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# INDONESIA'S FOREST REFERENCE EMISSION LEVEL: Data revisions, omissions and errors

In September 2015, the Ministry of Environment and Forestry (MoEF) announced the publication of a new Forest Reference Emission Level (FREL) report. This is Indonesia's official report to the UNFCCC, establishing baseline deforestation rates and emissions, and is a critical component of Indonesia's Reducing Emissions from Deforestation and Forest Degradation (REDD) reporting. The new FREL report does not appear to have been submitted to the UNFCCC or published on any GOI website. Greenpeace has received a copy of a version labelled 'final', on which the following analysis is based.

There are three primary issues of concern:

- **Data revision**: The FREL is based on land cover maps that appear to be significant revisions to those underpinning previously published government figures on forest cover. The baseline data allowing independent review of these revisions are unavailable. As a consequence, discrepancies between the emissions and deforestation rate baselines used in the FREL and those published elsewhere by the MoEF are a cause of deep concern. The peat maps used show around a third less peat area than other maps.
- **Data omission**: Emissions from peat decomposition only include peat deforested since 1990. Emissions from fires have been excluded from the FREL calculations. The FREL data appear to underestimate deforestation rates compared to published MoEF data on forest cover.
- **Calculation errors**: the baseline deforestation rates have been incorrectly estimated from the report's data.

The questionable nature of baseline peat map, the exclusion of peat deforested before 1990 from FREL calculations, and the exclusion of emissions from peat fire, mean that the FREL data on peat, and the report's overall conclusions on emissions levels do not aid broader efforts to measure and reduce GHG emissions associated with peatland degradation and fire. This year's disastrous fires in Indonesia have shown how careless this would be.

Left unaddressed, these issues have implications for the integrity of Indonesia's representations to the UNFCCC process. In order for official reports such as the FREL and INDC to be credible, the underlying maps and the justifications for changes in data on which Indonesia's international climate contribution and pledges are based need to be available for public scrutiny. This is necessary in the interests of transparency and accountability to Indonesians and to the international community.

## Questions to the FREL authors and oversight team

The FREL authors and oversight team should review and address the following issues:

- The FREL reports that there were 113 million ha of forest in Indonesia in 1990. This is nearly 10 million ha less forest cover than previously reported for that year by the Government of Indonesia. It contradicts recent Indonesian government declarations on historic forest cover, such as that in the UN Food and Agriculture Organisation's Global Forest Resources Assessment.1 What is the explanation for such a dramatic revision to the 1990 baseline?

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- The FREL states that all land cover maps used have been revised from previously available versions. What parameters were used for the revisions and what accuracy checks were made? Please make all maps used publicly available, and outline differences from previous versions where possible.
- The peat maps used show around a third less peat area than previous maps prepared by Wetlands International (14.9 million ha as opposed to 21.4 million ha) , and their methodology has been questioned by specialists working with Indonesia's Ministry of National Development Planning (BAPPENAS) who suggest that even the larger figure may be an underestimate and peat depths are also likely to be greater than previously thought. Why was this map used, what plans are there to improve the baseline data and how will later improved calculations of peat extent and depth be included when available?
- The FREL excludes emissions from peatlands cleared of forest before 1990 as well as emissions from forest and peat fires. What is the justification for the omission of these emission sources, given their significant contribution to Indonesia's greenhouse gas (GHG) emissions levels?
- It is unclear whether the 27.6Mt$CO_2$e/yr of emissions the FREL attributes to legal log production[2] are wholly accounted for within the 'degradation' figures given, which cover change from primary to secondary forest. Please clarify if this is the case. If not, why have they not been added to the total forestry-related emission figures? It is also important to note that degradation of secondary forests is an important emissions source that has been omitted from the FREL accounts.

## Peat fires are left off the accounts

The FREL emissions calculation does not include emissions from peat fires, explaining that 'emission from peat fires are excluded since the generation of the activity data for the latter is complicated and highly uncertain',[3] with the further explanation that emissions will be counted in 'the long term'[4] in peat degradation figures. This long-term calculation would take decades.[5] Uncertainty, though real, is not a sufficient justification for not including an estimate of fire emissions in calculations based on historic data. Indonesia's National Action Plan on GHG Reduction (RAN-GRK) uses an estimate of 314Mt$CO_2$e per year emissions from peat fires as part of the 2010 baseline against which the emissions cuts promised in Indonesia's INDC will be measured. Where does this figure come from and why has it not also been used for the FREL?

