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A Study on the Utilization of Forest Policy to Review from the Aspect of Climate Change

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Abstract. The purpose of this study was to review the utilization of forests from the policy aspects of climate change. This was then associated with the implementation of governmental commitment to carry out REDD+ to cope with the impact of climate change and to achieve sustainable development. Firstly, the author studied this problem from data and information about vast forest areas and conservative water areas in Indonesia. According to provincial governments, there have been several decision letters from the Minister of Forestry from different years ranging from 1999–2014. Comparing the forest areas in letters of 2005, 2008, and 2015, it can be suggested that the areas allocated as productive forest exceeded the areas of conserved or protected forest. This indicates that the utilization of forest as a development resource has occurred, and will continue to become an important element in Indonesia. Furthermore, Indonesian forests continue to suffer deforestation and forest degradation. Therefore, the author presented data and information about deforestation and forest degradation that occurred from forest damage and forest fires. Thirdly, the author presented data and information about the deforestation rate from 2000–2014. In 1989, rehabilitation activities were carried out for critical lands, and from 2012–2014, rehabilitation of forest and riverside areas occurred. This research uses descriptive methods with an approximation of legislation and an approach to librarianship. Then, this study is described in a narrative as well as an interpretive style, and compiled in the form of a working paper. From the results of this research, it can be concluded that Indonesian governmental policy regarding forest utilization has wide potential mitigations, and it is absolutely necessary to consistently implement a number of such programs related to climate change.

INTRODUCTION

Indonesia has rich forest resources. From the aspect of biological resources, it is known as one of seven countries in the world which has *mega-biodiversity*, and as a state which has the third largest tropical forest after Brazil and Zaire. Indonesia has a wealth of biological resources, owning 10% of flowering plants, 12% of mammals, 16% of reptiles and amphibians, 17% of birds, and 25% of fish ¹. Forests serve as carbon sinks (CO₂) from the atmosphere and convert it into organic carbon (carbohydrate), and keep it in the overall form of body volume tree (biomass). Biomass plays an important role in the carbon cycle. From the total forest carbon, about 47% of this is stored in the vegetation of forests ². Therefore, the biomass of forests is very relevant to the issue of climate change, as it is caused by carbon emissions in cases of forest damage, fires, logging, deforestation, and degradation.

In Indonesia, deforestation, forest degradation, and peat are some of the major contributors to greenhouse gases (GRK). From total GRK emissions of about 2,250,000 metric tons, the forestry sector and peat accounted for 84% of total GRK emissions. As a sector in a developing country, the Indonesian Government greatly depends on forestry and forestry-related industries such as agriculture and mining. For national development, forests are continuously exploited. This means that deforestation and forest degradation will continue and cannot be avoided.

The extensive forest area was originally approximately 144 million hectares, but now only 130.68 million hectares remains ³. Each year, the extent of forest cover decreases with deforestation and forest degradation and accompanying forest fires during the dry season. According to data from the statistical sources of the Ministry of Environment in 2015, it clearly appeared that vast forest and water areas of Indonesia in every province were addressed in the decision letters of Ministry of Forestry from 1999–2015 (Table 1). This indicated that it was not very relevant if carbon emissions into the atmosphere were predicted according to the data of the decision letters, but

that it remained extensive from 1999-2015, with the vast majority of carbon emissions being released as a result of deforestation, degradation, and forest fires. Thus, the data before 2015 could account for the extent. Of course, every year every province should have the data for forest areas periodically reported to the Minister of Environment and Forestry. Such conditions would make it difficult to predict a number of carbon emissions released into the atmosphere due to extensive depreciation, and the forest may also increase as a result of activities in critical land rehabilitation and rehabilitation around watersheds (Table 2). This can be evidenced by the vast forest comparison data according to its function in 2005, 2008, and 2015. This condition also shows that extensive forest production exceeded that allocated by vast forest conservation and protected forest. It indicates that the utilization of forest as a development resource will continue to result in deforestation and forest degradation.

Based on the results of the analysis of forest cover from 2000 to 2009, which was gathered by FWI ⁴, Indonesia has suffered deforestation of around 15 158 926.59 hectares with the rate of deforestation of about 1 515 892.66 hectares per year. The rate of deforestation increases due to utilization for non-food agriculture purposes such as forestry, fisheries, animal husbandry, mining, and a resettlement area of 13 025–053 hectares (Bureau of Statistics, the Ministry of Forestry, 1986). Spatially, in a number of the large islands in Indonesia such as Borneo, Sumatra, Java, Sulawesi, and Papua, the estimate of damage due to fire in 1997–1998, which spread in the jungle lowlands, mountain forests, peat swamps, dry shrubs, grass, forest industry plants, farms, and plantations was a total of about 9 745.00 hectares ⁵.

The high rate of deforestation and forest degradation has reduced the ability of forests in Indonesia to absorb carbon. According to gather data and information, about 21 million hectares of peat could potentially unleash a huge volume of carbon and GRK. This shows that Indonesia can provide a large donation to restraining the rate of GRK emissions due to deforestation, forest degradation, and forest fires. In addition, the government has committed to lowering emissions by as much as 26% in the year 2020, with the support of 41% of international commitment. It poured over presidential Regulation No. 61 in 2011 about the national action plan for decreasing GRK emissions (RAN-GRK) and in new developments it was mentioned that the Indonesian Government is committed to lowering emissions by 29% in the year 2030 with the international support of 41% ⁶ of the results of the meeting of the COP (Conference of the Parties).

From the above background, the author wants to review government policy in terms of forest utilization aspects of climate change.

EXPERIMENTAL DETAILS

The method of this research involves a descriptive approach to regulation and legislation and the libraries are sourced regarding the results of research and analysis of the literature reports that relate to the research objectives. The results of this study have been described in the narrative as well as interpretative style and compiled in the form of a working paper.

RESULT AND DISCUSSION

The author collected the statistical data sources from the Ministry of Environment and Forestry (2015) regarding vast forest conservation areas and water areas in Indonesia, according to the provincial decision letters of different years from 1999–2015, which can be seen in Table 1. These data are not so relevant if used to predict carbon emissions into the atmosphere, as the data are based on different decision letters of the Ministry in each province. Forest and water areas in each province have remained the same from 1999–2015, and these conditions will create an error result if used to predict emissions into the atmosphere, or of carbon absorption by forests. The years of each decision letter of the Ministry must be the same in order to determine the starting point of the basic conditions or standard lines which must be consistent with GRK emissions that can be saved. This is known as the Forest Reference Emission Level (REL) and is derived from the average of historical emissions in a specific period, so we must use a careful approach to assess the reduction of carbon emissions.

