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Technical report on the technical analysis of the technical annex to the first biennial update report of Suriname submitted in accordance with decision 14/CP.19, paragraph 7, on 5 November 2022

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 Suriname on 5 November 2022 through its first 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 (FREL) proposed by Suriname in its modified FREL submission of June 2018.

Suriname reported the results of implementing these activities for 2016–2019, which amount to 9,178,978 tonnes of carbon dioxide equivalent and were measured against the assessed FREL of 14,627,465, 15,591,284, 16,555,103 and 17,518,922 tonnes of carbon dioxide equivalent for 2016, 2017, 2018 and 2019 respectively.

The data and information provided in the technical annex are in overall accordance with the guidelines contained in decision 14/CP.19, annex. The technical analysis concluded that the data and information provided by Suriname in the technical annex are transparent and consistent with the data and information used for establishing the assessed FREL 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

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
BUR	biennial update report
CH$_4$	methane
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
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
N$_2$O	nitrous oxide
NFI	national forest inventory
NFMS	national forest monitoring system
QGIS	quantum geographic information system
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

I. Introduction, overview and summary

A. Introduction

1.   This technical report covers the TA of the technical annex provided by Suriname on 5 November 2022 in accordance with decision 14/CP.19, paragraph 7, included in its first BUR, which was submitted in accordance with decision 2/CP.17, paragraph 41(a), and annex III, paragraph 19. In the technical annex, Suriname provided the data and information used for estimating its anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and changes in forest carbon stock and forest area resulting from implementing 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 Keiichi Igarashi (secretariat).

2.   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 Suriname and through a facilitative sharing of views, resulting in a separate summary report.[1]

3.   Suriname made its first FREL submission, in accordance with decision 12/CP.17, on 8 January 2018, 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 first BUR in accordance with the guidelines contained in decision 14/CP.19, annex. The findings from the technical assessment of the FREL are included in a separate report.[2]

B. Process overview

4.   The TA of the first BUR of Suriname took place from 17 to 22 February 2023 as a desk analysis 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: Buket Akay (Türkiye), Irina Atamuradova (member of the Consultative Group of Experts from Turkmenistan), Bernard Ayittah (Ghana), Yen Mee Chong (Malaysia), Sangay Dorji (Bhutan), Craig William Elvidge (New Zealand), Baasansuren Jamsranjav (Mongolia), Nato Lomidze (Georgia), Anwar Sidahmed Mohamed Abdalla (Sudan), Gherghita Nicodim (Romania), Marcela Itzel Olguin-Alvarez (Mexico), Maria de los Angeles Soriano-Luna (Mexico) and David Glen Thistlethwaite (United Kingdom of Great Britain and Northern Ireland). Craig William Elvidge and Maria de los Angeles Soriano-Luna were the LULUCF experts who undertook the TA of the technical annex from 20 to 24 February 2023 in accordance with decision 14/CP.19, paragraphs 10–13.

5.   The TA of the technical annex provided by Suriname 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.

6.   During the TA and subsequent exchanges, the LULUCF experts and Suriname engaged in technical discussions, and Suriname provided clarifications in response to questions raised by the LULUCF experts, in order to reach an understanding on the identification of the capacity-building needs of the Party and areas for future technical improvement. As a result of the facilitative interactions with the LULUCF experts during the TA, Suriname submitted a modified version of its technical annex on 3 April 2023.

7.   Following the TA of the technical annex, the LULUCF experts prepared and shared the draft technical report with Suriname for its review and comments. The LULUCF experts responded to the Party's comments and incorporated them into and finalized this technical

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[1] FCCC/SBI/ICA/2023/TASR.1/SUR.
[2] FCCC/TAR/2018/SUR, published on 23 November 2018.

report in consultation with Suriname. This technical report on the TA of the technical annex was prepared in the context of the modified technical annex submitted by Suriname.

C. Summary of results

8.   In decision 1/CP.16, paragraph 70, the Conference of the Parties 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, Suriname, on a voluntary basis, proposed a national FREL covering the activities reducing emissions from deforestation and reducing emissions from forest degradation[3] for the purpose of a technical assessment in accordance with decision 13/CP.19 and its annex. The activities are being implemented in an area of 152,000 km^2, which is 100 per cent of Suriname's total forest land, comprising up to 93 per cent of the national territory. The assessed FREL of Suriname is 14,627,465 t CO_2 eq for 2016, 15,591,284 t CO_2 eq for 2017, 16,555,103 t CO_2 eq for 2018 and 17,518,922 t CO_2 eq for 2019.

