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Indonesia Curtails Deforestation

German Development Cooperation Lends Support,
a journalistic view by Marianne Scholte, independent journalist



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Indonesia Curtails Deforestation German Development Cooperation Lends Support

Indonesia frequently appears in international headlines as the site of vast tropical deforestation, and in fact around 30 percent of the national territory has been cleared of trees over the last 65 years (50 percent remains forested). However, since 2002, the Indonesian Government and Ministry of Forestry have been working steadily to curtail deforestation through wide-ranging government regulation, forest management reform, land tenure clarification, and prosecution of companies illegally clearing forests and corrupt officials who enable them.

Overcoming the vast institutional, financial, and political barriers to sustainable forest management inherited from the Soeharto regime is a herculean task, but one which successive governments have vigorously pursued—the rate of deforestation in Indonesia from 2015–2017 was less than one-third of what it was in the early 1990s and less than one-sixth of what it was during the worst period from 1996–2000, when 3.5 million hectares were lost each year.

One of the reasons that the ambitious efforts of Indonesia’s Ministry of Environment and Forestry and other government agencies to implement sustainable forest management do not garner the international recognition or support they deserve is that rapid technological developments in forest and carbon stock monitoring in the last decade (entailing varying definitions of what constitutes a forest) have produced wildly different estimates of deforestation and emissions, as well as considerable confusion and controversy about which figures are correct. The Indonesian Ministry of Environment and Forestry recently protested the reputational damage caused by the widespread dissemination of data that paints its deforestation situation in much bleaker terms than it believes warranted.

However, things are starting to change. In February 2019, the Norwegian Environment Minister announced that Norway will disburse the first results-based payment to Indonesia as part of a REDD+ agreement the two nations signed in 2010. The payment, the amount of which is yet to be determined, is for preventing the emission of 4.8 million tons of carbon dioxide equivalent (CO₂e) through reducing its rate of deforestation in 2017.

Global Forests, Deforestation, and Forest Management: An Historical Perspective

For millennia, forests covered nearly half of the Earth’s surface and deforestation proceeded only very slowly. Four thousand years ago, forests still covered more than 60 percent of China and as recently as 1500 years ago, four-fifths of western and central Europe were still covered with forests. However, as human populations expanded and required more and more land for crops, pastures, villages, and roads, as well as more wood and timber, deforestation accelerated. By 1200, Europe had cleared half its forests. By 1840, China’s forest cover declined to 17 percent and by 1949, less than 10 percent of Chinese land was forested.¹

¹ The Prince’s Charities, International Sustainability Unit, *Tropical Forests: A Review* (London, 2015), 10. <https://www.pcfisu.org/wp-content/uploads/2015/04/Princes-Charities-International-Sustainability-Unit-Tropical-Forests-A-Review.pdf>; FAO, *2016 State of the World’s Forests* (Rome, 2016), 11;

Today, trees cover around 30 percent of the world's surface. Some two billion hectares of forests have disappeared, and deforestation continues, particularly in the tropical areas of the world. According to the FAO, global forest area fell by 129 million hectares (3.1 percent) in the period 1990–2015. The largest net loss was in South America and Africa. Asia, which still had a net forest loss in the 1990s, reported a net gain of forest over the period 2000–2015, primarily due to largescale afforestation and reforestation in China. Forest area in North America has been stable or increasing since the early 20th century and in Europe since the end of the 20th century.²

Forests matter, something humans discovered as they increasingly destroyed them. Forests provide food, clean water, medicinal plants, and timber and non-timber livelihoods to many millions of people living inside or near them; they slow water flows and protect homes and fields from erosion, landslides, and dangerous storms; they suppress pests, filter pollutants from water and air, prevent sedimentation in rivers, capture atmospheric and underground water, produce rainfall, and maintain weather patterns.

The first laws and rules to protect forests began to appear in Germany in the 14th century but they could not hold back the growing demand for agricultural land, wood, charcoal, and minerals; entire forests were cleared, and those that remained were seriously degraded. As a result, at the beginning of the 18th century, the demand for wood in Germany could no longer be met by expansion into previously unused forests.

Hans Carl von Carlowitz, head of the Saxon mining administration, then published his pathbreaking *Sylvicultura oeconomica* (1713), which called for the scientific management of forests. Von Carlowitz was the first to write about sustainable forest management (*Nachhaltigkeit* in German), by which he meant that forests should be used as renewable resources for profitable and efficient commercial and industrial activities while maintaining and even increasing their productive capacity.³

Sylvicultura oeconomica became widely influential. Step by step, policies and laws to limit wood harvesting to the long-term productive capacity of the forest were introduced in Germany and throughout Europe. The process was highly conflictual: small farmers and forest users, large landowners, loggers, government officials—some hopelessly corrupt, some passionately committed to forest conservation—all played a role. Land ownership, grazing rights, forest use rights were all hotly contested.⁴

Something similar was happening in Japan during roughly the same period. After the catastrophic Meireki fire of 1657, which heightened awareness of timber scarcity in the country, successive shoguns instigated measures to reduce wood consumption and plant more trees.

Frances Seymour and Jonah Busch, *Why forests, Why now? The Science, Economics, and Politics of Tropical Forests and Climate Change* (Washington, D.C.: Center for Global Development, 2016).

<https://www.cgdev.org/publication/why-forests-why-now-science-economics-and-politics-tropical-forests-and-climate-change>.

² FAO, *2016 State of the World's Forests*, 11.

³ F. Schmithüsen, Three hundred years of applied sustainability in forestry, *Unasylva* 240, Vol. 64, 2013/1. <http://www.fao.org/docrep/018/i3364e/i3364e01.pdf>.

⁴ See Richard Hölzl, *Umkämpfte Wälder: Die Geschichte einer ökologischen Reform in Deutschland 1760-1860* (Frankfurt: Campus Verlag, 2010) for a fascinating account of these conflicts.

By 1700, an elaborate system of woodland management regulated the use of the forests: licenses were issued for the right to cut timber or graze animals in the forests; logged-over lands were closed off to permit forest regeneration; the practice of burning forest to clear land for agriculture was banned. At the same time, knowledge about the establishment, growth, composition, health, and quality of forests grew rapidly. Gradually, Japan, like Germany, developed the idea of plantation forestry, which became widespread between 1750 and 1800, reversing Japan's long decline in timber production by 1800.⁵

The practice of sustainable forest management steadily gained ground in Japan, Germany, and throughout Europe. Forest lands were surveyed, mapped, and recorded in land registries. Growth-and-yield tables were drawn up to calculate the volume of wood that could sustainably be cut each year; tree planting, tending, and thinning schedules were implemented; species were matched to site and end uses; plans to protect forests against tree disease and fire were formulated and executed.

Trained German forestry professionals became well known and were called to other countries, including Denmark, Russia, Burma, India, and the United States, to teach the idea of sustainable wood production. Perhaps the most influential German forester was Dietrich Brandis, who joined the British Imperial Forestry Service in 1856 as Superintendent of the teak forests of Pegu division in eastern Burma and went on to serve as Inspector General of Forests in India from 1864 to 1883.

Carl Alwin Schenck, a student of Brandis, went to the United States in 1895 to work as the forester for George W. Vanderbilt's Biltmore Estate and went on to found the Biltmore Forest School, the first practical forestry school in the United States.⁶ In 1954, Eberhard Brüning, the last in a long line of British and German foresters in the British colonial service, took up the post of Assistant Conservator of Forests in Kuching, Sarawak. German foresters Franz Erich Eidmann, Ernst Ludwig Schiemer, and Ludwig Rothmann played an essential role in researching, planning, and management of Java's teak forests over much of the early 20th century.⁷

Sustainable forest management has proven effective: the forest cover in European forests is stable, even increasing, as it is throughout the temperate climate zones of the globe, even though larger volumes of roundwood can today be sustainably harvested than were available two hundred years ago. Today, forests are highly valued in these regions for their role in protecting watersheds and biodiversity and providing extensive nature recreational areas.^{8 9}

⁵ Jared Diamond, *Collapse: How Societies Choose to Fail or Survive* (Penguin Books, 2005), 294-304.

⁶ See J.G. Goldammer (ed.), *Carl Alwin Schenck. Memoiren 1866 bis 1887: Familie, Lehrer und Vermächtnis* (Kessel: Forstbuchverlag, 2019).

⁷ Eidmann, Schiemer, and Rothmann were members of the forestry service of the German federal state of Hesse. Relations between the Hessian forestry service and Indonesia continued throughout the later 20th and then into the 21st century, as numerous Hessian foresters served long- and short-term assignments in German development cooperation projects working in the Indonesian forestry sector. See Landesbetrieb Hessen-Forst, *Hessische Förster im Ausland: Fünf Jahrzehnte internationale Zusammenarbeit von 1960 bis 2015 – Ein Rückblick* (2016).

⁸ It must also be said that the replacement of wood by coal as a source of energy, and the replacement of timber by steel for construction, shipbuilding etc. took pressure off the forests and allowed sustainable forest management to gain a foothold.

⁹ Schmithüsen, 8. Although forest cover is increasing, pristine/natural forests in European countries as well as in most temperate zones (e.g. Russian's Taiga and Siberian forests, Canadian temperate rainforest) continue to decline.

Nevertheless, deforestation continues unabated in the tropical regions of the world. According to FAO estimates, 33 percent of gross global deforestation from 1990-2008 was in South America, particularly the Amazon Basin, where over 70 percent of the cleared land was for cattle grazing, much of the rest for soy and oil palm plantations. Sub-Saharan Africa accounted for another 30 percent of gross worldwide deforestation during the same period, two-thirds of which was for subsistence farming, although commercial agricultural plantations are increasing.

Nineteen percent of gross global deforestation was in Southeast Asia, where timber and oil palm plantations have been by far the most important driver of deforestation, although smallholder encroachment into forests and population pressure has played an important role in some areas. Extensive forest fires have also devastated large swathes of land: Indonesia alone lost 9.75 million hectares of forests to fire during the El Niño Southern Oscillation (ENSO) event in 1997-1998.¹⁰

In the mid-1980s, a great deal of international attention was paid to the issue of tropical deforestation. The United-Nations-sponsored Tropical Forestry Action Plan (TFAP) called for some US\$8 billion in pledges from donor countries to save the rainforest, particularly the Brazilian Amazon. Implementation, however, proved difficult, and after the 1992 Earth Summit in Rio de Janeiro failed to reach agreement on forests, funding and policy attention to forests dissipated.¹¹

The world's attention has recently returned to tropical deforestation because of the growing realization that deforestation accelerates global emissions and climate change, while reforestation reduces these. In many cases, tropical deforestation matters much more for climate change than deforestation in the temperate zones of the world. Tropical forests have a more complex physical structure and richer biological diversity than any other ecosystem. They store 2.7 times more carbon per hectare than temperate forests, and when they are cleared, this carbon is released into the atmosphere. Furthermore, the thick white clouds that usually cover tropical forests then dissipate, and the newly exposed dark ground absorbs sunlight and heat, so that the planet is heated even more.

Today, net emissions from deforestation, primarily from tropical regions of the world, constitute more than 10 percent of total global emissions. However, the potential contribution of tropical forests to fighting climate change is considerably higher than their share of emissions because forests that regrow absorb carbon. The Intergovernmental Panel on Climate Change (IPCC) estimates that halting tropical deforestation and allowing tropical forests to recover could reduce net global emissions by 24-30 percent—potentially representing one-quarter to one-third of the near-term solution to climate change.¹²

Tropical Forest Protection as a Climate Mitigation Strategy

Tropical forest protection was thus reborn as a climate mitigation strategy. In December 2007, forests were incorporated into climate negotiations at the United Nations Climate Conference of the Parties (COP 13) to the 1992 UN Framework Convention on Climate Change (UNFCCC) in Bali, Indonesia. Negotiations eventually led to agreement in Warsaw in 2013 on the REDD+

¹⁰ FAO, *2016 State of the World's Forests*, 16-21.

¹¹ Seymour and Busch, 9.

¹² Seymour and Busch, 6, 43.

framework for results-based payments for reducing forest-based emissions, which was endorsed in the 2015 Paris Agreement. Development cooperation agencies returned to the forestry sector, and a new generation of forestry conservation initiatives was launched.

REDD+ stands for Reducing Emissions from Deforestation and forest Degradation plus conservation, sustainable management of forests, and enhancement of forest carbon stocks. Through REDD+, industrialized countries can provide results-based finance, either from public funds or carbon markets, to developing countries for reducing forest-based emissions and enhancing the carbon capture and storage functions of forests. In simplified terms, REDD+ represents the first time that payment can be made, on a global scale, for the environmental service provided by a tree standing in the forest and the carbon locked in it.

Paying for emissions reductions or sequestrations requires reliable monitoring of changes in forest cover and carbon stocks, which rapid technological developments have made possible in the last decade. For many years the FAO's Forest Resources Assessment (FRA) was the only cross-national data on tropical forests available. The accuracy of FRA statistics, which are published every five years and are based on self-reporting by the countries in question (based on the country's own definition of "forest"), varies widely from country to country.

