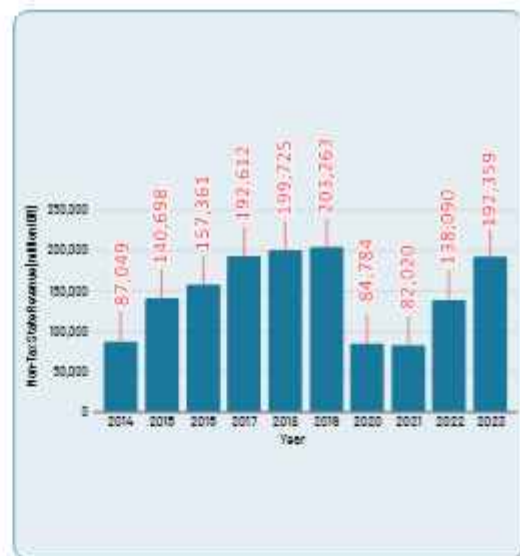
from the utilization of environmental services is derived from seven sources, namely: (1) entrance fees for natural tourism objects, (2) business license fees for the provision of natural tourism facilities, (3) business fees for the provision of natural tourism facilities, (4) business fees for water utilization, (5) business fees for water energy utilization, (6) business fees for the provision of natural tourism services, and (7) business revenue fees for the provision of natural tourism services. In contrast, the PNBP from the utilization of TSL is derived from domestic utilization and

foreign utilization revenues. The value of PNBP derived from environmental services and TSL utilization over the past decade is presented in Figure 2.6. It can be observed that the PNBP revenue has decreased during the COVID-19 pandemic, with a notable decline in revenue from the utilization of natural tourism services. In 2023, the value of PNBP has not yet reached the level observed in 2019 (prior to the onset of the COVID-19 pandemic).

**Figure 2.5**  
 Export Value from TSL Utilization



**Figure 2.6**  
 PNBP from Environmental Services and TSL Utilization





**Kaliwanggo River near the border of  
Indonesia and Papua New Guinea**

LOCATION

Wasur National Park, South Papua

PHOTO BY

Wasur National Park Office (2023)



## CHAPTER 3

# Deforestation and Environmental Challenges

### 3.1 Deforestation in Indonesia

#### Responsibility of Forests Management

The existence of forests needs to be maintained at its best, to ensure the continuity of providing functions and benefiting all Indonesian people. Forests have essential environmental, social, and economic functions and benefits, acting as a buffer for people's lives.

The government has the responsibility to manage forests. The law<sup>23</sup>, which is then elaborated in government regulation<sup>24</sup>, states that the government is responsible for determining and maintaining the adequacy of forest area and forest cover for each watershed, and island to optimize environmental, social, and economic benefits for local communities.

<sup>23</sup> Law Number 41 of 1999 on Forestry, as amended by Law Number 6 of 2023 on the Stipulation of Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law

<sup>24</sup> Government Regulation Number 23 of 2021 on Forestry Management



#### Biras Bathing Pool

##### LOCATION

Wasur National Park, South Papua

##### PHOTO BY

Wasur National Park Office (2023)

#### Challenges and Policy on Deforestation Management

A major challenge in maintaining forest area and forest cover is controlling land cover change to ensure the preservation of adequate forest coverage. The forest cover within and beyond the forest area is subject to considerable change. However, the condition of the forest in several locations in Indonesia is indicative of a decline in quality or reduction in area. To ensure that every change in forest area throughout Indonesia is recorded, monitoring forest cover changes and the



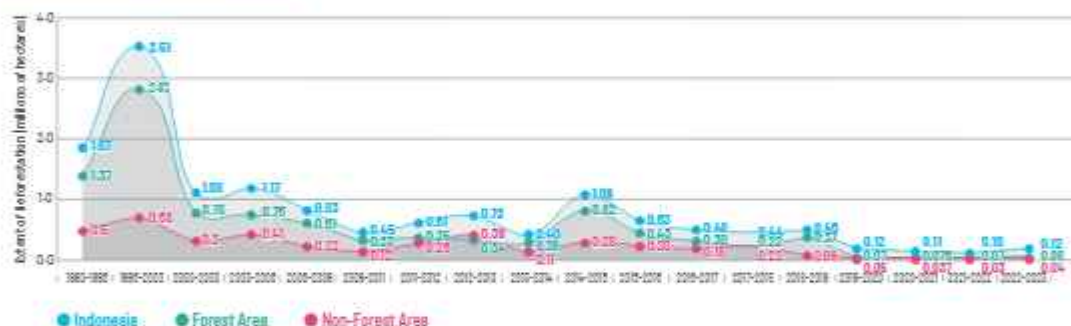
occurrence of deforestation and reforestation continues on an ongoing basis so that these changes can be followed up with appropriate policies.

The Ministry of Environment and Forestry consistently monitors Indonesia's deforestation rate, using 1990 as a baseline. Analysis shows that while deforestation rates have been dynamic, they have generally declined in recent years. The net deforestation rate decreased from approximately 1.9 million hectares per year in 1990-1996 to around 113 thousand hectares per year in 2021-2022. However, in 2022-2023, deforestation increased slightly to around 133 thousand hectares, influenced by fires and El Niño effects.

According to forest cover monitoring results from 2020 to 2021, Indonesia's net deforestation rate in 2021-2022 was 8.4 percent lower than in 2020-2021.

Deforestation increased by 16.4 percent in 2023, largely due to fires and other environmental impacts associated with El Niño, but remains much lower than in 2015 and 2019. Although deforestation increased in 2023, it was initially feared that the rate would be much higher due to the El Niño year. Nevertheless, the impact of anthropogenic forest fires has been subdued due to various factors, including relatively strong law enforcement. In addition, as in the previous period, the dynamics of forest cover in forest areas show a varied distribution in various functions of forest areas. Indonesia's deforestation trend 1990-2023 can be seen in Figure 3.1. In 2022-2023, deforestation in primary and secondary forests totaled 133,833 hectares. After accounting for forest plantations, net deforestation was 121,103 hectares (see Table 3.1).

**Figure 3.1**  
Indonesia's Deforestation Trend



In accordance with the observed deforestation rate, the results of Indonesia's Land Cover Recalculation can be used to observe the dynamics of the proportion of forested land area to Indonesia's land area on an annual basis.

**Table 3.1**  
Indonesia's Net Deforestation (2022-2023)

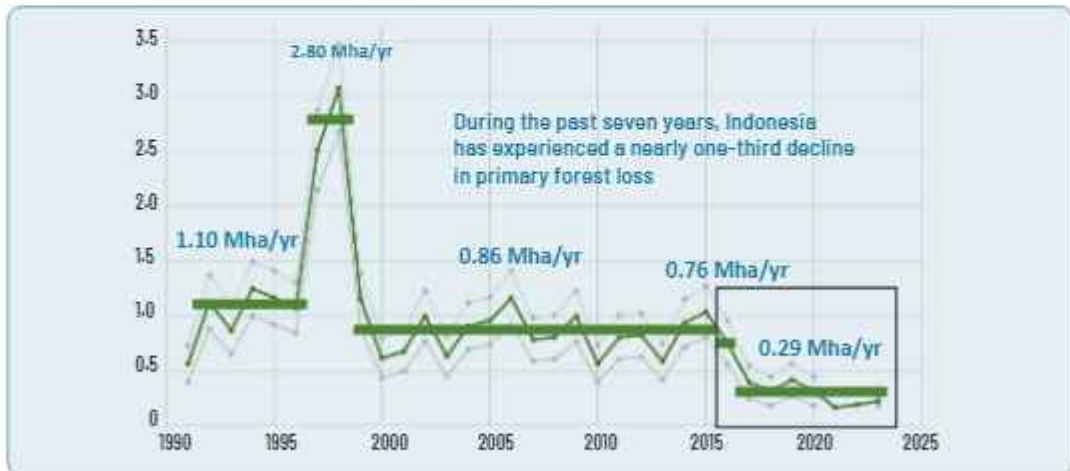
NO.	FOREST TYPE	FOREST AREA (thousand hectares)							APL	GRAND TOTAL
		PERMANENT FOREST					HPK	TOTAL		
		HK	HL	HPT	HP	SUB-TOTAL				
1	Deforestation in Natural Forest (A+B)	4,498.2	6,073.6	17,962.8	50,308.1	78,842.6	5,756.9	84,598.5	49,234.9	133,833.4
	A-Primary Forest	857.5	1,849.5	2,850.2	1,839.8	7,447.0	248.4	7,695.4	1,539.1	9,234.5
	B-Secondary Forest	3,640.7	4,224.0	15,112.6	48,468.3	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
2	Net Deforestation (A+B+C)	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

\* Plantation forests within conservation and protection forest areas are not classified as Industrial Plantation Forests (IUPHK-HT)

In a side event at the 19<sup>th</sup> Session of the United Nations Forum on Forests (6-20 May 2024), Prof. Matthew Hansen of Maryland University USA revealed that deforestation in Indonesia has declined significantly over the past decade (see Figure 3.2), despite using different analytical methodologies. The use of parallel and consistent charts

has also demonstrated a notable reduction in deforestation rates in Indonesia (Figure 3.2), which can be corroborated using IPCC methods. Additionally, he posited that the consistent and significant decrease in deforestation could be attributed to effective policy interventions and robust monitoring capabilities within the country.

**Figure 3.2**  
Estimated Annual Primary Forest Loss in Indonesia (Mha)



Note. According to Hansen, et al, (2024)

### BOX 3.1 | Deforestation

Deforestation is the conversion of forests to other land uses or the long-term reduction in tree canopy cover below a 10 percent threshold (FAO, 2000). The FAO's use of "long-term" is debatable and complicated for Indonesia, a country with fast rate of vegetation regrowth.

The Ministerial Decree of Forestry No. 30 of 2009 defines deforestation as the "permanent alteration from a forested area into a non-forested area as a result of human activities." The definition of deforestation as "permanent alteration" helps highlight the importance of natural forests. Areas of natural forests with temporary de-stocking, which then experience regeneration, do not count as having undergone deforestation. The definition nevertheless takes account of the fact that, in most cases in Indonesia, natural forest cover that has been changed (cleared) to become non-forested land rarely grows back into natural forest. Such areas are most typically utilized for non-forest purposes. Other significant anthropogenic activities will most likely stop any forest regeneration that does take place after succession stages in such locations.

The definition of deforestation in this document as a one-time permanent conversion of natural forest cover into other land cover categories was selected for the sake of practicality, simplicity, and the clarity it lends to land cover class identification and classification processes.

The related term "gross deforestation" was introduced in a 2008 Indonesia Forest Climate Alliance (IFCA) document. It counts only what has been lost (cleared natural forests) and does not take into consideration the possibility of forest regrowth (both naturally and by human intervention), nor carbon sequestration from forest regrowth. Gross deforestation is different from "net deforestation" where re-growing secondary forests and forest plantations are counted (The Ministry of Environment and Forestry, 2016).

Numerous factors affect how the land cover is changing. The most significant drivers of land cover change and forest area reduction in Indonesia are the conversion of forest areas to fulfill land needs for development other sectors, especially plantations, agriculture, and settlement/transmigration development. Furthermore, the reduction in forest area is attributable to a number of other factors, including the illicit trade in timber (illegal logging), the utilization of forest resources in a manner that fails to adhere to sustainability principles, encroachment and the occupation of forest areas, forest fires, and the impact of natural disasters.

The government has implemented a number of strategies to address deforestation. One such strategy involves intensified coordination among ministries, agencies, local governments, and institutions related to forest and land management. Furthermore, all governors and regents were instructed to suspend the granting of new licenses in primary natural forests and peatlands in accordance with Presidential Instruction<sup>28</sup>,

<sup>28</sup> Presidential Instruction Number 10 of 2011 on Moratorium of the Issuance of New Licenses and Governance Improvement of Primary Forests and Peatlands

### BOX | 3.2 Moratorium of New Issuance of Concession Licenses

The first milestone of Indonesia's Moratorium Policy occurred at the UNFCCC Conference of the Parties (COP) 13 in Bali 2007. Soon after, the Government introduced a new regulatory measure restricting any new concession license in primary forests and peatlands, widely known as the "moratorium policy." This moratorium policy was legalized through a Presidential Instruction in 2011, temporarily suspending the issuance of new concession licenses in primary forests. The Presidential Instruction was for a period of, and was renewed, every two years, until 2017. Each Presidential Instruction has been implemented by the issuance of Moratorium Map by the Minister of Forestry (since 2014, the Minister of Environment and Forestry), and this map had been revised every 6 months. In 2019, the Presidential Instruction No. 5 of 2019 permanently stopped the issuance of new licenses in primary forests and peatlands. This last Presidential Instruction aimed to further improve the governance of primary forests and peatlands. This means the moratorium on the issuance of new licenses in primary natural forests and peatlands is permanent, and the Moratorium Map is fixed, even though revisions will be undertaken every six months to accommodate any exceptions, as stated in the Presidential Instruction. The moratorium will be "permanent," until primary forest and peatland governance is improved.

Indonesia's decision to make the moratorium permanent was based on the following considerations:

1. The continued stability of the size of the area under moratorium since 2017, about 66 million hectares;
2. A significant decline in the deforestation rate (in 2017, deforestation stood at only 38 percent of what it was in 2011);
3. To optimize existing concession licenses based on forest concession-related policy directives since 2011;
4. Moratorium areas' contribution to NDC targets through the REDD+ mechanism and it may receive REDD+ result-based payments through the Environmental Fund Management Agency; and
5. To simplify administrative processes by not having to renew the moratorium every two years.



which was subsequently extended through three Presidential Instructions<sup>36</sup>. In order to implement the Presidential Instruction more effectively and to enhance the governance of primary natural forests and peatlands, a further Presidential Instruction was issued in 2019. This instructed the termination of new licenses and the improvement of governance of primary natural forests and peatlands.

Subsequently, the Minister of Environment and Forestry established the Indicative Map on the Termination of the Issuance of New License for Primary Natural Forests and Peatlands (PIPPIB) as an implementation of the Presidential Instruction. Since 2021 onwards, adjustments to the nomenclature were made in accordance with the relevant law<sup>37</sup> and government regulations<sup>38</sup>. This resulted in the Indicative Map on the Termination of the Issuance of New Business License, Approval for the Use of Forest Areas, or Revision of Forest Area Allotment in Primary Natural Forests and Peatlands, while the PIPPIB acronym was retained. In accordance with this policy, the issuance of new license within the PIPPIB area is prohibited until such time as improvements in the governance of natural forests and peatlands have been implemented. The policy of delaying or halting new license represents an ongoing effort to protect primary natural forests and peatlands and to continue reducing emissions from deforestation and forest degradation.

Following the implementation of the PIPPIB policy, the Indonesian government consolidated all deforestation-reduction policies under the Indonesia's FOLU Net Sink 2030 initiative. This policy places the FOLU (Forest and Other Land Use) sector under the purview of the Ministry of Environment and Forestry for adjustment. It is anticipated that this integrated approach will result in a reduction of emissions levels due to deforestation or other factors related to

FOLU, which is expected to be lower than the level of sequestration in 2030. To facilitate the implementation of this FOLU policy, it is essential to prioritize the continuous monitoring and analysis of deforestation.

International support for reducing deforestation includes Indonesia's commitment to the GHG emissions reduction agreement. Given the far-reaching consequences of deforestation, the issue is not merely a domestic concern but also globally. A number of initiatives have been implemented at the national level with the objective of reducing the rate of deforestation. These have subsequently been formalized into international agreements.

Indonesia's involvement in the deforestation reduction is predicated on Indonesia's international commitment to reduce GHG emissions. The Bali Action Plan's publication at the 13<sup>th</sup> Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) in Bali served as proof of this commitment. Further discussions were held at the 15<sup>th</sup> Conference of the Parties (COP) in Copenhagen, the 16<sup>th</sup> COP in Cancun, and the 21<sup>st</sup> COP in Paris. This has resulted in a number of adverse effects on various human activities. One of the strategies to reduce GHG emissions, which are increasingly affecting life on Earth, is controlling deforestation.

<sup>36</sup> Presidential Instruction Number 6 of 2013, Presidential Instruction Number 8 of 2015, and Presidential Instruction Number 6 of 2017 on Moratorium of the Issuance of New Licenses and Governance Improvement of Primary Natural Forests and Peatlands

<sup>37</sup> Law Number 11 of 2020 on Job Creation

<sup>38</sup> Government Regulation Number 23 of 2021 on Forestry Management

### 3.2 Addressing Indonesia's Deforestation

In Indonesia, activities that contribute to deforestation include the conversion of forest areas for other sectors (e.g., for plantations and transmigration), unsustainable forest management, illegal logging, forest fires, and illegal activities in forest areas.

The conversion of forested land into non-forested land without permits represents a forestry crime that is one of the primary causes of deforestation in Indonesia. The utilization of forest areas without applicable permits (non-procedural utilization forest area) driven by economic motives, with forest areas being converted into mining, plantations, or other activities. Furthermore, unplanned deforestation, such as illegal

logging, represents another form of forestry crime in forest areas. Deforestation may occur as a result of forest fires, particularly during prolonged periods of drought and typically during the process of land clearance for replanting. To rapidly combat forest and land fires, the MoEF law enforcement authority seals off burning sites in forest areas and other land use areas for further investigation. Fires within forest concessions or plantations is categorized as a crime with strict liability that applies to the concession holder or plantation company under Indonesian law.

Efforts to prevent and overcome threats and disturbances to forest areas that cause deforestation are carried out through a combination of preemptive, preventive, and



**Sealing-off the crime scene in the company concessions, as the first step in law enforcement for forest and land fire crimes**

**LOCATION**  
Palangka Raya, Central Kalimantan

**PHOTO BY**  
Gakkum KLHK (2023)

repressive measures. Prevention strategies against forestry crimes are implemented through the dissemination of information, the active involvement of communities in the vicinity of forests, the strengthening of the forest ranger, and the establishment of paralegal services. Additionally, conservation partnerships are employed to enhance the effectiveness of these strategies.

Prevention of forest fires is achieved through the provision of forest fire fighting facilities and infrastructure to the local community and hotspot monitoring at concessions through intensive satellite imagery. Furthermore, direct supervision is conducted to guarantee the preparedness of concessions in forest areas for the prevention of forest fire hazards.

The objective of securing forest areas is to control deforestation by reducing and securing disturbances to the forest area. This is achieved through a number of different initiatives, including routine patrols, enhanced efficiency at resorts, expanded capacity of forest rangers, and the allocation of sufficient budgetary resources. These efforts are based on the collection of data and information on potential threats and disturbances that may occur in forest areas.

The failure to implement effective forest rehabilitation has resulted in a significant increase in the extent of critical land, which has in turn led to an acceleration in the rate of deforestation. Furthermore, the impact of deforestation contributes to the overall deterioration of the environment. In Indonesia, deforestation rates in Indonesia are highly dynamic, emphasizing the importance of continuous monitoring to provide accurate information for policymaking. The data on deforestation rates from year to year demonstrate consistent patterns, thereby reinforcing the necessity for sustainable monitoring to ensure that relevant and timely information is available for decision-making.

### 3.3 Relevant Policies, Regulations, and Law Enforcement

#### Forestry and Environmental Law Enforcement

Since 2015, the Government of Indonesia has established a special working unit under the auspices of the MoEF to address law enforcement issues. The unit was specifically established to deal with forest-related crimes. It is given broad tasks and authority, including handling complaints, supervision, conducting security operations in forest areas, applying administrative sanctions, filing civil lawsuits, and enforcing criminal law. The Ministry of Environment and Forestry has consistently implemented these law enforcement efforts over the past nine years, intending to ensure the continuity of deforestation control. These law enforcement efforts are intended to eradicate the various offenses and crimes that cause deforestation in Indonesia.

Forestry law enforcement does not only aim to provide the heaviest punishment for perpetrators but also to build a compliance culture, create a deterrent effect, and restore losses to victims due to environmental and forest damage.

Various innovations to supports the objectives of forestry law enforcement, bolstered by strong modalities from the MOEF:

- (1) Forestry law enforcement authority is based on eight relevant laws, including the money laundering law, which was authorized through judicial review by the Constitutional Court in late 2021. The diversity of investigation powers under this Act strengthens law enforcement efforts in the forestry sector and assures that criminals causing deforestation can be charged with appropriate and multiple articles from different laws. Law enforcement can also apply various legal instruments to resolve a case related to the environment and forestry. So far, MoEF has been applying this to forest and land fire cases through supervision, investigation, and civil lawsuits. However, it does not rule out the possibility of applying it to other typologies of forestry crimes.

- (2) Law enforcement in environment and forestry receives strong support from various sectors, including political, technical, and institutional support. Political support from the executive, legislative, and judiciary helps create an ecosystem of law enforcement that complies with rules and regulations. In addition, strategic partners such as the police and prosecutors also provide support by increasing capacity, conducting joint investigations, and prosecuting procedures. The Judicial Commission also supports the provision of certified judges environmental, while PPATK (Indonesia Financial Transaction Report and Analysis Center) and KPK (Corruption Eradication Commission) assist in the supervision and resolution of other criminal offense cases, such as corruption and money laundering. Since 2015, close cooperation between government agencies. Since 2015 has also been carried out through various task forces, including those dedicated to handling crimes related to natural resources, investigating money laundering related to the environment and forestry, handling forest and land fires.
- (3) The participation of communities, civil organizations, academics, and the media is a key element in supporting forestry law enforcement efforts. Forestry crime eradication relies heavily on strong public support, among others, from forest communities, civil organizations, academics, and the media. At the field level, MoEF strengthens cooperation with surrounding communities, such as forest ranger partners, to protect forest areas. Civil organizations become strategic partners in overseeing forestry law enforcement, while the MoEF provides a complaint channel for information on forestry crimes throughout Indonesia. Since 2020, MoEF has trained civil society organizations, environmental activists, students, and community leaders to improve their understanding and skills in submitting complaints, conducting public monitoring, and comprehending environmental and forestry law enforcement processes. Academics are also important partners

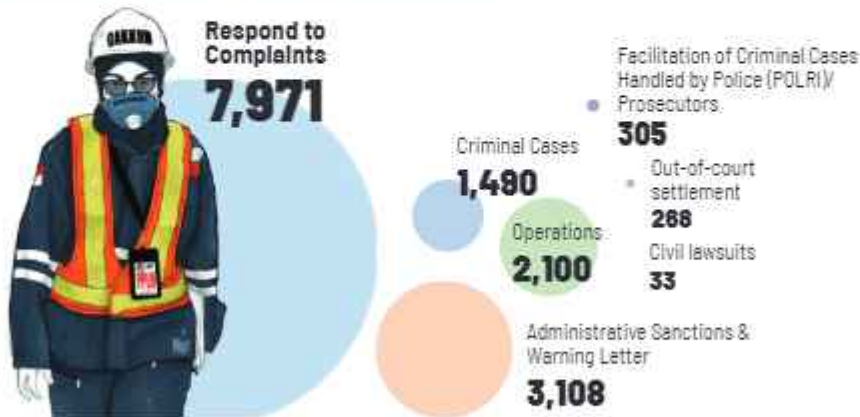
in various aspects of law enforcement, from prevention to scientific support in calculating environmental and forestry losses. In addition, the role of the media is crucial in conveying forestry law enforcement efforts, which strengthens the government's commitment to eradicating crimes against forests and their biodiversity.

