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Technical report on the technical analysis of the technical annex to the second biennial update report of Indonesia submitted in accordance with decision 14/CP.19, paragraph 7, on 21 December 2018

Summary

This technical report covers the technical analysis of the technical annex submitted on a voluntary basis, in the context of results-based payments, by Indonesia on 21 December 2018 through its second biennial update report, in accordance with decision 14/CP.19. The technical annex provides data and information on the activities reducing emissions from deforestation and reducing emissions from forest degradation, which are activities included in decision 1/CP.16, paragraph 70, and covers the same national territorial forest area as the assessed forest reference emission level proposed by Indonesia in its forest reference emission level submission of January 2016.

Indonesia reported the results of the implementation of these activities for 2013–2017, which amount to 244,892,137 t CO_2 eq and were measured against the assessed forest reference emission level.

The data and information provided in the technical annex are in overall accordance with the guidelines contained in the annex to decision 14/CP.19. The technical analysis concluded that the data and information provided by Indonesia in the technical annex are transparent and consistent with the assessed forest reference emission level established in accordance with decision 1/CP.16, paragraph 71(b), and decision 12/CP.17, section II. This report contains the findings from the technical analysis and a few areas identified for capacity-building and future technical improvement in accordance with decision 14/CP.19, paragraph 14.

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Abbreviations and acronyms

AD	activity data
BUR	biennial update report
COP	Conference of the Parties
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
FREL	forest reference emission level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
NFMS	national forest monitoring system
QA/QC	quality assurance/quality control
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
SOC	soil organic carbon
TA	technical analysis
TTE	team of technical experts
2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*

I. Introduction

A. Introduction

1. This technical report covers the TA of the technical annex provided by Indonesia on 21 December 2018 in accordance with decision 14/CP.19, paragraph 7, included in the second BUR of Indonesia, which was submitted in accordance with decision 2/CP.17, paragraph 41(a), and annex III, paragraph 19. In the technical annex, Indonesia provided the data and information used for estimating its anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest carbon stock and forest area changes resulting from the implementation of REDD+ activities. The submission of the technical annex is voluntary and in the context of results-based payments in accordance with decision 14/CP.19, paragraph 8. The TA was coordinated by Dirk Nemitz (secretariat).

2. In this context, Indonesia underlined that the submission of the technical annex through its second BUR is voluntary and exclusively to obtain and receive payments for REDD+ actions, under decision 13/CP.19, paragraph 2, and decision 14/CP.19, paragraphs 7 and 8.

3. The TA of the technical annex is part of the international consultation and analysis of BURs referred to in decision 2/CP.17, annex IV, paragraph 4, the objective of which is to increase the transparency of mitigation actions and their effects through analysis by the TTE in consultation with Indonesia and through a facilitative sharing of views, resulting in a separate summary report.[1]

4. Indonesia made its FREL submission, in accordance with decision 12/CP.17, on 4 January 2016, which was subject to a technical assessment following the guidance provided in decision 13/CP.19 and its annex. The assessed FREL was included as one of the elements of the technical annex to its second BUR in accordance with the guidelines contained in the annex to decision 14/CP.19. The findings from the technical assessment of the FREL are included in a separate report.[2]

B. Process overview

5. The TA of the second BUR of Indonesia took place from 27 to 31 May 2019 in Bonn and was undertaken by the following TTE drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Sorin Deaconu (Romania), Sangay Dorji (Bhutan), Takeshi Enoki (Japan), Sandra Motshwanedi (South Africa), Stanford Mwakasonda (United Republic of Tanzania), Sekai Ngarize (Zimbabwe), Atsushi Sato (Japan), Ioannis Sempos (Greece), Samir Tantawi (Egypt) and Hartley Walimwipi (Zambia). Ms. Ngarize and Mr. Sempos were the co-leads. Mr. Dorji and Mr. Sato were the LULUCF experts who undertook the TA of the technical annex in accordance with decision 14/CP.19, paragraphs 10–13.

6. The TA of the technical annex provided by Indonesia was undertaken in accordance with the procedures contained in decisions 2/CP.17, 14/CP.19 and 20/CP.19. This technical report on the TA was prepared by the LULUCF experts in the TTE in accordance with decision 14/CP.19, paragraph 14.