However, beginning in 2000, remotely sensed land cover data became available free of cost from NASA's MODIS (MODerate resolution Imaging Spectro-radiometer) sensor. In 2004, Brazil began using the 250- and 500-meter resolution MODIS images to identify illegal logging and enforce logging laws.

Then, in December 2008, the US Geological Service made their archive of Landsat satellite images available for free download. Landsat has been collecting data on the world's forests since 1972 and since 1999 has been systematically generating images of every area of the Earth's land surface every two weeks, providing information on areas of land as small as thirty square meters.¹³

Landsat images are now used by some tropical countries, including Brazil and Indonesia, to monitor their deforestation. They are also used by University of Maryland geographer Matthew Hansen and his colleagues at Google, who created an automated process to translate Landsat images into a map showing global tree cover loss from 2000-2012 at 30-meter resolution. The map, which they published in *Science* in November 2013, is constantly updated and freely available on the Global Forest Watch website of the World Resources Institute.¹⁴

Landsat remains the most important source of data for forest watchers, given that it offers (free of charge) time series dating back to 1972 at a reasonable spatial resolution, but data is also available from the Sentinel satellites of the European Commission and European Space Agency, several national satellites, and an increasing number of commercial satellite companies that offer expensive, but valuable high spatial resolution data. Independent forest monitoring initiatives, including GFW Pro, Imazon SAD Tools, Global Risk Assessment Services (GRAS),

¹³ Ibid., 96.

¹⁴ Matthew C. Hansen, et al., High-Resolution Global Maps of 21st-Century Forest Cover Change, November 2013, *Science* 342(6160), 850-853.

https://www.globalforestwatch.org/map/3/15.00/27.00/ALL/grayscale/loss,forestgain,forest2000?tab=analysis-tab&begin=2001-01-01&end=2018-01-01&threshold=30&dont_analyze=true.

Starling, and the Sustainability Consortium's Commodity Mapping Tool, are today routinely used by various stakeholders, including conservation groups, indigenous peoples, local communities, environmental journalists, palm oil companies, and supply chain traceability initiatives to track deforestation.

At the same time, new technologies to assess carbon density were also developed. In 2012, research teams from the NASA Jet Propulsion Lab and the Woods Hole Research Center independently mapped aboveground forest carbon stocks across the entire tropics by combining information from two satellite systems: Lidar data from the ICESAT-1 satellite-based Geoscience Laser Altimeter System (GLAS), which ran from 2003 to 2009 (and was installed on the International Space Station in 2018), and satellite-based MODIS. These maps, which are also freely available and continually refined, make it possible to estimate forest carbon stocks and carbon emissions from deforestation.¹⁵

The upshot of all this technological development is a proliferation of forest and carbon stock monitoring systems that are not always compatible. One of the major difficulties is that there are literally dozens of different definitions of forest; a forest can be understood as virgin forest, naturally regrown forest, or planted forest with varying specifications for minimum area covered, minimum height of the trees, and percentage of canopy cover. This extensive array of definitions and monitoring methods leads to wildly different estimates of deforestation and emissions, as well as considerable confusion and controversy about which figures are correct for a given country or region.¹⁶

These difficulties can be illustrated by a very brief look at two sets of statistics for Indonesia. According to FAO statistics (derived from Indonesia's own 23 categories of land cover), Indonesia lost 8.399 million hectares of primary, naturally regenerated, and planted forest between 2000–2015.¹⁷ On the other hand, Global Forest Watch reports that Indonesia lost 24.4 million hectares of tree cover from 2001 to 2017.¹⁸

Tree cover is clearly not the same as forest, one of the main differences being timber and oil palm plantations. Distinguishing between a natural forest and a plantation on a satellite image is difficult because plantation species grow quickly and form a closed canopy that looks like a natural forest. The two can be distinguished by a trained technical specialist on a high-resolution satellite image, because plantations have long, even rows, while natural forests appear rough and mottled. However, a computer algorithm, such as that used by Global Forest Watch, still has difficulties with this distinction.¹⁹

A number of careful studies, including one by the Indonesian-German Forests and Climate Change Programme (FORCLIME), have demonstrated that Global Forest Watch's "tree cover" includes vast expanses of plantations, shrubland, shifting cultivation, and forest regrowth, so

¹⁵ Seymour and Busch, 92, 99.

¹⁶ Rachael Petersen, Crystal Davis, Martin Herold and Veronique De Sy, *Tropical Forest Monitoring: Exploring the Gaps Between What is Required and What is Possible for REDD+ and Other Initiatives*, World Resources Institute, June 2018. <https://www.norad.no/contentassets/0d61d104423d448ba11e4f2fc5a6dd9f/tropical-forest-monitoring-exploring-the-gaps-between-what-is-required-and-what-is-possible-for-redd-and-other-initiatives-.pdf>.

¹⁷ FAO *Global Forest Resources Assessment 2105, Country Report Indonesia*.

¹⁸ <https://www.globalforestwatch.org/country/IDN>; <https://www.globalforestwatch.org/dashboards/country/BRA>.

¹⁹ Seymour and Busch, 107.

that it hugely overestimates forest cover and deforestation rates at the local level—among other things, counting harvesting of tree plantations as deforestation, although the land may be under a management plan that calls for replanting.²⁰

While Hansen and his team are careful to point out that the “tree cover loss” they are measuring is not the same as “loss of natural forest,”²¹ that distinction is largely lost on most commentators. Global Forest Watch data is widely and routinely cited as prima facie evidence of deforestation, and at least one commentator stated that the “the Indonesian government has been telling lies about its rate of forest loss.”²²

The Indonesian Government has not been telling lies; in fact, trained technicians at the Ministry of Environment and Forestry (MoEF), supported by international (including GIZ) experts, produce annual land cover maps derived from the visual interpretation of medium resolution Landsat satellite images and high-resolution SPOT satellite images. The results are validated with ground truthing where there are uncertainties. The MoEF has therefore recently protested the reputational damage caused by the widespread dissemination of Global Forest Watch data.²³

The MoEF not only produces increasingly accurate land cover maps; in the last 17 years, it has also made significant progress towards forest management reform, land tenure clarification, and precise government regulations. It is working to station well-trained forestry officials on the ground to continually monitor the forests, enforce the laws, and implement sustainable forest management. And it is taking legal action against illegal logging.

Although remotely sensed data is an invaluable tool, overcoming the vast inherited institutional, financial, and political barriers to sustainable forest management is a herculean task, one far removed from the technological frontiers which fascinate international researchers and the high-tech images that capture the attention of conservation activists. A short history of forests, forest management, and forest regulation in Indonesia will illustrate just how far the country has progressed.

Forests, Deforestation, and Forest Management in Indonesia: An Historical Overview including German Development Cooperation

Indonesia’s 17,000 islands encompass nearly 1.9 million square kilometers (188 million hectares), most of which was deeply forested as far back as there are records. In 1950, the Forest Service of newly independent Indonesia surveyed the country and concluded that nearly 84

²⁰ Forest and Climate Change Programme, The high-resolution global map of 21st-century forest cover change from the University of Maryland (‘Hansen Map’) is hugely overestimating deforestation in Indonesia, http://forclime.org/documents/press_release/FORCLIME_Overestimation%20of%20Deforestation.pdf; Petersen et al. 2018.

²¹ Matthew Hansen, Guest Post: Response to FORCLIME article on UMD high-resolution global map of 21st-century forest cover change, Global Forest Watch, August 11, 2014. <https://blog.globalforestwatch.org/gfw-community/response-to-forclime-article-on-umd-high-resolution-global-map-of-21st-century-forest-cover-change>.

²² Chris Lang, Indonesia’s rate of deforestation has doubled under the moratorium, *REDD-Monitor*, December 11, 2013. <http://www.redd-monitor.org/2013/12/11/indonesias-rate-of-deforestation-has-doubled-under-the-moratorium/>.

²³ Ministry of Environment and Forestry, *The State of Indonesia’s Forests 2018*; Foresthints.news, Minister confirms GFW map inaccuracies, WRI promises corrections, July 13, 2018. <http://www.foresthints.news/minister-confirms-gfw-map-inaccuracies-wri-promises-corrections>.

percent of the land—some 158 million hectares—was covered in primary and secondary forest, as well as small areas of tea, coffee, and rubber plantations. Sixty-five years later, in 2015, the FAO estimated that Indonesia had 91 million hectares of forested land, 53 percent of the national territory.²⁴

Although the Dutch colonial government began logging teak forests and establishing teak plantations on Java as early as the 17th century, most forest clearance throughout Indonesia up to 1950 was for agriculture, notably rice cultivation.²⁵

Extensive forest clearing in Indonesia began under Soeharto, who viewed Indonesia's vast forestland as a resource to be exploited in order to accelerate economic growth and also as a way to consolidate his political power through economic patronage. Forestry laws issued in the late 1960s declared more than 75 percent (143 million hectares) of Indonesia's total land area and 90 percent of land on the Outer Islands to be "state forest" (whether or not it had trees on it) and designated over 100 million hectares for logging or conversion to plantations. Traditional claims to the land were not considered.²⁶

Over 62 million hectares of forest were awarded (on a non-bidding basis) as logging concessions to business conglomerates comprised of Soeharto's family, business partners, and political and military allies. By the late 1970s, Indonesia became the world's largest exporter of tropical timber, with log exports generating US\$1.5 billion a year.²⁷

In the 1980s, the government banned the export of raw logs, and the firms shifted to value-added wood products. Plywood processing plants of conglomerates that continued to enjoy good political ties to Soeharto were subsidized, and APKINDO, the plywood cartel of Soeharto's friend and business associate, Bob Hasan, was awarded a monopoly over marketing and export of plywood. By the late 1980s, Indonesia was supplying 79 percent of global tropical plywood. Forest land was quickly cleared with no environmental safeguards, and the degraded forests became fire hazards.²⁸

The rainforests in Indonesia had always been resistant to fire, even in long dry seasons, because they retained moisture; however, the access roads required for large-scale logging and the felling of tall trees created openings in the canopy, allowing the sun to dry the surface layer of organic matter and leaves, while highly combustible logging waste—stumps, branches, treetops—was strewn everywhere. The inevitable disaster struck in 1982/83 as a result of the El Niño Southern Oscillation (ENSO).

ENSO events occur every four to five years and 1982/83 was an especially grave one: from July 1982 to April 1983, severe drought hit Southeast Asia, in particular East Kalimantan. In October and November, farmers, settlers, and plantation owners started fires to clear vegetation in preparation for the next planting cycle, and the fires quickly spread out of control, also igniting

²⁴ FAO, *Global Forest Resources Assessment 2015*, 17.

²⁵ Forest Watch Indonesia, *State of the Forests Indonesia*, 2002, 7. http://pdf.wri.org/indoforest_full.pdf.

²⁶ Human Rights Watch, *Without Remedy: Human Rights Abuse and Indonesia's Pulp and Paper Industry*, 2003, 12. <https://www.hrw.org/reports/2003/indon0103/>.

²⁷ *Ibid.*

²⁸ *Ibid.*, 17.

numerous peat swamps and surface coal seams. The “Great Fire of Borneo” burned 3.2 million hectares in East Kalimantan, 2.7 million of which were tropical rainforests. Logged-over forests were clearly the most severely burnt, while primary forests or forests that had recovered from logging carried out long before were unburnt or suffered only light damage.²⁹

The 1982/83 fire brought the issue to world attention, and the Indonesian Ministry of Forestry established a special fire mitigation task force. Short- to medium-term assistance in the form of emergency assistance, technical aid, equipment, and training courses, as well as management support and fact-finding missions, was provided by the EC, FAO, JICA, ITTO, GTZ, USAID, and AusAID. Nevertheless, fires continued to erupt in the subsequent ENSO events in 1987, 1991, 1994, and 1997.

Eventually, three long-term fire-management projects were initiated: the Integrated Forest Fire Management Project in East Kalimantan (1994-2003), supported by the German Government through GTZ and KfW;³⁰ the EU-supported Forest Fire Prevention and Control Project (FFPCP) in Southern Sumatra (1995-1998);³¹ and the JICA-supported Forest Fire Prevention and Management Project (FFPMP) in Bogor, Jambi, and West Kalimantan (1996-2001).³²

From 1994-2004, the Integrated Forest Fire Management Project (IFFM) worked with the Provincial Forestry Service in East Kalimantan to develop a comprehensive community-based fire management approach that included prevention, information, and suppression. The villages in the project were chosen for their proximity to areas of high fire risk and had suffered damage from previous wildfires. Volunteer village fire brigades were given extensive training and provided with appropriate tools and battery-powered communication stations, while environmental education programs alerted villagers to the dangers of fire and promoted safe burning practices.