### Strategies and Innovations in Environmental Law Enforcement

There are three legal instruments—administrative, criminal, and civil—used to control deforestation-related crimes, with appropriate and sustainable sanctions applied. Administrative sanctions are imposed on non-compliant companies, criminal sanctions are aimed at punishing offenders, and civil lawsuits are aimed at environmental restoration and compensation. Administrative sanctions that can be imposed include written reprimands, government coercions, administrative fines, suspension of licenses, and revocation of business licenses. The imposition of administrative sanctions does not absolve the perpetrators from the responsibility of restoration and criminal prosecution.

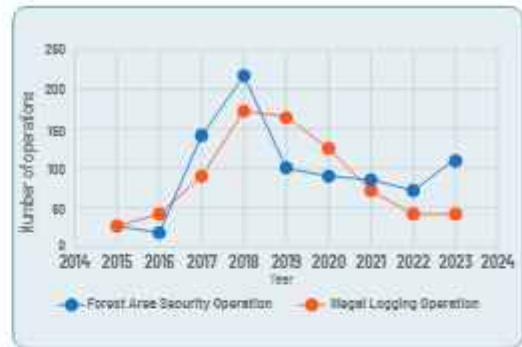
Criminal sanctions can be in the form of imprisonment, fines, or additional sentences such as environmental restoration obligations, seizure of assets, and the recovery of assets resulting from criminal offenses. The application of criminal sanctions pays attention to the principle of subsidiarity, where criminal law is applied as the main choice in law enforcement (*primum remedium*) or as a final settlement effort (*ultimum remedium*). Civil sanctions can be imposed early when a case occurs or after other sanctions have been imposed. Civil sentences include civil lawsuits and certain actions to restore the environment and stop the offense. Figure 3.3 reflects the Indonesian government's efforts to combat environmental and forestry crimes from 2015 to 2023.

**Figure 3.3**  
Environmental and Forestry Law Enforcement (2015-2023)



The implementation of law enforcement efforts represents a tangible advancement in the implementation of deforestation control policies. Law enforcement is carried out on environmental and forestry violations and crimes that cause deforestation, including non-procedural forest area utilization, illegal logging, and forest and land fires. These efforts are implemented through security operations, criminal law investigations (see Figures 3.4 and 3.5), and the facilitation of police and prosecutor cases handled by the police/prosecutors.

**Figure 3.4**  
Deforestation Control Efforts through Security Operations



**Figure 3.5**  
Deforestation Control Efforts through Criminal Cases Investigation (2015-2023)



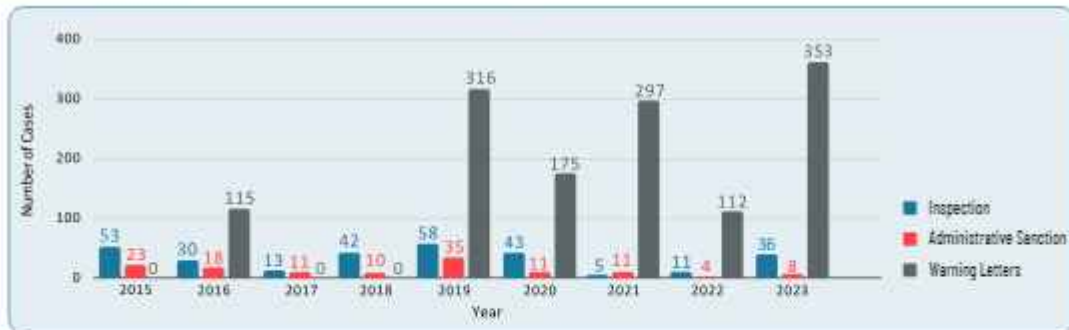
Deforestation crimes due to forest and land fires were enforced through inspection of business concessions and plantations, which often resulted in the issuance of administrative sanctions and written reprimands (see Figure 3.6).

The success of deforestation control can be gauged by the extent of forest area safeguarded through forest area security operations, and the quantity of timber safeguarded through illegal logging operations, as shown in Figure 3.7.

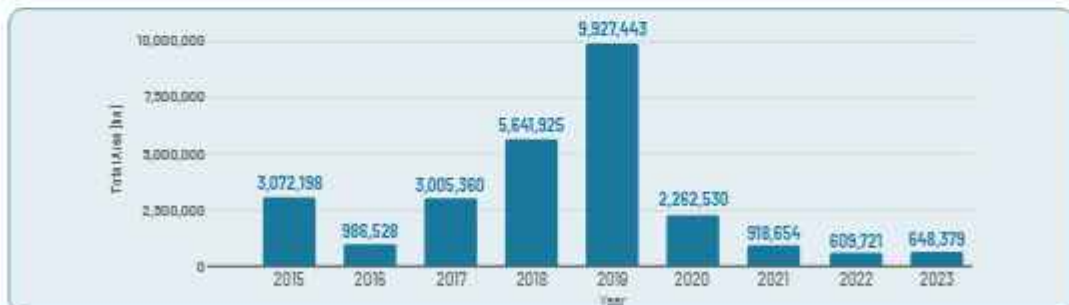
The objective of sustainable forestry law enforcement is to eradicate the violations and crimes that cause deforestation while increasing the deterrent effect on perpetrators. The government persists in its efforts to ensure sustainable deforestation control, with the objective of eradicating the various violations and crimes that cause deforestation in Indonesia.

The extensive process of environmental and forestry law enforcement in Indonesia has yielded several notable achievements, including strengthening the deterrent effect, upholding justice and providing legal certainty, and restoring environment and forests that have been damaged by crimes. Indonesia commits to eradicating deforestation crime through the implementation of environmental restorative justice, which provides benefits, justice, and legal certainty to the victims, who include both the impacted communities and the damaged forests and environment. The restorative justice approach aims to enhance the deterrent effect by investigating not only field operators but also the masterminds or beneficiaries of forest crimes. The Environmental Restorative Justice framework permits the implementation of a range of legal instruments concurrently, thereby facilitating the achievement of the aforementioned objectives.

**Figure 3.6**  
Deforestation Control Efforts Caused by Forest and Land Fires through Inspection, Administrative Sanctions, and Written Reprimands



**Figure 3.7**  
Results of Deforestation Control Efforts



### BOX 3.3 | Implementation of Multi-Instrument for Restorative Justice Law Enforcement

Multi-instrument applied through many tools, aiming for a restorative justice law enforcement. This multi-instrument is orientated to avoidance and restoration manner. Multi-instrument implementation can be done through the following:



Law enforcement instruments, whether administrative, class action, civil law, or criminal law, are applied to provide legal certainty and restore the victim's rights. The victims cover the environment, forests, and communities affected by environmental and forestry crimes. In terms of administrative, corporate perpetrators may be subject to government coercion or administrative fines for those who commit administrative violations. Class action or civil cases are filed to ensure compensation and restoration of the damaged environment and forests. Current practices in criminal law enforcement are imposing not only regular sentences, such as imprisonment and fines. There are also additional sentences such as seizure of profits and restoration. For money laundering, the seizure of assets is another additional sentence to be imposed.

The authorization to investigate money laundering offenses related to forestry crimes is one of the important factors in increasing the deterrent effect on criminals. Previously, the money laundering law did not cover environmental and forest crimes. However, with the request from MoEF, investigators successfully resolved a case of money laundering offenses stemming from illegal logging, targeting an increase in the resolution of similar cases to increase the deterrent effect on criminals in the future.

Success in environmental and forest law enforcement has also raised awareness of partners, including in prosecution, such as the Attorney General's Office. For the first time, the Attorney General's Guidelines on Handling Criminal Cases of Environmental Management and Protection were published,

providing guidance for prosecutors in handling environmental and forestry cases. The guidelines also emphasize the importance of applying additional sentences, which indirectly supports restorative justice efforts in combating crimes that cause deforestation.

One of the latest innovations implemented in environmental and forestry law enforcement is the implementation of *in absentia* trials against perpetrators of forestry crimes. This trial was conducted against a defendant who was legally summoned but failed to appear at the trial and did not have a valid reason. The court conducted an examination in court without the presence of the defendant. *In absentia* law enforcement is a law mandate that aims to uphold justice, provide legal certainty, and increase the deterrent effect in forestry law enforcement. The first *in absentia* trial

related to a forestry crime was conducted to try two suspects who possessed 32 containers of illegal Merbau timber from Papua, found in Makassar harbor in early 2022. The two perpetrators were each sentenced to five years of imprisonment and issued a fine of 2.5 billion Rupiah. This verdict was historic for environmental and forestry law enforcement. This *in absentia* law enforcement is proof of the government and state's commitment to protecting natural resources and states assets from the threat of crime.

### 3.4 Integrated Forest Fire Management

The year 2023 is a challenging year for forest and land fire management efforts in Indonesia due to another El Niño phenomenon, with a higher average Oceanic Niño Index than in 2019. However, Indonesia was able to reduce the area of forest and land fires by around 488 thousand hectares or around 29.6 percent, compared to the area of forest and land fires in 2019.

Figure 3.8 shows a decrease in the accumulated area of forest and land fires in 2023 compared to 2019. El Niño conditions in 2019 were at the weak El Niño level, while in 2023 they were at the Moderate-Strong El Niño level. Savanna/shrub/open-land/waterbody land cover types accounted for around

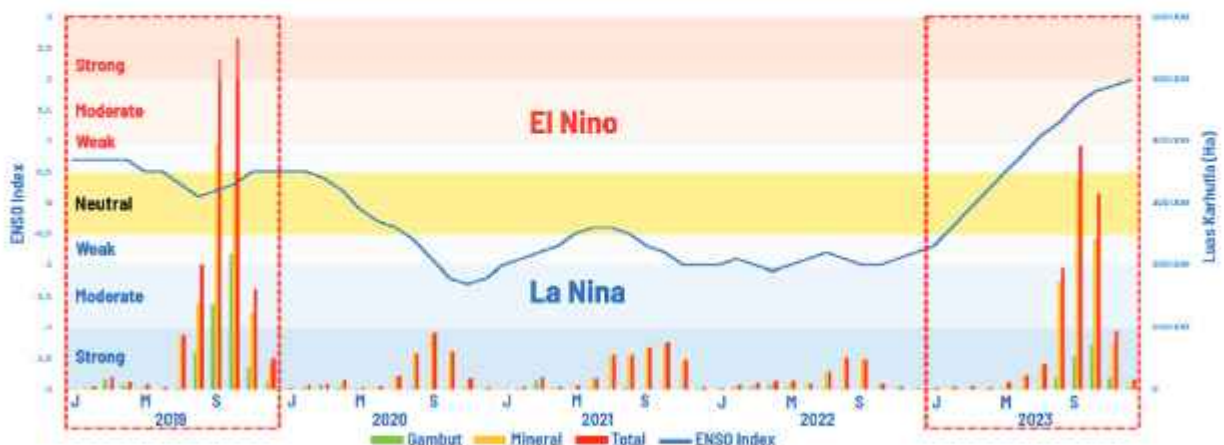
595 thousand hectares, or 51.3 percent, of the total area of forest and land fires in Indonesia in 2023.

The Ministry of Environment and Forestry (MoEF), in collaboration with stakeholders, manages forest and land fires through a number of measures, including prevention efforts, on-site fire suppression, and post-fire handling. MoEF and all parties involved in Indonesia work together in managing forest and land fires by taking steps to prevent, suppress on the site level, and deal with the aftermath of fires.

The new paradigm in forest and land fire management emphasizes prevention efforts by involving the community. These efforts include community counselling and the involvement of the community in integrated patrols in 246 villages, with the assistance of TNI and POLRI, and routine patrols in 847 villages. In addition, training and strengthening for Fire Care Communities (*Masyarakat Peduli Api*, MPA) is carried out, as well as Weather Modification Technology (Artificial Cloud Seeding) to keep peatlands moist, especially during the dry season.

Moreover, MoEF also utilizes satellite hotspot monitoring technology and applies the Fire Danger Rating System. MoEF also increases the capacity and updates the facilities and infrastructure for forest and land fire management, including strengthening the

**Figure 3.8**  
Correlation between El Niño-Southern Oscillation and Forest and Land Fire Area





Manggala Agni Brigade. Capacity building and welfare improvement have been carried out to 1,997 personnel of Manggala Agni Brigade which spread across 34 operating areas and 37 working huts, as well as the revitalization of forest and land fire control facilities and infrastructure (see Figure 3.9).

Manggala Agni (MA) currently has 2,383 personnel, but improvement is still needed to cover the vast areas requiring adequate protection. Continued efforts are being made to enhance training. The Ministry of Environment and Forestry has established 11,000 community-based fire management groups (MPA) in fire-prone areas. Further more, the government has mandated companies with land use permits to manage fire risks within their concessions, including establishing fire brigades and the requisite infrastructure.

### 3.5 Tackling Deforestation for Climate Mitigation

#### Indonesia's Commitment to Control GHG Emissions

Addressing deforestation to reduce GHG emissions is a major contribution under Indonesia's commitment to the Paris Agreement as reflected in the Enhanced NDC implemented from 2021 to 2030. In addition it also plays important role in the Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR 2050) in the forestry and other land use (FOLU) sector to achieve net sink by 2030. Two main sectors (FOLU and energy sector) have contributed to around 94 percent of the NDC, meanwhile, the rest six percent is achieved through agriculture industrial processing and product use (IPPU), and waste sector (CM1, Enhanced NDC).

Based on the Enhanced NDC in 2022, Indonesia has increased the national emission reduction target from 29 percent to 31.89 percent (conditionally) and from 41 percent to 43.2 percent (unconditionally). Highlighting that forestry and other land use sectors have significant contributions, ranging between 17.4 percent to 25.4 percent, following various efforts to increase land rehabilitation such as afforestation, reforestation, and restoration as well as peat ecosystem management. Table 3.2 shows GHG emissions in various sectors.

**Table 3.2**  
GHG Emissions in Various Sectors

Sector	GHG Emissions Level 2010* (Mton CO <sub>2</sub> e)	GHG Emissions Level 2030			GHG Emissions Reduction				Annual Average Growth BAU (2010-2030)	Average Growth 2000-2012
		Mton CO <sub>2</sub> e			Mton CO <sub>2</sub> e		% of Total BAU			
		BAU	CM1	CM2	CM1	CM2	CM1	CM2		
Energy*	453.2	1,669	1,311	1,223	358	446	12.5%	15.5%	6.7%	4.50%
Waste	88	296				43.5	1.4%	1.5%	6.3%	4.00%
IPPU	36	69.6				9	0.2%	0.3%	3.4%	0.10%
Agriculture	110.5	119.66				12	0.3%	0.4%	0.4%	1.30%
Forestry and Other Land Uses (FOLU)**	847	714				729	17.4%	25.4%	0.5%	2.70%
<b>TOTAL</b>	<b>1,334</b>	<b>2,869</b>	<b>1,953</b>	<b>1,632</b>	<b>915</b>	<b>1,240</b>	<b>31.89%</b>	<b>43.20%</b>	<b>3.9%</b>	<b>3.20%</b>

Notes :  
 CM1 : Counter Measure 1 (unconditional mitigation scenario)  
 CM2 : Counter Measure 2 (conditional mitigation scenario)  
 \*) including fugitive.  
 \*\*) including emission from estate and timber plantations.

**Figure 3.9**  
Efforts on Forest and Land Fire Management



**Incentive on GHG Emissions Reduction**

Indonesia is entitled to incentives for GHG emissions reductions through climate finance mechanisms based on the REDD+ results-based payment mechanism under Article 5 of the Paris Agreement. Incentives should be realized upon emissions reduction from deforestation and forest degradation, conservation and sustainable forest management implementation, and carbon stock increases through planting, rehabilitation, and restoration of forests and land.

The success in reducing deforestation is reflected in the declining deforestation rate from 2014 to 2022, enabling Indonesia to obtain payment incentives for GHG emissions reductions through the REDD+ mechanism. Indonesia received several climate finance incentives through REDD+ results-based payments, among others:

- (1) USD 103.8 million from the Green Climate Fund for reducing emissions by 20.3 million tons of CO<sub>2</sub>e between 2014 and 2016.

**Figure 3.10**  
Distribution of Funding Incentive Received through REDD+ Results-Based Payment Mechanism



- (2) USD 110 million from FCPF Carbon Fund East Kalimantan for 2019-2024, based on 22 tons CO<sub>2</sub>e emission reductions.
- (3) USD 70 million from the Jambi BioCarbon Fund for 2020-2025 towards emission reduction of 20.3 tons CO<sub>2</sub>e.
- (4) USD 56 million from Norway's Result Based Contribution, for 2016-2017, based on 11.7 tons CO<sub>2</sub>e emission reductions, and an additional contribution of USD 100 million.

### Efforts on Forest and Land Rehabilitation

Forest and land rehabilitation (RHL) is an effort to restore, maintain, and improve the function of forests and land to increase their carrying capacity, productivity, and role in maintaining the life support system. The targets of forest and land rehabilitation activities are critical lands in priority watersheds, all types of forest areas (except nature reserve areas and national park core zones) and land, and river abrasion. Forest and land rehabilitation with tree planting is carried out on damaged forest areas in the form of vacant land, reeds, or shrubs. Between 2015 and 2023, 1,918,150.14 hectares of land have been rehabilitated (see Figure 3.12). In the 2023 forest and land rehabilitation activities, 42,971,427 seedlings were prepared from seed centers, permanent and community nurseries (KBR), and around 195,433 hectares were successfully rehabilitated.

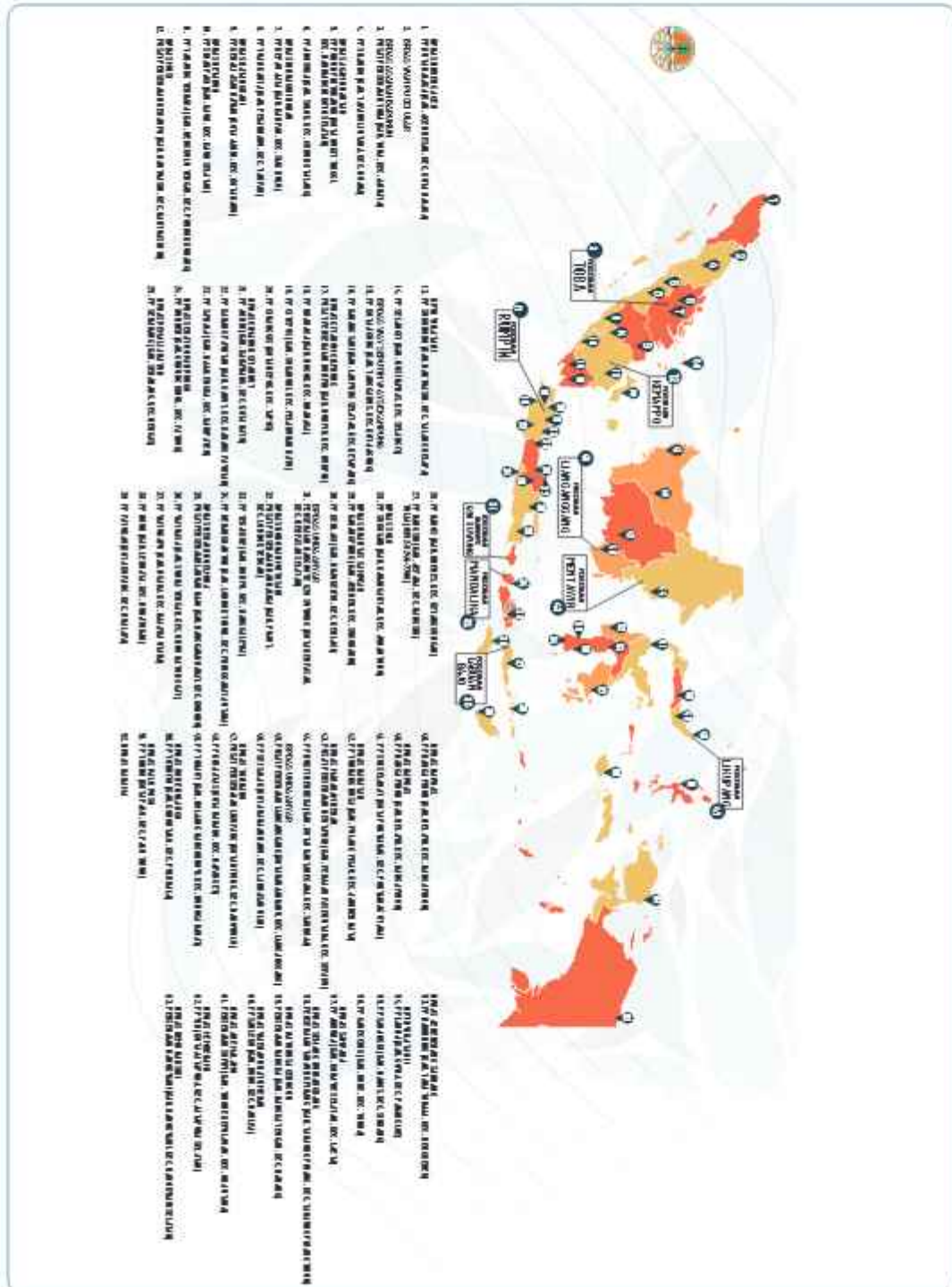
Forests and land rehabilitation is carried out through tree planting activities and civilian technical activities in land and water conservation buildings, with active participation community. By 2023, the efforts included the construction of 117 dam filling units, 687 gully plugs, 283 rainwater treatment installations, 229 water resorption wells, and 37 eco-hydraulic units.

The active participation of local communities in forests and lands rehabilitation is undertaken on a self-managed basis, thereby creating employment opportunities for those involved. In 2022, payments for land and forest rehabilitation activities were made directly, in order to demonstrate accountability for program implementation. In addition to the environmental benefits of reducing deforestation and forest and land rehabilitation, the latter also has a positive impact on the local economy through post-rehabilitation activities such as fruit production and non-timber forest products (NTFPs). Furthermore, holders of mining and non-mining business licenses with Forest Area Use Approval (PPKH) are also required to rehabilitate watersheds around their concession areas. From 2015 to 2023, holders of PPKHs have rehabilitated approximately 188,140 hectares.