TABLE 1. Area of forest and Conservation Area of Indonesian Waters by Provinces Based on Ministry of Forestry Decree

Province	Decree Year	Conservation			Protection Forest (Hectare)	Limited Production Forest (Hectare)	Permanent Production Forest (Hectare)	Convertible Production Forest (Hectare)	Total Area Land Area Forest (Hectare)	Total Area of Land and Forest Area (Hectare)
		Waters (Hectare)	Mainland (Hectare)	Conservation Total (Hectare)						
Aceh ¹	2015	-	1.058.144,00	1.058.144,00	1.788.265,00	141.771,00	554.339,00	15.409,00	3.557.928,00	3.557.928,00
Sumatera Utara	2014	-	427.008,00	427.008,00	1.206.881,00	641.769,00	704.452,00	75.684,00	3.055.794,00	3.055.794,00
Sumatera Barat	2013	37.164,00	769.775,00	806.939,00	791.671,00	233.211,00	360.608,00	187.629,00	2.342.894,00	2.380.058,00
Riau	2014	-	633.420,00	633.420,00	234.015,00	1.031.600,00	2.331.891,00	1.268.767,00	5.499.693,00	5.499.693,00
Jambi	2014	-	685.471,00	685.471,00	179.588,00	258.285,00	963.792,00	11.399,00	2.098.535,00	2.098.535,00
Sumatera Selatan	2014	48.707,00	741.918,00	790.625,00	577.327,00	208.724,00	1.713.531,00	176.694,00	3.418.194,00	3.466.901,00
Bengkulu	2012	-	462.965,00	462.965,00	250.750,00	173.280,00	25.873,00	11.763,00	924.631,00	924.631,00
Lampung ¹	2000	-	462.030,00	462.030,00	317.615,00	33.358,00	191.732,00	-	1.004.735,00	1.004.735,00
Kepulauan Bangka Belitung	2012	-	35.454,00	35.454,00	185.531,00	-	432.884,00	693,00	654.562,00	654.562,00
Kepulauan Riau ²	2015	-	12.294,72	12.294,72	97.662,65	118.833,75	78.830,37	74.510,24	382.131,73	382.131,73
DKI Jakarta	2000	108.000,00	272,34	108.272,34	44,76	-	158,35	-	475,45	108.475,45
Jawa Barat ¹	2003	-	132.180,00	132.180,00	291.306,00	190.152,00	202.965,00	-	816.603,00	816.603,00
Jawa Tengah	2004	110.117,00	16.413,00	126.530,00	84.430,00	183.930,00	362.360,00	-	647.133,00	757.250,00
DI Yogyakarta	2000	-	910,34	910,34	2.057,90	-	13.851,28	-	16.819,52	16.819,52
Jawa Timur	2011	3.506,00	230.126,00	233.632,00	344.742,00	-	782.772,00	-	1.357.640,00	1.361.146,00
Banten ³	1999	51.467,00	112.991,00	164.458,00	12.359,00	49.439,00	26.998,00	-	201.787,00	253.254,00
Bali	1999	3.415,00	22.878,59	26.293,59	95.766,06	6.719,26	1.907,10	-	127.271,01	130.686,01
Nusa Tenggara Barat	2009	11.121,00	168.044,00	179.165,00	430.485,00	286.700,00	150.609,00	-	1.035.838,00	1.046.959,00
Nusa Tenggara Timur	2014	256.482,00	260.219,00	516.701,00	684.403,00	173.979,00	296.064,00	113.604,00	1.528.269,00	1.784.751,00
Kalimantan Barat	2014	190.945,00	1.430.101,00	1.621.046,00	2.310.874,00	2.132.398,00	2.127.365,00	197.918,00	8.198.656,00	8.389.601,00
Kalimantan Tengah	2012	22.542,00	1.608.286,00	1.630.828,00	1.346.066,00	3.317.461,00	3.881.817,00	2.543.535,00	12.697.165,00	12.719.707,00
Kalimantan Timur dan Kalimantan Utara ⁴	2014	-	1.704.666,00	1.704.666,00	2.848.243,00	5.045.879,00	4.077.346,00	179.699,00	13.855.833,00	13.855.833,00
Sulawesi Utara	2014	69.800,00	245.165,00	314.965,00	161.784,00	208.927,00	64.367,00	14.696,00	694.939,00	764.739,00
Sulawesi Tengah	2014	340.119,00	648.374,00	988.493,00	1.276.087,00	1.390.971,00	401.814,00	217.322,00	3.934.568,00	4.274.687,00
Sulawesi Selatan	2009	606.804,00	244.463,00	851.267,00	1.232.683,00	494.846,00	124.024,00	22.976,00	2.118.992,00	2.725.796,00
Sulawesi Tenggara	2011	1.504.160,00	282.924,00	1.787.084,00	1.081.489,00	466.854,00	401.581,00	93.571,00	2.326.419,00	3.830.579,00
Gorontalo	2010	-	196.653,00	196.653,00	204.608,00	251.097,00	89.879,00	82.431,00	824.668,00	824.668,00
Sulawesi Barat	2014	-	215.190,00	215.190,00	452.030,00	330.700,00	71.859,00	22.597,00	1.092.376,00	1.092.376,00
Maluku	2014	9.208,00	420.330,00	429.538,00	627.256,00	894.258,00	643.699,00	1.324.866,00	3.910.409,00	3.919.617,00
Maluku Utara	2013	-	218.499,00	218.499,00	584.058,00	666.851,00	481.730,00	564.082,00	2.515.220,00	2.515.220,00
Papua Barat	2014	928.350,00	1.711.908,00	2.640.258,00	1.631.589,00	1.778.480,00	2.188.160,00	1.474.650,00	8.784.787,00	9.713.137,00
Papua	2012	1.019.017,00	6.736.267,00	7.755.284,00	7.815.283,00	5.961.240,00	4.739.327,00	4.116.365,00	29.368.482,00	30.387.499,00
Indonesia		5.320.929,00	22.108.630,99	27.429.559,99	29.673.382,37	26.798.382,01	29.250.783,10	12.942.295,24	120.773.441,71	126.094.366,71

Source: Statistics Ministry of Environment and Forestry 2015

Additionally, the possibility of shrinking area spaces will occur if deforestation and forest or land degradation increase, and rehabilitation activities for crisis land like surrounding watershed areas and extensive forest areas will also increase.

Government efforts to recover forest in the critical land is aimed at about 1,221,814 hectares, but yet remains at about 5,830,200 hectares, and government efforts to carry out rehabilitation and greening in the critical land is 5,814,545 hectares outside national forests, but yet remains at 7,269,700 hectares. These activities are carried out in some islands of Indonesia to execute government commitment for dealing with climate change⁷, as a manifestation of the government's commitment to addressing climate change.

In addition, the government also carried out forest rehabilitation from 2010–2014 and until 2014, approximately 2.5 million hectares was identified as a target for forest rehabilitation by the government for necessary conservation of watersheds, city forests, mangrove forests, cities, and swamps⁸. It has also shown the commitment of the government to deal with climate change.

From the activities of critical land forest rehabilitation, extensive areas come back to coverage with forest. Therefore, it can be concluded that the statistical data of the Ministry of Environment and Forestry in 2015 cannot

be used to predict forest carbon, as the carbon emissions will create an error. This can be evidenced by the vast forest comparison data according to its function in 2005, 2008, and 2015, as shown in Table 2 below.

TABLE 2. Comparison of vast forest kind in 2005, 2008 and 2015

Types of forest	2005 (million hectares)	2008 (million hectares)	2015 (million hectares)
Conservation forest	20.080	19.908	22.109a
Protected forest	31.782	31.604	29.673
Limited productions forest	21.717	22.502	26.798
Permanent productions forest	35.813	36.649	29.251a
Convention production forest	14.057	22.795	12.942
The function has been defined	0.007	0.233	0
Total	123.459a	133.694a	120.773

Figures are rounded

Source :Kemenhut (2006, 2009a, KemenLHK, 2015)

Table 2 shows that up to 2005, 2008, and 2015, extensive forest areas have decreased as widespread episodes of shrinkage have occurred. These conditions have also been shown to exceed forest production, which involved vast conserved and protected forests. It indicated that the utilization of forests as a development resource will continue to result in deforestation and forest degradation.