The IFFM project set up a FIRE-GIS system for East Kalimantan at the Provincial Fire Center in Samarinda.³³ The GIS included NOAA and ERS radar satellite data, base maps, vegetation cover

²⁹ W. Schindele, S. Priasukmana, W. Thoma, and K. Panzer, *The Forest Fire 1982/1983 in East Kalimantan Part 11: Necessary Steps for Forest Rehabilitation—A Plan of Action*, Deutsche Forstinventur-Service GmbH on behalf of the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, 1989; J.G. Goldammer and A.A. Hoffmann, *The forest fire situation in Indonesia*. *Int. Forest Fire News* 26, 2001.

³⁰ Initiated by several missions conducted by the Fire Ecology Research Group (Freiburg, Germany), which became the Global Fire Monitoring Center (GFMC) in 1998.

³¹ FFPCP was extended from 2003 until 2008 and implemented by GTZ International Services under the name of South Sumatra Forest Fire Management Project. http://gfmc.online/se_asia/projects/ssfmp/index10.html and http://www.gfmc.online/se_asia/projects/summary/1.%20Summary%20Report%20of%20Results%20and%20Achievements%202003-2007.pdf.

³² Rona Dennis, *A Review of Fire Projects in Indonesia, 1982-1998* (Bogor: Center for International Forestry Research, 1999).

³³ GTZ had already been active in Samarinda from the late 1970s to the early 1990s helping to develop the Faculty of Forestry at Mulawarman University (which combined silviculture, forest management, and wood technology and industry) in close cooperation with the Institute of World Forestry at the University of Hamburg and other German universities. The project provided scholarships to around 30 Mulawarman faculty members and others for Ph.D. and master’s studies, primarily in Germany and the Netherlands. It also equipped a number of laboratories, particularly the wood science lab, so that Mulawarman University became the best equipped forestry faculty in Indonesia, well before the more traditional faculties in Yogyakarta and Bogor. Source: email exchange (April 2, 2018) with Berthold Seibert, Team Leader of the project Advisory Assistance to the Faculty of Forestry, Mulawarman University, Samarinda from 1984 to 1989. See also R.H. Grammel, *Bericht zur Evaluierung des*

maps, burnt scar maps, fire risk maps, actual fire danger and hotspot information, infrastructure, and transmigration sites. The center also provided materials for prevention campaigns and training and fire-suppression coordination and advice to local fire centers in the districts. This system and comparable systems set up by the FFPCP and FFPMP projects were the predecessors of the national SiPongi system that is now operated on the national level.³⁴

However, even as the IFFM project worked with communities to prevent and fight fires, it became evident that the underlying land tenure and land use planning issues had to be addressed before a real solution could be found. “Why should communities fight wildfires if they do not have access to the areas or draw immediate benefits from the areas where the fires occur?”³⁵

Two additional GIZ-supported projects in Kalimantan during roughly the same period as IFFM were early attempts to address planning and land tenure issues. From 1992 to 2002, the Social Forestry Development Project operated on a site that encompassed eight adjoining villages in northern Sanggau District, West Kalimantan, developing and testing approaches to community forest management.

Implemented by the Indonesian Forestry Department and GTZ (through the GFA consulting company), the project emphasized sustainable forest management, while fortifying traditional Dayak livelihoods through non-timber forest products such as rubber and through better methods for food crop and livestock production and savings schemes intended to generate capital for local business initiatives. The program produced a detailed land-use plan, implemented infrastructure, education, and primary health components, and helped the villagers to form a cooperative in order to incorporate greater participation in decision making.

In a political context favoring central government control, the SFDP project attempted to decentralize responsibility to local institutions, while it focused on clarifying land tenure issues. However, as local institutions lacked capacity and political support, the project was vulnerable to local power struggles; in one instance, illegal loggers burned down the project office.³⁶

Despite small-scale, localized project successes, project staff themselves calculated that to truly manage the forest sustainably and generate satisfactory incomes, villagers must be granted the right to harvest and sell timber from the forest, as well as non-timber forest products. Private logging companies and industrial plantations had been granted access to vast areas of the Kalimantan’s forests—including areas inhabited and used by customary communities for generations—thus generating considerable conflict. At the same time, local communities and

Vorhabens “Beratung des Forstwirtschaftlichen Fakultät Samarinda/Indonesien,“ Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, 1988.

³⁴ Hartmut M. Abberger, Bradford M. Sanders, and Helmut Dotzauer, The development of a community-based approach for an integrated forest fire management system in East Kalimantan, Indonesia. <http://www.fao.org/docrep/005/AC798E/ac798e0a.htm>.

³⁵ Ibid.

³⁶ David Brown, Michael Richards, Kate Schreckenber, and Gill Shepherd, Getting Aid Delivery Right: Host Country, Donor and International Complementarity for Greater Aid Effectiveness in the Forest Sector, Overseas Development Institute, 1999, 11. <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/5703.pdf>.

SFDP were refused permission to log neighboring forests, even on a selective and sustainable basis.

The third German-supported forestry project in Kalimantan at that time, the Sustainable Forest Management Project (SFMP, 1993-2002), was also based in Samarinda, East Kalimantan and had three main activity fields: forest management, forest and land rehabilitation, and social forestry and training. Its achievements included a survey of legal land-use planning procedures and forest mapping requirements, development of a new concept for low-cost forest inventories, development of growth functions for the lowland dipterocarp forest of East Kalimantan, a volume- and growth-based concept for the determination of annual allowable cut, a concept for social zoning of forest management units and participatory boundary demarcation, a provincial guideline for reduced impact logging (issued by Kanwil Kehutanan in 1999), and a national regulation on the same topic (issued by the Ministry of Forestry in 2000).³⁷

SFMP was also intensively involved in working groups at the community, district, provincial, and national levels to develop proposals for participation of local communities in boundary delineation, but little was accomplished—the project encountered the same problems as the Social Forestry Development Project (see section on land tenure below).

Certification was understood and pursued by SFMP as an important instrument to enhance, support, and more widely introduce sustainable forest management in Indonesia. SFMP contributed to the final version of the Indonesian criteria and indicators for sustainable forest management, supported the design and implementation of assessor trainings, and facilitated the joint certification protocol between the responsible Indonesian institution for certification (Lembaga Ekolabel Indonesia) and the Forest Stewardship Council.³⁸

In spite of such early attempts to curtail it, unregulated and unsustainable deforestation continued in Kalimantan and across Indonesia, even accelerating in the late 1980s, as the paper and pulp industry took off, again with assistance from large government subsidies. The “Reforestation Fund,” which collected billions of dollars from timber companies, awarded over US\$1.0 billion in grants and zero-interest loans to pulp and paper concessionaires as well as 250 billion rupiah (US\$100 million) to Bob Hasan for a pulp mill. (Funds from the Reforestation Fund were also used for the 1997 Southeast Asia Games in Jakarta.)³⁹

From 1988 to 2010, Indonesian pulp production expanded from 368,000 to 7 million metric tons per year, and paper production expanded from 30,000 tons to 10.5 million tons per year. The vast majority of the wood that fed the mills was supplied by clearing millions of hectares of natural forests, not from sustainable plantations.⁴⁰

³⁷ Jörg Albrecht, Project interventions and impact analysis in the light of changing framework conditions, 1997-2006, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, 2006, 49-67.

³⁸ Ibid.

³⁹ Human Rights Watch, 2003, footnote 26.

⁴⁰ Indonesian Ministry of Industry, 2011, quoted in Krystof Obidzinski and Ahmad Dermawan, New round of pulp and paper expansion in Indonesia: What do we know and what do we need to know? ARD Learning Exchange, May 6-11, 2012. <https://www.cifor.org/ard/documents/background/Day5.pdf>.

Oil Palm Plantations Take Off in the 1990s

In the 1990s, oil palm plantations became the last major force behind forest clearing in Indonesia. The oil palm, which came from West Africa, was brought to Indonesia in 1848 by the Dutch and planted in the Botanical Gardens in Bogor, Java. It was first cultivated commercially in Indonesia by the Dutch in 1911 in the eastern coastal area of Sumatra. The plantation area steadily increased, and in 1938 Indonesia was the world's largest exporter of palm oil.⁴¹

Most oil palm plantations were abandoned during the Japanese occupation, and production stagnated until the late 1960s, when Soeharto's New Order government, supported by the World Bank and the Asian Development Bank, created *Perseroan Terbatas Perkebunan* (PTP, state owned plantation companies) that focused on the cultivation of export crops such as coffee, coconut, rubber, quinine, and palm oil.

In the late 1970s, the government introduced the *Perkebunan Inti Rakyat; PIR* (Nucleus Estate Scheme), whereby large, state-owned plantations (the "nucleus") provided two to three hectares of land, as well as seedlings, technical assistance, and financing to smallholder oil palm planters ("plasma famers") and purchased their oil palm fruit for the company mills.

The PIR program was linked to the government's resettlement (*Transmigrasi*) program, through which groups of smallholders were moved from Java, Madura, and Bali and resettled around large-scale oil palm plantations primarily in Sumatra, but also in Kalimantan, Sulawesi, and Papua.⁴²

The results of the PIR program were mixed. Land tenure was a huge issue. In most cases titles to the land were not granted until the smallholders had worked for two to four years and generated revenues. There are many accounts of breach of contract and serious agronomic and economic problems, leaving participants with no choice but to work on the nucleus plantation. Many PIR projects were characterized by poor management and insufficient finance.⁴³

However, the Nucleus Estate Smallholder Participation (NESP) Ophir project in West Pasaman, Sumatra, supported by German development cooperation in the 1980s and 1990s, proved that

⁴¹ Forest Watch Indonesia, *State of the Forests Indonesia*, 2002, 42. http://pdf.wri.org/indoforest_full.pdf; R. Rasiah and A. Shahrin, *Development of Palm Oil and Related Products in Malaysia and Indonesia*, University of Malaya, 2006, quoted in Hariati Sinaga, *Employment and Income of Workers on Indonesian Oil Palm Plantations: Food Crisis at the Micro Level*, *Future of Food: Journal on Food, Agriculture and Society*, Vol. 1, Nr. 2, Winter 2013, 67.

⁴² Beginning in 1977, the GTZ-supported Transmigration Area Development Project (later renamed Technical Cooperation for Area Development Project) worked to ensure progress in regional development by matching measures aimed at sectoral growth with the needs of planned settler communities. Project activities included development planning and training of planning institutions, development of infrastructure, agriculture (cropping systems, seed improvement, extension), small-scale industry, health, and nutrition. See Eveline Ferretti (ed.), *Cutting Across the Lands: An Annotated Bibliography on Natural Resource Management and Community Development in Indonesia, the Philippines, and Malaysia* (Cornell University; Southeast Asia Program Publications, 1997), 35; and Wolfgang Clauss, Hans-Dieter Evers, and Solvay Gerck, *The Formation of a Peasant Society: Javanese Transmigrants in East Kalimantan*, *Indonesia* No. 46, October 1988, 80. https://ecommons.cornell.edu/bitstream/handle/1813/53897/INDO_46_0_1107010934_79_90.pdf?sequence=1.

⁴³ Jean-François Bissonnette and Rodolphe De Koninck, *Large Plantations versus Smallholdings in Southeast Asia: Historical and Contemporary Trends*, Conference, Chiang Mai University, 2015, 9. https://www.iss.nl/sites/corporate/files/CMCP_12-_Bissonnette_and_De_Koninck.pdf.

smallholder palm oil production could be efficient and could create significant benefits for plasma farmers. The NESP Ophir project was an 8,000-hectare oil palm plantation, with 4,800 hectares managed by smallholders and 3,200 managed by the nucleus estate, which ran the milling facility.⁴⁴

The financial cooperation component of the project, funded by KfW (1981-1992), cleared the land and constructed plantation and feeder roads, housing for farmers, and the mill and port facilities. The technical cooperation component, implemented by GTZ (1982-1996), created farmers' groups, cooperatives, and management structures. GTZ organized extensive training for farmers, which encompassed rights and responsibilities in the Ophir organization; procedures for decision making; technical know-how related to harvesting and upkeep of the plantation; a computer-based bookkeeping system; and administrative/management skills.⁴⁵

The NESP Ophir project was so successful that the organizational structures set up in the 1980s with the assistance of GTZ were still functioning in 2009, when Shell Global Solutions International commissioned an evaluation by researchers at Wageningen University in order to “understand the role smallholders can play to provide sustainable palm oil as feedstock for bio-energy use” and “to learn how to increase the average palm oil yield per hectare in a sustainable way, thus increasing overall palm oil production without additional land use.” The study found that Ophir smallholder yields outperformed those of the Ophir nucleus estate, as well as yields of many leading oil palm plantation companies—something the researchers called “a remarkable achievement.”⁴⁶

The study concluded that “the impacts of the Ophir project on the local situation in West Pasaman appear huge”; “the Ophir project functioned as an engine of development in West Pasaman,” and “increased livelihood opportunities for many people who, directly and indirectly, profited from the large proceeds made by smallholders.”⁴⁷

Smallholder oil palm plots have been steadily increasing since the PIR program was introduced in the late 1970s. According to Indonesian Government estimates, in 2015 smallholders held 4.6 million hectares of oil palm plantations (40 percent of the total), while the government held 750,000 hectares, and private businesses held 6 million hectares.