7. During the TA and subsequent exchanges, the LULUCF experts and Indonesia engaged in technical discussions, and Indonesia provided clarifications in response to the questions raised by the LULUCF experts, in order to reach a common understanding on the identification of the capacity-building needs of the Party and areas for technical improvement.

8. Following the TA of the technical annex, the LULUCF experts prepared and shared the draft technical report with Indonesia for its review and comments. The LULUCF experts

[1] FCCC/SBI/ICA/2019/TASR.2/IDN.

[2] FCCC/TAR/2016/IDN, published on 25 November 2016.

responded to the Party's comments and incorporated them into and finalized this technical report in consultation with Indonesia.

C. Summary of results

9. In decision 1/CP.16, paragraph 70, the COP encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party in accordance with its respective capabilities and national circumstances. In the context of results-based payments and in line with decision 12/CP.17, Indonesia, on a voluntary basis, proposed a national FREL covering the activities reducing emissions from deforestation and reducing emissions from forest degradation for the purpose of a technical assessment in accordance with decision 13/CP.19 and its annex. The activities are being implemented in natural forests in Indonesia's national territory, which covered an area of 113.2 million ha in 1990, comprising up to 60 per cent of the national territory and 78.6 per cent of the country's total forest land in 1990 (plantation forests are excluded). The assessed FREL of Indonesia was 568,859,881 t CO_2 eq for 2013 but increases annually because of accumulating emissions from peat decomposition, reaching 593,329,235 t CO_2 eq for 2020.

10. The Party's FREL is based on its annual average historical CO_2 emissions for carbon losses in above-ground biomass due to deforestation and forest degradation and on the linear trend of historical CO_2 emissions for carbon losses in soil due to peatland decomposition for the historical reference period 1990–2012. Indonesia reported the results of the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2013–2017, calculated against the FREL, which amount to emission reductions of 48,978,427 t CO_2 eq annually (average of annual emissions) and 244,892,137 t CO_2 eq as the total for 2013–2017.

II. Technical analysis of the information reported in the technical annex to the second biennial update report

A. Technical annex

11. For the technical annex to the second BUR submitted by Indonesia, see annex I.[3]

B. Technical analysis

12. The scope of the TA is outlined in decision 14/CP.19, paragraph 11, according to which the TTE shall analyse the extent to which:

(a) There is consistency in the methodologies, definitions, comprehensiveness and information provided between the assessed FREL and the results of the implementation of REDD+ activities;

(b) The data and information provided in the technical annex are transparent, consistent, complete and accurate;

(c) The data and information provided in the technical annex are consistent with the guidelines referred to in decision 14/CP.19, paragraph 9;

(d) The results are accurate, to the extent possible.

13. The remainder of this chapter presents the results of the TA of the technical annex to the BUR according to the scope outlined in paragraph 12 above.

[3] In accordance with decision 14/CP.19, para. 14(a).

1. Consistency in the methodologies, definitions, comprehensiveness and information provided between the assessed reference level and the results in the technical annex

14. In accordance with decision 14/CP.19, paragraph 3, the data and information used by Parties for estimating anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest carbon stock and forest area changes related to REDD+ activities undertaken by them should be transparent and consistent over time and with their established FREL in accordance with decision 1/CP.16, paragraph 71(b) and (c), and decision 12/CP.17, section II.

15. The LULUCF experts noted that Indonesia ensured overall consistency between its FREL and its estimation of the results of the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation in 2013–2017 by:

(a) Using consistent methodologies and data to generate AD on the deforestation area (defined as loss of natural forest cover below a certain threshold and converted to non-forest land without considering subsequent regrowth after forest cover loss; i.e. "gross" deforestation), the forest degradation area (defined as a change from primary forest to disturbed secondary forest) and the degraded peatland area where deforestation or forest degradation have occurred. The areas of deforestation and forest degradation were both derived from the same forest monitoring system using the same method, procedure and stratification by overlaying land-cover maps with 23 land-cover classifications generated from Landsat satellite images in different time points, with a minimum mapping unit of 6.25 ha. Deforestation is identified by the change from six natural forest land classifications to non-forest land classifications, excluding subsequent regrowth. Forest degradation is identified by the change from primary natural forest land classifications to secondary natural forest land classifications. The same peatland map was used for deriving the degraded peatland area;

(b) Using consistent methodologies and data to generate EFs, in particular the same EFs associated with specific land-cover changes based on the consistent land-cover stratification;

(c) Including the same carbon pools: above-ground biomass and SOC;

(d) Including the same gases: CO_2 only;

(e) Covering the same area: entire national territory;

(f) Using the same assumption that all peatland where deforestation or forest degradation has occurred is considered as degraded (drained);

(g) Using the same forest definition as that used in constructing its FREL.