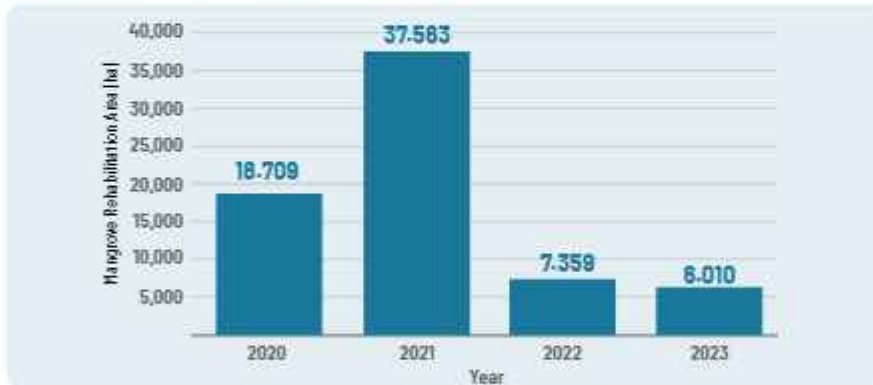
**Figure 3.11**  
Area of Forest and Land Rehabilitation



**Figure 3.12**  
Location of Nursery Centers and Permanent Nurseries



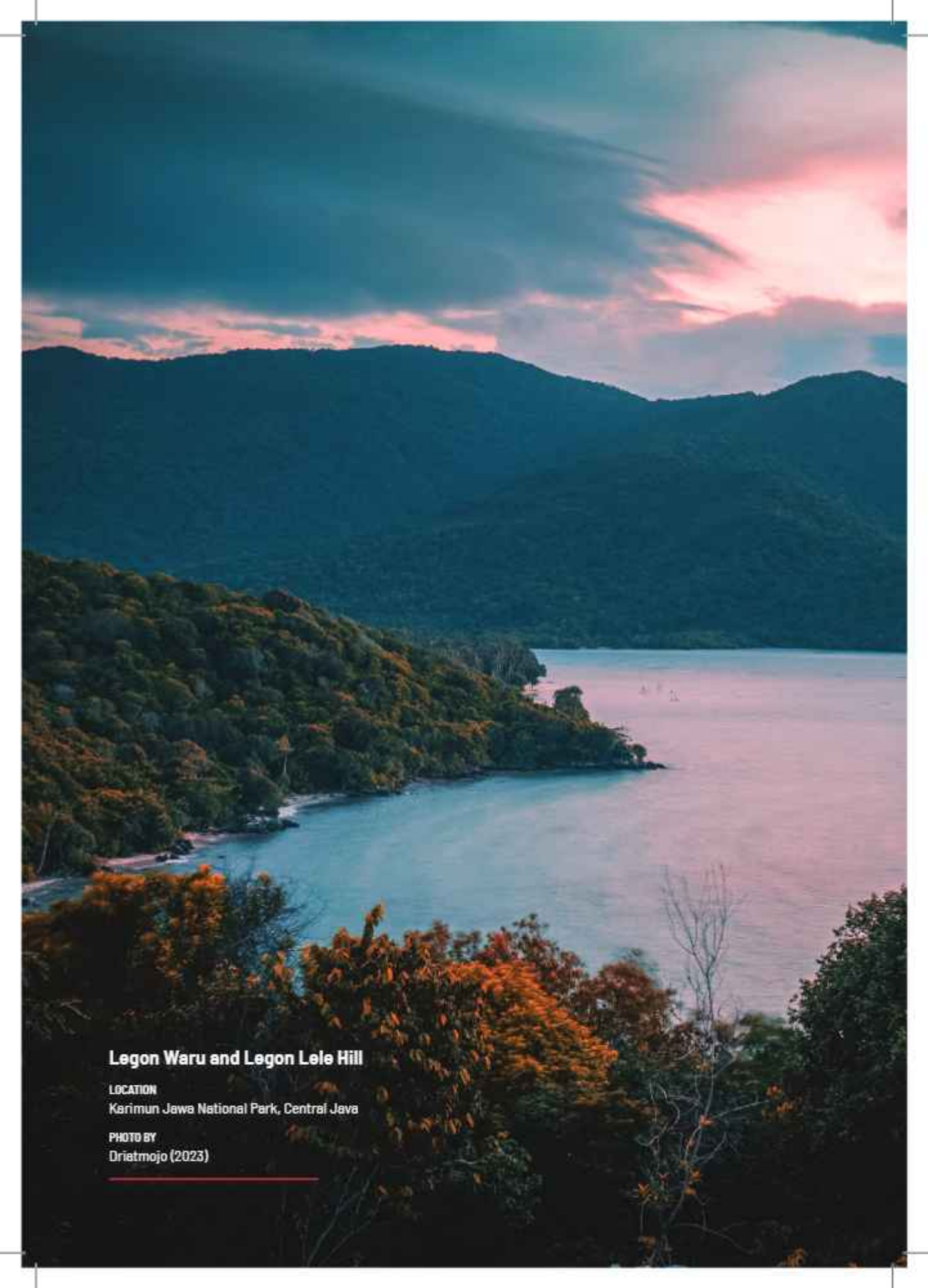
**Figure 3.13**  
Area of Mangrove Rehabilitation



The construction of a nursery center using advanced technology, which is capable of producing millions of seedlings, further demonstrates Indonesia's commitment to climate change mitigation. The construction of the nursery centers is carried out through a public-private partnership program involving ministries/institutions, state-owned enterprises, and the private sector. As of 2023, nine nursery centers have been established, with six already producing seedlings. These include facilities in Rumpin (West Java), Lake Toba (North Sumatra), Likupang (North Sulawesi), Labuan Bajo (East Nusa Tenggara), Mentawir (East Kalimantan), Mandalika (West Nusa Tenggara), Bali and South Kalimantan. Indonesia has 54 permanent nurseries distributed throughout the country (see Figure 3.13).

Forest and land rehabilitation activities include tree planting in inland and coastal areas through mangrove restoration. Mangrove planting in coastal areas prone to abrasion is crucial part of rehabilitation efforts. Mangroves play an important role in climate change mitigation due to their ability to absorb carbon five times more effectively than terrestrial plants. From 2015 to 2023, 73,754 hectares of mangrove have been rehabilitated by various stakeholders (see Figure 3.14).

The National Mangrove Map (PMN) supports mangrove rehabilitation as one of the crucial steps in climate change prevention. The annually updated PMN helps identify the condition of mangroves across Indonesia using satellite imagery and Geographic Information Systems. Effective management planning is based on the information provided by the PMN, which includes mangrove distribution and habitat potential. The Suwang Mangrove Nursery, built by the government, is capable of producing up to six million mangrove seedlings per year to rehabilitate mangroves in Bali and the surrounding areas, further supporting for mangrove rehabilitation. Indonesia's commitment to mangrove rehabilitation was highlighted at the G20 meeting, where President Jokowi and G20 leaders planted mangroves as a symbol of collaboration in addressing climate change challenges.



## Legon Waru and Legon Lele Hill

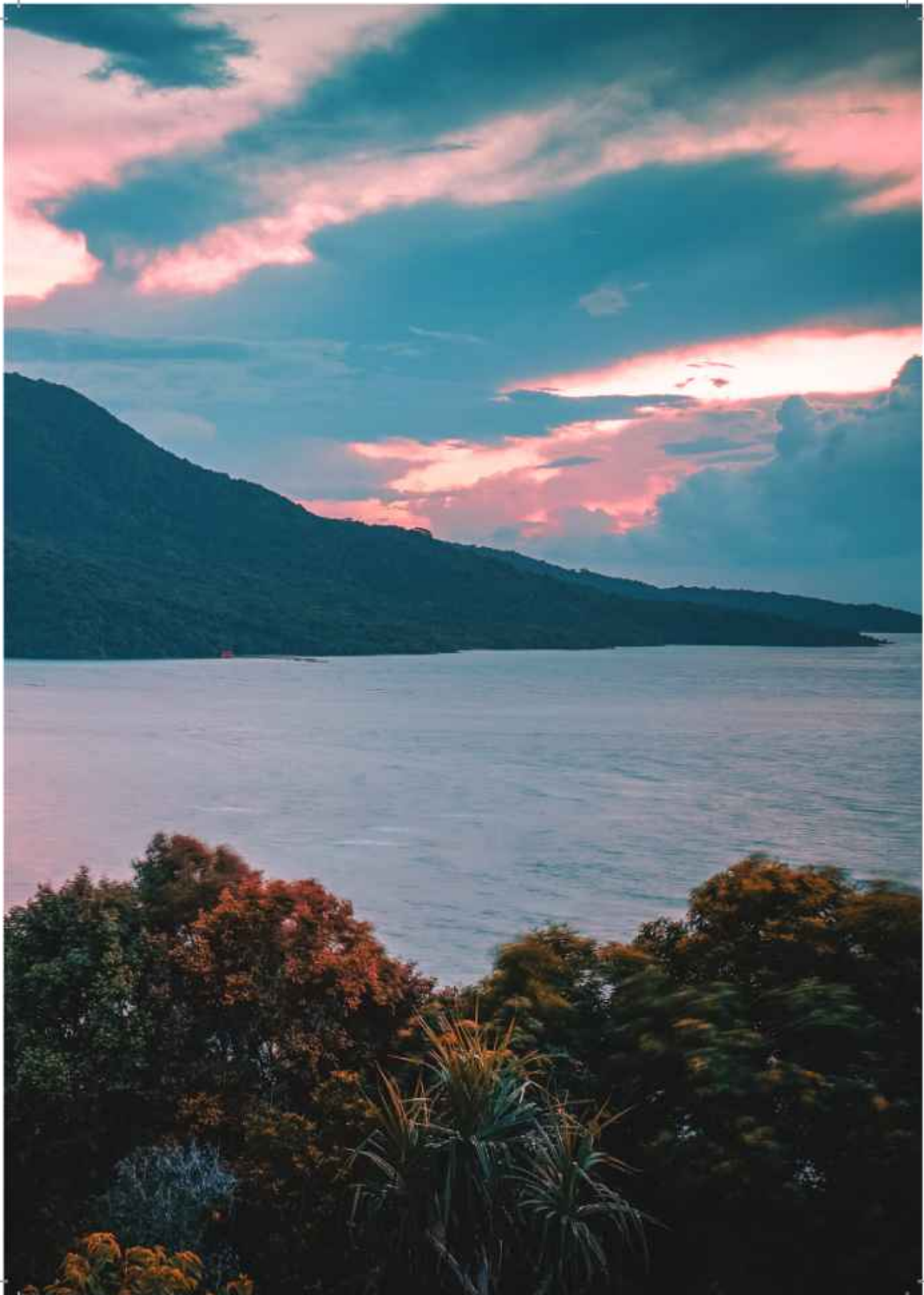
**LOCATION**

Karimun Jawa National Park, Central Java

**PHOTO BY**

Driatmojo (2023)

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## CHAPTER 4

# Community Engagement for Sustainable Forest Management

### 4.1 Social Forestry as a Model in Collaborative Management

#### Community and Social Forestry: Integration in Forest Management

The success of social forestry programs depends on active community participation in forest development and management, which affirms shared responsibility with the government. Community involvement encompasses more than mere partnership. It also entails minimizing potential conflict, which the appropriate authorities must handle properly. Community involvement in forest management and the surrounding environment underscores the shared responsibility between governments and communities for forest management and the environment. Having the community get involved in every phase of the program, especially in social forest management, helps them feel more connected and responsible for protecting the forests and nature around them.

Private sector concessions have the potential to enhance social forestry programs by allowing private entities to manage forest areas under government guidelines, leveraging expertise and technology for



#### Semujuan Hill, lake side of Danau Sentarum

##### LOCATION

Danau Sentarum National Park, West Kalimantan

##### PHOTO BY

BKSD National Park Office (2020)

sustainable management and economic growth. Between 2018 and 2023, these concessions generated IDR 20.7 trillion (USD 1.7 billion) in non-tax state revenue and USD 75.3 billion in foreign exchange earnings from timber products. They also create jobs, foster regional development, and promote sustainability through innovative practices and the SVLK system. The effective private management mitigates land use conflicts, fostering harmonious relationships. Social forestry programs integrate community co-management efforts with the designation





of protection and utilization spaces in the work plan document. The law on forestry<sup>39</sup> recognizes the function of forests as a global environmental aerator and balancer, which means that forests have a crucial role in people's lives. Forest relations with the outside world still prioritize national interests, despite their international importance. The social forestry program carries out collaborative management with the community, as reflected in the determination of protection space and utilization space in the Social Forestry Work Plan (RKPS) which is aligned with the long-term Forest Management Plan (RPHJP).

The integration and collaboration efforts in social forestry are supported by a Presidential Regulation<sup>40</sup>. This regulation provides an opportunity for integration and collaboration

between ministries/agencies, provincial and district/city governments, and related parties to accelerate social forestry management. This approach is implemented holistically, interactively, thematically, and spatially. The primary objective of this regulation is to facilitate the distribution, mentoring, and business development of social forestry activities. This has been achieved through the formulation of an action plan that addresses the challenges encountered in these endeavors.

Social forestry is a critical element for the implementation of the Presidential Regulation. Penta-helix collaborates with the government, non-profit organizations, universities, the private sector, and communities to create a local government initiative that combines local programs and strategies. Rural and regional economies are

<sup>39</sup> Law Number 41 of 1999 on Forestry

<sup>40</sup> Presidential Regulation Number 28 of 2023 on Integrated Planning for the Acceleration of Social Forestry Management

expected to grow, and suburban migration is increased. A total of 43 districts have initiated this, with 12 districts<sup>44</sup> holding a master plan.

#### Community Use of Conservation Area Potential

The use of non-timber forest products by traditional communities' supports sustainability and well-being, while strengthening partnerships with conservation area managers. Social forest management is employed to achieve forest sustainability, community well-being, ecological balance, and accommodate socio-cultural interactions. Forms of social forestry management include village forests, community forests, community plantation forests, *adat* forests and forestry partnerships. The practice of forestry partnerships in conservation forests is carried out through the granting access to the use of non-timber forest products, known as conservation partnerships.

Communities surrounding forests or individuals who have traditionally resided within the forests utilize non-timber forest products to meet daily necessities. In some cases, people live within conservation areas and coexist harmoniously with nature. Tribes such as the Anak Dalam, Mentawai, and numerous others in the interior of Sumatra, Kalimantan, Sulawesi, and Papua provide a range of services, including housing, clothing, tools, and food. Some of which are common to almost all conservation areas. People who live outside the forest area access forest resources to meet their daily needs.

**Figure 4.1**  
Utilization of Bamboo Kayek Group Melayet Besame



**LOCATION**  
Laman Satong Village, Matan Hilir Utara District,  
Ketapang District - West Kalimantan

**PHOTO BY**  
Bambang Suryentoro-Mount Palung National Park  
Office (2022)

<sup>44</sup> Ketapang, Kapuas Hulu, Sintang (West Kalimantan), Berau (East Kalimantan), Bulungan (North Kalimantan), Maros, Enrekang (South Sulawesi), Poso (Central Sulawesi), Belitung (Bangka Belitung Islands), Ngada (Nusa Tenggara Timur), Suleleng (Bali), dan Lumajang (East Java)

**Figure 4.2**  
Products Group Woven Handicrafts Purun Bawi Berkah



There are certain rights and obligations attached to community activities that are negotiated between the community and the conservation area manager. Access to or utilization of non-timber forest products can meet their daily needs, improve community welfare sustainably, and maintain or improve the quality of conservation areas with sustainable utilization practices of non-timber forest products.

**LOCATION**  
Kereng Bangkirai Village - Central Kalimantan

**PHOTO BY**  
Central Kalimantan Natural Resources Conservation Office (2022)

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**Figure 4.3**  
Harvesting of Pine Resin



**LOCATION**  
Pangeureunan Village, District of Garut, West Java

**PHOTO BY**  
Center for Natural Resources Conservation (BBKSDA) -  
West Java (2022)

### Conservation Partnerships in Facilitating the Utilization of Forest Resources

The FOLU Net Sink 2030 program supports the utilization of forest resources by communities to restore degraded conservation areas. The Conservation Partnership is a concrete breakthrough in utilizing the potential of conservation areas by the community, especially the poor and in need of land. This includes using areas for farming extracting non-timber forest products, as well as rehabilitating degraded areas. This Conservation Partnership Program is also one of the main activities in FOLU Net Sink 2030, especially for KSA and KPA rehabilitation and restoration activities that have been targeted at over one million hectares throughout Indonesia. Conservation partnerships have

helped resolve conflicts with communities that have not been resolved for 10-20 years. Between 2015 and 2020, the implementation of conservation partnerships has reached 230,977 hectares across 52 Technical Management Units (UPT) in 55 Conservation Areas, 256 villages, 279 Partners/Groups, and involved 10,857 farming families. As of 2022, the implementation of conservation regulations related to conservation partnerships was in the harmonization stage at the Ministry of Law and Human Rights to become the regulation of the Minister of Environment and Forestry. The entire process of applying for a conservation partnership in 2023 will be temporarily postponed while waiting for this regulation to be issued.

**Figure 4.4**  
Cultivation of Grass around Mount Merapi National Park



**LOCATION**  
Kemalang Village, Klaten - Central Java

**PHOTO BY**  
Dewi P. - Mount Merapi National Park Office (2019)

Conservation agreements between village governments and communities support conservation area management and economic empowerment. In 2022, village heads entered into 541 conservation agreements. These agreements stipulate that the village government acknowledges the existence of conservation areas, supports conservation initiatives, and provides support for community empowerment initiatives to enhance productive economic efforts. Conservation agreements have been achieved owing to various factors, including effective coordination and support from local governments, particularly at the village level. With this agreement, the scheme for providing community access via UPT will be more transparent. Furthermore, there will be assistance and intensive communication between UPT and the community

surrounding the area under its management. The strengthening of the role of UPT partners as area managers will include NGOs, universities, community leaders, the private sector, and cooperation projects.

The utilization of conservation areas through conservation partnerships provided to community groups encompasses four distinct types of utilization access: the collection of Non-Timber Forest Products (HNBK), traditional cultivation, utilization of aquatic resources, and traditional hunting. Until 2022, the provision of access to traditional uses to communities in conservation areas through conservation partnerships covered 308 villages with an area of approximately 222 thousand hectares, involving 363 community groups and 12,215 heads of families. The utilization activities are concentrated in 62 conservation areas and 51

KSDA/national park technical management units. Conservation partnerships with communities cover an area of 232,975.04 hectares and are carried out with 508 groups with 17,823 members. The development of conservation partnerships is illustrated in Table 4.1.

**Table 4.1**  
Conservation Partnership Involvement

Year	Area (Ha)	Partner (group)	Member (people)	Village (unit)	Conservation Area (household)	Technical Management Unit (unit)
2018	10,831.68	45	1,632	25	11	11
2019	98,369.98	163	5,723	129	43	38
2020	66,142.96	117	3,769	90	36	33
2021	51,285.76	165	6,307	138	39	32
2022	6,354.67	18	392	13	6	6
<b>Grand Total</b>	<b>232,975.04</b>	<b>508</b>	<b>17,823</b>	<b>375</b>	<b>76</b>	<b>58</b>

### Enhancing Forestry Management through Community Partnerships

One of the crucial strategic concerns in the forestry sector pertains to the significant conflict of forest area claims among communities situated in and around forests, as well as conflicts with forestry sector license holders. Measures are needed to prevent the depreciation and degradation of forest resources continues to occur, both quantitatively and qualitatively.

The forestry partnership between PBPH and communities aims to enhance the management of forest areas and the well-being of the local communities. As per government regulation<sup>42</sup>, PBPH holders in protected forests and production forests are obligated to establish partnerships with local communities. Forest Utilization in the forestry partnership agreement, among others, includes the utilization of areas, utilization and collection of non-timber forest products (HHBK), utilization of environmental services, and the use and collection of timber forest products (HHK).

PBPH holders are individuals who are either managers or holders of Forestry and Community Partnership approvals in and around forest areas, as partners in forestry partnership approval activities. According to Rukminda et al. (2020), people who have joined the forestry partnership in the West Rinjani Protected Forest Management Unit have experienced a 25 percent increase in the ease of accessing the forest, a 20 percent improvement in security, and a 15 percent enhancement in convenience of accessing the forest and its resources.

The Ministry of Environment and Forestry continues to monitor and regulate the performance of PBPH in the implementation of forestry partnerships. In 2023, community management access within the PBPH working area was around 1.9 million hectares, which includes:

- 1) A memorandum of understanding (MoU) covering about 28 thousand hectares (133 MoU documents and 50 NKK documents), according to the PBPH Forest Utilization Business Work Plan (RKUPH) document that the government has approved, covers community management access over an area of 1.2 million hectares.

<sup>42</sup> Government Regulation Number 23 of 2021 on Forestry Management

- 2) The area of community management access that has been built in the PBPH area (community oil plantations) is around 647 thousand hectares.

The success of forestry partnerships is measured by achieving conflict resolution, improving people's living standards, and accelerating the partnership approval process. According to Mustafa (2002), the creation of participation spaces or the provision of access to local communities to raise community living standards are indicators of successful conflict resolution in forest area management. While the efficacy of forestry partnerships still lacks evidence, PBPH holders are urged to persist in implementing forestry partnerships with local communities. There is a current effort to accelerate the approval of Forestry Partnerships in PBPH, as well as to adjust the determination of Forestry Partnerships with RKUPH.

## 4.2 Adat Forest Recognition

The 1945 Constitution expressly recognizes the unity of Adat Law Communities (*Masyarakat Hukum Adat/MHA*) and their traditional rights, in accordance with the principles of the Unitary State of the Republic of Indonesia. Adat Law communities are Indonesian citizens who have distinctive characteristics, live in groups in harmony according to their Adat Law, have ties to ancestral origins, and have the same place of residence. They have a robust connection with the land and the environment, as well as the existence of a value system that determines the economic, political, social, cultural, and legal institutions, and have used a particular region for generations.

Local regulations establish the recognition of Adat Law communities, but the process is not easy. Based on Forest Law<sup>43</sup>, local government regulations stipulate the confirmation of Adat Law in communities.

The Indonesian government recognizes and protects *adat* forests through local

regulations, with the main challenge being the complexity of recognizing and protecting the rights of Adat Law communities. Common issues encountered when making local regulations include giving more attention to physical development, basic social services, and infrastructure. To overcome these challenges, the Ministry of Environment and Forestry together with related parties to encourage local governments to publish regional legal products on the recognition and protection of Adat Law communities.

Some districts and cities consider the protection of MHAs and their rights, including *adat* forests, to be strategic by recognizing their cultural heritage and identities. If MHA are not recognized and protected, then they will be gradually lost. The traditional ability of MHAs to manage their lands and forests sustainably is an important consideration for the government when prioritizing their protection. This means that local regulations regarding the recognition and protection of MHAs will be issued through the facilitation of MoEF and other relevant parties.

Adat Forests aim to ensure the sustainability of MHAs, ecosystems, and resolve conflicts around forests. The establishment of Adat Forests aims to guarantee the living space of Adat Law communities, preserve ecosystems (forests and environment), and safeguard local wisdom and traditional knowledge, which is one of the patterns for conflict resolution related to communities in and around forest areas. Adat Forests will ensure living space for MHA, the preservation of ecosystems, and help resolve conflicts by providing a clear legal framework.

Since December 2023, the Ministry of Environment and Forestry has established 131 Adat Forests with a total area of 244,195 hectares, managed by 77,695 families. In 2023, MoEF established the status of Adat Forests in Gunung Mas District, consisting of as many as 23 units and 15 Adat Forests. These include two Adat Forests in Aceh Jaya District, three in Pidie District, and three in Bireun District. With the establishment of eight Adat Forests in Aceh province, the 50 priorities of Adat Forests proposals that need to be handled were reduced to 41.

<sup>43</sup> Law Number 41 of 1999 on Forestry

### 4.3 Sustainable Practices in Community Forest Management

Sustainable Forest management practiced by communities within conservation areas are very diverse, including local wisdom such as the *sasi* law, which applies moratoriums or quota restrictions to the traditional use of natural resources. This is in line with the social norms and cultural values of the surrounding community, known as local wisdom.

*Sasi* is a customary philosophy and social practice based on the balance between human relations and nature. It aims to maintain sustainability. Local wisdom dictates the prohibition of entering, taking, or doing something in a certain area and within a certain period. *Sasi* transforms this into a customary law that prohibits or limits the traditional use of natural resources by the community.