Labor-intensive palm oil production is the main source of income for millions of Indonesians, although the yields of most smallholders are lower than those of government and private sector plantations.⁴⁸ Most oil palm smallholders cannot improve their yields, because they do not have a title to the land they are farming and thus cannot access any financial support, such as grants from the People's Oil Palm Replanting (PSR) program offered by the Indonesian Oil Palm Estate Fund to renew aging trees.⁴⁹

⁴⁴ Idsert Jelsma, Ken Giller, and Thomas Fairhurst, *Smallholder Oil Palm Production Systems in Indonesia: Lessons Learned from the NESP Ophir Project* (Wageningen University, 2009), 1,11. <http://edepot.wur.nl/148600>.

⁴⁵ *Ibid.*, 18.

⁴⁶ *Ibid.*, 49.

⁴⁷ *Ibid.*, 50.

⁴⁸ Directorate General of Estate Crops, *Tree Crop Estate Statistics of Indonesia 2014-2016* (2015), Palm Oil; Bissonnette and De Koninck, 11; Sinaga, 69-70.

⁴⁹ Gemma Holliani Cahya, *Farmers dispute palm oil prosperity claims*, *The Jakarta Post*, Nov. 3, 2018. <http://www.thejakartapost.com/news/2018/11/03/farmers-dispute-palm-oil-prosperity-claims-environment.html>.

In the mid-1990s, the government sought to encourage private-sector and foreign direct investment in palm oil; conglomerates with ties to Soeharto began to invest massively in the sector. At the same time, Malaysian oil palm companies began to expand into Indonesia, attracted by the low land and labor costs. The palm oil sector was one of the few that suffered very little from the 1997/98 economic crisis, and policy changes under the more market-driven post-Soeharto *Reformasi* economic regime further stimulated the sector.

The area planted with oil palm in Indonesia increased rapidly from 1.1 million hectares in 1990 to around 11.3 million hectares in 2015 (7.139 million in Sumatra, 3.639 million in Kalimantan, 0.371 million in Sulawesi, and 0.117 million in Maluku and Papua).⁵⁰ In 2005, Indonesia overtook Malaysia as the world's leading producer and exporter of palm oil. Together, Indonesia and Malaysia produce 85 percent of the world's palm oil.⁵¹

Palm Oil as Biofuel

Palm oil is one of the world's most produced and consumed oils, as it is highly stable, very production efficient, and thus cheaper than all other oils. It can be used in a wide variety of food, cosmetic, hygiene, and chemical products, and as source for biofuel or biodiesel.

In 2003, the European Union (EU) adopted the Biofuels Directive, a non-binding target for Member States to use 5.7 percent of renewable energy in transport by 2010, on the assumption that this would reduce CO₂ emission from cars, trucks, and planes, create new markets for European farmers, and reduce the EU's dependence on foreign oil imports.

In December 2007, the US Congress passed the Energy Independence and Security Act, which required fuel producers to mix in soy, palm, and other kinds of vegetable oil with diesel fuel and to use ethanol from corn and sugar in gasoline. Imports of biodiesel to the United States surged from near zero to more than 100 million gallons a month. As soy oil became scarce, fuel and food producers switched to the cheaper and equally effective palm oil; Indonesian and Malaysian palm oil began to flood Western markets.⁵²

In 2009, the EU adopted the Renewable Energy Directive (RED) which required that 10 percent of Member States' transport sectors be fueled by renewable energy by 2020. At the same time, the EU Fuel Quality Directive (FQD) required the carbon intensity of fuels to be reduced by 6 percent by 2020, compared to 2010. These two laws became the main drivers for food-based biofuels in Europe and another major impetus for the expansion of palm oil production in Indonesia and Malaysia.

Unfortunately, neither the US nor the EU laws took into account CO₂ emissions coming from land use changes. Ironically, the clearing of natural forests to make way for oil palm plantations

⁵⁰ Directorate General of Estate Crops 2015.

⁵¹ Bissonnette and De Koninck, 8.

⁵² Abrahm Lustgarten, Palm Oil Was Supposed to Help Save the Planet. Instead It Unleashed a Catastrophe. *New York Times*, Nov. 20, 2018.

in Indonesian and Malaysia turned out to a major source of emissions, a mistake that EU policymakers have since been struggling to remedy.⁵³

There was furious, behind-the-scenes lobbying by European oilseed producers, as the more cost-effective palm oil was able to take market share from the less competitive EU oilseeds, such as rapeseed. The EU imposed anti-dumping duties in the range of 8.8 to 23.3 percent on biodiesel shipments from Indonesia in 2013, and shipments from Indonesia contracted from US\$649 million in 2013 to US\$150 million in 2016 (touching a low of US\$68 million in 2015).⁵⁴

Indonesia challenged the duties at the World Trade Organization and won six out of seven of its legal challenges in January 2018. Indonesia also won an appeal of the case, when the European Court of Justice ruled that the EU must do away with anti-dumping duties on imports of Indonesian biodiesel products, effective March 16, 2018.⁵⁵

In January 2018, the European Parliament voted to stop counting palm oil biodiesel towards the EU's green energy targets as of 2021. However, in June 2018, the European Parliament, the European Commission, and the Council agreed to a compromise, according to which the contribution of certain categories of biofuels, bioliquids, and biomass fuels produced from food or feed crops, namely those with high indirect land-use change risk and for which a significant expansion of the production area into land with high carbon stock is observed (widely expected to affect palm and soybean oil), will be limited to the 2019 consumption levels and will gradually decline from 2023 onwards until reaching 0 percent in 2030.⁵⁶

This decision allows for a far more gradual phase out of palm oil from European diesel fuels, giving palm oil producers in Malaysia and Indonesia time to make the required adjustments to the fall in demand for palm oil and also to realize a much larger part of the planned returns to their current investments.

However, the fight is not yet over. There are calls for the regulation of palm oil in foodstuffs, because of the deforestation it causes, and the finalized EU Action Plan on Tropical Deforestation may curb palm oil imports. Ideas are being floated for a trade agreement and licensing system for palm oil—similar to the VPA-FLEGT model currently used for Indonesian timber product exports. Indonesian officials and business groups have been quick to push the

⁵³ Timothy Searchinger, Ralph Heimlich, R.A. Houghton, Fengxia Dong, Amani Elobeid, Jacinto Fabiosa, Simla Tokgoz, Dermot Hayes, and Tun-Hsiang Yu, Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change, *Science* 29 Vol. 319, Issue 5867, Feb 2008, 1238-1240; *Transport and Environment*, Food-based biofuels: cure worse than the disease. <https://www.transportenvironment.org/what-we-do/biofuels-whats-problem>.

⁵⁴ Indonesia Investments, WTO Rules in Favor of Indonesia on EU's Biodiesel Anti-Dumping Duties, January 29, 2018. <https://www.indonesia-investments.com/id/news/news-columns/wto-rules-in-favor-of-indonesia-on-eu-s-biodiesel-anti-dumping-duties/item8549?>; M.A.K. Sahide, A. Maryudi, S. Supratman, and L. Giessen, Is Indonesia utilising its international partners? The driving forces behind Forest Management Units, *International Forestry Review* 18 (1), 78-95, 15.

⁵⁵ Reuters, UPDATE 1-Indonesia wins appeal against EU over anti-dumping duty on biodiesel. <https://af.reuters.com/article/commoditiesNews/idAFL3N1R32LN>.

⁵⁶ European External Action Service, Palm Oil: Outcome of the Trilogue of the EU's Renewable Energy Directive (RED II), June 25, 2018. https://eeas.europa.eu/headquarters/headquarters-homepage/46646/palm-oil-outcome-trilogue-eu%E2%80%99s-renewable-energy-directive-red-ii_fr.

idea of using Indonesia Sustainable Palm Oil (ISPO) certification as the basis of such an agreement.⁵⁷

Although palm oil is routinely vilified as one of the leading causes of deforestation in the world, this is no longer the case. A great many oil palm plantations (between 50 and 80 percent) replaced intact forest land in the 1990s and 2000s, but new oil palm plantations are increasingly being developed on non-forest land—where their growth is in fact binding carbon dioxide from the atmosphere and offering canopy cover to the soils under them.

One study estimated that between 2010 and 2015, 18 percent of new oil palm plantations replaced primary forest—most often in Kalimantan and Papua. Papua, with its high remaining forest cover, is seen as the new frontier for future oil palm development. Already there are a significant number of oil palm plantations on forest land in Papua, and most new plantations continue to replace intact forest land there.⁵⁸

Even in Indonesia, which produces over 60 percent of the world's palm oil, new oil palm plantations today account for less than 15 percent of the country's annual deforestation.⁵⁹ Worldwide, palm oil production accounts for far less. Three researchers from the French CIRAD Agricultural Research for Development calculated that palm oil was actually responsible for only 2.3 percent of the world's deforestation between 1999 and 2008.^{60 61}

Palm oil was the last in a long line of industries—logging in the 1970s, plywood in the 1980s, paper and pulp in the late 1980s, and, finally, palm oil in the 1990s—which have cleared some 67 million hectares of primary forest in Indonesia (30 percent of the national territory) since 1950 and left millions of hectares more of degraded forests.⁶²

⁵⁷ Khalil Hegarty Melbourne, The EU's war on palm oil will continue, *Jakarta Post*, July 6, 2018, 7.

⁵⁸ K.G. Austin, A. Mosnierb, J. Pirkerb, I. McCallumb, S. Fritz, and P.S. Kasibhatla, Shifting patterns of oil palm driven deforestation in Indonesia and implications for zero-deforestation commitments, *Science Direct*, Volume 69, December 2017, 46. <https://www.sciencedirect.com/science/article/pii/S0264837717301552>.

⁵⁹ Austin et al., 41.

⁶⁰ Victor Baron, Alain Rival, and Raphael Marichal, No, palm oil is not responsible for 40% of global deforestation, *The Conversation*, June 8, 2017. <https://theconversation.com/no-palm-oil-is-not-responsible-for-40-of-global-deforestation-78482>.

⁶¹ According to a 2013 study commissioned by the European Commission for the period 1999 to 2008, pastures for ruminant livestock (mainly cattle) represented the single largest contributor (58 million hectares or 24 percent) to worldwide deforestation, while all agricultural crops accounted for another 69 million hectares or 29 percent. The most important agricultural crops that contributed to deforestation in those years were: soybeans (13 million hectares), maize (8 million), oil palm (6 million), wood products (5 million), rice (4 million), and sugar cane (3 million). See EC Technical Report 2013-063, The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation, 22. <http://ec.europa.eu/environment/forests/pdf/1.%20Report%20analysis%20of%20impact.pdf>.

⁶² The Indonesian rubber industry, which has been experiencing steady production growth since the 1980s, has played a smaller role in deforestation in Indonesia than palm oil, timber, and paper and pulp. In 2016, the country's rubber plantations covered a total of 3.64 million hectares, 80 percent of which were held by smallholders. Source: Indonesian Rubber Association (Gapkindo). <https://www.indonesiainvestments.com/business/commodities/rubber/item185?>

The 1997/98 Fires and the Fall of Soeharto

Not only were millions of hectares of forest cleared; even worse, large areas of peat swamp were cleared, drained, and converted to industrial plantations. Peatlands are among the world's most carbon-rich ecosystems, and when swamps are drained, the peat is exposed to the air and decays, releasing greenhouse gases into the atmosphere for decades. It also becomes extremely flammable and, once ignited, can burn underground for years, reigniting periodically on the surface.

Around one million hectares of peat swamp forest in Central Kalimantan were designated by the Soeharto regime for the Mega Rice Project (MRP)—part of an effort to promote rice self-sufficiency in Indonesia. From January 1996 to June 1997, more than 4000 km of drainage and irrigation channels were constructed in the area designated for the MRP. In August 1997, fires were set to clear the land.

However, in 1997/98 ENSO also returned to Indonesia, causing a severe drought that extended from mid-1997 to May 1998, with only a short period of rain in December 1997. Fires set to clear the land in Kalimantan, Sumatra, and Irian Jaya/Papua quickly spread out of control. The new MRP drainage system in Central Kalimantan proved disastrous: the peat layer lost most of its water and the peat itself was ignited. Subsequent studies found that between 729,500 and 750,000 hectares (20 percent) of Central Kalimantan's peat swamp forest had been destroyed.⁶³

The total impact of all the fires across Indonesia in 1997/98 was much larger and more severe than the 1982/83 fires; they resulted in dense noxious haze across Southeast Asia and caused respiratory health problems as well as transportation delays and accidents on land, air, and sea. It was possibly the largest tropical fire in history.⁶⁴

The Indonesian National Development Planning Agency (BAPPENAS) and the Asian Development Bank (ADB) undertook a national assessment of fire-affected areas and estimated that during the 1997/98 ENSO event fire affected an area of about 9.75 million hectares: 1.7555 million hectares in Sumatra, 100,000 in Java, 6.5 million hectares in Kalimantan, 400,000 in Sulawesi, and 1 million in Papua.⁶⁵

East Kalimantan was again the most affected province in the country. Although the BAPPENAS/ADB study estimated that 3.536 million hectares had burned in East Kalimantan, the GTZ-supported Integrated Forest Fire Management (IFFM) project and the Sustainable Forest Management Project (SFMP), with their partners, conducted a radar-based inventory analysis of the fire-affected area in East Kalimantan and concluded that 5.26 million hectares, including 2.6 million hectares of forest, had been affected—1.724 million hectares or 50 percent

⁶³ Luca Tacconi, *Fires in Indonesia: Causes, Costs and Policy Implications*, CIFOR Occasional Paper No. 38, 2003, 3. https://www.cifor.org/publications/pdf_files/OccPapers/OP-038.pdf.