16. Regarding the AD referred to in paragraph 15(a) above, Indonesia provided the land-use matrices of deforestation and forest degradation areas in each year for 2013–2017 during the consultation process, in response to a request from the LULUCF experts. The LULUCF experts confirmed that the emissions reported in the technical annex were reconstructed using the land-use matrices provided by the Party. Indonesia also mentioned that the land-use matrices and the reported values for deforestation and forest degradation areas in the REDD+ performance report, which is one of the main background documents of Indonesia's REDD+ submission (see annex III), were not consistent with those used in the technical annex because there were some mistakes in the REDD+ performance report regarding the process of excluding the effect of regrowth after deforestation or forest degradation.

17. In view of the above, the LULUCF experts concluded that the results presented of the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation are consistent with the assessed FREL. The LULUCF experts commend Indonesia for ensuring the full consistency of the data and methodologies described in the FREL for 1990–2012 and in the technical annex with the results of the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2013–2017.

2. Transparency, consistency, completeness and accuracy of the data and information provided in the technical annex

18. The LULUCF experts noted that, as part of the TA process, Indonesia provided additional information, in particular the transition matrix of land-cover changes, some technical clarifications of EFs and the relationship between the GHG inventory and the result. The LULUCF experts commend Indonesia for its efforts to increase the transparency and ensure the completeness[4] of the data and information provided, allowing for the reconstruction of the results.

19. The method and procedure of AD collection are consistent in both the construction of the FREL and the calculation of the result. The same EFs are used in the calculations for the FREL and the results of the activities.

20. According to decision 12/CP.17, paragraph 8, the FREL shall be established taking into account decision 4/CP.15, paragraph 7, and maintaining consistency with the anthropogenic forest-related GHG emissions by sources and removals by sinks reported in the Party's GHG inventory. Indonesia clarified during the consultation process that there is no difference in the method and principal data it used for deforestation and forest degradation-related estimations in its GHG inventories between the first and second BURs. Taking into account the conclusion in the technical assessment of the FREL that consistency was achieved between the FREL and the GHG inventory in the first BUR[5] and also the information referred to in paragraph 21 below, the team assessing Indonesia's FREL noted that the Party maintained consistency in terms of sources of AD and EFs with the GHG inventory included in its second BUR.[6]

21. The LULUCF experts noted that Indonesia reported emission estimates from peat decomposition in its second BUR that are different from the emission estimates reported in the technical annex. The differences range from 29 to 31 per cent for 2013–2017. During the TA, Indonesia explained that the methodology used for the estimations was the same but the activity areas were different. The AD for the second BUR included the entire peat decomposition area in Indonesia, whereas the AD for REDD+ activities included only the areas of peat decomposition that were forested in 1990.

22. Indonesia identified in the technical annex an inadequacy in the reference level for emissions from peat decomposition (box 3-1, p.A-37). In the FREL, the reference level of peat decomposition was based on the future projection of emissions, which was estimated using a linear regression of historical emissions during 1990–2012. As the new annual degraded areas in 2010–2012 were larger than before, the linear regression approach estimated projected emissions in 2013–2015 to be smaller than the actual emissions in 2012. The AD for the emissions from peat decomposition are the total degraded peatland area in each year, and the new degraded area is added to the total degraded area from the previous year. The AD and the associated emissions do not decrease unless those degraded peatlands are restored or rewetted. Thus, Indonesia explained that the reference emissions will always be below the actual emissions. The LULUCF experts agreed with the Party on the inadequacy of the FREL and acknowledge Indonesia's intention for the future improvement of the peat emission estimates included in the FREL (see paras. 36 and 37 below). The LULUCF experts note that including emissions from peatland in FREL submissions is challenging and commend Indonesia for its efforts on this matter.