9.   The Party's FREL is based on its historical CO_2 emissions associated with the activities reducing emissions from deforestation and reducing emissions from forest degradation for the historical reference period 2000–2015. In accordance with decision 12/CP.17, paragraph 9, Suriname adjusted its proposed FREL upward by 1.3 per cent. Suriname indicated its intention to update its FREL by improving the stratification used for AD and EFs, the assessment of emissions from forest degradation related to mining and net emissions related to conversion of primary forests to areas of shifting cultivation, the monitoring of the AD and EFs for different logging activities and including other carbon pools such as litter and SOC and the other REDD+ activities. Suriname reported the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2016–2019, calculated against the FREL, which amount to emission reductions of 9,178,978 t CO_2 eq (1,819,273 t CO_2 eq for 2016, 1,526,545 t CO_2 eq for 2017, 2,903,107 t CO_2 eq for 2018 and 2,930,053 t CO_2 eq for 2019).

II. Technical analysis of the information reported in the technical annex

A. Technical annex

10.   For the technical annex to the first BUR submitted by Suriname, see annex I.[4]

B. Technical analysis

11.   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)   The methodologies, definitions, comprehensiveness and information provided are consistent between the assessed FREL and the results of implementing 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.

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[3] The activity reducing emissions from forest degradation in Suriname covers emissions only from forest degradation due to logging.
[4] As per decision 14/CP.19, para. 14(a).

12.   The remainder of this chapter presents the results of the TA of the technical annex to the Party's first BUR according to the scope outlined in paragraph 11 above.

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

13.   In accordance with decision 14/CP.19, paragraph 3, the data and information used by a Party for estimating its anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and changes in forest carbon stock and forest area resulting from implementing REDD+ activities should be transparent and consistent over time and with the data and information used for establishing its FREL in accordance with decision 1/CP.16, paragraph 71(b–c), and decision 12/CP.17, section II.

14.   The LULUCF experts noted that Suriname ensured overall consistency between its assessed FREL and estimated results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation in 2016–2019 by:

(a)   Using consistent methodologies and data to generate AD on gross deforestation in natural forests and forest degradation due to timber logging (e.g. area-based AD for deforestation and volume-based AD for forest degradation), in particular applying the same approach to assessing areas of deforestation;

(b)   Using consistent methodologies and data to generate EFs, in particular the same stratification through the same combination of physical (e.g. natural boundaries) and administrative (e.g. protected areas) boundaries of the four forest types used for the FREL;

(c)   Covering the same three carbon pools: above-ground biomass, below-ground biomass and deadwood;

(d)   Covering the same gases: CO_2, CH_4 and N_2O;

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

(f)   Assuming that all carbon from the three carbon pools is lost in the year of the deforestation event;

(g)   Using the same forest definition, namely land covered primarily by trees but also often containing shrubs, palms, bamboo, herbs, grass and climbers, with a minimum tree cover of 30 per cent (or equivalent stocking level) and the potential to reach a minimum canopy height in situ of 5 m and a minimum area of 1 ha.

15.   In view of the above, the LULUCF experts concluded that the results presented of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation are consistent with the assessed FREL. The LULUCF experts commend Suriname for ensuring consistency of data and methodologies between the FREL submission for 2016–2020 and the modified technical annex with the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2016–2019.

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

16.   As part of the TA process, Suriname provided additional information, including weblinks, in particular information demonstrating that the methodologies used to produce the results are consistent with those used to produce the FREL; worksheets showing the calculations underlying the results; and the uncertainty analysis pertaining to emissions from deforestation and forest degradation. The LULUCF experts commend Suriname for its efforts to increase the transparency and ensure the completeness[5] of the data and information provided, thus allowing for reconstruction of the results.

17.   Suriname used a combination of approaches 2 and 3 from the 2006 IPCC Guidelines to determine historical deforestation in 2000–2009, 2009–2013, 2013–2014 and 2014–2015. Areas of deforestation during these periods were determined on the basis of Landsat satellite

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[5]   "Complete" here means including the information necessary for reconstructing the results.

images, which were used for the base and all deforestation maps. The Party assumed a linear trend when projecting the level of deforestation for 2016–2020 for its FREL, taking into account the time series 2000–2015.

18.   The same approach as that used for determining historical emissions was used to determine actual deforestation in 2016–2019. Wall-to-wall monitoring of AD using Landsat and Sentinel-2A imagery with semi-automatic classification in QGIS and the methodology recommended by Olofsson et al. (2014) was used to estimate deforestation.

19.   The EFs for deforestation used for constructing the FREL and estimating the results for 2016–2019 were based on the average total carbon stocks of the three carbon pools (above-ground biomass, below-ground biomass and deadwood) for each of the four forest strata, assuming instantaneous oxidation of all carbon stocks (see tables 4–5 of the FREL submission). The data were provided by the Foundation for Forest Management and Production Control.

20.   The same AD and EFs were used for the FREL and estimating the results, with the same historical periods used for deriving the AD for forest degradation and deforestation. The volume-based AD for forest degradation were taken from the annual records of timber production of the Foundation for Forest Management and Production Control.