⁶⁴ H.D.V. Boehm and F. Siegert, *Ecological Impact of the One Million Hectare Rice Project in Central Kalimantan, Indonesia, Using Remote Sensing and GIS*, paper presented at the 22nd Asian Conference on Remote Sensing, Singapore, November 5-9, 2001. <https://pdfs.semanticscholar.org/be9b/19782e8c03e4ee833d1f4d38911a49bbddcc.pdf>.

⁶⁵ BAPPENAS-ADB, *Causes, Extent, Impact, and Costs of 1997/98 Fires and Drought*. Final Report, Asian Development Bank TA 2999-INO, National Development Planning Agency (BAPPENAS) and Asian Development Bank, Jakarta, 1999.

more than the BAPPENAS/ADB study had found. Given GTZ's decades of work on the ground in East Kalimantan, its figures were generally accepted as more accurate.⁶⁶

A German team that included two scientists from the IFFM project also undertook a detailed field survey in a 100,000-hectare forest concession in East Kalimantan. They found the same damage pattern as in the 1982/83 fires: severe fire damage was found in 49.5 percent of recently logged forests; in 26.3 percent of old logged forests; and in only 17.3 percent of pristine forest.⁶⁷

The stage was set for an annual problem: the 1997/98 fires severely damaged the remaining forests and left dead flammable wood everywhere. When farmers and agricultural companies set fires to clear land in subsequent years—as they had always done—the fires quickly spread out of control and the peatland reignited.^{68 69}

The 1997/98 fires thus created a completely new dimension regarding the need for land use planning and forest and land rehabilitation. Given the centralistic approach of the Ministry of Forestry and largely absent framework conditions in support of sustainable forest management, stronger project involvement at the central level was needed. The Sustainable Forest Management Project (SFMP) opened an office integrated directly into the office of the Director of Forest Utilization in the Ministry of Forestry, where it was involved in both strategic and routine ministry matters. The SFMP team leader was seconded to the Ministry of Forestry in Jakarta for the second project phase (1998–2002).⁷⁰

However, these were tumultuous years in Indonesia. The Asian Financial Crisis, which began in July 1997, set in motion a series of events that led to the resignation of Soeharto on May 21, 1998. After more than three decades of centralized national government under Soeharto's New Order regime, his successor, President Habibie, began a process of decentralization and regional autonomy with Law 22/1999 concerning Regional Administrations and Law 25/1999 concerning Fiscal Balance Between the Central Government and the Regions.⁷¹

These laws abruptly transferred political authority and financial resources for most government administrative sectors directly to the districts (*kabupaten*) and municipalities (*kota*), by-passing the provincial governments. The districts and municipalities suddenly had the authority to issue small concessions to forest land for logging, oil, and gas exploration, mining activities, and plantation expansion (in particular, fiber and oil palm plantations). Law 25/1999 also redistributed royalties from timber production and most other types of natural resource extraction among the country's national, provincial, and district governments.

⁶⁶ A.A. Hoffmann, A. Hinrichs, and F. Siegert, Fire damage in East Kalimantan in 1997/98 related to land use and vegetation classes: Satellite radar inventory results and proposal for further actions. MOFEC, GTZ, and KFW, Samarinda, 1999.

⁶⁷ F. Siegert, G. Ruecker, A. Hinrichs, and A.A. Hoffmann, Increased damage from fires in logged forests during droughts caused by El Nino, *Nature* 414, 2001, 437-440.

⁶⁸ Myrna A. Safitri, Peatland Restoration in Indonesia, Badan Restorasi Gambut, 2016.
https://www.env.go.jp/earth/cop/cop22/common/pdf/event/11/02_presentation1.pdf.

⁶⁹ The situation was particularly bad in 2015/2016, when ENSO returned and more than 100,000 fires burned 2.6 million of hectares of land and forest between June and October, including 875,000 hectares of peatland, and again spread haze across the region.

⁷⁰ Albrecht, 62.

⁷¹ Decentralization was strongly advocated by the international community, including the World Bank and IMF.

The two laws were scheduled to take effect on January 1, 2001, but many local governments began issuing their own regulations and asserting their administrative authority almost immediately after the regional autonomy laws were issued, particularly in the forestry sector. Many districts issued large numbers of 100-hectare logging and forest conversion permits, something they had not been able to do since the early years of the New Order regime—often in areas that overlapped with timber concessions that had already been allocated by the central government, or within the boundaries of national parks and protected areas.

They also adopted regulations requiring timber companies and wood processing industries to pay a variety of new taxes and fees, in addition to those required by the national government. The allocation of district logging and forest conversion permits generated large cash benefits for local communities and led to unprecedented levels of forest clearing—a period described by one MoEF official as the “wild west years.”⁷²

At the same time, the German Ministry for Economic Cooperation and Development (BMZ) largely withdrew from Indonesia’s forestry sector, following trends in the entire development cooperation community. Although the Sustainable Forest Management Project (SFMP) was originally planned to continue until 2008, it was closed in 2002, as was the Social Forestry Development Project (SFDP). The Integrated Forest Fire Management Project (IFFM) was closed in 2004.

For several years, there was very little bilateral German involvement in Indonesia’s forestry sector besides the Kayan Mentarang National Park Project (implemented by the World Wildlife Fund) and the small Strengthening the Management Capacities in the Ministry of Forestry Project (SMCP). SMCP continued to advise various departments of the Ministry of Forestry working on the national forest program and participated in high-level socio-political dialogue on forestry issues within the ministry and with other development partners, including DFID and USAID. The project assisted the Ministry of Forestry in modernizing its management practices and promoted new practices such as payments for environmental services, forest collaborative partnerships, establishment of the national forestry council, and a national forest statement.

Post-Soeharto Governments Gradually Curtail Deforestation

After the chaos of the immediate post-Soeharto years and Habibie’s decentralization policy, the Ministry of Forestry moved quickly to recentralize authority over the forestry sector, particularly with Government Regulation 34/2002, which authorized the ministry to design and plan activities related to forest structuring and to make forest management plans in the form of forest management units.⁷³

Beginning in mid-2002, the Ministry of Forestry effectively used these statutes to halt the issuance of small-scale logging and forest conversion permits by district governments for areas

⁷² Interview with Pak Hargyono, Director of Protected Forest Management, MoEF, October 25, 2018; Christopher Barr, Ida Aju Pradnja Resosudarmo, Ahmad Dermawan, and John McCarthy, *Decentralization of Forest Administration in Indonesia*, Center for International Forestry Research, 2006, 11-12.

⁷³ [http://climatepolicydatabase.org/index.php/Forestry_Law_Act_\(Law_41/1999\)_Indonesia_1999](http://climatepolicydatabase.org/index.php/Forestry_Law_Act_(Law_41/1999)_Indonesia_1999); <https://www.ecolex.org/details/legislation/government-regulation-no-342002-concerning-forest-structuring-and-making-of-forest-management-plans-utilization-of-forests-and-use-of-forest-areas-lex-faoc052631/>.

within the boundaries of the land that had been classified as *kawasan hutan*. The ministry also began to reassert its authority by issuing numerous forest conversion licenses for plantation development and renewing the contracts of several large-scale timber concession holders.⁷⁴

Then in 2003, as a reaction to wide-spread illegal logging, the Indonesian Government launched a multi-stakeholder process to design a system to ensure that timber and timber products harvested, imported, and processed in Indonesia originated from legal sources and complied with relevant Indonesian laws and regulations. Indonesia and the EU began negotiations in 2007 and signed a Voluntary Partnership Agreement in 2013. The mandatory certification system became operational on November 15, 2016, when Indonesia became the first country in the world to issue FLEGT (Forest Law Enforcement, Governance, and Trade) licenses to verified legal timber products exported to the EU.⁷⁵

The FLEGT license automatically meets the requirements of the European Union Timber Regulation (EU Reg.# 995/2010), which prohibits operators in the EU from placing illegally harvested timber and products derived from illegal timber on the EU market. Authorities in EU Member States will deny entry to any such products exported from Indonesia to the EU without a valid FLEGT license.

Today, all of Indonesia's timber exports to the EU are from factories and forests that are audited by the Independent Forest Monitoring Network (IFMN), a coalition of Indonesian NGOs and civil society groups—the first such initiative in the world. Forest Watch Indonesia, a member of IFMN, in fact won two legal cases that forced the Ministry of Environment and Forestry to release information about commercial forest activities, thus cementing IFMN's role as an independent monitor of Indonesia's forests.⁷⁶

Major structural reform was initiated on January 8, 2007 with Government Regulation No. 6/2007 on Forest Arrangement and Formulation of Forest Management Plan as well as Forest Exploitation, which authorized the Ministry of Forestry to design and plan activities related to forest structuring and to make forest management plans in the form of forest management units (*kesatuan pengelolaan hutan*, KPH). Regulation No. 6/2007, a stronger, more detailed version of the earlier Regulation 34/2002, provided the legal basis for millions of hectares to be organized into forest management units and mandated that forest management units be implemented.⁷⁷

Government Regulation No. 6/2007 contained the regulations needed to implement the three categories of forest management units as defined in the earlier Forestry Law 41/1999: conservation forests, protection forests, and production forests. The functions and tasks of different types of forests are set out in Regulation No. 6/2007, as well as detailed instructions for drawing up long-term and short-term forest management plans. The regulation also

⁷⁴ Barr, et al., 14.

⁷⁵ Indonesia-EU Joint Implementation Committee, Indonesia and EU launch FLEGT licensing scheme for verified legal timber products, press release, November 15, 2016. <http://www.euflegt.efi.int/web/jic-indonesia>; Independent Forest Monitoring Network. <https://www.jpik.or.id/home-2/>.

⁷⁶Norad, Improved access to forest information in Indonesia, September 6, 2016. <https://norad.no/en/front/funding/climate-and-forest-initiative-support-scheme/grants-2013-2015/achievements/achievements-2016/improved-access-to-forest-information-in-indonesia/>.

⁷⁷ Sahide, et al., 11.

provides for the issuance of licenses for the exploitation of conservation forests, protected forests, and production forests and for license rights and obligations.⁷⁸

The Ministry of Forestry and Environment⁷⁹ is thus responsible for the 120.6 million hectares of land in Indonesia (65 percent of the total) that are designated as forest land (*kawasan hutan*), whether or not it has trees on it. Production forests (*hutan produksi*) cover a total area of 68.8 million hectares, or 57 percent of the forest area, while conservation forests (*hutan konservasi*) cover a total area of 22.1 million hectares or 18 percent. Protection forests (*hutan lindung*), which have watershed functions, cover the remaining 29.7 million hectares or 25 percent. (Oil palm concessions fall within the jurisdiction of the Ministry of Agriculture, as palm oil is defined as an agricultural crop.)

In view of the similarities between the newly created forest management units and the *Forstämter* used to manage forests in Germany, the principal advisor of the SMCP project working in the Ministry of Forestry, saw the potential for renewed German activity supporting the development of sustainable forestry management in Indonesia. Drawing on decades of experience gained by GTZ/GIZ and others working in Indonesia's forestry sector and encouraged by the political momentum of the new interest in climate change and forestry worldwide, he immediately set to work drawing up the proposal for the project which, two years later, became FORCLIME.⁸⁰

After the December 2007 Bali Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), which incorporated forests into climate negotiations, development cooperation agencies, including BMZ, returned to the forestry sector. BMZ agreed to support the FORCLIME proposal.

FORCLIME became a driving force behind the scenes for a massive reform of the forestry sector in Indonesia.⁸¹ For decades, forest management had been based on the issuance of commodity licenses to private sector companies, primarily by the central government in Jakarta, but also for a few years by district governments. The institution of forest management units, however, represents a shift to area-appropriate management by trained forestry officials on the ground. The first pilot forest management units were set up in 2009; to date 692 forest management units have been legally established. (See the section on forest management units and FORCLIME below for more information on the project's activities and results.)

The 2007 Bali Conference called for the establishment of a mechanism for compensating the reduction in emissions from avoided deforestation and forest degradation in developing countries (REDD+). A series of pilot projects were initiated to provide the experience necessary to successfully implement such a mechanism within the framework of the climate change convention (UNFCCC).

⁷⁸ <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC075584>.

⁷⁹ The Ministry of Environment and the Ministry of Forestry were merged in 2014.