Social forestry permits, which have been in the hands of communities for 35 years, have played an important role in achieving sustainable forest management. The Katadata Insight Center (2020) found that social forestry programs have a demonstrated positive impact on fostering equitable economic access. Social Forestry maintains forest quality and legitimizes community land use (Ford Foundation, 2020). Additionally, the survey results indicated that farmers' incomes rose to two to five million rupiah per community group, forest cover increased, and tenure conflicts were resolved. This gives hope that forest management will become sustainable to contribute to a sustainable future and be useful for future generations.

Social forestry program has increased land cover through reforestation, contributing to an increase in carbon stocks of almost 71,000 tons. Furthermore, there has been an 18.4 percent reduction in illegal logging. Social forestry permit holders have the confidence to access forest areas with the permission of the government.

**Figure 4.5**  
Sustainable Use of Chili Puyang



**LOCATION**  
Tambora National Park

**PHOTO BY**  
Samsul Maarif (2022)



**Figure 4.6**  
Collection of Honey, Non-Timber Forest Products



**LOCATION**  
Tambora National Park

**PHOTO BY**  
Samsul Maarif (2022)

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Social forest practices include *Awig-awig* in West Lombok and Bali, *Beibei* in South Sumatra, *Balingkea* in Central Sulawesi, *Hompsonan* in Jambi, *Cavity* in West Java, *Kean* in South Sumatra, and *Pahomba* in East Nusa Tenggara. There are many similar practices in conservation areas, reflecting community efforts to maintain ecosystem balance in conservation areas (see Figure 4.5, 4.6, and 4.7).

**Figure 4.7.**  
Seaweed Cultivation



**LOCATION**  
Karimunjawa Village, Jepara District - Central Java

**PHOTO BY**  
Karimunjawa National Park Office (2023)

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### BOX 4.1 | Birdwatching and Conservation: KTH Warkesi's Innovative Community-Based Forest Management

The Warkesi forest is an important habitat for several unique species of birds and mammals, including the Red Bird of Paradise (*Paradisaea rubra*), Bald Paradise (*Ciccinnurus respublica*), Cockatoo Angle (*Cacatua galerita*), Mambruk Ubiat (*Goura cristata*), Black-headed parrot (*Lorius lory*), Julang Papua (*Rhyticeros plicatus*), and Nuri bayan (*Eolectus rotatus*). The forest is also home to the Waigeo cuscus (*Spilococou papuensis*), a mammal endemic to Waigeo island.

Birdwatching in Warkesi Village is the main tourist attraction of Warkesi Forest Farmers Group (KTH). Birdwatching activity is one of the steps to maintain the important habitat of endemic animals in the Warkesi Forest and also an additional income for the Warkesi community. People who have benefited from birdwatching tourism have their own initiatives to keep the area and also animals protected.

In addition to birdwatching, KTH Warkesi also held several other activities and businesses, such as Camping Ground, nursery, Jungle Tracking, and Smart Patrol. All activities support the preservation of flora and fauna and increase the income of the people who are members of KTH Warkesi.

KTH Warkesi is a community of Saonek Village, South Waigeo District, Raja Ampat District, Southwest Papua Province, a community of the Village assisted by the KSDA of West Papua. In 2023, KTH Warkesi won the first award in the appreciation of conservation-assisted villages at the peak of the National Nature Conservation Day.



**LOCATION**

Warkesi Forest, Raja Ampat, South West Papua

**PHOTO BY**

Adhityo Kusuma (2023)

## 4.4 Prospects of Social Forestry in Indonesia

Social forestry management must prioritize environmental, socio-economic, and institutional factors in order to achieve sustainability. This includes the establishment of forest protection and utilization spaces for environmental aspects, increasing income and community welfare through the sustainable use of forests for socio-economic aspects, and the establishment of social forestry business groups for institutional aspects.

Social forestry programs in Indonesia have had a significant impact on achieving economic and social sustainability for the

community. More than a million families have directly benefited from forest management access provided through thousands of units of decision letters (SK) and the determination of *adat* forests. Furthermore, with economic transactions reaching around Rp 1.1 trillion, and the establishment of over 10,000 business groups, social forestry programs have also become a major driver in the economic development of local communities, job creation, and the reduction of economic inequality.


The Platinum classification of social forestry business groups is based on key factors such as strong institutions, careful

planning, and smooth access to markets. Platinum status indicates that a social forestry group (KUPS) has been independent in its capita and has market access both nationally and internationally. These factors, along with the use of sustainable capital, constitute the primary pillars of accomplishment. Platinum status not only enhances the group's independence, but also opens wider collaboration opportunities and greater economic growth thanks to the reputation and credibility that have been built.

The Social Forestry Program not only provides a significant economic impact but also presents a solution to tenure conflicts and is a contributor to sustainable development in accordance with the Sustainable Development Goals. The program offers fresh hope for climate change control by utilizing diverse inclusive management approaches, including agroforestry, with a focus on mitigation and adaptation. Collaboration among local governments, government agencies, and communities holds the key to achieving the vision of sustainable development through social forestry programs. Social forestry business governance by the community still requires transformation in terms of market, capital, and assistance. The Ministry of Environment and Forestry provides assistance in the form of digital marketing training, business capital, productive economic tools, and companion capacity building to overcome obstacles in governance, markets, and capita aspects and aid in the field of social forestry. This support aims to address transformation challenges in social forestry business governance, including the management of business types through the development of National Social Forestry (Bang PeSoNa), assistance in productive economic tools, and increasing companion capacity through trainings.

The Social Forestry Program has successfully achieved significant economic transaction value, achieving 96 percent of the target set of 1.1 trillion rupiah, involving thousands of business groups, and managing millions of hectares of social and adat forests. Until December 2023, the value of economic transactions achieved by KUPS exceeded one trillion rupiah. This success is reflected in the achievement of a total of 10,249 KUPS, divided into 4,725 KUPS Blue, 4,506 KUPS Silver, 964 KUPS Gold, and 54 KUPS Platinum. The achievement classifications KUPS Blue, Silver, Gold, and Platinum are awarded to Social Forestry Business Group (KUPS) based on their performance in managing social forests. For social forests provided to 1.3 million head of families, the community has successfully used and managed forests covering an area of 6.4 million hectares.

Social forestry not only brings about economic advantages but also nurtures sustainable development. Social forestry programs contribute to poverty alleviation, food security, gender equality, employment, economic growth, and climate change management.



**Crater of Mount Merapi, one  
of most active volcano**

**LOCATION**

Mount Merapi National Park, Special  
Region of Yogyakarta

**PHOTO BY**

Iskandar (2017)

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## CHAPTER 5

# Nature Conservation and Ecosystem Management

### 5.1 Resort-Based Management for Biodiversity Conservation

#### Management and Establishment of Conservation Resorts

The basic principle of conservation area management is to mobilize resources to achieve the objectives that have been set effectively and efficiently. Understanding the management object and objectives is essential and must be completed in the early stages of conservation area management. Preconditions involves establishing the rules of the game, such as spatial design, distribution of management areas, and management plans. With this foundation in place, the subsequent stage of management can be more focused on implementing effective and efficient management strategies.

To effectively improve conservation area management, management units up to the site level are needed to maintain the natural condition of the area. A resort is the smallest conservation area management unit at site level. The establishment of forest management zones at the site level is carried out by considering the characteristics of the land, forest type, social and cultural community, economy, local community institutions, government administrative boundaries,



**Komodo Dragon (*Varanus komodoensis*).**  
The largest extant lizard species endemic to Komodo National Park and Flores Island

#### LOCATION

Rinca Island, Komodo National Park, East Nusa Tenggara

#### PHOTO BY

Iskandar (2022)

as well as the degree of anthropogenic pressure or threat to the area. When these characteristics are analyzed spatially, they will serve as the determining factor for the resort's work area and the allocated resources. A resort for conservation area management comprises three to seven rangers. The amount of funding and equipment is contingent upon the requirements and availability of resources.



### Resort-based Management Systems and Its Benefits

The management system utilized at the Conservation Area site level is commonly referred to as resort-based management. This system allows the resort to be responsible for executing the technical activities of Conservation Area Management as well as managing biodiversity outside the conservation area. The responsibility of the resort includes executing systematic efforts to oversee conservation areas under the guidance of the regional section. The aforementioned tasks are completed through the implementation of various planning activities, including prevention of potential risks, recovery strategies, utilization of resources, fostering positive relationships with the local community, delivering public services, completing administrative tasks, and managing data and information. As of 2023, 834 conservation area management resort units were established throughout Indonesia.

Resort-based management is aimed at overseeing the territory and assessing the state of the managed entity, especially the biodiversity potential of the area, the occurrence of natural phenomena, and the prevailing pressure conditions, threats, and disturbances, by using appropriate working methods and strategies suited for site level. Resort-based management ensures the documentation of thorough and cohesive area data and information and promotes partnership with local stakeholders.

Resorts are an important part of the management of conservation areas, serving as a comprehensive source of current and accurate information. The resort can collect field information quickly and communicate directly with the surrounding community to obtain additional information. Between 2018 and 2022, nearly one million data points were recorded, and more than 50 percent of the data came from the field. The data were directly input by resort personnel

into the Information and Data System of the Ministry of Environment and Forestry. The effectiveness of resort-based management has been statistically proven, showing a significant correlation between patrol efforts and reduced threat levels of encroachment and other disturbances. For example, the Pearson correlation coefficient  $r$  for Gunung Leuser National Park reached 0.89, indicating a strong positive relationship. The reduction in threat level of encroachment is primarily due to the patrolling efforts of resort personnel. With a coefficient of determination of 0.80, it is clear that resort staff patrol efforts directly contributed to 80 percent of the decrease in the threat of encroachment.

#### Resort-Based Management Paradigm

Resort-based management represents a paradigm for conservation area management, not just temporary activities or programs. Conservation areas are generally located in remote areas with limited infrastructure facilities. The conservation area management officers can perform their duties best in the forest areas rather than from their representative and section offices. For example, Gunung Leuser National Park and Kerinci Seblat National Park span in two and four provinces, respectively, with an area of about one million hectares. This reinforces the notion that conservation area management must be done on a resort basis. The officers stationed at the resort near the conservation area possess the ability to swiftly respond to emergencies and effectively communicate with the parties in the vicinity, thereby avoiding lengthy and costly procedures.

The presence of personnel on duty in conservation areas will improve their control. Due to the presence of officers around the area, guarding, patrol implementation, and data collection will be more effective and efficient. The resort will also serve as a node of information exchange from upstream and downstream through a system of data collection, reporting, and extension efforts, thoroughly and involving various aspects management of conservation areas.

Most Conservation Area Management resorts in Indonesia utilize multiple spatial monitoring, data collection, and reporting systems. Ranging from simple to highly structured and complex. For instance, conservation area managers and other land-based businesses frequently use the SMART (Spatial Monitoring and Reporting Tool) application extensively. This tool is important in facilitating detailed tracking and management of conservation efforts across diverse regims.

The SMART Platform contains software and a tool for analysis designed to help assist conservation area managers. Composing of interconnected mobile and desktop applications, SMART standardizes and streamlines data collection, analysis, and reporting, and facilitates the flow of data and information from the field to decision-makers. SMART provides support for a diverse range of Conservation Area Management activities, including biodiversity conservation, law enforcement, tourism and visitor management, natural resource management, intelligence requirements, performance evaluation, and threat levels to areas.

The government has developed a SMART Dashboard application device to make it easier for decision makers to read and interpret data and information from the field quickly. The Dashboard is used in an integrated way, from the technical implementation unit to the center. At the section, division, office, and central levels, decision-makers will closely monitor field activities using the SMART Dashboard.

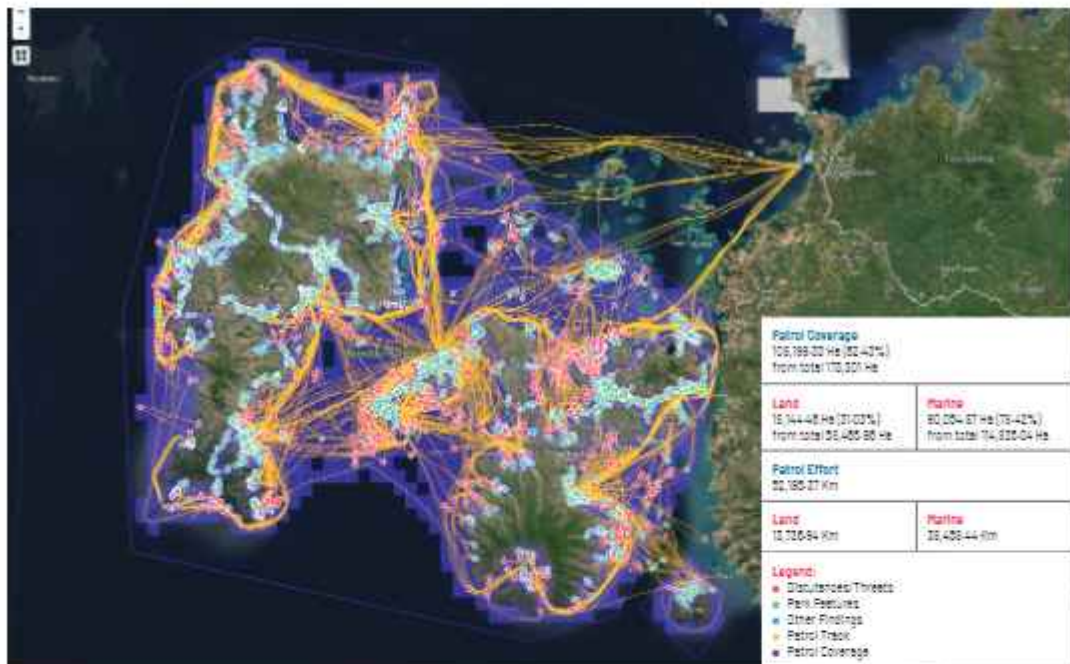
Komodo National Park is an example in which a fully integrated SMART dashboard was implemented. Between 2022 and 2023, all the resorts located within Komodo National Park conducted monitoring of a total area of 108,199 hectares, representing 62 percent of the total area. The monitoring encompasses approximately 18 thousand hectares of land and approximately 90 thousand hectares of marine area, with a total distance of approximately 52 thousand kilometers, comprising almost 14 thousand kilometers of land and more than 38 thousand kilometers of marine area. The data pertaining to monitoring coverage and monitoring path can be observed in Figure 5.1.



During the period 2022-2023, all resorts in Komodo National Park conducted area monitoring for 442 times, with nearly 27 thousand datapoint recordings after monitoring for 10-15 days. The resulting data include over 1,000 findings of human activity in the area, more than 19 thousand potential data records of the area, and more than 6 thousand other information records. The efforts made in response to all the findings are documented in SMART and its Dashboard. The biodiversity findings and their locations are also summarized in a concise dashboard, and all detailed information can be traced back and retrieved for further analysis.

The information generated from the patrolling and monitoring of the area can be observed in Figure 5.2. The information can also be restricted to a certain time range, and daily data can be displayed in the form of charts. The statistical formula for kernel density describes the intensity of the findings, which can be applied to spatial data in the form of a heatmap. The severity of encounters with animals is also displayed on the SMART Dashboard.

**Figure 5.1**  
 SMART RBM Dashboard: Monitoring Results of Komodo National Park (2022-2023)



**Figure 5.2**  
Visualization of Some Features on the SMART Dashboard in Komodo National Park



## 5.2 High Conservation Value Areas

### Optimizing Biodiversity Conservation In Sustainable Development

A Presidential Instruction<sup>44</sup> issued on January 16, 2023 served as a policy for biodiversity conservation, which must be considered in all development sectors by ministries, institutions, and local governments. The purpose of the Presidential Instruction is to promote cross-sector integration to achieve ecological, economic, and social balance within sustainable development. It is

important to map areas of high biodiversity value in order to determine priority areas of land use according to their characteristics and potential. Habitat distribution and species richness are integral components of regional development policies. However, biodiversity distribution information is also important for conservation planning, especially for the purpose of establishing conservation area networks, protecting the representation of ecosystem types, and protecting species habitats from extinction threats caused by habitat pressures.

<sup>44</sup> Presidential Instruction Number 1 of 2023 on Mainstreaming Biodiversity Conservation in Sustainable Development

The Ministry of Environment and Forestry is mandated to maintain High Conservation Value Areas (HCVA) under the National Medium-Term Management Plan 2020–2024. The National Development Planning Agency (Bappenas) estimated that a minimum of 70 million hectares of areas have high levels of biodiversity. The HCVA coverage area has significant biological, ecological, social, and cultural values at the national, regional, and global levels (Widayati et al., 2018). Implementation of this mandate is carried out through the inventory and verification of areas with high biodiversity value, both within and outside conservation areas. Habitat distribution and species richness are mapped based on data collected by field officers and their partners throughout Indonesia.

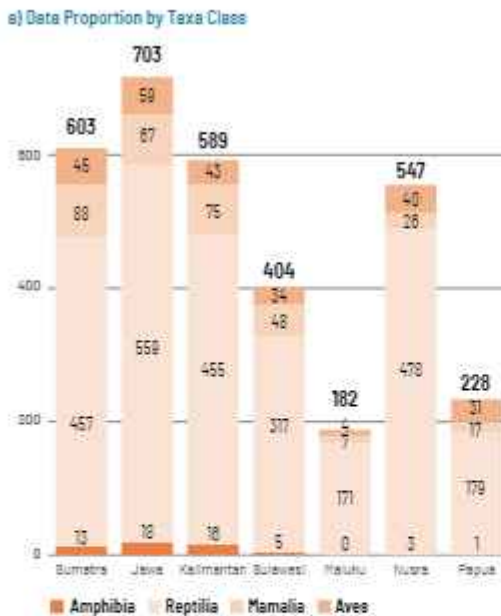
### Findings of the Number of Species from Four Taxa<sup>45</sup> in Each Region

Data collected until 2022 encompasses over 521 thousand rows, with almost 510 thousand rows verified and validated. The data are sourced from 74 Technical Management Units of MoEF, and various partners. It reveals a total of 1,560 species, 186 families, and four classifications.

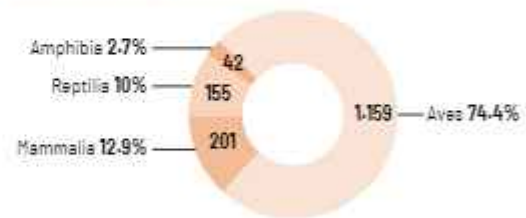
The majority of the data emanated from Sumatra (57.71%) and Java (18.07%). For some regions, such as Maluku, Sulawesi, and Papua, the data is still relatively rare, with respective contribution of 0.4 percent, 3.1 percent, and 8.6 percent. Kalimantan and Papua regions are having the largest area, which still requires more effort in data collection. The high variation in the number of data records across regions is influenced by the region's size, the number of technical implementation units, and the intensity of data collection.

According to the verified and validated data, there are 1,159 species of birds (74.45%), 201 species of mammals (12.9%), 155 species of reptiles (10%), and 42 species of amphibians (2.9%) when compared to data from the 6<sup>th</sup> National Report for the CBD, these figures represent 28.2 percent of the mammal class, 72.3 percent of the Aves class, 21.7 percent of the reptile class, and 11.7 percent of the amphibian class. These four categories of animals are also used for advanced analysis, prediction, and extrapolation of habitat suitability and species richness.

**Figure 5.3**  
 Findings of the Number of Species from Four Taxa in Each Region



b) Species Count Comparison by Region



<sup>45</sup> Taxa are the hierarchical divisions of a species from Kingdom to subspecies

### Areas with High Biodiversity

Areas with high biodiversity value are those with a wealth of species and a high habitat quality, especially for wildlife. The criteria for determining such area includes the significance of endemism, national protection status, and threat status, local, regional, and global levels. The species with the highest score becomes a focal sample for modeling in the identification of areas with high biodiversity at the ecoregion level using the maximum entropy (MaxEnt) method. Method is employed to predict potential habitats with diverse species, thereby aiding in the identification of areas with high biodiversity. Modeling with MaxEnt is used to assess areas with high biodiversity value through species samples. The species are ranked according to their protection status, threat, and endemism. MaxEnt's results indicate the suitability of habitat for selected animals, and they are used as an approach to assessing important areas of biodiversity. The outcomes of this habitat suitability modeling necessitate rigorous statistical testing, encompassing the requirement for supplementary samples in diverse regions such as Kalimantan, Sulawesi, Maluku, and Papua to broaden the sample coverage.

The MaxEnt prediction model is a correlative learning machine widely used in the study of Ecology and habitat suitability (Elith & Leathwick, 2009; Wisz et al., 2008). Maximum entropy results in a correlation between the value of the predictor variable and the location of a known species (Phillips et al., 2006). It is a popular method because it has predictive and analytical capabilities, as well as the ability to predict and extrapolate data with a few samples and a few coordinate points of absence (Wisz et al., 2008).

The modeling results cover a total land area of nearly 103 million hectares, including Sumatra (21.7 million hectares), Kalimantan (36.2 million hectares), Java (7.1 million hectares), Bali-Nusantara (3.4 million hectares), Sulawesi (13 million hectares), Maluku (0.9 million hectares), and Papua (20.6 million hectares). Scope of this analysis demonstrates the prediction of suitable regions as habitats for species with the highest scores in each region.

According to Pusparini (2014), most of the forests in the Sumatra region are fragmented and isolated, resulting in adverse effects on numerous animal species. According to Chiaverini et al. (2022), the Kerinci Seblat, Bukit Barisan Selatan, and Berbak Sembilang national parks protect a few species in Sumatra. Fragmentation and isolation make them difficult for animal species with large ranges to isolate. The main threat to tigers and elephants is negative interaction with humans, and the decline in genetic diversity becomes a long-term problem for large mammals. Sumatra, with an area of 473,000 km<sup>2</sup>, has many endangered species (CEPF, 2001). It is estimated that 45 percent of Sumatra has high conservation potential, including 34 important bird areas (IBAs), although many are outside conservation areas and in threatened lowland forests. Biodiversity is found in conservation areas such as Gunung Leuser National Park, Kerinci Seblat, and Bukit Barisan Selatan. However, Sumatra's forests require wildlife corridors because of past deforestation, which has severely fragmented them.

In Java region, about 43.1 percent of the land area has a high biodiversity. The species richness exists both within and outside conservation areas, as well as in urban areas such as Jakarta, Bogor, Semarang, and Yogyakarta. Mount Papandayan is home to 73 species of birds and 185 species of plants (Sulistiyawati et al., 2006). The northern coast and Bawean Island are important for biodiversity and need special attention. They need special attention. Java maintains 7.1 million hectares of conservation areas, equivalent to 55 percent of the total land area, which are focused on mountains and protected areas, and 10 thousand hectares of primary forest are still preserved.

In Kalimantan region, species richness is concentrated in high biodiversity areas of 1.5 million hectares (6.3%), most of which are conservation areas. Conservation areas such as Sebangau National Park, Bukit Baka Bukit Raya, and Tanjung Puting have numerous species. Kalimantan boasts a significant conservation area of 36.2 million hectares, accounting for 67 percent of its total area. Many vertebrate species are endemic (Curran

et al., 2004), and some taxa achieve the highest biodiversity at low elevations (Ashton, 2010). For example, 50 percent of Borneo's endemic bird species and more than 35 percent of endemic mammal species rely on lowland forests (Lambert & Collar, 2002).