Deforestation can be interpreted as the change in forest cover due to governmental policies for the utilization of the forest, both planned and unplanned, legitimate or illegal activities. Forest degradation can also be caused by legitimate or illegal activities, for example taking of legal forest products and seeking illegal woods. The allocation of forests occurs when forests are converted from a non-forest area, such as plantation of agricultural land, mining, and settlement. Extensive forest areas were converted to 4.5 million hectares in 2007 and increased in 2010 to about 4.9 million hectares⁹. Up to mid-2010, the government provincial in Sumatra, Kalimantan, and Sulawesi proposed to convert use of an area of 6.5 million (Ministry of Forestry, 2010). The conversion of forests to palm oil plantations is the dominant reason for the forest decrease. According to the data of Palm Watch¹¹, palm oil plantations reached 1,652,301 hectares in 1989. During 1993-1994 these increased to 3,805,113 hectares and more and in 1998 increased again to 8,204,524 hectares.

The increase in conversion of forests to palm oil plantations due to the interconnectedness with renewable energy in the world and vegetable ingredients as a source of alternative energy meant that as much as 10.25 million hectares of land were needed for national vegetable materials in 2015 (Minister for Research, 2007). According to the data of the Ministry, the palm oil plantations, both large and small, increased every year and reached 7 007 867 million hectares in 2008 and 8 430 026 million hectares in 2010¹⁰.

Within both the Palm Center of Borneo and Sumatra the limitation of land availability has led the government to plan an expansion in Papua (AFP, 2008). The government has published several regulations and policies, enacted as Act No. 18 of 2004, regarding plantations that introduce the right to attempt (HGU) for 35 years for the plantation owners. An accelerated government program was published as Presidential Decree No. 5 of 2006, regarding the national energy policy, and Presidential Instruction No. 1 of 2006 about provision use of biofuels as an alternative fuel. In 2007, the regulations of the Minister of Agriculture No. 26/Permentan/OT/140/2/2007 was published, which stated that lands for palm oil plantations in Papua were provided twice the normal broad 100,000 hectares. Then, followed the regulation of the Minister of Forestry No. P22/Menhut-II/2009 as the legal basis for the palm oil companies to possess estates of 100,000 and 200,000 hectares in Papua. Next, the national government published principle permits and decisions to convert forest areas to palm oil plantations, with a total area of 9.13 million hectares (AFP, 2008). According to Palm Watch¹¹, in 2009 these areas almost tripled at 26.7 million hectares and were planning to convert about 2.8 million hectares areas in the following years to palm oil in Papua.

The mining sectors also require development for the conversion of forests, often compared with agriculture and plantations. According to the data of the Ministry of Forestry (2009a), lease licenses were used to cover 344,000 hectares of mining areas until 2008. However, many mining activities including the licenses which were issued by the district government really did not operate based on the licenses¹²⁻¹⁴. These two factors and small mining activities were carried out to cover the real impact of mining on forests mining. In addition, many mining activities

are carried out in conservation areas and protected forests which should be protected if many mineral ores are found in these areas.

Although the laws prohibit opencast mining in the protected forest, at least 13 companies acquired operational licenses for nearly 850,000 hectares of protected forest areas before the laws were enacted, and were considered as exceptions, so these companies continued their activities listed in the attachment decision President no. 41 of 2004⁶.

Governmental policy regarding utilization of forest for mining plans within protected forest and forest conservation areas has been running since 2000, with a total of about 11 441 852 hectares (Department of Forestry, 2000).

These conditions increased forest destruction from deforestation and forest degradation. Forest utilization plans like these should not actually happen because forest conservation and forest protection actually aim to protect and preserve ecosystems and their ecological functions. However, in practice, other activities like mining will be able to be carried out to the detriment of these forest types. The Ministry of Forestry has the authority to decide where national forest areas are, and their use for non-forestry activities such as mining to forest conservation and protected areas. The lease licenses for forest areas are regulated by Government Ordinance No. 24 in 2010, regarding the utilization of forest areas that replaced the guidelines for issue of lease licenses for utilization permits in the regulation of the Minister of Forestry No. P. 64/Menhut-II/2006. This ordinance is one of the contributing factors to deforestation and forest degradation in Indonesia. In the laws and regulations which are outlined in the regulation of the Minister of Forestry No. P. 30/Menhut-II/2009, regarding the procedures for reducing emissions from deforestation and forest degradation, it is defined that "deforestation means the permanent change of forest areas from forest not because of human activities" (article 1 (10)). In this regulation, "degradation" is defined as meaning to decrease the amount of forest cover and carbon reserves during a certain period due to human activities (article 1 (11)). Here, according to the government, human activity relates to perpetrators of illegal logging and deforestation to perpetrators of forest degradation.

Illegal logging is also one of the biggest threats of deforestation through forest degradation. The damaged forest is easier to open, so that forest degradation activities occur easily, such as forests being cut down and not been cared for by concessionaire holders who rarely leave trees in the forest, so allowing easy conversion to agricultural lands and plantations.

In Indonesia, the high rate of deforestation and forest degradation areas occur in Sumatra and Kalimantan with illegal logging in all types of forests, such as fixed production forests, conserved, production forest, forests conserved and non-forest protected areas from logging, hauling, and distribution of the wood, until the implementation of the rule of law¹⁵.

The issue of licenses for the forest plant industry (HTI) in old-growth forests also became a trigger for forest degradation, after the government started the program of HTI for pulp and paper in the 1990s. The government developed the HTI in 1995, covering 1.4 million hectares, then in 2000 this increased to approximately 1.8 million hectares, and 2.3 million hectares in 2000, with plans to increase to 10.5 million hectares of HTI by 2030 (Resosudarmo et al., 2003).

The opening of forest areas occurred not only in national forest areas but also outside national forest areas, known as areas for other utilization (APL). According to a circular letter to the Minister of Forestry No. SE 9/Menhut-VI/2009, regarding volume of economic timber in areas of lease utilization forest for other utilization (APL), licenses has been issued to permit allocation which expressed permission to use wood not necessary for production capacity to less than 50 m³ of wood volume with up to 30 cm in diameter, with intensity of 100% in one candidate's permission to use the wood. It was shown that the activities in forest areas to open the APL will also increase deforestation and forest degradation.

With a delay in the enactment of regulations, "blanks" often occur in the new legislation or change of law, as the old legislation continues to apply. These blanks generate uncertainty about more specific guidelines that must be adhered to and referenced by the projects or programs carrying out these activities, such as REDD+ as in Government Ordinance No. 27 in 2012 about the environmental license of environmental legislation for the protection and management no. 32 in 2009.

Presidential Instruction No. 10 in 2011, which was issued on 20 May 2011, announced the postponement of the issue of new forest concession licenses. This instruction aimed to suspend new licenses for the cutting down of forests for two years. Its enforcement involved points that influenced the issue of new licenses. These happened five months before the Presidential Instruction was proclaimed. In the next 11 days after its delay was enforced, the Ministry of Forestry announced the Minister's decision 292/Menhut II/2011 regarding the change in the status of forest areas and made a non-forest area of almost 1.2 million hectares in Central Kalimantan. This resulted in unresolved matters of forest areas and the status of the land affected by the postponement¹⁶.