The draft calculation of emissions from peat fire included in Annex 4 appears to have been lifted wholesale from the 2014 draft of the FREL. These calculations arbitrarily exclude fires on peat deforested before 2000, and produce a result (27.1MtCO2e/yr average) massively at odds with other estimates of Indonesia's emissions from peat fire, such as the RAN-GRK (see above) and the Global Fire Emissions Database.[6]

Greenpeace is concerned that the exclusion of peat fire emissions from the FREL minimises Indonesia's land-based emissions baseline. As a result, Indonesia risks missing important opportunities to reduce emissions and prevent fires through forest and peatland protection, including REDD+ initiatives and private sector contributions.

## Calculation errors underestimate emissions

Review of the FREL document reveals an apparent mathematical error that skews the FREL calculations. Annual averages for areas deforested and degraded and for resultant emissions have been calculated wrongly.

Correcting this error changes the 'constructed' annual forest reference emission level – the FREL itself – from 0.568Gt$CO_2$e (p24) to 0.598Gt$CO_2$e. The annual average deforested area for 1990–2012 changes from the 918,678ha given in the FREL report[7] to 969,968ha. These calculation errors are independent of the queries relating to forest cover maps (see above).

If previous official 1990 land cover maps, which show a larger forest cover baseline, had been used to calculate the FREL, then the annual average area deforested, and the emissions level, would be about 50% higher.

### Details of the mathematical errors

The mathematical error stems from the fact that averages for calculation periods of different length (eg annual averages for six years 1990–96 and for two years 2009–11) have been treated equally in calculating the

annual average for 1990–2012, instead of weighting for the different lengths of the periods, or using the total figures. For deforestation area, the figures given are:[8]

| Period | Annual average (ha) |
|---|---|
| 1990-1996 | 638,162 |
| 1996-2000 | 2,255,196 |
| 2000-2003 | 444,362 |
| 2003-2006 | 842,636 |
| 2006-2009 | 913,820 |
| 2009-2011 | 550,520 |
| 2011-2012 | 786,052 |

Treating each of these as a single figure gives the 'annual' average of 918,678ha cited in the text (p24), but this is mathematically incorrect. An accurate annual average requires taking the total deforestation claimed for the 1990–2012 period (21,339,301ha, calculated from Table Annex 5.1) and dividing by 22 years, which gives 969,968ha average annual deforestation.

Treating degradation area in the same way corrects the average of 507,486ha cited on p25 to 543,675ha average annual degradation, based on figures in Table Annex 5.1 (total degradation for period 11,960,842ha).

The error in relation to deforestation and degradation emissions is similar: the figures of 293.2Mt$CO_2$e/yr for deforestation[9] and 58Mt$CO_2$e/yr for degradation[10] have been wrongly calculated in the same way as deforestation area and should be 310Mt$CO_2$e and 62.4Mt$CO_2$e respectively, based on the figures in Table 4.[11]

For the 'constructed' FREL,[12] given as 0.568Gt$CO_2$e, a figure of 217Mt$CO_2$e for emissions from peat decomposition has been added to the annual average deforestation and degradation emissions. However, this figure is unexplained. It should not be (and is not), an annual average for 1990-2012, because of the ongoing and incremental nature of peat decomposition emissions (see explanation FREL p28). By this logic, the constructed FREL should use the 2012 peat emissions figure, but that is 226Mt$CO_2$e,[13] not 217Mt$CO_2$e.

Therefore, based on the FREL report's own data, we calculate a FREL of 0.598Gt$CO_2$e, made up of 310Mt$CO_2$e deforestation emissions, plus 62.4Mt$CO_2$e forest degradation emissions, plus 226Mt$CO_2$e peat decomposition emissions.

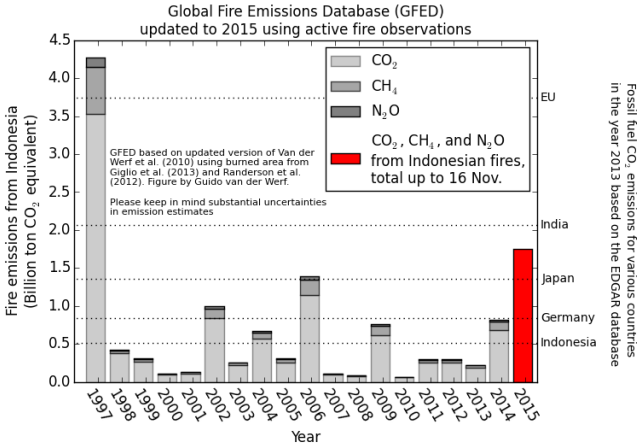
### *Other questionable numbers*

On p34, the FREL states that 'the total area of natural forests that can be converted from HPK and APL is 14.72 million ha'. On the following page, it refers to 'Natural forest area of 15.44 million ha in HPK and APL (MoFor, 2013)'. The source cited is not listed in the 'References' section. **Why are two different areas stated, or, if this is an error, which area is correct?**

## Accuracy is essential to the COP process

Calculation errors aside, Greenpeace is concerned that the FREL data paints a selective and conservative picture of Indonesia's actual forest and peatland emissions.