The region of Bali and Nusa Tenggara is rich in species, with 1.25 million hectares in Bali having high biodiversity at 0.4 million hectares (25.8%). This region, including islands such as Bali, Lombok, Sumbawa, Sumba, and Flores, is known as the Lesser Sunda, and is part of the Wallacea zone with the highest level of endemism in Indonesia. Species such as komodo dragons, rote snake-necked turtles, and yellow-crested cockatoos are only found in this region. The main vegetation is mainly monsoon forests and savanna ecosystems. Nusa Tenggara has a high conservation potential of around 3.4 million hectares, with 67.5 percent interspersed with areas of high biodiversity value. There are 105 Key Biodiversity Areas (KBA) covering an area of 2.1 million hectares.

Sulawesi Region, with an inventoried species richness of 1.2 million hectares, has a high biodiversity of 0.7 million hectares (6.7%). Animal inventory still requires verification, particularly in conservation zones. Sulawesi has a conservation potential of 13 million hectares, with 87.6 percent of the area covering high conservation value areas and 95 KBA areas covering 5.2 million hectares. Wallace lines have an impact on the degree of endemism of the fauna of Sulawesi. The Wakatobi and coastal islands exhibit the highest levels of biodiversity, whereas the central region with its extensive forests exhibits a lower level of biodiversity. Pusparini, et al. (2023) recommend expanding new protection areas with scenarios of 17 percent, 30 percent, and 50 percent. Protection priorities were identified for locations such as the Gorontalo corridor, Bangkiriang landscape, Tokalekaju corridor, Centra Sulawesi corridor, and Mekongga corridor.

The Maluku Region possesses a species richness of 0.3 million hectares, with a high biodiversity value of 0.1 million hectares (6.8%). The availability of species data is very limited, particularly in the principal islands such as Seram, Obi, Halmahera, Bacan, and Tanimbar, which are far from the target of two million hectares. Maluku, with its marine ecosystems and small islands, requires conservation strategies that support connectivity between sea, coast, and land. The MaxEnt model exhibits a significant conservation potential of 0.9 million hectares, with 17.6 percent of the area being of significant biodiversity value. Due to the lack of data and the limited distribution of species, MaxEnt analysis is less representative. It was reported that 51 KBAs in Maluku covered an area of 2.1 million hectares (von Rintelen et al., 2017). Biodiversity is notably high on Seram Island with Manusela National Park, in contrast to the Darmawan Study (2018), which recommended conservation priorities on the coast and small islands in the North and Southeast.

The Papua Region has the highest biodiversity in the world, ranging from coral reefs to cryogenic vegetation that grows in icy and snowy areas on mountain peaks (Marshall, 2006) Papua, the epicenter of endemic species belonging to diverse taxonomic groups, stands out for the distinctiveness and complexity of its ecosystems, which hold significant biological significance (Supriatna, 1999). Papua has an inventoried species richness of 0.6 million hectares, and a high biodiversity area of 0.3 million hectares (1.4%). The surveyed area is merely 3.1 percent, restricted to Wasur and Lorentz National Parks. The habitat map of Papua shows a potential conservation area of 20.6 million hectares, which is almost equal to the high biodiversity zone of 21.1 million hectares. The proportion of modelling results and biodiversity areas with high biodiversity is only 38.6 percent. The main difference between the two areas is the low biodiversity value in the highlands and the lack of data from the mountains, including Lorentz National Park.

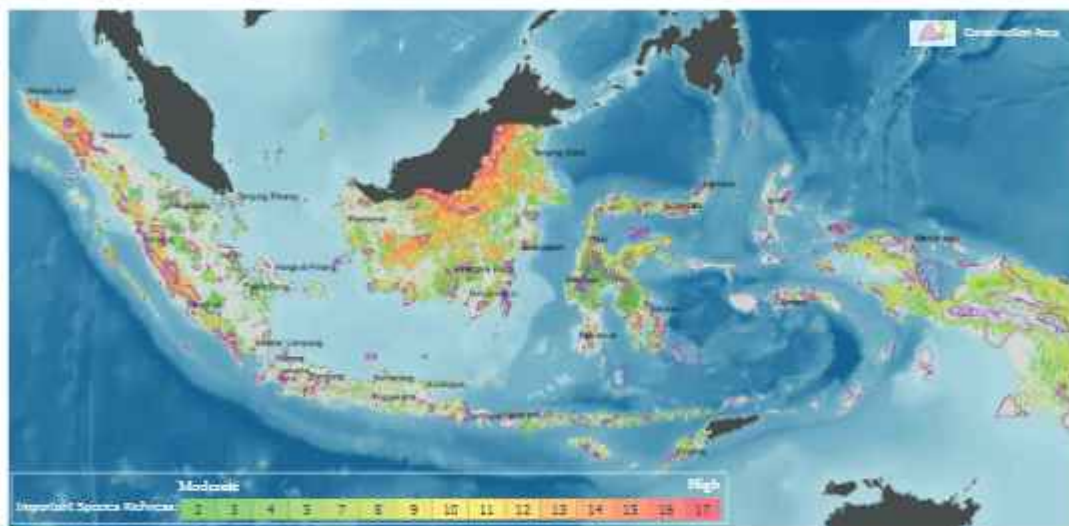
Figure 5.4 displays a map of the region showing areas of medium to high biodiversity scale, predicted as wildlife habitat, or having a wealth of species covering an area of 109 million hectares. Based on the overlay results using the HVCA indicative map issued by the Bappenas, areas with high biodiversity are not only found in conservation areas but also in forest areas with other functions. A small portion is situated in other use areas (APL). Areas with high biodiversity are directly proportional to plateaus with steep slope topography in areas with high biodiversity. This is consistent with the fact that residential and industrial areas are generally located in lowlands with a relatively flat topography. This is also one of the fundamental considerations when determining the preservation area as a protection area for plant and wildlife species.

In the context of landscape-based biodiversity management, the existence of conservation areas and their supporting areas is evaluated based on their extent and the necessity to consider their interconnectedness. Theoretically, a highly fragmented natural area would evolve into a habitat island that would no longer permit

energy exchange (the food chain) to sustain genetic diversity. It is also important to maintain the ecological connectivity of areas with high biodiversity and important habitats. One approach is to establish a network of interregional wildlife corridors that are regulated and managed as conservation areas.

The conservation of biodiversity is enhanced if natural lands or waters surrounding protected areas are retained. Maintaining natural habitats that foster ecological connectivity between protected areas is crucial for species conservation and the integrity of natural habitats and ecosystems. This is particularly important given the dynamics of climate-change-induced biome shifts. The alternative of establishing protected areas as islands within a sea of developed land will result in the vulnerability of numerous species to extinction over time. Connectivity conservation emphasizes the need to think beyond isolated conservation enclaves or islands to a whole of landscape vision of many lands under various tenures and jurisdictions, contributing to an integrated approach to conservation.

**Figure 5.4**  
Map of Species Richness throughout Indonesia



The World Commission on Protected Areas, one of the IUCN's six commissions, strongly supports large-scale coral reef conservation. Recognized it as one of the most significant strategic responses to climate change, this approach is socially inclusive and acknowledges that the entire society

contributes to the conservation effort, thereby benefiting both individuals and wildlife. This effort is an essential investment for sustaining the ecosystem services of terrestrial and marine environments for the 9.3 billion people forecast to live on Earth by 2050 (Worboys et al., 2010).

### BOX 5.1 | Population Dynamics of Sumatran Tiger (*Panthera tigris sumatrae*) in the Intensive Protection Zone of Bukit Barisan Selatan National Park

The tiger is a flagship species whose protection is of global concern. While the tiger is globally listed on the IUCN Red List as Endangered, the Sumatran tiger subspecies *Panthera tigris sumatrae* is listed as Critically Endangered (Linkie & Ridout, 2011). The Sumatran tiger is endemic to the Indonesian island of Sumatra, where it is threatened across its range. It includes Bukit Barisan Selatan National Park (BBSNP), one of the 76 Tiger Conservation Landscapes (Dinerstein et al., 2006), and a World Heritage Site. In 2016, the Government of Indonesia designated a 1,000 km<sup>2</sup> Intensive Protection Zone in the park's central section to protect and monitor wildlife diversity.

A camera trap survey conducted in IPZ of BBSNP in 2022, provided invaluable information on wildlife diversity and activity. The survey took place from May 27 to December 16, 2022, using 130 camera traps installed in 66 deployment grids, with 12 camera traps reported missing due to theft within the area. A total sampling effort of about eight thousand trap nights resulted in 217,074 photos, including almost four thousand independent photos of identified wildlife species. In detail, a total of 51 animals were identified, consisting of two animals identified at the genus level and 49 at the species level (i.e., two reptiles, 14 birds, and 33 mammals), including the Sumatran tiger.

Sumatran tigers were recorded frequently, with 746 photos taken, including 86 independent photos. Tigers were observed on 39 different camera trap deployment grids. The data were then used to get an estimate of the population density using the Spatial Explicit Capture-Recapture (SECR) method (O'Brien et al. 2003) and the single-season model, which came up with 2.2 individuals per 100 km<sup>2</sup> density. In the IPZ of BBSNP, the number of tigers was higher in 2022 than it was in 2019 (1.5 individuals/100 km<sup>2</sup>) (BBSNP & WCS-IP, unpublished), but lower than it was in 2015 (2.3 individuals/100 km<sup>2</sup>) (Pusparini et al. 2018). Density estimates fluctuated in 2015, 2019, and 2022 (1.53-2.3 individuals/100 km<sup>2</sup>), but overall remained relatively stable. The sex ratio in the BBSNP IPZ has shifted from 1:3.5 in 2019 and 1:3.3 in 2015 to 1:1.18 in 2022, indicating a good balance in the tiger population. The proportion of female tigers now exceeds the proportion of male tigers.

### 5.3 International Commitments for Biodiversity Conservation

In December 2022, the 196 member states of the Convention on Biological Diversity (CBD) agreed on the Kunming-Montreal Global Biodiversity Framework (KM-GBF) to prevent species extinction. To implement these targets, the Indonesian government is preparing the Indonesian Biodiversity Strategy and Action Plan (IBSAP) 2025-2045, coordinated by the Ministry of National Planning and Development (Bappenas). This process involves various sectors, including government, private, and NGOs, and included Indonesia participation in 34 meetings of the CBD Secretariat between 2022 and 2023.

All KM-GBF targets are included in the IBSAP 2025-2045. Although still being finalized, discussions have been ongoing since early 2023. The targets align with the 2025-2029 Medium Term Development Plan (RPJMN). The IBSAP aims to restore 500,000 hectares of ecosystems by 2030, while the RPJMN targets 300,000 hectares in degraded protected areas. Separate targets are set for peat, mangrove, seagrass, and coral reef ecosystems outside protected areas.

Indonesia targets 54.06 million hectares of terrestrial protected areas. As of 2023, 51.67 million hectares, or 27.30 percent of Indonesia's land area, are protected, including protected forests (15.63%) and terrestrial conservation forests (11.67%). Additionally, Indonesia aims to manage 15 million hectares of high biodiversity areas outside protected areas and achieve 55 percent sustainable cultivation practices in forestry, agriculture, plantation, and fisheries.

Indonesia has also ratified the Nagoya and Cartagena Protocols, which are products of the CBD Convention. The Nagoya Protocol is implemented through a policy of access and benefit sharing for the use of bioprospecting. The regulation governing the utilization of genetic resources is overseen by the Ministry of Environment and Forestry Regulation<sup>46</sup>.

The drafting of IBSAP documents subsequent to 2020 is an integral component of the implementation of the CBD Convention, which serves as the foundation for biodiversity management strategies at the national level.

Since joining the CBD, Indonesia has been a member of the CITES Convention since 1978. Over the past two years, Indonesia has actively participated in various CITES meetings and assemblies, including the CITES Conference of the Parties (COP19) held in Panama. During the meetings, Indonesia was actively involved in strengthening its position and that of ASEAN countries in order to advance relevant agendas, contributing to cancellation of 95 of the 102 plant and animal species included in the proposed review, the majority of which were American proposals. Indonesia's membership in CITES is crucial to Indonesia's economy, creating jobs, and controlling biodiversity protection. Legal and sustainable wild plant and animal trade also provides opportunities to develop plant and animal breeding, which has economic and social impacts on the community. It also improves the quality of plant and animal habitat in Indonesia.

All conventions ratified by Indonesia play a crucial role in guiding the attainment of national and global objectives in a balanced manner. Through KM-GBF, UNCBD provides guidance for the implementation of biodiversity conservation policies at the national and regional levels. Conventions also have a significant role in resource mobilization. Cooperation and technical assistance can be provided between State parties and by the secretariat of the convention. Fellow CITES members can help each other implement the protection of species traded between countries.

To support its international commitments and implement the ratified convention, Indonesia is taking various steps, such as the preparation of the Indonesian Biodiversity Strategy and Action Plan (IBSAP) and regular submission of national reports on progress in achieving its targets. Furthermore, Indonesia is also active in the development and management of the Biodiversity Clearing House, Bio Safety Clearing House, and Access and Benefit Sharing Clearing House.

<sup>46</sup> Minister of Environment and Forestry Regulation P.2/MENLHK/SETJEN/KUM.1/1/2018 regarding Access on Wildlife Species Genetic Resources and Benefit Sharing on Its Utilization



Indonesia's government is also actively proposing and determining World Heritage Sites, Biosphere Reserves, Ramsar Sites, and ASEAN Heritage Parks.

## 5.4 Development of Sustainable Ecotourism

### International Recognition of Indonesia's Conservation Areas

There are conservation forest areas in almost every province in Indonesia, including 56 national parks, 214 nature reserves, 79 wildlife reserves, 11 hunting parks, 39 grand forest parks, 128 nature recreation parks, and 40 nature conservation areas. The majority of these regions are recognized as tourist attractions.

International recognition from several international institutions is given to Komodo National Park, which receives The New Seven Wonders, World Heritage Site, and Biosphere Reserve. Furthermore, Gunung Leuser National Park, Bukit Barisan Selatan National Park, and Kerinci Seblat National Park received the titles of Asean Heritage Parks and World Heritage Site of UNESCO. Five national parks have been designated Ramsar sites, namely Berbak National Park, Danau Sentarum National Park, Wasur National Park, Rawa Aopa Watumohai National Park, and Sembilang National Park. Twelve other national parks are also designated as biosphere reserves, including Bromo Tengger Semeru National Park, Alas Purwo National Park, Baluran National Park, Meru Betiri National Park, Gunung Gede National Park, Komodo National Park, Lore Lindu National Park, Tanjung Puting National Park, Gunung Leuser National Park, Siberut National Park, Wakatobi National Park, and Taka Bonerate National Park.

The international recognition of the National Parks enhance their competitive advantage and branding, thereby enhancing its visibility among tourists, particularly those from abroad. Tourist visits, both foreign and domestic, can increase and support the achievement of the target of 1.5 million foreign tourists and 20 million domestic

tourists. Nonetheless, it is imperative to exercise caution in the management of tourism, as national parks and grand forest parks serve both roles: tourism utilization and protection and preservation biodiversity. With sustainable management, tourism in national parks, nature tourism parks, and grand forest parks contributes to conservation, and provides multiplier effect, providing employment opportunity for local communities, as well as development the regional economic.

### Contribution of Sustainable Tourism and Implementation of Ecotourism

According to Nagle (1999), sustainable tourism refers to tourism that can endure for an extended period of time without causing harm to the environment, while also incorporating local communities and involving them in the planning and execution of tourism development. Ecotourism, economy by low density and minimal impact, is advocated as a sustainable approach. Ecotourism is recommended as an effective way to implement sustainable tourism, especially in national parks, nature recreation parks, and grand forest parks.

According to Scheyvens (2002), ecotourism is also regarded as a means of resolving the conflict between conservation and development. Ecotourism offers numerous economic and social advantages to the local populace, including employment, infrastructure development, local income, and the preservation of the environment.

The Indonesian government has developed a series of policies governing the implementation of sustainable ecotourism in conservation areas. Ecotourism in conservation areas is only permitted in nature conservation areas, such as national parks, nature parks, and forest parks. In a conservation area, only utilization zone or block is allowed, usually a small area. For example, in Komodo National Park, which covers an area of over 173 thousand hectares, only about two thousand hectares of utilization zones for ecotourism, or only 1.4 percent of the total area. Within these zones, infrastructure development is only allowed

to a maximum of 10 percent of the area. This arrangement is strictly enforced, considering that ecotourism is essentially a supportive activity to conservation areas.

We have implemented visitor limitations to the conservation area based on the carrying capacity of the area. For example, in many mountain conservation areas that are frequently climbed, such as Mount Gede and Mount Rinjani, daily restrictions are carried out through strict booking systems. Additionally, a temporary open and closed area system is implemented in order to provide recovery time to nature.

To further mitigate the impact of ecotourism by various measures are, including vehicle restrictions, the application of high entry fees, and the obligation to own essential items for ecotourism. Despite these efforts, the management of waste in ecotourism and conservation areas remains a significant challenge, requiring continuous improvement and innovative solutions.

In order to ensure that ecotourism practices remain in line with environmental conservation efforts and consider the social conditions of local communities, the government continues to implement a policy of limiting activities and increasing the involvement of local communities in conservation management. To enhance the economy of the local community, the government has implemented a policy of licensing natural tourism services, such as tour guides, porter services, and others.

Ecotourism management practices with the community are carried out with a cooperative system in some locations. Through this cooperation, the local community, through the village government, will derive direct economic benefits from their involvement in ecotourism management. For example, in 2019, ecotourism in Komodo National Park generated non-tax revenues of IDR 38 billion, and the community income multiplier effect was IDR 533 billion. The income was derived from the provision of accommodation, food, transportation, and guide services to the people of Labuan Bajo.

These measures are supported by legislation pertaining to nature conservation<sup>47</sup>, environmental protection<sup>48</sup>, and management of natural tourism, which encompasses regulations pertaining to licensing attempts<sup>49</sup> and the management of conservation areas<sup>50</sup>.

## 5.5 Potential of Forest Healing and People's Wellbeing

### Forest Healing Initiatives and Examples

Forest healing is defined by the capacity of its forest environment to promote human health through diverse tourism activities, which can be conducted within conservation zones. The key principle of forest healing is to establish a connection between humans and nature in order to have a positive impact on the body, soul, and mind of people. The unique and distinctive features of conservation areas in terms of landscape and ecosystems, biodiversity, social and cultural life, and local community involvement can serve as supportive factors in the implementation of healing forests.

Conservation areas possess considerable potential for ecotourism, encompassing 102 mountain and hiking points, 1,200 natural panoramic spots, 274 cave sites, 820 waterfalls, 160 lakes, and 51 marine attractions. The Ministry of Environment and Forestry has taken measures to promote forest healing in Indonesia's conservation areas, taking into account management

<sup>47</sup> Law Number 5 of 1990 on the Conservation of Natural Resources and ecosystems

<sup>48</sup> Law Number 32 of 2009 on Environmental Protection and Management (which has been amended most recently by Law Number 8 of 2023 on The Establishment of Government Regulations in Lieu of Law Number 2 of 2022 on job creation into Law), Government Regulation Number 38 of 2010 on The Exploitation of Nature Tourism in Wildlife Sanctuaries, National Parks, Forest Parks, and Nature Tourism Parks, Government Regulation No 28 of 2011 on the Management of Nature Reserve and Nature Conservation Areas (which has been amended several times most recently by Government Regulation Number 108 of 2015 on amendments to government regulation Number 28 of 2011)

<sup>49</sup> Government Regulation Number 5 of 2021 on The Implementation of Risk-Based Business Licensing

<sup>50</sup> Government Regulation Number 22 of 2021 on The Implementation of Environmental Protection and Management, and Regulation of The Minister of Environment and Forestry Number

factors such as location determination and program implementation.

Ramdan et al. (2021) identified a suitable site within Mount Ciremai National Park for forest healing, characterized by invitation-based activities. There are five natural invitations; air, vegetation, land, water, and emotional release. An example of the implementation of a healing forest is established in Gunung Tunak Nature Recreation Park, West Nusa Tenggara which gained outcomes such as facilities and buildings covering a total area of approximately 3000 m<sup>2</sup>, capacity building activities involving a total of 175 participants and mapping the potential and distribution of Natural Tourist Attractions. The impact of this project during the period 2017-2020 includes an increase in the visitation rate to Gunung Tunak Nature Recreation Park by up to 42 percent annually, a 52 percent average annual increase in Non-Tax State Revenue (PNBP) from natural tourism, and a 52 percent yearly increase in community income from tourism activities.<sup>52</sup>

Maintaining the delicate balance between visitor experience and environmental preservation is crucial. A significant task is to implement sustainable management practices that minimize ecological impacts and ensure the long-term viability of healing forests.

Although no research has been conducted in relation to the forest healing program at Gunung Tunak Nature Recreation Park, several research results support the forest healing program:

- (1) the potential of medicinal plants, one of which is the diversity of Ganodermataceae from several forest areas on the island of Lombok (Muspiah et al. 2016),
- (2) identification of attractions, accessibility, and amenities of Gunung Tunak Nature Recreation Park (Permadi et al. 2021),
- (3) potential natural attractions of Gunung Tunak Nature Recreation Park (Cahyani & Mayana, 2019).

The direct impact is seen in the increase in Non-Tax State Revenue from visits and the income of local communities. There exist Tunak Besopoq community groups that, under the guidance of BKSDA NTE, have obtained a Business License for Providing Nature-Based Tourism Services (PB-PJWA) and offer tourist services to visitors in cottages and restaurants, since their formation in 2016. This group was founded in 2016. The Tunak Besopoq group comprises a total of 95 individuals. The income of the group has significantly increased since the establishment of tourism services and food and beverage provision. Revenue in 2018 was around IDR 132 million, then increased three times in 2019, to almost IDR 412 million. In 2020, despite the COVID-19 pandemic, the income of individuals amounted to nearly IDR 514 million; in 2021, it reached almost IDR 584 million; and at the conclusion of 2022, it reached almost IDR 950 million.

Forest healing ecotourism development at TWA Gunung Tunak emphasizes the importance of interaction with nature, especially forests, for healing and well-being. The measures encompass the selection of sites with high biodiversity, as well as the establishment of amenities such as hiking trails and meditation zones.

Educational programs are conducted to introduce visitors to the ecological significance of the forest. Experienced instructors lead the meditation and yoga sessions, and the planting of aromatic plants improves the sensory experience. Management practices involve maintaining natural silence and the continuous evaluation of impacts.

A holistic and sustainable approach with good infrastructure support is needed for the development of forest healing ecotourism.

<sup>52</sup> P.8/MENLHK/SETJEN/KUM.1/3/2019 on The Exploitation of Nature Tourism in Wildlife Reserves, National Parks, Forest Parks and Nature Parks.

An aerial photograph of a tropical bay. The water is a vibrant turquoise color, transitioning to a deeper blue towards the center. A sandy beach curves along the right side of the bay. The surrounding land is covered in dense, lush green forest. In the foreground, the tops of trees are visible, framing the bottom of the image. A small white boat is visible in the water on the left side.