In addition, there is the exception with delay activities related to food security and energy (Ministry of Agriculture and the Ministry of Energy and Mineral Resources is not covered in the Presidential Instruction), which has opened new divisions that can stimulate new delays in licenses, although the moratorium map of indication which has been announced continually was renewed in 2011, and will be kept updated by the Ministry of Forestry, becoming the tool of supervision for the public to secure and perhaps even to add the extents covered by such delays (Cifor, 2013), so that deforestation and forest degradation are unavoidable. This moratorium, which was entered in Presidential Instruction No. 10, delayed the issue of new licenses for the primary natural forests and peatlands, located in conservation protected forests, forest production and other utilizations stated in the indicative map of the new delay of licenses (PIPIB). In practice, the moratorium map was not a map which was dead, and did not change, as it was revised every six months, or when complaints arose from license holders who got licenses before Presidential Instruction No. 10 in 2011, it could just be changed because there was an announcement of an exception delay with related energy and food security activities, as described above.

The actual data for deforestation has been running since 1986 covering 13,025,053 hectares, which are utilized for non-food purposes such as agriculture forestry, fishing, stock farming, mining, and transmigration (Bureau of Statistics Department of Forestry, 1986). Until 1987, HPH reached 19 HPH with 564 units with about 55,468.35 million hectares of forest area (Bureau of Planning and Food Department of Forestry, 1986).

Based on the results of the analysis of forest cover from 2000 to 2009, which were gathered by FWI⁴, Indonesia has suffered deforestation of around 15,158,926.59 hectares, with a rate of deforestation of about 1,515,892.66 hectares per year.

Forest fires are also triggers for deforestation and forest degradation, which result in the destruction of forests. Indonesia suffered serious forest fires in 1997–1998. These fires resulted from the utilization of forest land by careless conversion or improper combustion of land, as well as the deliberate burning of wild activities by people who were harmed, and usually due to disputes about the change of traditional rights over land utilization. In 1997–1998, fires occurred in the Sumatra district covering 1.7 million hectares, 6.5 million hectares in Borneo, 0.1 million hectares in Java, 0.4 million hectares in Sulawesi, and in Papua about 1 million hectares of forest categories, which involved utilization lands such as mountain forest in 0.1 million hectares, lowland forests of 3.3 million hectares, 1.45 million hectares of peat forest, open grassland and farmland of 4.6 million hectares, and plantation and HTI of 0.3 million hectares with total burned areas in 1997–1998 of about 9.7 million hectares. The large-scale cultivation of land was pushed with governmental policies announced early in the 1980s, especially, Kepmentan No. 764/Kpts/Um/1980, regarding the release of forest for plantations, agriculture, fisheries, and food security, and the Ministry of Forestry No. 417/II/1986 regarding the plantation timber industry (Indranto et al., 2003).

Forest fire areas continued every year from 1999–2015 (Kemenhut, 2009¹⁷, 2015) as shown in Table 3.

TABLE 3. Extensive forest fires in Indonesia, 1999–2015

No.	Year	Extensive forest fire (hectares)	No.	Year	Extensive forest fire (hectares)
1	1999	44.090	9	2007	6.974
2	2000	3.016	10	2008	6.793
3	2001	14.329	11	2010	3.500
4	2002	35.496	12	2011	2.011
5	2003	3.545	13	2012	9.606
6	2004	3.343	14	2013	4.918
7	2005	5.501	15	2014	44.411
8	2006	4.140	16	2015	11.226

Sumber: Kementerian Kehutanan (2009b) (data 1999–2008) dan http://sipongi.menlhk.go.id/hotspot/luas_kebakaran (data 2010–2015)

Table 3 shows that the extensive forest fires did not decrease from 1999–2015 in Indonesia. The government had established the center for the control of forest fires which is charged with the prevention of the occurrence of fires. This was implemented with the National Coordination Team for controlling forest land fires. However, forest and land fires continued due to the inadequacy of prevention plans, management, budget, equipment, and human resources.

In addition, most of the land and forest fires occurred in areas of peat during the period 2001–2012 as shown in Table 4.

TABLE 4. Extensive peat cumulative annual school of biological oxidation and fires in Indonesia during the period from 2001 to 2012

Year ¹⁰	Extensive peat who experience biological oxidation ¹¹ (hectares)	First Fire	Second Fire	Third And subsequent Fire
2001	8.788.942	69	109.569	0
2002	9.027.177	9.544	558.328	45.431
2003	9.255.687	2.452	174.069	72.525
2004	9.540.238	6.768	252.339	151.882
2005	9.890.367	16.720	168.521	158.664
2006	10.414.498	22.462	441.647	332.452
2007	10.677.356	3.625	43.080	66.613
2008	10.952.204	7.882	39.179	80.587
2009	11.361.302	17.664	166.760	299.092
2010	11.563.432	2.008	20.783	66.490
2011	11.821.646	5.455	95.383	230.646
2012	12.083.405	947	89.032	262.522

¹⁰ Indicate the year of the occurrence of extensive peat changes from the previous year. For example, the year 2001 shows the changes in the area of peat from 2000 to 2001

¹¹ This shows the cumulative vast peat oxidation in school annual biological including extensive peat was broken in the previous year (including land deforestation prior to 2001), which contributes towards emissions run from the biological oxidation of peat.

Source: KemenLHK (Badan Penelitian, Pengembangan dan Inovasi, 2015)

Table 4 shows that the extensive peat areas suffered biological oxidation every year including extensively damaged peat which increased from 2001–2012. These conditions were caused by the need for biological oxygen in damaged peatlands increasing from year to year due to peat soil conditions which were dry. Peat fires from 2001–2012 demonstrated variations of the first fire, a second fire, third fire and so on. However, the most extensive first fires occurred in 2006 and 2009 respectively, involving 22,462 hectares and 17,664 hectares. The second fires occurred in 2002, reaching 558,328 hectares and 2006 reaching 441,674 hectares. Third and subsequent fires occurred in 2006 reaching 332,452 hectares and 299,092 hectares in 2009. These conditions indicated that in 2002, 2006, and 2009, the content of the coals were still burning from the previous year, as the peat became dry due to careless utilization of forest policies that actually should be protected and preserved, as it serves as a buffer system for the protection of life in the forest and peat ecosystems. These conditions coupled with high temperatures and strong winds in the dry season mean that forest fires are easily spread.

GRK emissions from deforestation are mainly caused by land utilization activities related to the conversion of forest land into the non-forest land of around 95%, and with great intensive fires that also cause deforestation events accounting for 5% of emissions from deforestation GRK. The occurrences of deforestation in the productive forest could account for 44%, and the occurrences of deforestation in forest lands allocated to APL accounted for 43% GRK. High emissions from forest degradation that appear to be caused by conventional loggings account for 62% and 38% of forest fires. Forest degradation often results in broken remnants of trees that are prone to further degradation, which will cause fires during the dry season. Degradation also occurs in conservative forest and protected forest areas, which reaches 13% with logging activities and forest encroachments. Forest degradation in productive forests reaches 66% with conventional logging and forest fires. Forest degradation occurs in conservative forests and protective forests at around 20%, as well as in the APL at about 15%, which are both caused by illegal logging and forest fires ¹⁸.

The high rate of deforestation and forest degradation have reduced the forests' abilities to absorb carbon in Indonesia. Obviously, Indonesian forestry sectors have potential mitigations or preventive activities for deforestation and forest degradation, so the management of forest resources which deal with climate change are thoroughly required.