23. In response to a question from the LULUCF experts, Indonesia clarified that most of the data (EFs and the NFMS base data) are publicly available; however, the land-use matrices are not publicly available because of the large size of the relevant base data. The LULUCF experts commend Indonesia for providing transparent information and continuing to improve the accuracy of its estimates.

24. The LULUCF experts concluded that Indonesia provided the necessary information to allow for the reconstruction of the results of the implementation of the activities reducing

[4] "Complete" here means the provision of the information necessary for the reconstruction of the results.

[5] FCCC/TAR/2016/IDN, para. 39.

[6] Available at https://unfccc.int/documents/192165.

emissions from deforestation and reducing emissions from forest degradation. The data and information provided in the technical annex are considered to be transparent, consistent, complete and accurate to the extent possible. Although some of the elements required by COP decisions or allowing for the reconstruction of results were not explicitly described in the technical annex, relevant information and data to allow for the reconstruction of results were obtained from the documents referred to in the technical annex or the responses from the Party to the questions of the LULUCF experts during the TA.

3. Consistency with the guidelines on elements to be included in the technical annex

25. Indonesia provided data and information on all the required elements in accordance with the guidelines contained in the annex to decision 14/CP.19, namely summary information from the final report containing the assessed FREL; results in t CO_2 eq per year, consistent with the assessed FREL; a demonstration that the methodologies used to produce the results are consistent with those used to establish the assessed FREL (as outlined in chapter II.B.1 above); a description of forest monitoring systems and the institutional roles and responsibilities in the MRV of the results; the information necessary for the reconstruction of the results (as outlined in chapter II.B.2 above); and a description of how the elements contained in decision 4/CP.15, paragraph 1(c) and (d), have been taken into account.

26. In its submission, Indonesia provided a summary table with the results of the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2013–2017, consistent with the assessed FREL and allowing for the reconstruction of the results. The emission reductions achieved can be calculated by referring to the listed references and actual emissions in table 3-1 of the technical annex and amount to 48,978,427 t CO_2 eq per year (on average) and 244,892,137 t CO_2 eq as a total for the five years covered.

27. The LULUCF experts noted that Indonesia provided a description of the NFMS and a summary of the institutional roles and responsibilities for the MRV of the results in the technical annex, together with weblinks for accessing further information. The NFMS is web based, and timber stocks and changes are assessed using data based on a land-cover map of Indonesia generated in three-year intervals or less, covering 23 land-cover classes.

28. The NFMS covers all forest lands (areas that are legally designated forest) with forest cover at altitudes below 1,000 m (excluding mountain forests). The roles and responsibilities of the agencies and institutions involved in MRV were transparently explained. The NFMS is managed by the Directorate of Forest Resources Inventory and Monitoring and the Directorate General of Forestry Planning and Environmental Arrangements of the Ministry of Environment and Forestry, and emission estimates and validation of the estimates are done by the Directorate General of Climate Change. The LULUCF experts commend Indonesia for sharing this information and the information that the NFMS is continuously improving.

29. According to decision 11/CP.19, paragraph 4(b), the NFMS should enable the assessment of different types of forest in the country, including natural forest. The technical annex to the second BUR and the additional information provided to the LULUCF experts during the TA indicated that the NFMS coverage includes dryland forest, swamp forest and mangrove forest with primary and secondary strata. Indonesia further clarified during the TA that the NFMS is continuously being improved to increase the accuracy of data generated.

30. Indonesia provided a description of how IPCC guidance and guidelines were taken into account in accordance with decision 4/CP.15, paragraph 1(c). For the estimation of emission reductions in natural forests across Indonesia, Indonesia used the methodology provided in the 2006 IPCC Guidelines and used the *2013 Supplement to the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands* for estimating carbon stocks relating to land-cover changes among 23 land-cover categories. Accordingly, emissions from deforestation and from forest degradation were estimated for 2013–2017 by combining AD (i.e. areas of annual gross deforestation and forest degradation detected by land-cover transition matrices) with the appropriate EF (i.e. emissions associated with the land-cover changes corresponding to each forest type).