⁸⁰ Interview with Georg Buchholz, Principal Advisor of FORCLIME, in the MoEF, June 11, 2018. In 2007, when he was Principal Advisor of SMCP, he led the effort to design new German assistance to help develop FMUs in Indonesia.

⁸¹ Sahide, et al., 11.

One of the first pilot projects was the Merang REDD Pilot Project (MRPP) in south Sumatra, commissioned by the German Federal Ministry of Environment, Nature Conservation, and Nuclear Safety (BMU) and implemented from 2008 to 2012 by GTZ/GIZ in cooperation with the Indonesian district and provincial forestry agencies and the Ministry of Forestry.⁸²

The Merang Kepayang peat swamp forest was one of the last contiguous peat forests of southern Sumatra, but by 2007 about 40 percent of the forest had been destroyed by illegal logging, recurrent wildfires, and oil palm plantations; deforestation and degradation had decreased the carbon stock by almost half in less than 20 years. Without conservation measures, the Merang Kepayang peat swamp forest would have been quickly lost (within two to five years in the worst-case scenario) and with it one of the last refuges for many threatened animal species, including the critically endangered Sumatran Tiger.

The Merang REDD Pilot Project did groundbreaking research into carbon accounting and monitoring. The methodologies developed by the project to inventory the carbon stored in the Merang Peat Dome (below and above ground) became the basis of the national regulation for carbon inventories in production forests. A carbon trading and management concept was developed for obtaining payments for carbon peat sequestration, biodiversity protection, and for emission reductions. After the project was completed, private sector entities aware of the work of the Merang REDD pilot project were able to acquire international carbon finance.⁸³

In September 2009, the Lalan Mangsang Mendis Forest Management Unit (covering 265,953 hectares) was set up under the Merang REDD Pilot Project as a model for managing forest concessions and conservation areas. An extensive community development program was implemented to reduce poverty and dependence on the remaining forest. In cooperation with local authorities, local communities, and the private sector, rehabilitation measures for degraded peat forests and threatened biodiversity were identified, tested, and implemented at various areas in Merang. These measures included seedling production, village nursery development, reforestation by local communities, and hydrological restoration by canal blocking. A community-based management approach was implemented for fire patrols and to monitor illegal logging.⁸⁴

Additional Government Initiatives to Regulate the Forests

On May 20, 2011, Indonesian President Susilo Bambang Yudhoyono signed a Presidential Instruction calling for a two-year moratorium on new resource licenses (for logging, timber, and

⁸² Information on the Merang REDD Pilot Project is from Karl-Heinz Steinmann, Djoko Setijono, Solichin, Asep Ramdani, Syafrul Yunardi, and Mohamad Rayan, Summary of Results and Achievements, Merang REDD Pilot Project (MRPP), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2011; and Mohamad Rayan, Merang REDD Pilot Project (MRPP) Rehabilitation, Conservation, and Protection of the Merang Peat Swamp Forest, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, 2010.

⁸³ The project benefitted from and built on various studies and other work carried out in the same area under the EU-funded South Sumatra Forest Fire Management Project from 2003 to 2007. See footnote 31.

⁸⁴ Work in the Merang peat swamp continues today. The Althelia Climate Fund, supported by a capital guarantee from USAID Development Credit Authority, is investing US\$5.7 million in the Sumatra Merang Peatland Project (SMPP), aiming to restore ecosystems, conserve biodiversity, and develop local communities in over 22,000 hectares of the Merang peat swamp forest. See <https://usaid-credit.exposure.co/indonesia-restoring-ecosystems> and <https://ecosphere.plus/sumatra-merang-peatland/>.

oil palm plantations, mining, etc.) on some 66 million hectares of primary forests and peatland (one-third of the national territory) that were not yet encumbered with resource licenses. The moratorium, which covers conservation forest, protection forest, production forest, and even areas allocated for other uses (APL), was extended every two years, most recently by President Jokowi in December 2017. The Indicative Map, which details the 66 million hectares in question, has been renewed every six months, with slight revisions based on updated information. Environment and Forestry Minister Siti Nurbaya Bakar has announced that the moratorium will be made permanent when it comes up for renewal again in July 2019.⁸⁵

In 2014, Law 23/2014 shifted authority away from district to provincial governments, giving the latter more authority over forest governance, including mining and fishery. Thus, the MoEF and provincial governments are today jointly responsible to support and supervise forest management units. This was a major step forward, reversing the devolution of widespread authority to the district levels, which had led to a great deal of unsustainable forest management.⁸⁶

In January 2016, the government established the Badan Restorasi Gambut (BRG), the Peat Restoration Agency, which reports directly to the President of Indonesia. BRG aims to coordinate and facilitate the restoration of 2.4 million hectares of degraded peatlands in the provinces of Riau, South Sumatra, Jambi, Central Kalimantan, South Kalimantan, West Kalimantan, and Papua within five years. By the end of 2017, the first 200,000 hectares had been rewetted.⁸⁷ BRG is also spearheading the effort to inventory peatland areas, developing policy with regard to land use and zoning of peatland areas, and reviewing permits and licenses on peatland.

On December 1, 2016, President Jokowi expanded the peatland moratorium into Presidential Regulation No. 57 of 2016, which not only prohibited the draining and clearing of new peatland, but also prohibited companies that had a license from opening or draining intact peatland.⁸⁸

However, existing maps are not detailed enough, and there is a great deal of uncertainty about exactly where the peat soils are. The major problem is that existing maps have a scale of only 1:250.000, meaning that one centimeter on the map is equivalent to 2.5 kilometers, whereas a scale of 1:50.000 or higher is required for local level planning decisions. Furthermore, the maps do not contain accurate information on peat thickness. In fact, there has been no agreed, uniform method for measuring peat thickness; a national standard is presently being established

⁸⁵ Hans Nicholas Jong, Indonesian ban on clearing new swaths of forest to be made permanent, *Mongabay Series*, June 10, 2019. <https://news.mongabay.com/2019/06/indonesian-ban-on-clearing-new-swaths-of-forest-to-be-made-permanent/>. Concessions issued before the moratorium are still valid, even if the company has not yet cleared the land, meaning that much of the deforestation that continues in Indonesia is completely legal.

⁸⁶ Bernadinus Steni, Review of the New Local Government Law, Earth Innovation Institute, May 2016. <http://newsite.inobu.org/wp-content/uploads/2017/04/INOBU-Report-Review-of-the-New-Local-Government-Law.pdf>.

⁸⁷ Hans Nicholas Jong, Study: Indonesia's ambitious peat restoration initiative severely underfunded, *Mongabay*, 2018. <https://news.mongabay.com/2018/03/study-indonesias-ambitious-peat-restoration-initiative-severely-underfunded/>.

⁸⁸ Wahyudi Soeriaatmadja and Arlina Arshad, New law banning cultivation also covers concession land previously licensed to firms, *The Straits Times*, Dec 7, 2016. <https://www.straitstimes.com/asia/indonesia-expands-protection-for-peatland>.

in connection with the peat prize competition held by Indonesia's Geospatial Information Agency.

At present, the companies that are in possession of a logging or oil palm concession are themselves responsible to take soil core samples to determine the extent of peatland on their concession, and then to map the area.

Indonesia has approximately 15 million hectares of tropical peatland—far more than any other country in the world. Currently, there are 99 industrial plantation forests (IUPHHK-HT), one natural forest timber concession (IUPHHK-HA), and nine ecosystem restoration units (IUPHHK-RE) located in peat ecosystems.⁸⁹

On September 19, 2018, President Jokowi issued Presidential Instruction 8/2018 on Postponement and Evaluation of Palm Plantation Permits and Increasing Productivity of Palm Plantations, and ordered five ministries, the Investment Coordinating Board (BKPM), governors, regents, and mayors to halt new permits, evaluate the existing permits, and increase the productivity of palm plantations. The instruction allows the continuation of palm plantations established before the instruction was issued. Environmental groups welcomed the instruction to halt the issuing of permits for palm plantations, calling it a long-awaited step towards sustainability; however, many are concerned that a presidential instruction does not carry much weight and will simply be ignored.⁹⁰

A recent estimate assembled by Greenpeace on the basis of available information calculates that there are around 12 million hectares of oil palm concessions, 24 million hectares of logging concessions, 10.6 million hectares of timber concessions, 4.1 million hectares of mining concessions, and 5.8 million hectares of mixed concessions.⁹¹ This is roughly in line with the data in the 2018 Ministry of Environment and Forestry publication, *The State of Indonesia's Forests 2018*, which states that concessions have been granted for 30.6 million hectares of Indonesia's production forests, 61 percent for the selective felling of natural forest timber (IUPHHK-HA) and about 37 percent for the planting of industrial timber (IUPHHK-HT). These two types of concessions are the main producers of logs for Indonesia's pulp and paper, plywood, and sawn timber sectors.⁹²

Although precise deforestation statistics were not available until the 1990s, when the Indonesian Ministry of Forestry began its own detailed monitoring of the forests, it is estimated that around one million hectares were cleared annually in the 1970s and 1980s. Deforestation accelerated to 1.87 million hectares a year between 1990 and 1996 and to 3.51 million hectares a year from 1996 to 2000. In other words, some 20 million hectares were deforested from 1970

⁸⁹ Ministry of Environment and Forestry, *The State of Indonesia's Forests 2018*, 15-16.

⁹⁰ Dyaning Pangestika, Groups welcome Jokowi's palm plantation moratorium, *The Jakarta Post*, September 21, 2018. <http://www.thejakartapost.com/news/2018/09/20/groups-welcome-jokowis-palm-plantation-moratorium.html>.

⁹¹ Quoted in Sinan A. Abood, Janice Ser Huay Lee, Zuzana Burivalova, John Garcia-Ulloa, and Lian Pin Koh, Relative contributions of the logging, fiber, oil palm, and mining industries to forest loss in Indonesia, *Conservation Letters*, April 3, 2014. DOI: 10.1111/conl.12103.

⁹² Ministry of Environment and Forestry, *The State of Indonesia's Forests 2018*, xxix-xxx.

to 1990, and 38.88 million hectares were deforested due to clearing or forest fires between 1990 and 2016.⁹³

As a result of the above-outlined initiatives on the part of the Indonesian Government and the Ministry of Forestry, the annual rate of deforestation fell from its peak of 3.5 million hectares a year during 1996-2000 to slightly more than one million hectares a year from 2000 to 2006 and even further most years after that. According to the Ministry of Environment and Forestry, 650,000 hectares of land were deforested in 2015-16 and 480,000 in 2016-2017.⁹⁴

Forest Management Units and FORCLIME

Before forest management units (FMUs) were instituted in Indonesia, forest management outside of Java was largely based on commodity management, with centrally processed licenses issued to private sector commercial companies. As license holders are typically interested in short-term profits, sustainable forest management—particularly that involving partnership with or consent by local communities—was not on the agenda.

On January 8, 2007, Government Regulation No. 6/2007 on Forest Arrangement and Formulation of Forest Management Plan as well as Forest Exploitation provided the legal basis for a profound reform of forest management in Indonesia—a radical move from commodity-based forest management to appropriate area-based forest management units administered by trained FMU officials on the ground.

There are three types of FMUs: protected, production, and conservation FMUs. Conservation FMUs (*kesatuan pengelolaan hutan konservasi*, KPHK), essentially protected areas such as national parks, have the primary function of conserving plant and wildlife biodiversity and their ecosystems. Protection FMUs (*kesatuan pengelolaan hutan lindung*, KPHL) are intended to protect life support systems in order to regulate water, prevent flooding, control erosion, prevent seawater intrusion, and maintain soil fertility. The main purpose of production FMUs (*kesatuan pengelolaan hutan produksi*, KPHP) is the production of forest products, especially timber.

FMUs are also a key element in local climate change mitigation and adaptation efforts. By conducting forest planning (inventory and stock assessment), management (including planting, thinning, harvesting) as well as conservation activities, they provide the basis for functional MRV (measurement, reporting, verification) under the Indonesian Emission Reduction Plan (RAN/RAD-GRK) and a future REDD+ mechanism.

FMU officials are responsible for day-to-day on-site forest management, fire protection, law enforcement, encroachment prevention, and extension services to forest stakeholders. They ensure that all functions and services of the forests in the area are maintained and that sustainable forest management is implemented. They oversee the whole planning and management process within the FMU area; monitor and control the forest management plans and operations of private forest concessions and those involved in various community forestry schemes; directly manage open access forest, protected forest, and protected areas; and, in

⁹³ Direktorat Inventarisasi dan Pemantauan Sumber Daya Hutan, Ditjen Planologi Kehutanan dan Tata Lingkungan, Kementerian Lingkungan Hidup dan Kehutanan, Deforestasi Indonesia Tahun 2015-2016.

⁹⁴ Ministry of Environment and Forestry, *The State of Indonesia's Forests 2018*, 33.

partnership with independent bodies (e.g. NGOs), help to resolve overlapping forest land tenure claims that cause conflicts and may threaten forest function.