## Permisan Beach

**LOCATION**

Meru Betiri National Park, East Java

**PHOTO BY**

Arihadi Wibowo (2020)

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## CHAPTER 6

# Addressing Global Climate Change

### 6.1 Development of National Policies on Climate Change

Indonesia was among the nations that signed the Paris Agreement in 2015 and subsequently ratified in 2016. This step also confirms Indonesia's commitment to reduce greenhouse gas emissions through its First Nationally Determined Contributions. Indonesia submitted the First NDC document to the UNFCCC with a target of 29 percent and 41 percent for CM1 (Counter Measure 1, unconditional) and CM2 (Counter Measure 2, conditional) in 2016, and then submitted the updated NDC in 2021, together with the Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR) 2050, a long-term climate change control vision. In the LTS-LCCR 2050 document, Indonesia has expressed its determination to achieve Net Zero emissions in 2060 or even sooner. Through a low-carbon emissions scenario in accordance with the Paris Agreement (LCCP) target, Indonesia intends to reach the peak of national greenhouse gas emissions in 2030 with a net sink in the Forestry and other Land Use Sector. In 2022, Indonesia increased its commitment through Enhanced NDC (ENDC), whereby CM1 commitment increased to 31.89 percent and CM2 increased to 43.2 percent.



### Curik Bali (Bali Starling)

#### LOCATION

Bali Barat National Park

#### PHOTO BY

Sofi Sugiharto (2021)

Indonesia issued Minister of Environment and Forestry Regulation Number 21 of 2022 on the Procedure for Implementation of the Carbon Economic Pricing (NEK) that describes the implementation of carbon trading, result-based payment, carbon levy and other instruments. In addition, the Minister of Environment and Forestry Decree No. 168 of 2022 regarding Operational Plan of Indonesia's FOLU Net Sink 2030. The ministerial regulation further confirms Indonesia's direction towards achieving NDC targets and controlling GHG emissions, one of which is through carbon trading.



Presidential regulation on carbon pricing (NEK)<sup>52</sup> has been promulgated to support for the achievement of NDC targets. Subsequently, in 2023, the Minister of Environment and Forestry a regulation was issued by the Minister of Environment and Forestry<sup>53</sup> to regulate carbon trading procedures within the forestry sector. This was then followed by the Minister of Environment and Forestry decree<sup>54</sup> a roadmap for carbon trading in the forestry sector. These two regulations constitute

the foundation for the establishment of an allowance of emissions cap (PTBAE) that can be seamlessly integrated with the NDC roadmap and FOLU Net Sink 2030. Figure 6.1 provides a succinct summary of Indonesia's policy journey in the realm of climate change, after the adoption of the Paris Agreement.

<sup>52</sup> Regulation of the President of the Republic of Indonesia Number 98 of 2021 on The Implementation of Carbon Pricing to Achieve the Nationally Determined Contribution Target and Control Diver Greenhouse Gas Emission in the National Development

<sup>53</sup> Regulation of the Minister of Environment and Forestry Number 7 of 2023

<sup>54</sup> Decree of the Minister of Environment and Forestry Number 1027 of 2023 on the Roadmap of Carbon Trading in the Forestry Sector

**Figure 6.1**  
Climate Change Policy Developments in Indonesia



## 6.2 The Role of Indonesia in Global Commitments to Control Climate Change

### Indonesia's role in the Global Forum on Environment and Climate Change

Indonesia is actively leveraging its strategic role in the global forum by active participation in international convention, and various multilateral, regional, and bilateral forums related to the environment and climate change. This includes its role as a party in the UNFCCC, as a member state of ASEAN Presidency and as a member of the G20 including holding the G20 Presidency in 2022. Additionally, Indonesia as a member of the Intergovernmental Panel on Climate Change (IPCC), participates in the Petersberg Climate Dialogue (PCD), the Ministerial on Climate Action (MOCA), the Global Environment Facility (GEF), the Green Climate Fund (GCF), and the Indo-Pacific Economic Framework for Prosperity (IPEF). Through these Convention and forums, Indonesia strengthens its commitment and joint action towards addressing climate change. The commitment is made through building consensus, resource mobilization, joint statements, and other forms of collaboration.

At UNFCCC negotiations, Indonesia has been actively engaged in the negotiation of many important agendas. At COP 28 in Dubai,

Indonesia contributed to the negotiation of decisions adopted under the UAE Consensus such as on mitigation work program, just transition pathway, Article 6, Global Stocktake and finance for loss and damage.

At the GEF Forum, Indonesia emerged as the largest recipient of GEF-8, with the total allocation through the STAR reached USD 103.6 million. Of this, the biodiversity focus area received USD 82.1 million, with the climate change focus area received USD 20 million and the land degradation focus area USD 1.4 million dollars. Additionally, three proposals from Indonesia have successfully passed through the Integrated Program window under the theme Net-Zero Nature-Positive Accelerator, Food Systems, and Wildlife Conservation for Development for the GEF-8 cycle.

In 2023, Indonesia served as the chair of the ASEAN Regional Forum with the theme "ASEAN Matters: Epicentrum of Growth". During leadership period, three major results were achieved:

- 1) The ASEAN Joint Statement on Climate Change (AJSCCC) to the UNFCCC COP 28



summarizes ASEAN position and views on global climate change policy. As ASEAN Chair 2023, Indonesia led the preparation of the AJSCC for the COP 28. ASEAN urges all parties to increase their commitment to reducing greenhouse gas emissions.

- 2) The ASEAN Community-Based Climate Action is widely recognized as one of the most vulnerable regions to the effects of climate change. Local communities, as well as non-party stakeholders, play an important role in the region's efforts to tackle climate change. The objective is to develop a community-based climate action knowledge management system and encourage the participation of local communities in implementing climate action.
- (3) The ASEAN Coordinating Centre for Transboundary Haze Pollution Control (ACCTHPC) will be based in Jakarta, Indonesia, and will serve to facilitate cooperation and coordination in addressing forest and land fires and haze pollution arising from fires in ASEAN. It involves the development of Information Systems, as well as the improvement

of expertise, technology, techniques, and knowledge. We have intensified our collaboration with forest and land fire mitigation partners in ASEAN.

At the 2022 G20 forum, Indonesia led with the theme "Recover Together, Recover Stronger," resulting in key environmental commitments:

- 1) The G20 reaffirmed its commitment to the Paris Agreement and pledged to implement the Glasgow Climate Pact to limit temperature increases to 1.5°C. They urged, among others, to enhance climate actions, increase mitigation and adaptation efforts, and progress on loss and damage.
- 2) Leaders called for finalizing the Post-2020 Global Biodiversity Framework to halt and reverse biodiversity loss by 2030. They emphasized clear goals, financial support for developing countries, and efforts to combat biodiversity loss and land degradation. The G20 committed to conserving 30 percent of global land and oceans by 2030.



**Head of Governments were Visiting  
Suwung Mangrove Nursery**

**LOCATION**  
Suwung Keuh-Denpasar, Bali

**PHOTO BY**  
Presidential Palace Media Bureau (2023)

- (3) The G20 also highlighted the importance of nature-based solutions, ecosystem conservation, ending illegal fishing, and developing a binding agreement on plastic pollution by 2024, recognizing the role of ecosystems in climate mitigation and adaptation.

Indonesia joins tropical countries such as Cameroon, Ghana, Guyana, Liberia, and Congo in the Broader Market Recognition Coalition (BMRC) to gain global recognition for sustainable forestry and reduce carbon emissions while producing essential forest products. The BMRC aims to implement an institutional framework that promotes inclusive processes, environmental law enforcement, independent forest monitoring, and third-party audits. This framework also focuses on certifying and promoting forest products on the global market, encouraging foreign investment in the tropical forest industry, especially MSMEs, and facilitating collaboration and knowledge exchange among members. The BMRC invites participation from tropical countries committed to sustainable forestry.

Indonesia, Brazil, and Congo have formed the Indonesia-Brazil-Congo (IBC) coalition as the world's largest owners of tropical forests. This coalition focuses on sustainable forest management and fostering collaboration. Joint programs include fire prevention, deforestation control, social forestry, and peat and mangrove restoration. At UNFCCC COP28 in Dubai, ministers from these three countries convened meeting to strengthen cooperation in managing tropical forests as part of their climate action efforts.

### 6.3 Actions to Address Climate Change

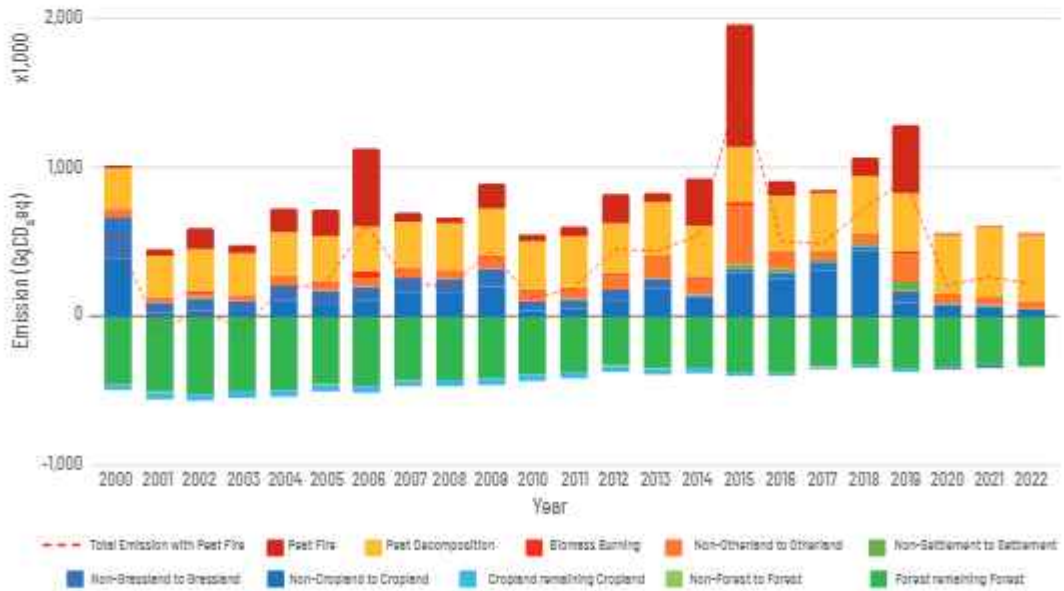
#### Indonesia's Role in Climate Change Mitigation

In 2021, the total GHG emissions from the forestry and other land use sectors (including peat fire) amounted to nearly 450 thousand Gigagrams CO<sub>2</sub>e. In 2022, the emissions decreased to approximately 250 thousand Gigagrams CO<sub>2</sub>e. Figure 6.2 indicates that GHG emissions from these sectors have fluctuated over the years, with peat fires significantly influencing the trends. Indonesia emphasizes on the management of forest and land fires, especially peatlands, due to their substantial impact on GHG emissions.

As per the ENDC, the Forestry and other Land Use Sectors are aiming to achieve GHG emissions reductions of more than 50 percent through measures such as deforestation reduction, forest rehabilitation, peat water management, peatland restoration, and peat fire management.

Forest and land fire management initiatives encompass prevention, suppression, and post-fire activities. The Ministry of Environment and Forestry (MoEF), with assistance from the Indonesian Armed Forces and the Indonesian National Police, engaged the community in integrated patrol operations in 246 villages as part of its prevention initiatives and carried out routine patrols in 847 villages. Additionally, training was provided to develop the Fire Care Community. Furthermore, hotspot locations were monitored via satellite, fire prone maps were used, and a Fire Danger Rating System was implemented. MoEF has strengthened 1,997 personnel from the Manggala Agni Brigade, operating in 34 areas and 37 workstations. Furthermore, MoEF also employs weather modification technology (artificial cloud seeding) to maintain peatland moisture during the dry season. Various parties in the region are engaged in efforts to suppress forest and land fires.

**Figure 6.2**  
Emissions from Forestry and Other Land Uses (Including Peat Fire)



Post-fire management involves forest and land rehabilitation, and also stringent law enforcement. From 2015 to 2023, no less than 1,487 administrative sanctions have been given to individuals, 295 company inspections, 12 criminal cases (When the dossier is declared completed, it receives the status P21), and 97 cases with the facilitation of the police/prosecutor.

Further more the Ministry of Environment and Forestry initiated the Climate Village Program (*Kampung iklim/Proklim*) now Community Program for climate, at the field to strengthen climate action. Proklim involves the active participation of communities in conducting integrated climate change mitigation and adaptation efforts. The objective is to facilitate the reduction of greenhouse gas (GHG) emissions and enhance the resilience of communities to the impacts of climate change. Based on calculations using the Spectrum application, between 2015 and 2023, the potential for reducing GHG emissions produced by about two thousand Proklims in Indonesia is approximately 2.5 million tons of CO<sub>2</sub>e.

### Indonesia's Steps in Carbon Trading and Carbon Exchange

In addition to the Presidential Regulation on carbon pricing for NDC targets and emissions control<sup>25</sup>, the Ministry of Environment and Forestry issued regulations governing the implementation and mechanism of carbon-based pricing<sup>26</sup>. These regulations outline the implementation mechanisms for carbon pricing, a market approach used to reduce GHG emissions by buying and selling carbon units. The government then issued a regulation of the Ministry of Environment and Forestry<sup>27</sup> to facilitate carbon trading within the forestry sector.

<sup>25</sup> Regulation of the President of the Republic of Indonesia Number 98 of 2021 on The Implementation of Carbon Pricing to Achieve the Nationally Determined Contribution Target and Control Over Greenhouse Gas Emissions in the National Development

<sup>26</sup> Regulation of the Minister of Environment and Forestry number 21 of 2022 on Procedure for Implementation of Carbon Pricing

<sup>27</sup> Regulation of the Minister of Environment and Forestry number 7 of 2023 on Procedures for Carbon Trading in the Forestry Sector to Support the Implementation of Carbon Trading in the Forestry Sector

Carbon trading in Forestry Sector aims to control GHG emissions from the forestry sector, improve carbon sequestration and storage, and achieve sector NDC targets. This includes both the forestry sub-sector and the peat and mangrove management sub-sector. Carbon trading is conducted in accordance with the roadmap established by the decree of the Minister of Environment and Forestry<sup>38</sup>. The roadmap includes general criteria related to emissions baselines and emission reduction targets, as well as specific criteria related to implementation plans, goals, and target achievement strategies.

The forestry industry has a mandate to reduce GHG emissions by 60 percent in order to combat climate change through the implementation of Indonesia's Forestry and Other Land Use (FOLU) Net Sink 2030, per the Minister of Environment and Forestry's decree on the Forestry and Other Land Use (FOLU) Net Sink 2030<sup>39</sup>. PBPH is prepared to implement carbon trading, with preparations for legality, performance, business plan, human resources, area of mitigation action, and funding. The activities of the Forest Utilization Business Work Plan (*Rencana Kerja Usaha Pemanfaatan Hutan/RKUPH*) encompass mitigation measures such as SILIN, RIL-C, planting, enrichment, environmental restoration, and forestry partnerships, achieving FOLU targets.

Presidential regulations<sup>40</sup> support national targets for reducing greenhouse gas emissions through carbon pricing, and ministerial regulations<sup>41</sup> provide strong support for forestry businesses. As of February 2024, 64 RKUPHS MUK for carbon sequestration and storage utilization have been approved, and 22 percent of PBPH are interested in

participating. The PBPH that has received RKUPH approval must prepare a mitigation action document. This demonstrates Indonesia's dedication to addressing the global climate crisis.

### The Role of Carbon Pricing in Achieving Indonesia's Climate Targets

Pricing carbon plays a big part in meeting the Nationally Determined Contribution (NDC). It does this by gradually lowering greenhouse gas (GHG) emissions in NDC sectors and encouraging people to take action on climate change through different methods, like trading carbon and paying people based on how well they do. On September 26, 2023, the President of the Republic of Indonesia, Joko Widodo, officially inaugurated the Carbon Exchange on the Indonesia Stock Exchange, a trading market for carbon emission permits and carbon credits. Some information pertaining to Certificate for Emission Reduction (SPE) can be obtained from the data in carbon exchange and National Registry System (SRN). This includes issuance of a SRN of 0.9 million tCO<sub>2</sub>e and the recording on IDXCarbon of 0.9 million tCO<sub>2</sub>e from the construction of a new natural gas-fueled power plant PLTGU Block 3 PJB Muara Karang. Additionally, there was an issue of a SRN of 864,209 tCO<sub>2</sub>e and a recording on IDXCarbon of 864,209 tCO<sub>2</sub>e from Lahendong Project Unit 5 and Unit 6 of PT Pertamina Geothermal Energy Tbk.

<sup>38</sup> Decree of the Minister of Environment and Forestry Number SK.1027/MENLHK/PHL/KUM.1/9/2023 dated 22 September 2023.

<sup>39</sup> Minister of Environment and Forestry Decree No. 168 of 2022 on Indonesia's Forestry and Other Land Use (FOLU) Net Sink 2030 for Climate Change Control.

<sup>40</sup> Regulation of President Number 98 of 2021 on The Implementation of Carbon Pricing.

<sup>41</sup> Regulation of the Minister of Environment and Forestry Number 21 of 2022 on Carbon Pricing, and Regulation of the Minister of Environment and Forestry Number 7 of 2023 on Procedures for Carbon Trading in The Forestry Sector.

Table 6.1 shows the transactions in the Indonesian Carbon Exchange (IDXCarbon), with most of carbon trading transactions were conducted through auctions, which account for 59.8 percent of the total transaction value. In addition, negotiation and regular transactions also make a significant contribution to carbon trading. This reflects significant carbon trading activity in the market, demonstrating a commitment to reducing carbon emissions and promoting sustainable economic development.

Currently, most users of carbon exchange services come from sectors other than forestry, which accounts for 77.78 percent of the total users, as seen in Table 6.2. Despite this, only a small percentage of the total users have engaged in carbon trading transactions, with only 56.5 percent of them having been active in such trading activities. This

indicates the potential for significant growth and participation of other sectors in carbon trading in the future.

The carbon levy is an attempt by governments to attract additional fees from entities that contribute to carbon emissions. The aim is to support the reduction of carbon emissions and encourage more environmentally friendly practices. The levies are applied in the form of taxes by central and local governments, customs, and other State levies, which are based on carbon content, carbon emission potential, carbon emission amount, and climate change mitigation action performance. Indonesia already has Law Number 7 of 2021, which regulates carbon taxes. The carbon tax will take effect in 2025, subject to supporting regulations and carbon calculation schemes.

**Table 6.1**  
Indonesia Carbon Exchange Transactions

Market	Total Price (IDR)	Total Volume (ton CO <sub>2</sub> e)	Total Value (IDR)	Volume (%)	Value (%)
Auction	123,192	300,000	18,478,800,000	60.70	59.8
Negotiations	561,351	62,200	3,039,157,959	12.6	9.8
Regular	2,368,800	132,054	9,389,311,600	26.7	30.4
Total	3,053,343	494,254	30,907,269,559	100.00%	100.00%

SOURCE: IDX Carbon, September 26, 2023 to January 9, 2024.

**Table 6.2**  
Carbon Exchange Service Users

No	Sector	Total	Have made a transaction	Percentage
1	Energy	16	5	31.25
2	Industry	1	0	0.00
3	Agriculture	1	0	0.00
4	Industrial Process and Product Use	1	0	0.00
5	Waste	0	0	0.00
6	Other Sectors	27	21	77.78
Total		46	26	56.52

SOURCE: IDX Carbon Data as of September 26, 2023, to January 9, 2024

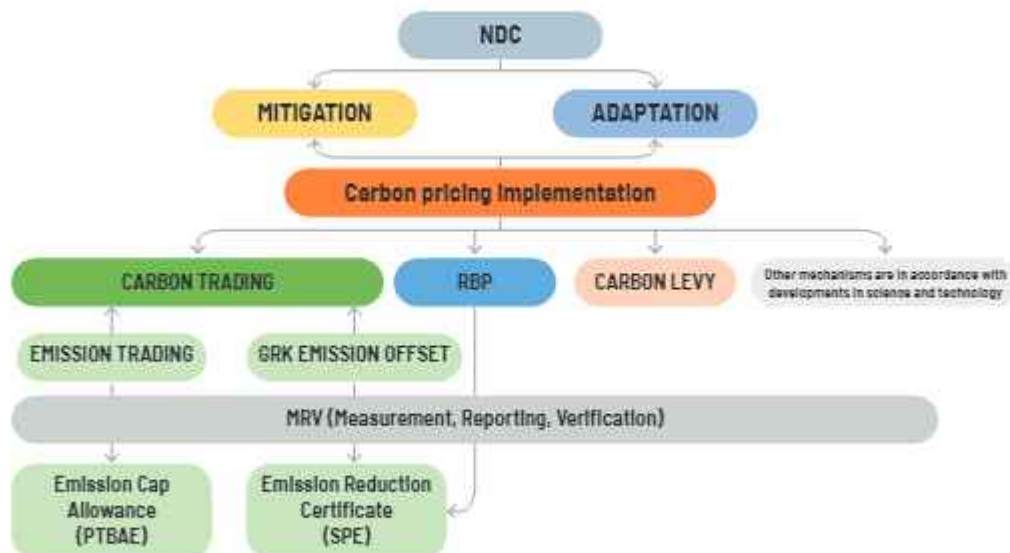
One of the important aspects of Economic Value of Carbon (carbon pricing/NEK) is measurement, reporting, and verification (MRV). The MRV is used to ensure transparency and accountability in the implementation of NDC (Nationally Determined Contribution) With verifiable report, Indonesia can ensure that policy implementation aligns with announced commitments. Furthermore, the data obtained through MRV can aid the government in evaluating the performance of NDCs and making necessary adjustments. This evaluation involves consideration of carbon pricing (NEK) to ensure sustainability and the effectiveness of the measures. Indonesia can achieve its climate change goals by integrating NDC, NEK, and MRV. In Figure 6.3, the relationship between NEK, MRV, and NDC is shown.

Due to global concern over global climate change and climate disasters, the forestry and land use sectors have set a very ambitious target of reducing GHG emissions by -40 million tons of CO<sub>2</sub>e in 2030. Indonesia's FOLU Net Sink serves as the means for accomplishing this, to be divided into three phases. The year 2022-2023 is a precondition for achieving Indonesia's FOLU Net Sink 2030 targets. The implementation stage of

the operational plan has been built for 2024, and 2025-2030 is the timeframe for achieving Indonesia's FOLU Net Sink 2030 targets. The 2030 target for Indonesia's FOLU Net Sink has been transcribed into five primary areas, including Sustainable Forest Management, Enhancement of forest carbon stocks, conservation, Peat Ecosystem Management, and Instruments and Information.

Launched in 2022, Indonesia established the FOLU Net Sink 2030 Plan to reduce GHG emissions including 12 initiatives and prioritizing locations based on maps and indices. Key areas are Sustainable Forest Management, Peatland Enhancement, Conservation, and Peatland Management, with 28 provinces have setting Sub-National Work Plans. Fifteen FOLU manuals guide implementation for 2024-2025. Moreover international cooperation, including a USD 156 million partnership with Norway, is crucial to achieving the net sink 2030 target by reducing emissions by 31.2 million tons of CO<sub>2</sub>e. By the end of 2023, efforts included preparing and disseminating operational plans, developing subnational work plans in 16 provinces, creating 21 FOLU manuals, and formulating implementation guidelines.