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A study on the utilization of forest policy to review from the aspect of climate change

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A Study on the Utilization of Forest Policy to Review from the Aspect of Climate Change

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Abstract. The purpose of this study was to review the utilization of forests from the policy aspects of climate change. This was then associated with the implementation of governmental commitment to carry out REDD+ to cope with the impact of climate change and to achieve sustainable development. Firstly, the author studied this problem from data and information about vast forest areas and conservative water areas in Indonesia. According to provincial governments, there have been several decision letters from the Minister of Forestry from different years ranging from 1999–2014. Comparing the forest areas in letters of 2005, 2008, and 2015, it can be suggested that the areas allocated as productive forest exceeded the areas of conserved or protected forest. This indicates that the utilization of forest as a development resource has occurred and will continue to become an important element in Indonesia. Furthermore, Indonesian forests continue to suffer deforestation and forest degradation. Therefore, the author presented data and information about deforestation and forest degradation that occurred from forest damage and forest fires. Thirdly, the author presented data and information about the deforestation rate from 2000–2014. In 1989, rehabilitation activities were carried out for critical lands, and from 2012–2014, rehabilitation of forest and riverside areas occurred. This research uses descriptive methods with an approximation, legislation and an approach to librarianship. Then, this study is described in a narrative as well as an interpretive style, and compiled in the form of a working paper. From the results of this research, it can be concluded that Indonesian governmental policy regarding forest utilization has wide potential mitigations, and it is absolutely necessary to consistently implement a number of such programs related to climate change.

INTRODUCTION

Indonesia has rich forest resources. From the aspect of biological resources, it is known as one of seven countries in the world which has *mega-biodiversity*, and as a state which is the third largest tropical forest after Brazil and Zaire. Indonesia has a wealth of biological resources, owning 10% of flowering plants, 12% of mammals, 16% of reptiles and amphibians, 17% of birds, and 25% of fish¹. Forests serve as carbon sinks (CO₂) from the atmosphere and convert it into organic carbon (carbohydrate), and keep it in the overall form of body volume tree (biomass). Biomass plays an important role in the carbon cycle. From the total forest carbon, about 47% of this is stored in the vegetation of forests². Therefore, the biomass of forests is very relevant to the issue of climate change, as it is caused by carbon emissions in cases of forest damage, fires, logging, deforestation, and degradation.

In Indonesia, deforestation, forest degradation, and peat are some of the major contributors to greenhouse gases (GRK). From total GRK emissions of about 2,250,000 metric tons, the forestry sector and peat accounted for 84% of total GRK emissions. As a sector in a developing country, the Indonesian Government greatly depends on forestry and forestry-related industries such as agriculture and mining. For national development, forests are continuously exploited. This means that deforestation and forest degradation will continue and cannot be avoided.

The extensive forest area was originally approximately 144 million hectares, but now only 130.68 million hectares remains³. Each year, the extent of forest cover decreases with deforestation and forest degradation and accompanying forest fires during the dry season. According to data from the statistical sources of the Ministry of Environment in 2015, it clearly appeared that vast forest and water areas of Indonesia in every province were addressed in the decision letters of Ministry of Forestry from 1999–2015 (Table 1). This indicated that it was not very relevant if carbon emissions into the atmosphere were predicted according to the data of the decision letters, but

that it remained extensive from 1999-2015, with the vast majority of carbon emissions being released as a result of deforestation, degradation, and forest fires. Thus, the data before 2015 could account for the extent. Of course, every year every province should have the data for forest areas periodically reported to the Minister of Environment and Forestry. Such conditions would make it difficult to predict a number of carbon emissions released into the atmosphere due to extensive depreciation, and the forest may also increase as a result of activities in critical land rehabilitation and rehabilitation around watersheds (Table 2). This can be evidenced by the vast forest comparison data according to its function in 2005, 2008, and 2015. This condition also shows that extensive forest production exceeded that allocated by vast forest conservation and protected forest. It indicates that the utilization of forest as a development resource will continue to result in deforestation and forest degradation.

Based on the results of the analysis of forest cover from 2000 to 2009, which was gathered by FWI⁴, Indonesia has suffered deforestation of around 15 158 926.59 hectares with the rate of deforestation of about 1 515 892.66 hectares per year. The rate of deforestation increases due to utilization for non-food agriculture purposes such as forestry, fisheries, animal husbandry, mining, and a resettlement area of 13 025–053 hectares (Bureau of Statistics, the Ministry of Forestry, 1986). Spatially, in a number of the large islands in Indonesia such as Borneo, Sumatra, Java, Sulawesi, and Papua, the estimate of damage due to fire in 1997–1998, which spread in the jungle lowlands, mountain forests, peat swamps, dry shrubs, grass, forest industry plants, farms, and plantations was a total of about 9 745.00 hectares⁵.

The high rate of deforestation and forest degradation has reduced the ability of forests in Indonesia to absorb carbon. According to gather data and information, about 21 million hectares of peat could potentially unleash a huge volume of carbon and GRK. This shows that Indonesia can provide a large donation to restraining the rate of GRK emissions due to deforestation, forest degradation, and forest fires. In addition, the government has committed to lowering emissions by as much as 25% in the year 2020, with the support of 41% of international commitment. It poured over presidential Regulation No. 61 in 2011 about the national action plan for decreasing GRK emissions (RAN-GRK) and in new developments it was mentioned that the Indonesian Government is committed to lowering emissions by 29% in the year 2030 with the international support of 41%⁶ of the results of the meeting of the COP (Conference of the Parties).

From the above background, the author wants to review government policy in terms of forest utilization aspects of climate change.

EXPERIMENTAL DETAILS

The method of this research involves a descriptive approach to regulation and legislation and the libraries are sourced regarding the results of research and analysis of the literature reports that relate to the research objectives. The results of this study have been described in the narrative as well as interpretative style and compiled in the form of a working paper.

RESULT AND DISCUSSION

The author collected the statistical data sources from the Ministry of Environment and Forestry (2015) regarding vast forest conservation areas and water areas in Indonesia, according to the provincial decision letters of different years from 1999–2015, which can be seen in Table 1. These data are not so relevant if used to predict carbon emissions into the atmosphere, as the data are based on different decision letters of the Ministry in each province. Forest and water areas in each province have remained the same from 1999–2015, and these conditions will create an error result if used to predict emissions into the atmosphere, or of carbon absorption by forests. The years of each decision letter of the Ministry must be the same in order to determine the starting point of the basic conditions or standard lines which must be consistent with GRK emissions that can be saved. This is known as the Forest Reference Emission Level (REL) and is derived from the average of historical emissions in a specific period, so we must use a careful approach to assess the reduction of carbon emissions.