The size of an FMU varies from 4,500 to 800,000 hectares, but on average is about 133,000 hectares. One FMU normally comprises a variety of forest areas, including areas with long-running licenses (up to 55 years) for natural and plantation forest, mining and oil concessions, smaller areas of village, community, and cultural forests, and forest areas of various sizes without any license (mostly ex-license areas without considerable timber stock left). At present, at least nine different departments/ministries deal with each of these separately. However, a forest management unit is the only entity that can coordinate and adjudicate between these various interests, and the goal is for forest management units to be the ultimate managers of local forests. Progress towards this goal varies from FMU to FMU, depending, to a large extent, on the local situation.⁹⁵

Following Law 23/2014, the MoEF and provincial governments are jointly responsible to support, supervise, and fund forest management units, which of course leads to conflicts about jurisdiction. Furthermore, there is no formal system of communication and coordination between FMUs, district governments, NGOs working directly with villagers, and officials employed by the province, who in many cases simply ignore each other.

This struggle over roles, responsibilities, jurisdictions, and funding between the MoEF, local forest administrations, and other local actors can be expected to continue for some time, particularly as the MoEF is chronically short funded and thus not able to employ sufficient numbers of FMU foresters or completely operationalize the FMUs. Inadequate implementation, in turn, negatively influences FMU authority and discourages the adoption of FMU policies by other actors at the local level.⁹⁶

The Forests and Climate Change Programme (FORCLIME), jointly implemented by the Indonesian Ministry of Environment and Forestry and German development cooperation (though GIZ and KfW) since 2009, is the most important external supporter of Indonesia's forestry reform and is a driving force behind the implementation of forest management units in Indonesia's forests. The goal of FORCLIME is to reduce greenhouse gas emissions from the forest sector while improving the livelihoods of Indonesia's poor rural communities.

FORCLIME combines the specific approaches of technical and financial cooperation in a multi-level approach. Technical cooperation, implemented by GIZ, focuses on forestry administration reform processes and human capacity development at all levels, while financial cooperation, implemented by KfW, supports district-based REDD+ demonstration activities in three districts of Kalimantan.

At the national, provincial, and district levels, GIZ provides policy advice and supports the development of forest governance and sustainable forest development strategies, as well as medium-term plans to reduce greenhouse gas emissions. Moreover, GIZ assists the Ministry of Environment and Forestry in the establishment of forest management units. While work at the

⁹⁵ Interview with Pak Hargyono, Director of Protected Forest Management, MoEF, October 25, 2018.

⁹⁶ Rebecca A. Riggs, James D. Langston, Chris Margules, Agni Klintuni Boedhihartono, Han She Lim, Dwi Amalia Sari, Yazid Sururi and Jeffrey Sayer, *Governance Challenges in an Eastern Indonesian Forest Landscape*, *Sustainability* 2018, 10(1),169. doi:10.3390/su10010169; <https://www.mdpi.com/2071-1050/10/1/169/htm>.

national level mainly focuses on the development of relevant policies for FMU development and capacity building, at the local level FORCLIME actively supports the development of four model FMUs in the districts of Berau (East Kalimantan), Kapuas Hulu (West Kalimantan), Malinau (North Kalimantan), and Palu in Central Sulawesi.

In order to staff all the FMUs with qualified forest professionals, at least 15,000 new forest managers will need to be trained at the national Centre for Forestry Education and Training (CFET) in Bogor and at subnational training centers. GIZ supports these centers by developing specific training modules on forest management units and climate change mitigation in the forestry sector; developing policies and standards for human resource capacity development; and strengthening the management capacity of these centers.

Annual study tours to forestry institutions in Germany for MoEF and FMU officials have been a key element of GIZ's capacity development efforts for years. The 2018 trip (August 27 to September 4, 2018) was titled Expert Dialogue on Afforestation and Forest Landscape Restoration in Germany. Fourteen Indonesian foresters and forestry officials visited a conservation forest in the Lueneburger Heide (a forest and peat swamp area) and the Alfred Töpfer-Academy for Nature Conservation in Lower Saxony, two large-scale private tree nurseries in Norderstedt, the *Forstamt* (forest management office) Sellhorn, the Forest Seed Information Center in the *Forstamt* Oerrel, and a post-mining area near Leipzig that had been completely rehabilitated.

The Indonesian participants intensely discussed what they observed. One participant, Pak Hargyono, Director of Protected Forest Management, MoEF, later commented that three things had particularly impressed him: first, old mining areas were in fact completely rehabilitated, despite the enormous cost; second, the German Forestry Department set budgets and implemented them consistently for years, even though the results of their work might not be seen for decades; and third, German foresters had the discretion to make decisions throughout the forest areas for which they were responsible, depending on the local situation. In Indonesia, in contrast, extensive rules for every different type of forest area limit the discretion and flexibility of foresters.⁹⁷

Another participant, Pak Sandi Kusuma, the Deputy Head of Planning at MoEF, commented that he was particularly impressed by the spirit of German foresters, their commitment to their work, and their close integration with the communities in which they worked. His first priority, he stated, was to try and cultivate this spirit among Indonesian foresters.⁹⁸

While GIZ focuses on the implementation of FMUs and capacity development, the financial cooperation module of FORCLIME, implemented by KfW, is implementing district-based REDD+ demonstration activities (in the same three districts of Kalimantan as GIZ) in order to reduce emissions from deforestation and forest degradation. The REDD+ pilots implement participatory carbon management, land use planning and management; promote forest ecosystem management and reduced impact logging; and support community forestry.

⁹⁷ Interview with Pak Hargyono, Director of Protected Forest Management, MoEF, October 25, 2018.

⁹⁸ Interview with Pak Sandi Kusuma, Deputy Head of Planning, MoEF, October 26, 2018.

REDD+ pilot projects support low-impact, alternative livelihoods for rural communities that increase incomes and well-being as well as reduce dependence on forest extraction. The villages obtain investment financing from the MoEF for activities such as tree nurseries, community-based forest patrols, beekeeping, fishponds, pig farming, and improved stoves.

According to Dr. Yetti Rusli, Vice Chief Technical Advisor of FORCLIME's financial cooperation module, such grants are part of the government's attempt to extend economic opportunity to the remoter areas of Indonesia and enhance non-forest livelihoods while demonstrating that local development, sustainable forest management, biodiversity conservation, and climate protection go hand in hand.⁹⁹

Land Tenure Issues

The move to regional autonomy and decentralization after 1998 was accompanied by a surge of claims on forest land by individual families, farmer cooperatives, villages, and indigenous groups—who had been using the land for generations and in many cases based their claims on *adat* or customary law. Issues of access to and control of forest land are highly conflictive and frequently violent. Many forest communities have taken direct action against timber or plantation companies by blocking logging roads or seizing equipment.¹⁰⁰

Prior to the 1990s, communities living in and around forests were not regarded as having the capacity to play a significant role in the management of forests but were instead seen as sources of cheap labor for plantation and forestry activities. In the period from 1990 to 1998, there was a growing acceptance and awareness of the idea that these communities could play an active role in forest management, and experiments with community forest management began to appear. The GTZ-supported Social Forestry Development Project (SFDP) and the Sustainable Forest Management Project (SFMP) were among the projects which attempted to work with local communities and governments to clarify land tenure issues, although little was accomplished.

However, in May 2013, Indonesia's indigenous peoples won a landmark victory, when the Constitutional Court in Jakarta ruled that the provision of the 1999 Forestry Law that included customary forests of indigenous peoples in state forest area (*kawasan hutan*) was unconstitutional. The Court explicitly rebuked the Ministry of Forestry for disenfranchising communities by allocating customary lands as concessions to logging and plantation companies.

The judgment was made in response to a petition filed with the court by the national indigenous peoples' organization AMAN (Aliansi Masyarakat Adat Nusantara). AMAN had objected to the way the 1999 Forestry Act provided indigenous peoples with only weak use rights to their customary forests within state forest areas.¹⁰¹

⁹⁹ Interview with Dr. Yetti Rusli, July 9, 2018.

¹⁰⁰ Barr, et al., 12.

¹⁰¹ Human Rights Watch, *The Dark Side of Green Growth, Human Rights Impacts of Weak Governance in Indonesia's Forestry Sector*, 2013. <https://www.hrw.org/report/2013/07/15/dark-side-green-growth/human-rights-impacts-weak-governance-indonesias-forestry>; Chris Lang, What's the point paying the Indonesian government for REDD when it's losing billions to corruption in the forest sector? *REDD-Monitor*, July 23, 2013. <http://www.redd-monitor.org/2013/07/23/whats-the-point-paying-the-indonesian-government-for-redd-when-its-losing-billions-to-corruption-in-the-forest-sector/>.

President Jokowi moved quickly to implement the ruling. The National Medium-Term Development Plan (RPJMN 2015-2019) called for 12.7 million hectares of forest land (designated in the Indicative Map of Social Forestry Areas) to be allocated for management by local communities in the form of social forestry licenses through five separate social forestry schemes, namely community forests (*hutan kemasyarakatan*, HKM), village forests (*hutan desa*, HD), community plantation forests (*hutan tanaman rakyat*, HTR), forestry partnerships (*kemitraan kehutanan*), and adat forests (*hutan adat*, HA).¹⁰²

The ruling opened the way for a major reallocation of forests back to indigenous people. According to government statistics, there are 25,863 villages with 37.2 million people located either within or at the fringe of state forest areas. However, implementation of the ruling requires the mapping and registration of these lands and the negotiation of their removal from existing concessions. By June 2018, 1.72 million hectares had been reallocated nationwide.¹⁰³

German development cooperation is helping communities in Kalimantan fulfil the legal requirements for participation in these social forestry programs. The financial cooperation module of FORCLIME, implemented by KfW and the Bureau of Planning in the MoEF, is active in 78 villages in three districts of Kalimantan (Berau, Malinau, and Kapuas Hulu). Villagers are being assisting in drawing up participatory land use plans, resolving boundary conflicts with neighboring villages, and delineating village boundaries—prerequisites for obtaining a social forestry license. As of July 2018, five villages involved in the program had obtained a 35-year village forest (*hutan desa*) license, while another six licenses were expected to be issued shortly.

The technical cooperation module of FORCLIME, implemented by GIZ and the MoEF, is also working to resolve conflictive land tenure and land use issues in the three districts where the program is working. The first conflict resolution desk was set up in Kapuas Hulu to advise the district regent, and a mediation team, consisting of local civil society actors, NGOs, and local firms, is being trained in mediation techniques. The team addresses issues of village boundaries and land use rights and draws up MoUs, which are then signed by all parties. In one notable case in the Berau district, the mediation team was able to negotiate an agreement whereby a local company relinquished some 100 hectares of land of its concession around a local waterfall, which will be developed as a tourist destination to generate income for the village.

MoEF and KPK Cases against Illegal Deforestation

In addition to the Indonesian Government's regulatory and administrative efforts to stop deforestation outlined above, the MoEF and Indonesia's Corruption Eradication Commission (KPK) have both been pursuing legal means to curtail corruption in the plantation sector. However, the cases often drag on for years, and it is not unusual for companies to get off on procedural grounds or to evade paying the imposed penalties.

The MoEF filed one lawsuit after another, and in 2014 won its first big case against a large Indonesian palm oil firm for environmental destruction. PT Kallista Alam was fined 114.3 billion rupiah (US\$30 million) for illegally burning a vast area of peat swamp forest in the Leuser

¹⁰² Ministry of Environment and Forestry, *The State of Indonesia's Forests 2018*, 83-84.

¹⁰³ Ibid.

Ecosystem in Tripa, Aceh, which once harbored about 3,000 critically endangered Sumatran orangutans.

Both the High Court in Banda Aceh and the Supreme Court in Jakarta rejected Kallista Alam's appeals and, on August 28, 2015, the Supreme Court ordered the company to pay the penalties imposed in the earlier ruling and instructed the Meulaboh District Court in Aceh to execute the sentence. However, in 2018, the Meulaboh District Court refused to execute the verdict on the grounds that incorrect coordinates were submitted as evidence by the MoEF in the original case against the company and that this constituted sufficient reason for the court not to execute the sentence. In fact, the court permitted the company to turn around and sue the Indonesian Government. (The mistake in question is a minor typographical error.)¹⁰⁴

In 2013, the MoEF sued the pulp company Merbau Pelalawan Lestari (MPL) for illegally clearing natural forest and felling protected trees in Pelalawan Regency, Riau Province between 2004 and 2006, but the case was rejected by the Pekanbaru District Court in March and the Pekanbaru High Court in November of the following year. The MoEF subsequently filed an appeal to the Supreme Court, and on August 18, 2016 the Supreme Court ordered MPL to pay a 16-trillion-rupiah (US\$1.7 billion) fine for unlawful forest clearing outside its concessions, the biggest penalty for environmental damage ever imposed in the country. However, over two years later, the MoEF has been unable to collect the money from MPL.¹⁰⁵

The MoEF has in fact won a series of cases against firms for damaging the environment or illegally starting forest fires, but in most cases has been unable to collect the fines.¹⁰⁶

The Corruption Eradication Commission (KPK) has also had its eye on the forestry sector. Its first case against illegal deforestation was in 2007 against Martias Fangiono, owner of the multinational timber firm Surya Dumai, and Suwarna Abdul Fatah, then governor of East Kalimantan. Claiming it would establish oil palm plantations, Surya Dumai obtained licenses from Suwarna to clear a vast area of rainforest. Surya Dumai felled almost 700,000 cubic meters of timber, but the land was never planted. Both he and Suwarna were convicted and imprisoned, and Martias Fangiono was ordered to pay 346 billion rupiah, then equivalent to around US\$35 million. The KPK continued with a string of successful cases against a governor and several district chiefs in Riau province and elsewhere.¹⁰⁷

¹⁰⁴ Annette Gartland, Palm oil company owes millions in fines for burning peat forest, but court blocks verdict, *Changing Times*, May 4, 2018. <https://changingtimes.media/2018/05/04/palm-oil-company-owes-millions-in-fines-for-burning-peat-forest-but-court-blocks-verdict/>.