31. The carbon pools included in the estimates are above-ground biomass and SOC. Both deforestation and forest degradation include the same carbon pools: above-ground biomass and SOC on peatland. Below-ground biomass, litter, deadwood and soil organic carbon except for peat soil are not included. The estimation of the results includes CO_2 only. The inclusion of carbon pools and gases is fully consistent between the FREL and the estimation of the results.

4. Accuracy of the results proposed in the technical annex

32. The LULUCF experts noted that the Party's estimation of the results of the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation in the national area of Indonesia was undertaken using a transparent and consistent approach. The LULUCF experts commend Indonesia for its significant long-term efforts to build up a robust NFMS that can provide transparent estimates of emissions from deforestation.

33. Both the established FREL and the results obtained for 2013–2017 from the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation are based on the assumptions that the amount of above-ground biomass per area in each forest type does not change over time, all losses of carbon in above-ground biomass are estimated as CO_2 emissions in the year of land-cover change (i.e. by applying instantaneous oxidation), regrowth after land-cover change is not considered, and all peatland areas where deforestation or forest degradation appear are treated as degraded. The LULUCF experts noted that these assumptions may affect the accuracy of the estimated emissions from the activities; however, the effect of the assumptions on the emission reduction results, in terms of accuracy, may be limited because such effects are likely cancelled out by comparing the FREL and the actual emissions.

34. Indonesia clarified during the consultation process that the accuracy of AD has improved over time (e.g. the accuracy of AD on forest land in 1990, 2012 and 2016 is 93.32, 94.60 and 95.98 per cent, respectively). This is due to various improvements, including the quality of the raw data and the technique of satellite image interpretation. Indonesia also improved its uncertainty estimates, namely moving from a single uncertainty value in the FREL to improved uncertainty values generated to improve AD for each year, taking into account the issue identified during the TA of the FREL.[7] The LULUCF experts commend Indonesia for these efforts and noted that this improvement helps to reduce uncertainties in accordance with decision 4/CP.15, paragraph 1(d)(iii).

35. As mentioned in paragraph 22 above, Indonesia expressed concern about the accuracy of the estimated emissions from peat decomposition expressed as increases of emissions compared with the reference level of peat decomposition. However, overall consistency between the FREL and the results of the activities is ensured, and the LULUCF experts concluded that the results are accurate to the extent possible.

C. Areas identified for technical improvement

36. The LULUCF experts concluded that the following areas for technical improvement identified in the report on the technical assessment of Indonesia's FREL[8] also apply to the provision of information on the results of the implementation of the activities reducing emissions from deforestation and reducing emissions from forest degradation:

(a) AD: improving the accuracy and consistency of the interpretation of satellite images by directly comparing time series of satellite images (rather than analysing satellite images for time points individually by overlaying maps to detect changes), and automated image processing techniques could be introduced;

(b) Forest EFs (carbon stock): further improving the EFs derived from the national forest inventory;

[7] FCCC/TAR/2016/IDN, para. 41(b).
[8] FCCC/TAR/2016/IDN.

(c) Peatland EFs: improving data collection on peatlands, which will lead to a better understanding of their characteristics and to better peatland EFs;

(d) Peatland fire emission estimates: including peat fire emission estimates in future FRELs by using advanced remote sensing technology to improve burned scar and peat depth mapping, which would increase the accuracy of estimations of peat fire emissions;

(e) Inclusion of other REDD+ activities in future FREL submissions: making efforts to understand both the technical aspects and the socioeconomic aspects of the enhancement of forest carbon stocks, as well as the role of conservation and sustainable management of forests, with the aim of including additional REDD+ activities in the FREL;

(f) Assessing whether post-conversion removals in different land uses are significant and could be taken into account when estimating emissions from deforestation;

(g) Including other significant pools, such as below-ground biomass, deadwood and SOC in addition to that for peat soil (see para. 31 above), and including non-CO_2 GHG emissions.

37. During the consultation process, Indonesia informed the LULUCF experts on progress regarding the improvement plans on AD accuracy, namely by establishing a new system for examining the accuracy of land-cover (forest) mapping from remote sensing data and from annual land and forest fire maps from the Landsat satellite starting from 2000, and is developing detailed maps of the peatland area and peatland canals, which are periodically updated.