TABLE 1. Area of forest and Conservation Area of Indonesian Waters by Provinces Based on Ministry of Forestry Decree

Province	Decree Year	Conservation			Protection Forest (Hectare)	Limited Production Forest (Hectare)	Permanent Production Forest (Hectare)	Convertible Production Forest (Hectare)	Total Area Land Area Forest (Hectare)	Total Area of Land and Forest Area (Hectare)
		Waters (Hectare)	Mainland (Hectare)	Conservation Total (Hectare)						
Aceh ¹	2015	-	1.058.144,00	1.058.144,00	1.788.265,00	141.771,00	554.339,00	15.409,00	3.557.928,00	3.557.928,00
Sumatera Utara	2014	-	427.008,00	427.008,00	1.206.881,00	641.769,00	704.452,00	75.684,00	3.055.794,00	3.055.794,00
Sumatera Barat	2013	37.164,00	769.775,00	806.939,00	791.671,00	233.211,00	360.608,00	187.629,00	2.342.894,00	2.380.058,00
Riau	2014	-	633.420,00	633.420,00	234.015,00	1.031.600,00	2.331.891,00	1.268.767,00	5.499.693,00	5.499.693,00
Jambi	2014	-	685.471,00	685.471,00	179.588,00	258.285,00	963.792,00	11.399,00	2.098.535,00	2.098.535,00
Sumatera Selatan	2014	48.707,00	741.918,00	790.625,00	577.327,00	208.724,00	1.713.531,00	176.694,00	3.418.194,00	3.466.901,00
Bengkulu	2012	-	462.965,00	462.965,00	250.750,00	173.280,00	25.873,00	11.763,00	924.631,00	924.631,00
Lampung ¹	2000	-	462.030,00	462.030,00	317.615,00	33.358,00	191.732,00	-	1.004.735,00	1.004.735,00
Kepulauan Bangka Belitung	2012	-	35.454,00	35.454,00	185.531,00	-	432.884,00	693,00	654.562,00	654.562,00
Kepulauan Riau ²	2015	-	12.294,72	12.294,72	97.662,65	118.833,75	78.830,37	74.510,24	382.131,73	382.131,73
DKI Jakarta	2000	108.000,00	272,34	108.272,34	44,76	-	158,35	-	475,45	108.475,45
Jawa Barat ¹	2003	-	132.180,00	132.180,00	291.306,00	190.152,00	202.965,00	-	816.603,00	816.603,00
Jawa Tengah	2004	110.117,00	164.13,00	126.530,00	84.430,00	183.930,00	362.360,00	-	647.133,00	757.250,00
DI Yogyakarta	2000	-	910,34	910,34	2.057,90	-	13.851,28	-	16.819,52	16.819,52
Jawa Timur	2011	3.506,00	230.126,00	233.632,00	344.742,00	-	782.772,00	-	1.357.640,00	1.361.146,00
Banten ³	1999	51.467,00	112.991,00	164.458,00	12.359,00	49.439,00	26.998,00	-	201.787,00	253.254,00
Bali	1999	3.415,00	22.878,59	26.293,59	95.766,06	6.719,26	1.907,10	-	127.271,01	130.686,01
Nusa Tenggara Barat	2009	11.121,00	168.044,00	179.165,00	430.485,00	286.700,00	150.609,00	-	1.035.838,00	1.046.959,00
Nusa Tenggara Timur	2014	256.482,00	260.219,00	516.701,00	684.403,00	173.979,00	296.064,00	113.604,00	1.528.269,00	1.784.751,00
Kalimantan Barat	2014	190.945,00	1.430.101,00	1.621.046,00	2.310.874,00	2.132.398,00	2.127.365,00	197.918,00	8.198.656,00	8.389.601,00
Kalimantan Tengah	2012	22.542,00	1.608.286,00	1.630.828,00	1.346.066,00	3.317.461,00	3.881.817,00	2.543.535,00	12.697.165,00	12.719.707,00
Kalimantan Timur dan Kalimantan Utara ⁴	2014	-	1.704.666,00	1.704.666,00	2.848.243,00	5.045.879,00	4.077.346,00	179.699,00	13.855.833,00	13.855.833,00
Sulawesi Utara	2014	69.800,00	245.165,00	314.965,00	161.784,00	208.927,00	64.367,00	14.696,00	694.939,00	764.739,00
Sulawesi Tengah	2014	340.119,00	648.374,00	988.493,00	1.276.087,00	1.390.971,00	401.814,00	217.322,00	3.934.568,00	4.274.687,00
Sulawesi Selatan	2009	606.804,00	244.463,00	851.267,00	1.232.683,00	494.846,00	124.024,00	22.976,00	2.118.992,00	2.725.796,00
Sulawesi Tenggara	2011	1.504.160,00	282.924,00	1.787.084,00	1.081.489,00	466.854,00	401.581,00	93.571,00	2.326.419,00	3.830.579,00
Gorontalo	2010	-	196.653,00	196.653,00	204.608,00	251.097,00	89.879,00	82.431,00	824.668,00	824.668,00
Sulawesi Barat	2014	-	215.190,00	215.190,00	452.030,00	330.700,00	71.859,00	22.597,00	1.092.376,00	1.092.376,00
Maluku	2014	9.208,00	420.330,00	429.538,00	627.256,00	894.258,00	643.699,00	1.324.866,00	3.910.409,00	3.919.617,00
Maluku Utara	2013	-	218.499,00	218.499,00	584.058,00	666.851,00	481.730,00	564.082,00	2.515.220,00	2.515.220,00
Papua Barat	2014	928.350,00	1.711.908,00	2.640.258,00	1.631.589,00	1.778.480,00	2.188.160,00	1.474.650,00	8.784.787,00	9.713.137,00
Papua	2012	1.019.017,00	6.736.267,00	7.755.284,00	7.815.283,00	5.961.240,00	4.739.327,00	4.116.365,00	29.368.482,00	30.387.499,00
Indonesia		5.320.929,00	22.108.630,99	27.429.559,99	29.673.382,37	26.798.382,01	29.250.783,10	12.942.295,24	120.773.441,71	126.094.366,71

Source: Statistics Ministry of Environment and Forestry 2015

Additionally, the possibility of shrinking area spaces will occur if deforestation and forest or land degradation increase, and rehabilitation activities for crisis land like surrounding watershed areas and extensive forest areas will also increase.

Government efforts to recover forest in the critical land is aimed at about 1,221,814 hectares, but yet remains at about 5,830,200 hectares, and government efforts to carry out rehabilitation and greening in the critical land is 5,814,545 hectares outside national forests, but yet remains at 7,269,700 hectares. These activities are carried out in some islands of Indonesia to execute government commitment for dealing with climate change⁷, as a manifestation of the government's commitment to addressing climate change.

In addition, the government also carried out forest rehabilitation from 2010–2014 and until 2014, approximately 2.5 million hectares was identified as a target for forest rehabilitation by the government for necessary conservation of watersheds, city forests, mangrove forests, cities, and swamps⁸. It has also shown the commitment of the government to deal with climate change.

From the activities of critical land forest rehabilitation, extensive areas come back to coverage with forest. Therefore, it can be concluded that the statistical data of the Ministry of Environment and Forestry in 2015 cannot

be used to predict forest carbon, as the carbon emissions will create an error. This can be evidenced by the vast forest comparison data according to its function in 2005, 2008, and 2015, as shown in Table 2 below.

TABLE 2. Comparison of vast forest kind in 2005, 2008 and 2015

Types of forest	2005 (million hectares)	2008 (million hectares)	2015 (million hectares)
Conservation forest	20.080	19.908	22.109a
Protected forest	31.782	31.604	29.673
Limited productions forest	21.717	22.502	26.798
Permanent productions forest	35.813	36.649	29.251a
Convention production forest	14.057	22.795	12.942
The function has been defined	0.007	0.233	0
Total	123.459a	133.694a	120.773

Figures are rounded

Source :Kemenhut (2006, 2009a, KemenLHK, 2015)

Table 2 shows that up to 2005, 2008, and 2015, extensive forest areas have decreased as widespread episodes of shrinkage have occurred. These conditions have also been shown to exceed forest production, which involved vast conserve³⁵ and protected forests. It indicated that the utilization of forests as a development resource will continue to result in deforestation and forest degradation.