- **Deforestation appears to be rising**. Forest-loss alerts published by World Resources Institute show that between 2010–14 these satellite-based real-time alerts more than doubled. Even excluding the extensive damage to forests by fires, the 2015 figures were forecast to be nearly as high as 2014. The most recent MoEF data on deforestation support the WRI data, showing increasing deforestation rates for the periods 2011-2012 and 2012-2013.[14]
- The exclusion of fire emissions and historic deforested peat emissions downplays the significance of Indonesia's contribution to global GHG emissions.[15] It is vital that these partial calculations are not used outside the REDD+ process.




## Development plans assume significant deforestation

The FREL uses historical forest emissions as a baseline for assessing future reductions in deforestation and degradation. It reports that as of 2012–13, there were some 14.7/ 15.44 million ha of natural forest in zones scheduled for conversion[16] ('planned deforestation'[17]), with over 9 million ha of this in Kalimantan and Papua (see Figure 14, p35).[18] The FREL assumes that this conversion will go ahead, noting that the government's 'Nawa Cita' (nine priorities) agenda includes expansion of agricultural production (including palm oil) and increases in mining and forest products, all current drivers of deforestation. The plans for large-scale investment in relatively untouched forested areas such as Papua are exemplified by the May 2015 announcement of a revival of plans for 1.2 million ha of rice-growing in Merauke district[19] (rice is specifically excluded from the deforestation moratorium). The country's 2015–19 development plan proposes extensive development of plantations to produce biofuels as well as coal expansion (both also excluded from the moratorium).[20]

# Indonesia's Paris emission 'reduction' pledge means a massive increase in emissions

As part of the preparation for this December's Paris UN Climate Change Conference, Indonesia has set a figure for its Intended Nationally Determined Contribution (INDC) to reduce emissions.[21] The figure it has pledged[22] is a reduction of 29% against the National Action Plan on GHG Reduction (RAN-GRK) business-as-usual projection of 2,881Mt$CO_2$e emissions in 2030.[23]

However, as Indonesia had already (in 2009) pledged a 26% reduction against business-as-usual (BAU) by 2020[24] – which would mean an actual drop in emissions against a 2010 baseline – the INDC figure represents a further reduction of just three percentage points over the subsequent decade. Given the rapid increase in BAU emissions projected between 2020 and 2030, this means that in real terms Indonesia is prepared to see its emissions increase by as much as a third over the next 15 years.[25]

Meanwhile, the country's additional 2009 pledge of a reduction of 41% – conditional on international assistance – has been pushed back from 2020 to 2030, with no explanation.[26] Given that both before and since 2009 Indonesia has received offers of significant international financial support to reduce emissions from deforestation,[27] this appears to mark a weakening of its 2009 commitment.

The INDC submission is also thin on detail as to how emissions reductions are to be achieved. It presents the moratorium as the most significant step the government has so far taken towards land-use emissions reductions,[28] despite the MoEF's own data showing that deforestation rates rose after the moratorium was introduced.[29] The role of of the pulp and paper and palm oil industries as the two largest drivers of deforestation is ignored. Although an INDC draft from late August said that Indonesia aims to 'protect its remaining forests by increasing efforts in the implementation of palm oil industry no deforestation commitments',[30] this had disappeared from the final version that appeared just a few days later. Furthermore, the measures proposed include no commitments to protect undisturbed peatlands, nor to mitigate or halt current emissions from degraded peatlands, including from peat fires.

Finally, no mention is made in the INDC of the Indonesian government's New York Declaration on Forests commitment to strive for zero deforestation by 2030.

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[1] UN FAO 2015 Global Forest Resources Assessment FAO (2015) Table 2, p15, where the 1990 forest cover figure reported is the same as in previous editions. The FAO table lists 118.5m ha for Indonesia in 1990. However, in its 2010 report to the FAO, MoFor provided the original results of its land cover monitoring, which resulted in a forest cover of 122.7m ha for 1990. The lower figure in the final FAO report is due to FAO standardisations.