**Figure 6.3**  
Relationship between NEK and NDC Achievement



## 6.4 Mitigation and Adaption Actions at the Local Level

Proklim, Community Program for Climate, launched in 2015 as a national movement for community-based climate change action that involves active participation of communities in conducting integrated climate change mitigation and adaptation efforts. The objective is to facilitate the reduction of greenhouse gas (GHG) emissions and enhance the resilience of communities to the impacts of climate change.

In 2023, Proklim implementation was reconceptualized to expand the scope of program implementation and optimize the participation of all parties in encouraging climate change adaptation and mitigation as part of a sustainable lifestyle. Proklim is then interpreted as a nationally inclusive program that provides recognition and appreciation of climate change adaptation and mitigation efforts. Not only to communities based on administrative areas, but also organized communities based on landscapes, management units or specific activities. The number of Proklim locations that have registered and verified can be seen in Figure 6.4.

Proklim reconceptualization represents the process of developing a climate village program into a community program for climate. This expanded approach aims to optimize participation from all sectors and recognizes diverse contributions to climate resilience and sustainability.

**Figure 6.4**  
Number of Proklim Locations Registered in the National Registry System



The number of locations that have been registered as Proklim in 2023 increased by 128 percent compared to the previous year. The number of participating provinces increased from 33 provinces (2022) to 36 provinces (2023). Additionally, the number of participating districts/cities has increased from 254 districts/cities (2022) to 346 districts/cities (2023), or as many as 67 percent of the districts/cities in Indonesia participated in Proklim development. Participation in Proklim can be seen in Figure 6.5.

**Figure 6.5**  
Proklim Participation Based on the Number of Provinces and Districts/Cities



Proklim activities consist of Climate Change Adaptation actions, Climate Change Mitigation actions, and a combination of both (joint adaptation mitigation/JAM). Some examples of adaptation activities include addressing climate-related challenges such as drought, flood, and landslide controlling, improving food security, handling/anticipating sea level rise, and controlling

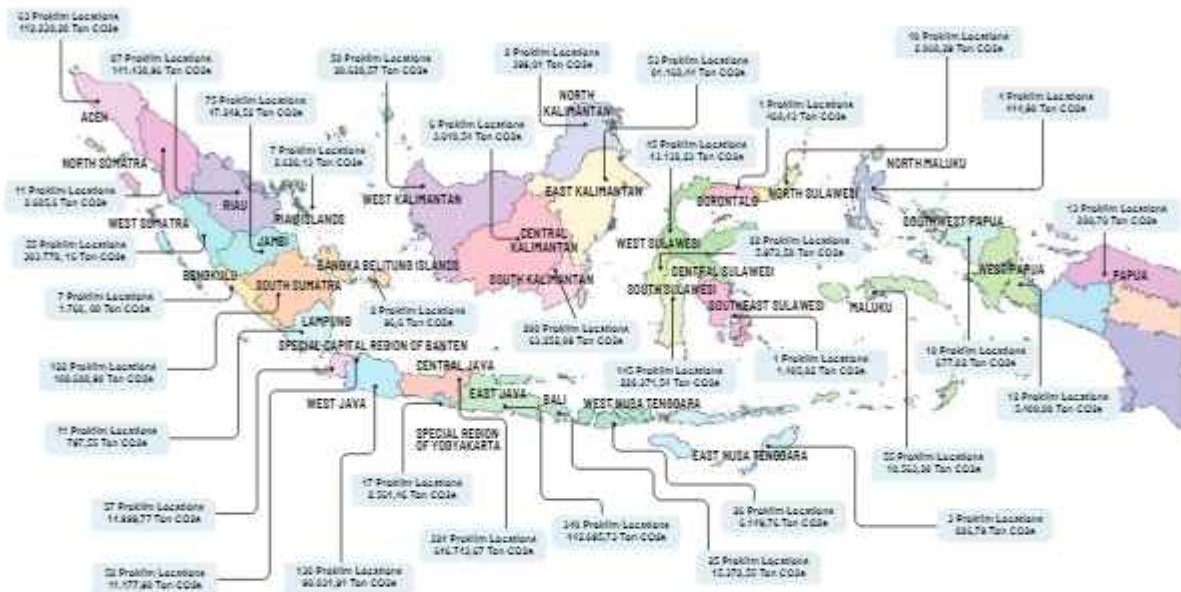
climate-related diseases. Examples of climate change mitigation activities include waste management for solid/liquid waste, utilizing renewable energy, managing agricultural cultivation, increasing vegetation cover, and preventing of forest and land fires.

Using the spectrum application, which adheres to the guidelines set by Regulation, Proklam's impact between 2015 and 2023 has been significant. The program has facilitated climate mitigation actions that have collectively reduced GHG emissions by approximately 2.5 million tons of CO<sub>2</sub>e. This calculation (Fig 6.6) supports the effectiveness of community-based mitigation actions within the Proklam Framework.

SIDIK is a web-based tool designed to assess climate vulnerability and risks, focusing on factors like floods, droughts, forest

fires, and land fires. It employs 21 indicators spanning biophysical and socio-economic data to analyze vulnerability at various levels, from national to local. Local governments can customize SIDIK with relevant data, enabling tailored vulnerability analyses and planning. By identifying priority areas and actions, SIDIK empowers governments to mitigate risks and enhance resilience against climate challenges. This flexibility makes SIDIK a crucial resource for effectively developing targeted strategies that address local vulnerabilities. SIDIK (Vulnerability Index Data Information System), developed by the Ministry of Environment and Forestry, has been recognized as winning the United Nations Public Service Award - 2024 for the Special Category Tackling Climate Change.

**Figure 6.6**  
Potential Reduction in GHG Emissions through the Climate Village Program (2015-2023) Using the Spectrum application



**Notes:**  
\* Locations that have complete data on mitigation action activities



## 6.5 Peat and Mangrove Management

Peatlands have an important role in the climate, both as a carbon dioxide absorber and as a source of methane and nitrous oxide. In some cases, they can also be a source of carbon dioxide when peatlands are dried, degraded, and burned. Indonesia, which boasts the world's largest tropical peatland with a total area of 24.67 million hectares, of 865 peatlands hydrological units (PHUs) holds carbon peat reserves that amount to 46 giga tonnes, or approximately 8-14 percent of the carbon in the world's peatlands.

The Government is highly committed to the protection and management of peatland ecosystems, which includes issuing regulations, policies, and technical guidance for operational implementation.

Indonesia has taken measures to protect peatland ecosystems by issuing regulations in 2014, which were amended in 2016. In 2019, a Presidential Instruction was issued to establish a permanent moratorium to safeguard primary forests and peatlands. Following this, five ministerial regulations implemented these peatland-related rules, providing authority for protecting and managing peatland ecosystems based on specific hydrological units.

The Ministry of Environment and Forestry has conducted an inventory of peatland ecosystems in 342 distinct units of PHU and formulated function maps for 138 units at a scale of 1:50,000 as of 2023. Peatland governance in Indonesia has just passed a new milestone with the issuance of the Ministerial Decree of the Environment and Forestry<sup>63</sup> on the National Peatland Ecosystem Protection and Management Plan. This decree provides comprehensive strategies for utilizing peatland ecosystems, regulating degradation (prevention, mitigation, and restoration), ensuring maintenance (reserve and conservation areas), and addressing climate change mitigation and adaptation in peatland ecosystems. The Peatland Ecosystem Protection and Management

Plan is a reference for various development plans, including long/medium-term, spatial, and forestry plans. It aligns with other sectoral strategic plans developed by provincial, district, and city governments and stakeholders.

Peatland restoration is essential to supporting the emissions reduction target from the forestry and other land use (FOLU) sector by 2030. Peatlands, with an area of 13.4 million hectares, have a high potential for carbon storage. Indonesia is attempting to restore over two million hectares of peatlands in seven provinces: Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan, South Kalimantan, and Papua.

Restoration of the hydrological function of the Peatland ecosystem is carried out in concession areas and non-concession areas, by involving communities and encouraging the private sector to restore their areas. The obligation of peatland restoration is imposed on all concession areas with a Business Permit for utilizing timber forest products and oil palm plantations. Indonesia supports the UN Decade of Ecosystem Restoration (2021-2030) by restoring over four million hectares of land, including peat and mangroves, since 2015. These efforts reduce greenhouse gas emissions and increase carbon stocks, and provide data on peatland ecosystem restoration in concession areas. In concession areas, the restoration of peatland ecosystems continues to increase, and as of December 2023, it had reached 3.93 million hectares in 73 industrial forest plantations and 259 oil palm plantations.

Regarding peatland restoration in concession areas, monitoring involves 10,838 groundwater-level units managed by SiMATAG-0.4m. Evaluation of concession areas has been conducted using PROPER and direct assessment by the Ministry of Environment and Forestry for around 330 corporations since 2023. Recognizing the crucial role of village communities, the Ministry has initiated peatland restoration in community-owned areas, covering more than 52 thousand hectares and 270 villages, through Peatland Stewardship Villages (DMPG).

<sup>63</sup> Ministerial Decree of the Environment and Forestry Number SK.248/MENLHK/SETJEN/KUM.1/6/2020 on the National Peatland Ecosystem Protection

**Table 6.3**  
Achievements of Peatland Restoration in Concession Areas as of 2023

Data	Industrial Forest	Oil Palm Plantation	Total
Number of companies	73	259	332
Restored area (ha)	2,135,748.78	1,619,838.40	3,935,587.18
TMAT compliance point (unit)	5,086	5,752	10,838
Rainfall station (unit)	269	687	956
Canal blocking construction (unit)	8,081	22,323	30,404
Vegetation rehabilitation (ha)	184,741.65	-	184,741.65
Vegetation rehabilitation of burnt (ha)	27,230.35	9824.01	37,054.36

The Ministry of Environment and Forestry initiated proposed carbon measurement techniques from the groundwater level (GWL) on the peatland ecosystem at the Tier 3 level. All studies indicate that worldwide groundwater level is the best predictor of peatland emissions. Indonesia has valuable

modality from massive groundwater level monitoring stations spread in Peat Hydrological Units (PHUs). These efforts need best practices, data sharing, and stakeholder collaboration, i.e., researchers, academic private sector, and government.

### BOX 6.1 | Community Based Peatland Ecosystems Protection and Management

UPT Singkuang SP-2 village, located in Muara Batang Gadis subdistrict, Mandailing Natal District, North Sumatra province, is one of the peatland ecosystem protection and management locations based on community participation. *Desa Mandiri Peduli Gambut/ DMPG* (peatland stewardship village) was developed by the Ministry of Environment and Forestry. The village is located within Peatland Hydrological Unit (PHU) of Aek Siriam-Batang Singkuang, with a peatland ecosystem area of 1,658 hectares. Peatland Ecosystem Management in UPT Singkuang SP-2 Village is carried out by a community group known as the "Working Team on Peatland Ecosystem Protection and Management of Harapan Kita".

TK-PPEG Harapan Kita consists of 12 administrators, with group chairman Mr. Pendi Yuhadi Nasution. The peatland ecosystem management activities carried out by TK-PPEG Harapan Kita were accompanied by Medan State University, which provided information, science and sustainable peatland management skills needed by the group.

The peatlands of UPT Singkuang SP-2 Village experience fires every year, occurring since 2018. TK-PPEG Harapan Kita conducted rewetting peatland by constructing 10 units of canal blocking by 2023. A water depth measurement unit is installed to monitor peat groundwater levels and used as a fire risk measure for peat dryness.

To increase the economic value of the community, TK-PPEG Harapan Kita involves communities around the village to manage peatland ecosystems through agroforestry and livestock activities. The village administration is committed to and supports community groups in peat ecosystem management by providing four hectares of village land grants for agroforestry and livestock activities. Agroforestry practices are applied by raising goats and intercropping yam, pineapple, areca nut, and rambutan. The Ministry of Environment and Forestry is supporting all of these activities.

The community hopes to increase its capacity to support the growth and sustainability of the activities that have been carried out. So the land ecosystem in UPT Singkuang SP-2 Village is maintained, the risk of forest and land fires is avoided, and the welfare of the community is guaranteed.

Massive forest and land fires occurred in Indonesia in 2015, including on peatland. In response to the incident, the government established the Peat Restoration Agency (BRG) in 2016 with the mandate of expediting recovery and restoring the hydrologic function of peat, which covers an area of two million hectares until 2020. In 2020, the BRG was renamed the Peat and Mangrove Restoration Agency, with the additional task of rehabilitating 600 thousand hectares of mangroves by 2024.

Peat restoration is carried out through three approaches known as the 3R approach, namely: (1) Rewetting peatlands with the construction of peat restoration infrastructure such as canal blocking, boreholes, and canal backfilling; and (2) Revegetation through the creation of peatland rehabilitation demonstration plots to restore lost vegetation; and (3) Revitalizing community livelihoods to re-empower the local economy and improve the welfare of surrounding communities.

In the context of FOLU Net Sink 2030 in Indonesia, peat ecosystems have a significant role to play in achieving this target. One way to prevent emissions from peatlands is to engage in peat protection efforts through the

activities of the *Desa Mandiri Peduli Gambut* (DMPG). Other measures aimed at mitigating climate change encompass the management of peatlands and the prevention of fires. Furthermore, the improvement in peatland cover increases the absorption of emissions.

As of December 2023, peat hydrological restoration in seven provinces (Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan, South Kalimantan, and Papua) reached nearly 1.7 million hectares in seven provinces. The restoration included the construction of more than eight thousand units of canal blockings and more than 14 thousand units of boreholes/deepwells. In areas where hydrological restoration has been carried out, a pilot plot for revegetation of burned peatlands covering an area of more than two thousand hectares has been created. Furthermore, economic assistance was provided to 1,413 community groups living in or around peatlands. BRGM has installed 168 units of Water Level Monitoring Equipment, as depicted in the Peatland Water Monitoring System (see Table 6.4). This equipment serves as a valuable tool for monitoring the water level in peatlands.

**Table 6.4**  
Peat Restoration Intervention Achievement 2016-2023

Province	Borehole	Canal Block	Canal Backfilling	Revegetation	Revitalization
Riau	1,125	1,836	5	390	285
Jambi	821	799	0	325	175
South Sumatra	356	1,173	64	310	201
West Kalimantan	491	928	0	200	219
Central Kalimantan	10,664	3,187	115	830	321
South Kalimantan	630	155	0	57	56
Papua	0	0	0	0	156
<b>TOTAL</b>	<b>14,087</b>	<b>8,078</b>	<b>184</b>	<b>2,122</b>	<b>1,413</b>

Peatland restoration is also to strengthened community participation through the DMPG program, which integrates peatland ecosystem restoration and protection into village development. Until 2023, 791 DMPGs have been formed, the operational activities

of which are supported by the government budget and partners. The community can monitor the development of peat restoration activities through Peatland Restoration Information Management System in <https://prims.brg.go.id/>.

### BOX 6.2 | Working with Communities in Peat Restoration

In Pandan Sejahtera Village, located in Geragai District, Tanjung Jabung Timur District, Jambi Province, peat restoration activities have succeeded in reducing forest and peatland fires. This village is located in the Sungai Mendahara, Sungai Batanghari peat hydrological unit (KHG) area, which is the main target for restoration. The peat has been degraded due to the construction of canals to drain peat water, making the area vulnerable to fires.

Since 2017, the Perintis Jaya community group, led by Suwarno, has been persistent in restoring dry and damaged peat in the region. They diligently build canal bulkheads, maintain boreholes, and replant to keep peatlands wet. The group was also instrumental in establishing the Jelutung (*Dyera polyphylla*) revegetation pilot field to increase peatland cover and gain additional benefits from jelutung sap.

The group is collaborating with BRGM to utilize the high-water level monitoring tool (Alat Pemantau Tinggi Muka Air/APTMA) to monitor the condition of peatlands. APTMA provides real-time information on peatland water levels, which is used to build village community preparedness for land and forest fires. If an alert signal is detected, the group immediately conducts peat wetting by activating drilled wells.

The success of this group is inseparable from the economic revitalization program they received, which resulted in an increase in cattle farming and additional income for peatland maintenance costs. Under the leadership of Suwarno and his team, the area of forest and land fires in Pandan Sejahtera village has decreased dramatically from year to year. Despite facing its driest year yet due to El Niño, the village managed to sustain fires only on a very limited scale in 2023, thanks to efforts to keep peat moist and a quick response from the community. The success story of peat restoration in Pandan Sejahtera village is a clear proof that persistence, cooperation, and community awareness can overcome complex environmental challenges.



Community group maintaining canal-blocking.

**LOCATION**  
Desa Pandan Sejahtera, Jambi

**PHOTO BY**  
Firman (2023)

### Mangrove Conservation in Indonesia

According to the State of the world's mangroves, the area of the world's mangroves in 2016 was 136 thousand km<sup>2</sup>. Southeast Asia is home to a third of the world's mangroves, and Indonesia has a mangrove area of almost 20 percent of the world's mangroves or 54 percent of Asian mangroves (Spalding & Maricé, 2021).

According to the National Mangrove Map (*Peta Mangrove Nasional/PMN*) in 2021, Indonesia's mangrove area is almost 3.4 million hectares, and the potential mangrove habitat is around 756 thousand hectares. Potential mangrove habitats include mangrove ecosystems that have been damaged (see Figure 6.7), mangrove vegetation that has significant lost or reduction in cover, and newly identified mangrove areas. The

preservation of mangroves is threatened due to anthropogenic disturbances and natural factors.

Between 1980–2005, Indonesia saw a reduction of 1.3 million hectares (31%) from the original 4.2 million hectares of mangrove forest.

Sixty percent of the mangrove area lost was attributed to damages caused by human activities. Other natural factors contributing to mangrove loss are erosion, sea level rise, and storms associated with climate change.

In the year 2021, a comprehensive mangrove rehabilitation acceleration program was implemented through the National Economic Recovery Scheme. In addition, mangrove forest rehabilitation was carried out regularly, between 2022 and 2023.

**Figure 6.7**  
Degraded Mangrove Forest



**LOCATION**  
Mimika Coast, Amar District

**PHOTO BY**  
Indah (2023)

The community, government, and private sector, including corporate social responsibility programs, participate in national mangrove planting programs.

The National Economic Recovery Fund, facilitated by BRGM, supports a program where communities contribute mangrove seeds for planting in rehabilitation.

### Indonesian Mangrove Rehabilitation for Climate Change

Mangrove ecosystems also play an important role in climate change mitigation (see Figure 6.8). Countries that possess mangrove forests are urged to exert significant efforts to preserve their remaining mangrove forests and to consistently initiate restoration initiatives. The Indonesian government believes it is important to address specifically mangroves. BRGM has been mandated to accelerate the rehabilitation of 600,000 hectares of mangroves in the period 2021-2024.

According to Environmental Protection and Management Law<sup>43</sup>, the recognition of mangroves as important ecosystems requires the participation of all sectors, including both central and local governments.

The National Mangrove Rehabilitation Roadmap 2021-2030 has become an instrument for inter-institutional consolidation for the implementation of a more systematic and integrated mangrove rehabilitation.

In 2021, BRGM and MoEF accelerated the intensive mangrove rehabilitation program through the National Economic Recovery Scheme, covering an area of 34,911 hectares across 654 villages. Furthermore, it also carried out the rehabilitation of mangrove forests, encompassing an area of 1,381 hectares, exceeding the initial target of 1,250 hectares. These efforts continued into 2022

<sup>43</sup> Law Number 32 of 2009 on Environmental Protection and Management

**Figure 6.8**  
Mangrove Line-WaifoI at Village, Waigeo Islands, Raja Ampat



**LOCATION**  
WaifoI Village on Waigeo Island-Raja Ampat

**PHOTO BY**  
R. Sahputra (2023)

with a target of 3,638 hectares in 71 villages, and in 2023, rehabilitation efforts aimed to cover 3,064 hectares in 70 villages.

In 2021, BRGM established 212 mangrove stewardship villages, with 182 DMPM receiving assistance using State budget. The other 30 DMPM were facilitated by partners. In 2022, BRGM established 88 DMPM, whereas 45 of which are supported by the State budget, 36 are facilitated by partners, and seven are funded by a combination of State budget and partner fund. The establishment of DMPM continues in 2023 with the establishment of 63 DMPM, whereas 58 of which were financed by the government and the other five facilitated by partners.

Education regarding mangroves is also conducted through educational programs and capacity building for community through mangrove community field school training. In 2021, a total of 176 field schools were established, encompassing 150 mangrove rehabilitation thematic field schools and 26 environmentally friendly pond thematic field schools. Moreover, in the year 2022, 168 teams of mangrove rehabilitation thematic field schools were established. The formation of field school cadres continues in 2023, with the achievement of 310 thematic field school cadres for the purpose of mangrove rehabilitation. Field schools have enhanced the technical skills, knowledge, attitudes, and conduct of the community in mangrove management practices. This includes participatory mapping, mangrove ecosystem functions, mangrove rehabilitation techniques, mangrove species identification, breeding, preparation of planting sites, planting, maintenance, monitoring, and evaluation.

To enhance the understanding of the younger generation about mangroves at the school level, BRGM is working with the Curriculum and Learning Center of the Ministry of Education, Culture, Research, and Technology. It collaborates with education offices in diverse regions to integrate environmental education. This curriculum includes materials about mangroves as part of the local curriculum for elementary, junior high, high school, and level students. Several provinces, such as Jambi and Kubu Raya in West Kalimantan province, as well as Riau Province and Dumai City, have incorporated learning about mangroves into their local educational curriculums.



**Awarding Social Forestry Decrees by  
the President of the Republic of Indonesia  
at the 2023 LIKE Festival**

**LOCATION**  
Senayan, Jakarta

**PHOTO BY**  
Simon Unggo (2023)



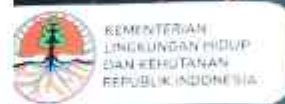


## CHAPTER 7

# Embracing Our Heritage for Future Generations

The authority of the Indonesian government in the management of Natural Resources and the Environment is constitutionally based on the provisions of Article 33, paragraph 3 of the 1945 Constitution, which states “the Earth and water and natural resources contained therein are controlled by the State and used for the greatest prosperity of the people.” In order for future generations to continue enjoying and benefitting from Indonesia’s forest resources, this prosperity shouldn’t just benefit one or two generations. This is what intergenerational equity means. It can be defined as a concept of natural resource utilization that considers the awareness that natural resources are inherited from the generation before us so that they must be passed on to the generation after us, and so on, until the end of time (Spijkers, 2018). This is the foundation of sustainable development.

The Ministry of Environment and Forestry relies on the mandate of the Constitution and the basic concept of sustainable development in every movement and step to maintain, build, and improve Indonesia’s forest resources. This is in the interest of all Indonesians. Indeed, as one of the nations that have played a significant role in the formulation of Sustainable Development Goals (SDGs) in



### Green Leadership Indonesia, Graduation Day

#### LOCATION

Auditorium Manggala Wanabakti, Jakarta

#### PHOTO BY

Ryan Sandria (2024)



2015, Indonesia has successfully integrated the SDGs into the National Medium-Term Development Plan (RPJMN) 2015-2019 (Alisjahbana and Murniningtyas, 2018). The global commitment to the SDGs is also reflected in the Paris Agreement, other conventions, and many international forums.