Deforestation can be interpreted as the change in forest cover due to governmental policies for the utilization of the forest, both planned and unplanned, legitimate or illegal activities. Forest degradation can also be caused by legitimate or illegal activities, for example taking of legal forest products and seeking illegal woods. The allocation of forests occurs when forests are converted from a non-forest area, such as plantation of agricultural land, mining, and settlement. Extensive forest areas were converted to 4.5 million hectares in 2007 and increased in 2010 to about 4.9 million hectares⁹. Up to mid-2010, the government provincial in Sumatra, Kalimantan, and Sulawesi proposed to convert use of an area of 6.5 million (Ministry of Forestry, 2010). The conversion of forests to palm oil plantations is the dominant reason for the forest decrease. According to the data of Palm Watch¹¹, palm oil plantations reached 1,652,301 hectares in 1989. During 1993-1994 these increased to 3,805,113 hectares and more and in 1998 increased again to 8,204,524 hectares.

The increase in conversion of forests to palm oil plantations due to the interconnectedness with renewable energy in the world and vegetable ingredients as a source of alternative energy meant that as much as 10.25 million hectares of land were needed for national vegetable materials in 2015 (Minister for Research, 2007). According to the data of the Ministry, the palm oil plantations, both large and small, increased every year and reached 7 007 867 million hectares in 2008 and 8 430 026 million hectares in 2010¹⁰.

Within both the Palm Center of Borneo and Sumatra the limitation of land availability has led the government to plan an expansion in Papua (AFP, 2008). The government has published several regulations and policies, enacted as Act No. 18 of 2004, regarding plantations that introduce the right¹⁸ attempt (HGU) for 35 years for the plantation owners. An accelerated government program was published as Presidential Decree³⁴ No. 5 of 2006, regarding the national energy policy, and Presidential Instruction No. 1 of 2006 about provision use of biofuels as an alternative fuel. In 2007, the regulations of the Minister of Agriculture No. 26/Permentan/OT/140/2/2007 was published, which stated that lar⁵ for palm oil plantations in Papua were provided twice the normal broad 100,000 hectares. Then, followed the regulation of the Minister of Forestry No. P22/Menhut-II/2009 as the legal basis for the palm oil companies to possess estates of 100,000 and 200,000 hecta²⁰ in Papua. Next, the national government published principle permits and decisions to convert forest areas to palm oil plantations, with a total area of 9.13 million hectares (AFP, 2008). According to Palm Watch¹¹, in 2009 these areas almost tripled at 26.7 million hectares and were planning to convert about 2.8 million hectares areas in the following years to palm oil in Papua.

The mining sectors also require development for the conversion of forests, often compared with agriculture and plantations. According to the data of the Ministry of Forestry (2009a), lease licenses were used to cover 344,000 hectares of mining areas until 2008. However, many mining activities including the licenses which were issued by the district government really did not operate based on the licenses¹²⁻¹⁴. These two factors and small mining activities were carried out to cover the real impact of mining on forests mining. In addition, many mining activities

are carried out in conservation areas and protected forests which should be protected if many mineral ores are found in these areas.

Although the laws prohibit opencast mining in the protected forest, at least 13 companies acquired operational licenses for nearly 850,000 hectares of protected forest areas before the laws were enacted, and were considered as exceptions, so these companies continued their activities listed in the attachment decision President no. 41 of 2004⁶.

Governmental policy regarding utilization of forest for mining plans within protected forest and forest conservation areas has been running since 2000, with a total of about 11 441 852 hectares (Department of Forestry, 2000).

These conditions increased forest destruction from deforestation and forest degradation. Forest utilization plans like these should not actually happen because forest conservation and forest protection actually aim to protect and preserve ecosystems and their ecological functions. However, in practice, other activities like mining will be able to be carried out to the detriment of these forest types. The Ministry of Forestry has the authority to decide where national forest areas are, and their use for non-forestry activities such as mining to forest conservation and protected areas. The lease licenses for forest areas are regulated by Government Ordinance No. 24 in 2010, regarding the utilization of forest areas that replaced the guidelines for issue of lease licenses for utilization permits in the regulation of the Minister of Forestry No. P. 64/Menhut-II/2006. This ordinance is one of the contributing factors to deforestation and forest degradation in Indonesia. In the laws and regulations which are outlined in the regulation of the Minister of Forestry No. P. 30/Menhut/II/2009, regarding the procedures for reducing emissions from deforestation and forest degradation, it is defined that "deforestation means the permanent change of forest areas from forest not because of human activities" (article 1 (10)). In this regulation, "degradation" is defined as meaning to decrease the amount of forest cover and carbon reserves during a certain period due to human activities (article 1 (11)). Here, according to the government, human activity relates to perpetrators of illegal logging and deforestation to perpetrators of forest degradation.

Illegal logging is also one of the biggest threats of deforestation through forest degradation. The damaged forest is easier to open, so that forest degradation activities occur easily, such as forests being cut down and not been cared for by concessionaire holders who rarely leave trees in the forest, so allowing easy conversion to agricultural lands and plantations.

In Indonesia, the high rate of deforestation and forest degradation areas occur in Sumatra and Kalimantan with illegal logging in all types of forests, such as fixed production forests, conserved, production forest, forests conserved and non-forest protected areas from logging, hauling, and distribution of the wood, until the implementation of the rule of law¹⁵.

The issue of licenses for the forest plant industry (HTI) in old-growth forests also became a trigger for forest degradation, after the government started the program of HTI for pulp and paper in the 1990s. The government developed the HTI in 1995, covering 1.4 million hectares, then in 2000 this increased to approximately 1.8 million hectares, and 2.3 million hectares in 2000, with plans to increase to 10.5 million hectares of HTI by 2030 (Resosudarmo et al., 2003).

The opening of forest areas occurred not only in national forest areas but also outside national forest areas, known as areas for other utilization (APL). According to a circular letter to the Minister of Forestry No. SE 9/Menhut-VI/2009, regarding volume of economic timber in areas of lease utilization forest for other utilization (APL), licenses has been issued to permit allocation which expressed permission to use wood not necessary for production capacity to less than 50 m³ of wood volume with up to 30 cm in diameter, with intensity of 100% in one candidate's permission to use the wood. It was shown that the activities in forest areas to open the APL will also increase deforestation and forest degradation.

With a delay in the enactment of regulations, "blanks" often occur in the new legislation or change of law, as the old legislation continues to apply. These blanks generate uncertainty about more specific guidelines that must be adhered to and referenced by the projects or programs carrying out these activities, such as REDD+ as in Government Ordinance No. 27 in 2012 about the environmental license of environmental legislation for the protection and management no. 32 in 2009.

Presidential Instruction No. 10 in 2011, which was issued on 20 May 2011, announced the postponement of the issue of new forest concession licenses. This instruction aimed to suspend new licenses for the cutting down of forests for two years. Its enforcement involved points that influenced the issue of new licenses. These happened five months before the Presidential Instruction was proclaimed. In the next 11 days after its delay was enforced, the Ministry of Forestry announced the Minister's decision 292/Menhut II/2011 regarding the change in the status of forest areas and made a non-forest area of almost 1.2 million hectares in Central Kalimantan. This resulted in unresolved matters of forest areas and the status of the land affected by the postponement¹⁶.