38. Indonesia also identified the following areas for technical improvement:

(a) In relation to paragraph 36(d) and (g) above, on the inclusion of other significant pools, reflecting new information that is becoming available, for example from peer-reviewed studies of GHG emissions from mangrove ecosystems and peatland fires;

(b) Applying a remote sensing approach to estimate water table conditions or the subsidence of peatland to significantly improve the accuracy and consistency of the data and to provide wall-to-wall monitoring of peatlands, resulting in improved AD and improved EFs.

39. Furthermore, the LULUCF experts noted that Indonesia could consider the following areas for technical improvement:

(a) Exploring the possibility of reconsidering the reference level emissions from peatland decomposition by incorporating Indonesia's experience to date (e.g. by applying the average additional emissions during the reference period as annual incremental emissions from peat decomposition) as communicated to the LULUCF experts during the analysis week;

(b) Enhancing the QA/QC procedures applied in the compilation of the submission, particularly those aimed at ensuring the accuracy and consistency of units, significant figures and conversion factors used.

D. Comments and responses of the Party

40. During the consultation process, Indonesia identified several capacity-building needs. Addressing those needs could potentially enable Indonesia to improve its data and methodologies, and to include additional activities and gases in future FREL submissions. After exchanges with the LULUCF experts, Indonesia identified the following capacity-building needs:

(a) Data improvement:

(i) Improvement of the national technical capacity by allowing increased participation by the public, researchers, academic institutions and other non-State actors, including subnational entities such as forest management units to use more detailed methods to detect forest degradation, and include other REDD+ activities;

(ii) Capacity-building for EFs, especially for improving data management;

(b) Institutional arrangements:

(i) Improvement of standard operating procedures to reduce the uncertainty and increase the accuracy of the analysis of land cover and land-cover change;

(ii) Facilitation for the implementation of standard operating practices that include multiple stakeholders;

(c) MRV system improvement:

(i) Development of a data publication and online analysis system, to comply with transparency requirements;

(ii) Development of an integrated system for strengthening the linkage between the GHG inventory and mitigation actions to support the transparency and accountability of methodologies.

41. The LULUCF experts noted that units were not reflected correctly in the tables and that significant figures in the numbers reported were not consistent. In response to a question from the LULUCF experts, Indonesia explained that there were no specific rules on the use of significant figures. Enhanced QA/QC checks of those elements of reporting, such as checking for units, significant numbers, conversion factors and so on, were identified as an additional capacity-building need.

III. Conclusions

42. The LULUCF experts conclude that Indonesia reported the results of the implementation of two activities, reducing emissions from deforestation and reducing emissions from forest degradation, for its entire territory. Deforestation is defined as loss of natural forest cover below a certain threshold and converted to non-forest land without considering subsequent regrowth after forest cover loss. Forest degradation is defined as a change from primary forest to disturbed secondary forest. Plantation forest is excluded from Indonesia's REDD+ activities. The results include estimates of emissions of CO_2 from two carbon pools: above-ground biomass and SOC from deforestation and forest degradation occurring on peatlands identified with a minimum mapping unit of 6.25 ha for 2013–2017. The results of the activities were reported using methodologies, definitions, assumptions and information consistent with those used for the assessed FREL.

43. The LULUCF experts consider the data and information provided in the technical annex to be transparent, consistent, complete and accurate.

44. The LULUCF experts found that the data and information provided in the technical annex, with the additional clarification by Indonesia during the consultation process, are consistent with the guidelines referred to in decision 14/CP.19, paragraph 11.

45. The results are accurate to the extent possible, based on the assumptions used.

46. In conclusion, the LULUCF experts commend Indonesia for showing a strong commitment to the continuous improvement of the data and information used for calculating the results, in line with the stepwise approach, which are consistent with those used to establish its assessed FREL. Some areas for future technical improvement and capacity-building needs identified by Indonesia have been identified in this report. At the same time, the LULUCF experts acknowledge that such improvements are subject to national capabilities and circumstances, and note the importance of adequate and predictable support.[9] The LULUCF experts also acknowledge that the TA process was an opportunity for a facilitative and constructive technical exchange of views and information with Indonesia.[10]

[9] In accordance with decision 2/CP.17, para. 57.

[10] In accordance with decision 14/CP.19, paras. 12–13.