¹⁰⁵ Arlina Arshad, Indonesian pulp firm found guilty of illegal logging, ordered to pay record \$1.7b in damages, *Straits Times*, Nov 17, 2016. <https://www.straitstimes.com/asia/se-asia/indonesian-pulp-firm-found-guilty-of-illegal-logging>; Forestry Ministry demands execution of court verdict against MPL, *Antara News*, September 18, 2018. <https://en.antaranews.com/news/118414/forestry-ministry-demands-execution-of-court-verdict-against-mpl>.

¹⁰⁶ Hans Nicholas Jong, These 3 companies owe Indonesia millions of dollars for damaging the environment. Why haven't they paid? Mongabay, August 23, 2017. <https://news.mongabay.com/2017/08/these-3-companies-owe-indonesia-millions-of-dollars-for-damaging-the-environment-why-havent-they-paid/>.

¹⁰⁷ Gecko Project, Analysis: Does Indonesia's storied anti-graft agency have a blind spot for corrupt land deals? August 21, 2018. <https://thegeckoproject.org/analysis-does-indonesias-vaunted-anti-graft-agency-have-a-blind-spot-for-corrupt-land-deals-67e482b2f551>.

A recent KPK case involved a dramatic sting operation in Central Kalimantan in late October 2018, in which a representative of PT Binasawit Abadi Pratama, a subsidiary of the Sinar Mas conglomerate, was caught bribing a pair of provincial legislators. The firm apparently wanted the politicians to avoid an investigation into the pollution of Lake Sembuluh in Seruyan, a district in Central Kalimantan. Local residents and activists say the lake, which is ringed by plantations and mills, has been contaminated by palm oil processing waste and pesticides.

The company also allegedly wanted the provincial legislators to tell the media that its operating permits were in order. According to documents published on the website of the Roundtable on Sustainable Palm Oil and a provincial government database, the permits underpinning Binasawit's operations were issued by Darwan Ali, who was head of Seruyan district from 2005 to 2015. Three leading Sinar Mas executives were arrested, and four members of the Central Kalimantan provincial legislature were also named by the KPK as suspects.¹⁰⁸

(Mongabay in collaboration with the Gecko Project published an investigation into Darwan's licensing practices, showing he had issued licenses for 18 enormous oil palm plantations to as many shell companies formed by his relatives and cronies. Instead of developing the plantations, these individuals flipped the companies, with the licenses attached, to conglomerates owned by the billionaire Kuok and Rachmat families for millions of dollars.)¹⁰⁹

Conclusion

The Ministry of Forestry and successive post-Soeharto governments have moved vigorously to curtail deforestation and forest degradation since 2002. Crucial regulations have been issued, a radical forest management reform has been initiated, millions of hectares of forest land are being allocated for management by local communities, and illegal logging and plantations as well as corrupt officials have been prosecuted.

Some of the key events include:

- FLEGT (Forest Law Enforcement, Governance, and Trade) licenses to verified legal timber products exported to the EU—the first FLEGT initiative in the world. The process was begun in 2003 and the system, which is independently audited by NGOs and civil society groups, became operational on November 15, 2016.
- Government Regulation No. 6/2007, which mandated that forest management units be implemented on the 120.6 million hectares of land in Indonesia that had been classified as *kawasan hutan* under the authority of the Ministry of Forestry. Forest management units represent a shift from forest management based on the issuance of commodity licenses to private sector companies towards area-appropriate management by trained forestry officials on the ground. The first pilot forest management units were set up in 2009; to date 692 forest management units have been legally established.

¹⁰⁸ Hans Nicholas Jong, Indra Nugraha, and Philip Jacobson, Palm oil executives arrested in bribery scandal in Indonesia, *Mongabay Series*, October 30, 2018. <https://news.mongabay.com/2018/10/palm-oil-executives-arrested-in-bribery-scandal-in-indonesia/>.

¹⁰⁹ Ibid.

- Presidential Instruction calling for a two-year moratorium on new resource licenses (for logging, timber, and oil palm plantations, mining, etc.) on some 66 million hectares of primary forests and peatland that were not yet encumbered with resource licenses—signed by President Susilo Bambang Yudhoyono on May 20, 2011 and extended every two years since then, most recently by President Jokowi in December 2017. Environment and Forestry Minister Siti Nurbaya Bakar has announced that the moratorium will be made permanent in July 2019.
- Ruling by the Constitutional Court in Jakarta in May 2013 that the provision of the 1999 Forestry Law that included customary forests of indigenous peoples in state forest area (kawasan hutan) was unconstitutional. The Ministry of Forestry was rebuked for disenfranchising communities by allocating customary lands as concessions to logging and plantation companies.
- The National Medium-Term Development Plan (RPJMN 2015-2019) called for 12.7 million hectares of forest to be allocated for management by local communities in the form of social forestry licenses through five separate social forestry schemes.
- The establishment of the Badan Restorasi Gambut (Peat Restoration Agency) in January 2016 to coordinate and facilitate the restoration of 2.4 million hectares of degraded peatlands within five years.
- Presidential Regulation 57/2016 prohibited the draining and clearing of new peatland, and prohibited companies that had a license from opening or draining intact peatland.
- Presidential Instruction 8/2018 (Postponement and Evaluation of Palm Plantation Permits and Increasing Productivity of Palm Plantations) halted new permits for oil palm plantations.
- Vigorous prosecution by the MoEF and the Corruption Eradication Commission (KPK) of illegal logging and environmental damage, including a dramatic sting operation in Central Kalimantan in late October 2018, in which a representative of the Sinar Mas conglomerate was caught bribing a pair of provincial legislators.

Although precise deforestation statistics were not available until the 1990s, when the Indonesian Ministry of Forestry began detailed monitoring of the forests, it is estimated that around one million hectares were cleared annually in the 1970s and 1980s. Deforestation accelerated to 1.87 million hectares a year between 1990 and 1996 and to 3.51 million hectares a year from 1996 to 2000.

As a result of decisive initiatives on the part of the Indonesian Government and the Ministry of Forestry since 2002, the annual rate of deforestation in Indonesia fell from its peak of 3.5 million hectares a year during 1996-2000 to slightly more than one million hectares a year from 2000 to 2006 and even further most years after that. According to the MoEF, 650,000 hectares of land were deforested in 2015-16 and 480,000 hectares in 2016-17.

Norway therefore announced on February 16, 2019 that it will award the first results-based payment to Indonesia as part of a REDD+ agreement the two nations signed in 2010. The

payment, the amount of which is yet to be determined, is for preventing the emission of 4.8 million tons of carbon dioxide equivalent (CO₂e) through reducing its rate of deforestation in 2017.¹¹⁰

Among Indonesian forestry officials, there is considerable understanding of and support for the principles of sustainable forest management that were first introduced in Germany by Hans Carl von Carlowitz in the 18th century and have been developed and implemented around the world since then. Ironically, it seems that some Indonesian forestry officials understand sustainable forest management better than the German public does.

Pak Hargyono, Director of Protected Forest Management in the MoEF, who participated in the FORCLIME study tour to Germany in August/September 2018, noted with amusement that the German public is increasingly opposed to all cutting and thinning of German and international forests, despite the fact that Germans love natural wood products. For Pak Hargyono, the history of deforestation in Indonesia has amply demonstrated that Indonesia's vast forests will be decimated if they are not sustainably managed to ensure both economic benefits and forest conservation. Achieving Indonesia's development goals requires both.¹¹¹

The involvement of German foresters in Indonesia's forestry sector has been crucial in raising awareness of the importance of sustainable forest management among Indonesian forestry officials. Already in the early 20th century, German foresters played an essential role in researching and managing Java's teak forests. In the later 20th and into the 21st century, numerous German foresters have served long- and short-term assignments in German development cooperation projects working in the Indonesian forestry sector. More recently, GIZ has also organized annual study tours to forestry institutions in Germany for Indonesian forestry officials and foresters.

Key moments of German development cooperation in the Indonesian forestry sector:

- From the late 1970s to the early 1990s, GTZ helped develop the Faculty of Forestry at Mulawarman University in Samarinda, East Kalimantan. Scholarships were awarded to faculty and students for master's and Ph.D. studies, primarily at German and Dutch universities, and the university's wood laboratories were equipped with state-of-the-art equipment.
- In the 1980s and 1990s, the Nucleus Estate Smallholder Participation Ophir project in West Pasaman, Sumatra, supported by GTZ and KfW, proved that smallholder palm oil production could be highly efficient and could serve as an engine of development for the local community.
- From 1994-2004, the Integrated Forest Fire Management (IFFM) project worked with the Provincial Forestry Service in East Kalimantan to develop a community-based fire management approach and to set up a FIRE-GIS system at the Provincial Fire Center in

¹¹⁰ Hans Nicholas Jong, Indonesia to get first payment from Norway under \$1b REDD+ scheme, *Mongabay Series*, February 20, 2019. <https://news.mongabay.com/2019/02/indonesia-to-get-first-payment-from-norway-under-1b-redd-scheme/>; Frances Seymour, Indonesia Reduces Deforestation, Norway to Pay Up, World Resources Institute, February 21, 2019. <https://www.wri.org/blog/2019/02/indonesia-reduces-deforestation-norway-pay>.

¹¹¹ Interview with Pak Hargyono, Director of Protected Forest Management, MoEF, October 25, 2018.

Samarinda. This system and comparable systems set up by other projects were the predecessors of the national SiPongi system that is now operated on the national level.

- The Sustainable Forest Management Project (SFMP, 1993-2002), also based in Samarinda, Kalimantan, focused on forest management, forest and land rehabilitation, and social forestry and training. SFMP pioneered attempts to draw local communities into land tenure clarification and boundary delineation.
- The Social Forestry Development Project (SFDP, 1992-2002) in northern Sanggau District, West Kalimantan developed and tested approaches to community forest management.
- GTZ experts in the IFFM, SFMP, and SFDP projects promoted the view that to manage the forest sustainably and generate satisfactory incomes, villagers and indigenous groups must be granted the right to harvest and sell timber from the forest, as well as non-timber forest products (a viewpoint that did not become national policy until 2013 after a ruling by the Constitutional Court in Jakarta).
- The Strengthening the Management Capacities in the Ministry of Forestry Project (SMCP, 1997-2008) assisted the Ministry of Forestry in modernizing its management practices and promoted new practices such as payments for environmental services, forest collaborative partnerships, establishment of the national forestry council, and a national forest statement.
- From 2008 to 2012, the Merang REDD Pilot Project (MRPP) in south Sumatra did groundbreaking research into carbon accounting and monitoring, developing methodologies that became the basis of the national regulation for carbon inventories in production forests. MRPP also developed a carbon trading and management concept that subsequently enabled private sector entities to acquire international REDD+ carbon finance.
- Since 2009, the Forests and Climate Change Programme (FORCLIME), a project of the Indonesian MoEF and German development cooperation through GIZ and KfW, has been the driving force behind forest management reform through the implementation of forest management units in Indonesia's forests.

A great deal has been accomplished, and German development cooperation can justifiably be proud of its contribution to these achievements. However, as this history clearly demonstrates, change takes time and requires long-term commitment. And the battle is far from over. The MoEF is struggling to enforce government regulations and quickly implement the new forest management units. Staffing is proceeding too slowly, and the training and curricula are not adequate to the new responsibilities foresters will face in the forest management units. There are still too many overlapping jurisdictions within Indonesia's forest areas.

The moratorium on new resource licenses and the postponement of new oil palm plantation permits are being circumvented. Furthermore, the MoEF's legal victories over corrupt companies and politicians have been undermined by a corrupt and ineffective legal system. Clearly, the Government of Indonesia must redouble its efforts to end deforestation and properly manage its forests.

However, what is at stake extends far beyond Indonesia. While stopping unregulated deforestation and implementing sustainable forest management serves Indonesia's development goals, it is also an essential element of any international strategy to reduce global emissions, slow climate change, and stabilize the global climate. It is to be hoped that growing awareness of the dire consequences of global warming will rally the necessary political will among Indonesia's development partners for a sustained and effective collaboration to assist Indonesia in implementing its ambitious efforts to stop unregulated deforestation and implement sustainable forest management.

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