In addition, there is the exception with delay activities related to food security and energy (Ministry of Agriculture and the Ministry of Energy and Mineral Resources is not covered in the Presidential Instruction), which has opened new divisions that can stimulate new delays in licenses, although the moratorium map of indication which has been announced continually was renewed in 2011, and will be kept updated by the Ministry of Forestry, becoming the tool of supervision for the public to secure and perhaps even to add the extents covered by such delays (Sitor, 2013), so that deforestation and forest degradation are unavoidable. This moratorium, which was entered in Presidential Instruction No. 10, delayed the issue of new licenses for the primary natural forests and peatlands, located in conservation protected forests, forest production and other utilizations stated in the indicative map of the new delay of licenses (PIPIB). In practice, the moratorium map was not a map which was dead, and did not change, as it was revised every six months, or when complaints arose from license holders who got licenses before Presidential Instruction No. 10 in 2011, it could just be changed because there was an announcement of an exception delay with related energy and food security activities, as described above.

The actual data for deforestation has been running since 1986 covering 13,025,053 hectares, which are utilized for non-food purposes such as agriculture forestry, fishing, stock farming, mining, and transmigration (Bureau of Statistics Department of Forestry, 1986). Until 1987, HPH reached 19 HPH with 564 units with about 55,468.35 million hectares of forest area (Bureau of Planning and Food Department of Forestry, 1986).

Based on the results of the analysis of forest cover from 2000 to 2009, which were gathered by FWI⁴, Indonesia has suffered deforestation of around 15,158,926.59 hectares, with a rate of deforestation of about 1,515,892.66 hectares per year.

Forest fires are also triggers for deforestation and forest degradation, which result in the destruction of forests. Indonesia suffered serious forest fires in 1997–1998. These fires resulted from the utilization of forest land by careless conversion or improper combustion of land, as well as the deliberate burning of wild activities by people who were harmed, and usually due to disputes about the change of traditional rights over land utilization. In 1997–1998, fires occurred in the Sumatra district covering 1.7 million hectares, 6.5 million hectares in Borneo, 0.1 million hectares in Java, 0.4 million hectares in Sulawesi, and in Papua about 1 million hectares of forest categories, which involved utilization lands such as mountain forest in 0.1 million hectares, lowland forests of 3.3 million hectares, 1.45 million hectares of peat forest, open grassland and farmland of 4.6 million hectares, and plantation and HTI of 0.3 million hectares with total burned areas in 1997–1998 of about 9.7 million hectares. The large-scale cultivation of land was pushed with governmental policies announced early in the 1980s, especially, Kepmentan No. 764/Kpts/Um/1980, regarding the release of forest for plantations, agriculture, fisheries, and food security, and the Ministry of Forestry No. 417/II/1986 regarding the plantation timber industry (Indranto et al., 2003).

Forest fire areas continued every year from 1999–2015 (Kemenhut, 2009¹⁷, 2015) as shown in Table 3.

TABLE 3. Extensive forest fires in Indonesia, 1999–2015

No.	Year	Extensive forest fire (hectares)	No.	Year	Extensive forest fire (hectares)
1	1999	44.090	9	2007	6.974
2	2000	3.016	10	2008	6.793
3	2001	14.329	11	2010	3.500
4	2002	35.496	12	2011	2.011
5	2003	3.545	13	2012	9.606
6	2004	3.343	14	2013	4.918
7	2005	5.501	15	2014	44.411
8	2006	4.140	16	2015	11.226

Sumber: Kementerian Kehutanan (2009b) (data 1999–2008) dan http://sipongi.menlhk.go.id/hotspot/luas_kebakaran (data 2010–2015)

Table 3 shows that the extensive forest fires did not decrease from 1999–2015 in Indonesia. The government had established the center for the control of forest fires which is charged with the prevention of the occurrence of fires. This was implemented with the National Coordination Team for controlling forest land fires. However, forest and land fires continued due to the inadequacy of prevention plans, management, budget, equipment, and human resources.

In addition, most of the land and forest fires occurred in areas of peat during the period 2001–2012 as shown in Table 4.

TABLE 4. Extensive peat cumulative annual school of biological oxidation and fires in Indonesia during the period from 2001 to 2012

Year ¹⁰	Extensive peat who experience biological oxidation ¹¹ (hectares)	First Fire	Second Fire	Third And subsequent Fire
2001	8.788.942	69	109.569	0
2002	9.027.177	9.544	558.328	45.431
2003	9.255.687	2.452	174.069	72.525
2004	9.540.238	6.768	252.339	151.882
2005	9.890.367	16.720	168.521	158.664
2006	10.414.498	22.462	441.647	332.452
2007	10.677.356	3.625	43.080	66.613
2008	10.952.204	7.882	39.179	80.587
2009	11.361.302	17.664	166.760	299.092
2010	11.563.432	2.008	20.783	66.490
2011	11.821.646	5.455	95.383	230.646
2012	12.083.405	947	89.032	262.522

¹⁰ Indicate the year of the occurrence of extensive peat changes from the previous year. For example, the year 2001 shows the changes in the area of peat from 2000 to 2001

¹¹ This shows the cumulative vast peat oxidation in school annual biological including extensive peat was broken in the previous year (including land deforestation prior to 2001), which contributes towards emissions run from the biological oxidation of peat.

Source: KemenLHK (Badan Penelitian, Pengembangan dan Inovasi, 2015)

Table 4 shows that the extensive peat areas suffered biological oxidation every year including extensively damaged peat which increased from 2001–2012. These conditions were caused by the need for biological oxygen in damaged peatlands increasing from year to year due to peat soil conditions which were dry. Peat fires from 2001–2012 demonstrated variations of the first fire, a second fire, third fire and so on. However, the most extensive first fires occurred in 2006 and 2009 respectively, involving 22,462 hectares and 17,664 hectares. The second fires occurred in 2002, reaching 558,328 hectares and 2006 reaching 441,674 hectares. Third and subsequent fires occurred in 2006 reaching 332,452 hectares and 299,092 hectares in 2009. These conditions indicated that in 2002, 2006, and 2009, the content of the coals were still burning from the previous year, as the peat became dry due to careless utilization of forest policies that actually should be protected and preserved, as it serves as a buffer system for the protection of life in the forest and peat ecosystems. These conditions coupled with high temperatures and strong winds in the dry season mean that forest fires are easily spread.

GRK emissions from deforestation are mainly caused by land utilization activities related to the conversion of forest land into the non-forest land of around 95%, and with great intensive fires that also cause deforestation events accounting for 5% of emissions from deforestation GRK. The occurrences of deforestation in the productive forest could account for 44%, and the occurrences of deforestation in forest lands allocated to APL accounted for 43% GRK. High emissions from forest degradation that appear to be caused by conventional loggings account for 62% and 38% of forest fires. Forest degradation often results in broken remnants of trees that are prone to further degradation, which will cause fires during the dry season. Degradation also occurs in conservative forest and protected forest areas, which reaches 13% with logging activities and forest encroachments. Forest degradation in productive forests reaches 66% with conventional logging and forest fires. Forest degradation occurs in conservative forests and protective forests at around 20%, as well as in the APL at about 15%, which are both caused by illegal logging and forest fires¹⁸.

The high rate of deforestation and forest degradation have reduced the forests' abilities to absorb carbon in Indonesia. Obviously, Indonesian forestry sectors have potential mitigations or preventive activities for deforestation and forest degradation, so the management of forest resources which deal with climate change are thoroughly required.

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