Annex I

Technical annex to the biennial update report

Owing to the complexity and length of the submitted technical annex to the BUR, and in order to maintain the original formatting, the technical annex is not reproduced here. It is available on the UNFCCC website at https://unfccc.int/BURs.

Annex II

Summary of the main features of the proposed results of the implementation of the activities referred to in decision 1/CP.16, paragraph 70, based on information provided by Indonesia

Key elements		*Remarks*
Results reported	48 978 427 t CO_2 eq/year (average) 244 892 137 t CO_2 eq (total)	Represented as emission reduction amounts (see para. 10 of this document)
Results period	2013–2017	See paragraph 10 of this document
Assessed FREL	568 859 881 t CO_2 eq/year (for 2013) 593 329 235 t CO_2 eq/year (for 2020)	See paragraph 9 of this document
Reference period	1990–2012	The FREL is based on the annual average of historical CO_2 emissions for carbon losses in above-ground biomass due to deforestation and forest degradation and on the linear trend of historical CO_2 emissions for carbon losses in soil due to peatland decomposition for the historical reference period of 1990–2012 (see para. 10 of this document)
National/subnational	National	Indonesia has developed a national FREL that covers all land areas covered by natural forests in 1990 (113.2 million ha) or 60 per cent of the total land area of Indonesia (see para. 9 of this document)
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation	The activities include gross emissions from deforestation (without considering forest regeneration) and emissions from forest degradation (conversion of primary forests to secondary forests) (see paras. 10, 15(a) and 17 of this document)
Pools included	Above-ground biomass Soils	Above-ground biomass is included for all strata. SOC is included only for deforestation and forest degradation occurring on peatlands. Below-ground biomass, deadwood and litter are not included. SOC on any soils except peatlands is also not included. The pools included are consistent between the FREL and the results (see paras. 15(c) and 31 of this document)
Gas included	CO_2	The gas included is consistent between the FREL and the results (see paras. 15(d) and 31 of this document)
Consistency between assessed FREL and the results	Methods, definitions and information used for the assessed FREL are consistent with the results	Indonesia used consistent methodologies and data to generate AD and used the same EFs for both the results and FREL assessments (see paras. 15 and 17 of this document)

Key elements		*Remarks*
Description of NFMS and institutional roles	Included	The NFMS is a web-based integrated monitoring system that provides spatial forest data and summary reports. The NFMS offers data on forest resources, consisting of a national forest/land cover data set including forest/land fires (burn scar data sets), which are periodically updated (see paras. 27 and 28 of this document)
Identification of future technical improvements	Included	Several areas for future technical improvement were identified in the additional clarification from the Party (see para. 38 of this document)

Annex III

Documents and information used during the technical analysis

A. Reference documents

First FREL submission of Indonesia. Available at https://redd.unfccc.int/submissions.html?topic=6.

"Guidelines and procedures for the technical assessment of submissions from Parties on proposed forest reference emission levels and/or forest reference levels". Annex to decision 13/CP.19. Available at https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf.

"Guidelines for submissions of information on reference levels". Annex to decision 12/CP.17. Available at https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf.

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Report on the TA of the proposed FREL of Indonesia submitted in 2016. FCCC/TAR/2016.IDN. Available at https://redd.unfccc.int/submissions.html?country=idn.

B. Additional information provided by the Party

The following documents[1] were provided by the Party in response to requests for clarification or additional information during the TA:

1.Indonesia Report on REDD+ Performance, Directorate General of Climate Change, Ministry of Environment and Forestry, Republic of Indonesia, 2018, available at: http://ditjenppi.menlhk.go.id/reddplus/images/adminppi/dokumen/Book_IRPR_KLHK_B5_revisi_4_opt.pdf

2. Proces Technical Assessment: Forest Emission Level, Indonesia Pada Tahun 2016, Direktorat Jenderal Inventarisasi GRK Dan MPV Direktorat Genderal Pengendalian Perubahan Iklim Kementerian Lingkungan Hidup Dan Kehutanan, 2018, available at: http://ditjenppi.menlhk.go.id/reddplus/images/adminppi/dokumen/igrk/13-buku_proses_TA_B5.pdf

3. Land Transition Matrices, 2012-2017.

[1] Reproduced as received from the Party.