[2] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. Annex 8

[3] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p12

[4] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p28

[5] Hooijer A, Page S, Jauhiainen J, et al (2012) Subsidence and carbon loss in drained tropical peatlands. Biogeosciences 9:1053–1071. doi: 10.5194/bg-9-1053-2012

[6] GFED (2015) Updates. Global Fire Emissions Database. http://www.globalfiredata.org/updates.html.

[7] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p24

[8] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. (p69, Table Annex 5.1)

[9] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p27

[10] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p28

[11] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p29

[12] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p30

[13] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p28

[14] MoF (2014) Statistik Kementerian Kehutanan/Ministry of Forestry, Indonesia 2013, Ministry of Forestry, July 2014 and MoEF (2014) Deforestasi Indonesia Tahun 2012-2013, Kementarian Lingkungan Hidup dan Kehutanan, 2014

[15] The GFED estimate for the 2015 fires alone will be about 1.75Gt$CO_2$e, with substantial uncertainty. GFED (2015) Updates. Global Fire Emissions Database. http://www.globalfiredata.org/updates.html accessed 23 November.

[16] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p34

[17] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p36

[18] Ministry of Environment and Forestry (2015a) National forest reference emission level for deforestation and forest degradation: In the context of decision 1/CP.16 para 70 UNFCCC. p3

[19] Anwar A (2015) Jokowi Tetapkan Merauke Lumbung Padi Nasional. Bisnis.com. http://kabar24.bisnis.com/read/20150511/15/431870/jokowi-tetapkan-merauke-lumbung-padi-nasional.

[20] BAPPENAS (2014) Rencana pembangunan jangka menengah nasional 2015-2019 / National medium term development plan 2015-2019. http://www.bpkp.go.id/public/upload/unit/sesma/files/Buku%20II%20RPJMN%202015-2019.pdf. p255

[21] Ministry of Environment and Forestry (2015d) Intended nationally determined contribution - Republic of Indonesia. http://www4.unfccc.int/submissions/INDC/Published%20Documents/Indonesia/1/INDC_REPUBLIC%20OF%20INDONESIA.pdf. p5

[22] Ministry of Environment and Forestry (2015d) Intended nationally determined contribution - Republic of Indonesia. http://www4.unfccc.int/submissions/INDC/Published%20Documents/Indonesia/1/INDC_REPUBLIC%20OF%20INDONESIA.pdf. p5

[23] Sekretariat RAN-GRK (2015) Hasil kaji ulang dan penyusunan INDC / Results of review and preparation INDC. http://ranradgrk.bappenas.go.id/rangrk/component/content/article/92-bahasa/informasi-sektoral/193-hasil-indc.

[24] Yudhoyono SB (2009) Indonesian President's speech on climate change at 2009 G-20 meeting. http://forestclimatecenter.org/files/2009-09-25%20Intervention%20by%20President%20SBY%20on%20Climate%20Change%20at%20the%20G-20%20Leaders%20Summit.pdf

[25] Even with a 29% reduction against BAU, emissions could increase by around one-third from 2015 to 2030 – from 1,500Mt$CO_2$e to 2,000Mt$CO_2$e. This trajectory is not specific to the RAN-GRK figures but would look similar under any reasonable BAU scenario. Source: Sekretariat RAN-GRK (2015).

[26] Ministry of Environment and Forestry (2015d) Intended nationally determined contribution - Republic of Indonesia. http://www4.unfccc.int/submissions/INDC/Published%20Documents/Indonesia/1/INDC_REPUBLIC%20OF%20INDONESIA.pdf. p6

[27] Since 2007 the international donor community has pledged Indonesia some US$4.4 billion (around a third as grants, the remainder as loans) to reduce emissions from deforestation and forest degradation (source: The REDD Desk (2013)).

[28] Ministry of Environment and Forestry (2015d) Intended nationally determined contribution - Republic of Indonesia. http://www4.unfccc.int/submissions/INDC/Published%20Documents/Indonesia/1/INDC_REPUBLIC %20OF%20INDONESIA.pdf. p2

[29] Ministry of Environment and Forestry (2014) Deforestasi Indonesia tahun 2012-2013 / Deforestation in Indonesia in 2012-2013. pp54–55

[30] Ministry of Environment and Forestry (2015c) Intended nationally determined contribution - Republic of Indonesia. Consolidated Draft 2.0 - Aug 26, 2015. p2