Indonesian technocracy has structured forestry and forest management through a series of deep scientific considerations, inclusive and based on spiritual values, which are one of the basic elements of the Indonesian state. Spirituality is the quality of a person's relationship with God, which is a source of motivation and emotion. Spirituality

will later form morality and ethics in everyday life, which will change the pattern of attitudes, words, and behavior.

### **7.1 Dimension of spirituality in Forest and Environmental Management**

As is known, the forest has a deep spiritual meaning in various beliefs and religions in Indonesia. Therefore, forest management in Indonesia is currently carried out considering spiritual aspects that are integrated into people's daily lives. In every policy or action, it is imperative to contemplate the fundamental

spiritual principles, bearing in mind that their preservation and upholding are a mandate.

Spirituality plays a significant role in the management of forests. This can also be observed in international forest management policies that have incorporated aspects of spirituality into the criteria for sustainable forest management (de Pater et al., 2021). Diverse efforts to preserve nature are not enough to rely solely on the rule of law. Spirituality must be emphasized. It is imperative that we maintain a harmonious relationship with nature, cherish life, and fully appreciate the splendor and diversity that exist. Therefore, good forest management requires spiritual understanding and engagement.

As regards aspects of spirituality in forest management, research by de Pater et al. (2021) concludes that, although spiritual values are complex, unclear in their boundaries, and often hidden within other broader concepts, with a structured framework of thought, the role of spiritual values can be deeply studied so that it can help to improve our understanding of practical and theoretical aspects of sustainable forest management that are usually disregarded.

## 7.2 Alignment with Sustainable Development Goals

With 85 percent of the world's population identifying with a religion (World Population Review, 2024), religious beliefs has a significant impact on the development and achievement of the Sustainable Development Goals (Schliesser, 2023). This is particularly relevant to Indonesia, which makes religion the first precept of the country's foundation. This is undoubtedly closely associated with moral and ethical principles in sustainable forest management, which is one of the 17 Sustainable Development Goals.

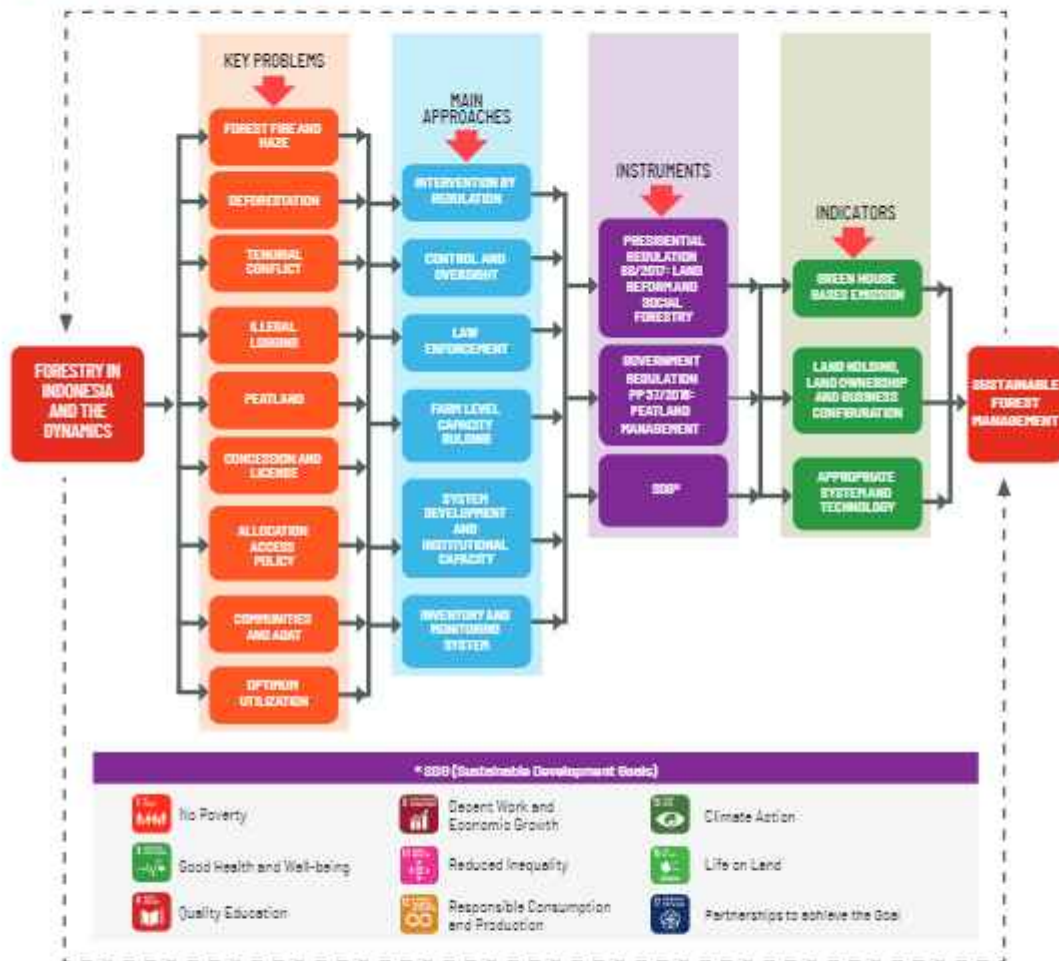
Forestry and forest managers in Indonesia must align management measures with sustainable development goals. MoEF is actively involved in achieving sustainable development goals, including reducing negative impacts on the environment and promoting sustainable economic growth. This alignment is the key to creating harmony between the needs of today and the needs of future generations.

Over the past decade, Indonesia has taken several corrective measures, the development of a comprehensive and inclusive governance system, and intensified law enforcement efforts. Equipped with substantial moral, intellectual, and financial resources, Indonesia is well-prepared to achieve sustainable forest management that not only provides welfare for all Indonesian citizens, but also contributes to the global community by achieving the Sustainable Development Goals.

Since the commencement of President Joko Widodo's administration, the concept of forest policy formulation and implementation has been implemented with a novel balance approach as a comprehensive and quantifiable approach to thinking and acting. The concept is illustrated in Figure 7.1.

Figure 7.1 illustrates how environmental governance and sustainable development are operated by the MoEF, which translate and operationalize new paradigms and balances driven by: (1) scientific development and understanding; (2) evolving conceptual frameworks; (3) results-based solutions; (4) social relevance; (5) interrelation with the planning process; and (6) efforts to continuous improvement. Good environmental governance should pay attention to the interests and main roles of actors in protecting the environment, such as NGOs, civil society, business, and the government. Collaborative efforts are essential to implementing effective governance and achieving sustainable development.

**Figure 7.1**  
New Paradigm in Forest Governance



In line with the new paradigm of balance, the Government has made concerted efforts to plant and enhance forests, going above and beyond the extensive target for forest restoration within the ecosystem. In the realm of forest products, diversification in their usage has been observed, both wood and non-wood materials. Additionally, the government supports forest fire control efforts carried out by holders of Forest Utilization Business Licenses (PBPH), including building fire towers and water reservoirs, to support sustainable efforts to secure forest ecosystems. Furthermore, environmental protection and restoration at PBPH are carried

out through area rehabilitation and replanting programs, including increasing the area of protected forests and enhancing biodiversity restoration.

The government also supports food security initiatives in the PBPH and Perhutani regions to promote economic diversification within the local communities. Furthermore, agroforestry practices was expanded at the FMU level, utilizing diverse plant species such as durian, jabon, and eucalyptus, as a means of implementing comprehensive and sustainable natural resource management.

The dynamic progress of forest management over the past decade can be

seen in the export value of timber and non-timber forest products, which demonstrate sustainable growth potential. The surge in investment in the forestry sector is indicative of a favorable environment for its expansion. The PNEP value for Forest Utilization reached 2,796 trillion Rupiah. In the interim, the government's initiatives to promote SVLK and its achievement in the Global Timber Index represent the government's commitment to actively engage in the implementation of global sustainability standards.

For Indonesia, 2024 will be a challenging year due to the increasingly complex dimensions of development. Hence, it is imperative to align each step with the Sustainable Development Goals. Nature conservation measures must take into account the long-term and sustainable consequences, in accordance with the vision of Indonesia as a developed and advanced nation by 2045.

Sustainable forest management in Indonesia can be seen from Indonesia's ambitious FOLU Net Sink 2030 initiative, as a commitment to carry out various efforts to preserve the environment and combat climate change. Between the years 2021 and 2022, Indonesia undertook a precondition phase aimed at preparing the foundational policy, coordination, and infrastructure preparation necessary for this program.

The realisation phase will commence in 2023-2024 through the implementation of awareness raising, capacity building, and policy development at the sub-national level in several provinces. Initiatives such as the consolidation of forest and land fire prevention, the expansion of international cooperation, and the incorporation of the economic value of carbon in forest governance demonstrate a comprehensive and inclusive approach.

The 2025-2030 period represents an acceleration stage to increase efforts to achieve the FOLU Net Sink 2030 target. During this period, Indonesia will implement strategies and programs that have been carefully planned through the measurement of outcomes, adaptation of strategies, and enhancement of collaboration at the national and international levels.

The social forestry program is also very relevant and has been aligned with the SDGs through various programs that address critical issues such as poverty eradication, ending hunger, gender equality, increased employment opportunities, increased economic growth, and concrete action related to climate change management. The social forestry program also incorporates agroforestry techniques, gender-responsive planning and budgeting, and alignment with the community program for climate (Proklim), which is expected to strengthen the economic, social, and environmental pillars of sustainable development.

One of the key factors in confronting the challenges of sustainable forest management towards achieving SDGs is the quality of human resources involved in forest management. In this regard, the quality of human resources should include the capacity of forest farmer groups (*Kelompok Tani Hutan/KTH*), the competence of environmental and forestry human resources, and the fulfillment of environmental and forestry human resources.

KTH human resources are improved by introducing an independent KTH. In addition, increasing the competence of environmental and forestry human resources is achieved through training and increasing the number of graduates from forestry vocational schools. Furthermore, there has been an increase in the frequency of competency testing and evaluation of both government and non government officers competencies. Other activities carried out include promoting creative entrepreneurs and training to establish a National Adiwiyata School.

### 7.3 Environmental Education as a Pillar of Sustainability

#### Environmental Awareness and Action for the Future

Ensuring the sustainability of policies, programs, and implementation on the ground for future generations. It requires serious preparation. The awareness of the younger generation towards the conservation of the environment and natural resources should be further enhanced and intensified. This will establish a robust foundation for preserving nature and making a positive contribution towards sustainability of future generations.

Environmental awareness should be a central component in every government policy and in action taken by all components of society. In the absence of public awareness and participation, the achievement of nature conservation initiatives will be challenging. The MoEF continues to promote environmental awareness among the community, especially the younger generation, through various education and counseling programs. These programs aim to build environmental awareness and increase capacity for protecting the environment.

Environmental education in Indonesia aims to increase public awareness and knowledge about environmental issues, as well as encourage attitude and appropriate behavior to protect Indonesia's natural resources for future generations. The government has implemented policies and programs to incorporate environmental education into both formal and informal educational programs. NGOs and community groups also play an important role in implementing such environmental education.

Since 2006, Indonesia has introduced environmental awareness movements for students, through a collective actions of many schools to promote environmentally friendly behaviors. The purpose of this program is to increase the number of schools that are actively involved in the movement for a caring and cultured environment within schools. Schools that have successfully implemented the movement are awarded an Adiwiyata recognition according to their level.

The movement focuses on six aspects, including a clean environment, proper sanitation, and drainage function, waste management through the "three Rs" (Reduce, Reuse, and Recycle), planting and maintenance of trees/plants, water, and energy conservation, innovation activities, and environmentally friendly behavior.

Additionally, the *Gerakan Masyarakat Peduli Lingkungan* (Gemilang) initiative is a group effort by the community to engage in voluntary, cooperative, and sustainability-based environmentally friendly activities and behaviors. The program's goal is to support local institutions and communities in enhancing environmental initiatives. The program focused on activities such as increasing the number of communities and institutions that activate the Gemilang movement and managing the environment and forests sustainably. They also established a forum of creativity and environmental innovation for the community through exhibitions and campaigns.

#### Activating Environmental Education: Green Leadership Indonesia and Green Ambassador

In response to urgent environmental challenges, Indonesia has embarked on a pioneering initiative to empower its youth with the responsibility of ecological stewardship through the Green Leadership Indonesia (GLI) program and the Green Ambassador initiative. These pioneering initiatives aim to harness the enthusiasm and potential of young Indonesians, equipping them with the necessary tools to lead the way towards sustainability and environmental conservation. As the world confronts the realities of climate change and environmental degradation, the role of these young leaders becomes increasingly critical, representing hope and action for a greener future. This foundation establishes a foundation for understanding the transformative impact of the GLI and Green Ambassador programs in fostering a new generation of environmental advocates and leaders.

The GLI program's success in educating over 500 young Indonesians by March 2023 and eventually expanding to 618 leaders by March 2024, highlighting its role in developing environmental leaders. It is anticipated that GLI alumni will have a significant impact on mainstreaming social and ecological justice and serve as a catalyst for future generations towards sustainable forest and environmental governance. This vision positions alumni graduates as critical agents in driving the global climate justice movement.

Collective knowledge and the adoption of a sustainable lifestyle are imperative to address future challenges, including the triple planetary crises of climate change, pollution, and biodiversity loss. This emphasizes the significance of involving the youth, given the substantial proportion of Indonesia's population belonging to the younger demographic.

The Ministry's thorough support for the GLI program served as evidence of the government's dedication by facilitating educational opportunities, providing mentoring, and encouraging participation in international environmental conferences such as COP 26, COP 27, and COP 28.

Through initiatives like Green Innovation Week, the GLI program encourages the development of practical solutions to environmental challenges, reflecting a proactive approach to environmental education and activism. This approach fosters a generation of young leaders who are well-equipped to confront Indonesia's ecological challenges and contribute to global sustainability initiatives.

The Indonesian Ministry of Environment and Forestry has also established the Green Ambassador program, a crucial initiative to involve the country's youth in environmental preservation and natural resource management. This noteworthy initiative has successfully designated 71 students and conservation cadres in East Kalimantan, and an impressive total number 1,994 students from 1,068 schools across Indonesia as Green Ambassadors. This demonstrates a comprehensive and significant approach to environmental engagement and stewardship.

The Green Ambassador initiative focuses on the strategic inclusion of young environmental advocates in the Ministry's decision-making processes, facilitated by their active participation in the MoEF's Technical Implementation Unit. This approach aims to foster a deep understanding of national environmental management strategies and global environmental issues, highlighting the critical role of the younger generation in leading conservation efforts.

The Green Ambassador program's educational foundation is robust, emphasizing the important environmental governance knowledge and the cultivation of trust, courage, and leadership skill among its participants. Furthermore, the program emphasizes civic education, which empowers these young ambassadors to navigate and influence environmental policy and governance effectively. Opportunities for networking and knowledge exchange support this educational strategy by encouraging ambassadors to share local insights and cutting-edge environmental conservation techniques.

Significant initiatives, such as tree-planting events attended by President Joko Widodo, highlight the Green Ambassadors' ongoing and active dedication to practical conservation initiatives, underscoring the program's emphasis on concrete environmental action. The initiative has obtained support from various organizations, including educational institutions and foreign partners like USAID, ensuring its viability and amplifying its impact throughout the Indonesian archipelago.

The Green Ambassador program extends across various Indonesian regions, including East Kalimantan and Lampung, showcasing a nationwide effort to mobilize young people in the fight against environmental degradation. The initiative demonstrates Indonesia's commitment to fostering an informed, engaged, and proactive generation of environmental stewards by prioritizing education, civic involvement, and direct participation in conservation activities.



## 7.4 The Role of Climate Justice in Transforming Indonesia's Forests to Sustainability

In the context of climate change, it is of the utmost importance that all relevant parties give priority to the principle of climate justice. Those who are the greatest contributors to global pollution must assume a greater degree of responsibility for reducing their emissions and provide technological and financial assistance to nations facing challenges in reducing emissions and adapting to the effects of climate change already underway.

It is the responsibility of developed countries to provide climate finance to developing countries in accordance with their commitments under the Paris Agreement. Furthermore, green technologies and renewable energy solutions, including energy storage, electric vehicles, and sustainable agricultural systems, should be widely disseminated in developing countries in order to reduce their dependence on fossil fuels. Likewise, climate change mitigation measures include the transition to renewable energy, the improvement of energy efficiency, and the reforestation of areas that have been deforested in the past.

Through the FOLU Net Sink 2030 initiative, Indonesia extends an invitation to the global community to assist in its transition towards carbon neutrality, emphasizing sustainable forest management as a key strategy. Indonesia has demonstrated to the international community that result-based payments and contributions for the reduction of emissions from deforestation and forest degradation are a tangible and effective approach.

## 7.5 Epilogue: Forest Management for a Better Future

Indonesia's forestry development aims to facilitate the attainment of national ideals, specifically the prosperity of a just and sustainable population. For this reason, forestry development is carried out by: (1) ensuring the existence of forests with sufficient area and proportional distribution;

(2) optimizing various forest functions, including conservation, protection, and production functions to achieve balanced and sustainable environmental, social, cultural, and economic benefits; and (3) increasing the carrying capacity of the ecosystem. Enhancing the community's resilience to external changes and ensuring equitable distribution of benefits.

Future goals of forest management in Indonesia include various important aspects in order to achieve environmental, social, and economic sustainability within the framework of sustainable national development, namely: (1) increased economic growth and exports of the forestry sector; (2) increased value of financial transactions of forest farmer groups to encourage equitable development; and (3) decreased deforestation rates. Therefore, sustainable forest management programs should be directed to: (1) control the rate of deforestation; (2) address conflicts in the use of forest areas; (3) improve access to management and capacity of groups (KUPS, forest farmer groups and empowerment groups); and (4) increase forest productivity.

To support the achievement of a long-term national development program within the framework of Golden Indonesia 2045, the MoEF has set the following stages of Forestry Development: (1) by 2030 Indonesia is projected to achieve net sink in forestry and other land use, as well as being able to develop forest-based bioeconomy and circular economy; (2) by 2035, Indonesia is expected to be able to become a nation that influences the world market for forest products and circular economy; (3) by 2040 the implementation of low carbon emission development can support efforts to master the world bioprospection market share; and (4) by 2045, Indonesia will become a sovereign nation for food, energy and medicine resources derived from its natural ecosystem.

Despite these factors, the future of forest management in Indonesia has been carefully planned by taking into account all national and State collaborations that aim to achieve healthy forest and environmental conditions (Environmental Pillar), forest resources that increasingly contribute to national and community development (Economic

Pillar), forest and environmental resource governance that is increasingly consolidating (Governance Pillar), and social interaction in forest and environmental resource management that is increasingly cohesive (Social Pillar), all with the aim of supporting Indonesia's livelihood as a developed and independent nation by 2045.

It is of paramount importance that the roles of young people in ensuring the sustainability of Indonesia's forest ecosystems are recognized and supported. Consequently, it is imperative to educate the younger generation in order to prepare them to assume significant roles in the momentum of Golden Indonesia 2045 Vision. The Ministry of Environment and Forestry is currently providing support and accelerating the implementation of green leadership training for Indonesia's youth. The training is designed to provide a perspective of social and ecological justice in the context

of national insight, and a sense of nationalism. This is a crucial educational initiative that aligns with the government and civil society's efforts to cultivate leaders at the local, national, and international levels who are actively engaged in efforts to conserve the planet. Indonesia's optimism in spearheading the climate action agenda and its commitment to addressing climate-related issues, including those in the forestry sector, is evident in this initiative.

The younger generation in Indonesia is expected to stepping up to become catalysts for change within their communities. They actively participate in local environmental initiatives, engage in international conferences, and influence public policy. This presents a significant advantage for Indonesia and a noteworthy contribution to the burgeoning global youth movement.

A photograph of four male lesser birds of paradise perched on the branches of a tree. The birds have dark brown heads and necks, bright yellow chests, and long, flowing white tails. They are surrounded by dense green foliage and brown tree branches.

**Male lesser birds of paradise  
(*Paradisaea minor*).**

**LOCATION**  
Tabiesupa village, adjacent to Cycloop  
Nature Reserve, Jayapura, Papua

**PHOTO BY**  
Simon Onggo (2022)

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**Lowland forests of Way Kambas  
National Park**

**LOCATION**  
Way Kambas National Park, Lampung

**PHOTO BY**  
Simon Origo (2023)

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## About the Editors



### Editor-in-Chief

**PROF. DR. SITI NURBAYA** obtained her PhD in Environmental Science in 1998 from a joint program between IPB University and Siegen University, Germany. In 2022, Brawijaya University awarded her an Honorary Professor in Natural Resources Management Science recognizing her excellent works in environmental and forestry governance during her tenure in the Ministry of Environment and Forestry where she always uses scientific bases for making decisions, formulating policies, negotiating Indonesia's interests in

international fora, as well as delivering lectures in universities. She is now promoting a shift in the paradigm of Indonesia's forest management through the agenda of Forestry and Other Land Use (FOLU) Net Sink 2030. For such agenda, she promotes forest, environmental and carbon governance.

She began her career as a government officer at Lampung Provincial Government in 1981 and a few years later was appointed as the Deputy Head of Provincial Development Planning Agency. In 1998 she was transferred to Jakarta, assigned as the Director of Planning Bureau in the Ministry of Home Affairs, and in 2001 was promoted as the Secretary General of the Ministry. Her career then continued as Secretary General of the Regional Representative Council of the Republic of Indonesia (Indonesian Senate) for the period 2006-2013. She was also the first Secretary General of the Council.

In October 2014, President Joko Widodo appointed her to join the Government Cabinet, to serve as the Minister for Environment and Forestry, a consolidated portfolio from the two previously Ministry of Forestry and Ministry of Environment, housing more than 16,000 national civil servants. For the second period of the Joko Widodo Administrative Government, she was again entrusted to serve as the Minister for Environment and Forestry in October 2019. The Ministry also serves as the focal point for climate change, biodiversity and other forestry and environmental issues.



### Managing Editor

**DR. EFRANSJAH** was born in Lima Puluh, Asahan, North Sumatera in 1956. He has accumulated over 35 years of experience working with government, international organizations, including the United Nations, and civil society. Following his graduation from the Faculty of Forestry at Bogor Agricultural University (IPB) in 1980, he pursued further studies in France under a government fellowship, obtaining a Master's and Doctoral degree in Sciences du Bois from the Université de Nancy 1 in 1988. He commenced his career with

the Ministry of Forestry in Jakarta in 1980.

He resided in Yokohama, Japan for ten years, where he served as the Projects Manager for the Asia-Pacific region within the International Tropical Timber Organization (ITTO) between 1993 and 2002. For a period of over six years, from 2002 to 2008, he was based in Kuala Lumpur, where he served as the Chief Technical Advisor for UNDP's GEF large initiative for the conservation of peat swamp forests in Pahang, Sarawak and Sabah.

From 2010 to 2016, Efransjah was the Chief Executive Officer of WWF Indonesia. Prior to this role, he served as Regional Coordinator for Southeast and Middle Asia for CIFOR, an international forestry research organization based in Bogor. He presently serves as a Senior Advisor to the Minister of Environment and Forestry, having commenced this role in 2016 and continuing until the present.







Ministry of Environment and Forestry  
Republic of Indonesia