21.   The EFs for forest degradation were estimated on the basis of the assumption of the instantaneous oxidation of the direct losses in living biomass due to logging activities, including log extraction, non-extraction of felled trees (e.g. stumps and logging-related damage to other trees incidental to tree felling) and establishment of skid trails and haul roads. The Party reported that, since the IPCC good practice guidance for LULUCF and the 2006 IPCC Guidelines do not provide sufficient detail on how to calculate emissions from logging activities, it applied the methodology developed by Pearson et al. (2014), according to which the EF (in tonnes of carbon emitted per m^3 timber extracted during selective logging) is estimated as the sum of the amount of carbon produced during the selective logging, the amount of carbon produced from deadwood as a result of the logging and the amount of carbon produced from deadwood as a result of the establishment of skid trails and haul roads.

22.   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. The team assessing Suriname's FREL noted that the Party maintained consistency in terms of sources of AD and EFs with those used for the GHG inventory included in its first BUR.[6] The LULUCF experts noted that this is also true for the estimated results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2016–2019.

23.   The Party clarified that all data, images and annual maps are publicly available, which enables stakeholders to reconstruct annual increments of forest stocks. Suriname, as a developing country, is seeking possibilities to implement a full NFI covering the whole country, which is expected to provide data that will help to improve the accuracy of its estimates. The LULUCF experts commend Suriname for providing transparent information and continuing to improve the accuracy of its estimates.

24.   The LULUCF experts concluded that Suriname provided the information necessary for reconstructing the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2016–2019. The data and information provided in the technical annex are considered to be transparent, consistent, complete and accurate to the extent possible.

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

25.   Suriname provided data and information on all the required elements in overall accordance with the guidelines contained in decision 14/CP.19, annex, namely summary information from the final report containing the assessed FREL; results in t CO_2 eq/year consistent with the assessed FREL; a demonstration that the methodologies used to produce

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[6] Available at https://unfccc.int/documents/622910.

the results are consistent with those used to establish the assessed FREL (as outlined in chap. II.B.1 above); a description of the forest monitoring system and institutional roles and responsibilities in MRV of the results; the information necessary for reconstructing the results (as outlined in chap. II.B.2 above); and a description of how the elements contained in decision 4/CP.15, paragraph 1(c–d), have been taken into account.

26.   Suriname provided a summary table with the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2016–2019, which are consistent with the assessed FREL, thus allowing for reconstruction of the results.

27.   The LULUCF experts noted that Suriname provided a description of the NFMS and a transparent summary of the roles and responsibilities of the agencies and institutions involved in MRV of the results in the technical annex, together with weblinks for accessing further information. The LULUCF experts commend Suriname for sharing this information.

28.   Suriname's NFMS incorporates a national sustainable forestry information system and a near-real-time monitoring system, both designed to strengthen the monitoring of AD and EFs under different logging activities, and to detect illegal logging activities. The NFMS also includes an MRV function, other monitoring functions such as satellite land monitoring and an NFI.

29.   On the basis of the available information, the LULUCF experts noted that, so far, there is no evidence of displacement of emissions.

30.   Suriname provided a description of how IPCC guidance and guidelines were taken into account in accordance with decision 4/CP.15, paragraph 1(c). Suriname used the methodology from the 2006 IPCC Guidelines for estimating carbon stocks in forest land converted to other land uses and a combination of approaches 2 and 3 from those Guidelines to determine historical deforestation for 2000–2009, 2009–2013, 2013–2014 and 2014–2015. Areas of deforestation for those periods were determined on the basis of Landsat satellite images, which were used for the base and all deforestation maps. Accordingly, emissions from deforestation for 2016–2019 were estimated by combining AD (i.e. areas of annual deforestation) with the appropriate EFs (i.e. emissions associated with the corresponding forest stratification).

31.   The first FREL included the pools above-ground biomass, below-ground biomass and deadwood, with litter and SOC excluded owing to an absence of adequate data, and covered CO_2, CH_4 and N_2O emissions from deforestation and CO_2 emissions from forest degradation. Overall, the exclusion of the litter and SOC pool and non-CO_2 gases was adequately justified. The LULUCF experts commend Suriname for its intention to obtain better information on litter and SOC and non-CO_2 gases with the aim of including them in future FREL submissions and estimates of results as part of the stepwise approach.

4.   Accuracy of the results proposed in the technical annex

32.   The LULUCF experts noted that the Party estimated the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation in its national territory using a transparent and consistent approach. They commend Suriname for its significant long-term efforts to build up a robust NFMS that is capable of providing transparent estimates of emissions from deforestation.

33.   Both the established FREL and the results obtained for 2016–2019 from implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation are based on the assumption that all carbon stock from carbon pools included in the analysis is lost immediately at the time of conversion of land to another land use (see para. 19 above) and that instantaneous oxidation of the direct losses in living biomass due to logging (see para. 21 above) occurs. The LULUCF experts noted that the assumption of instantaneous oxidation could lead to overestimation of emissions from deforestation and forest degradation. However, as Suriname used a consistent methodology for estimating those emissions when constructing the FREL and estimating the results for 2016–2019, the overestimation would cancel out.

34.   As mentioned in paragraph 16 above, Suriname provided some information related to the uncertainties of the emission estimates for deforestation and forest degradation for 2000–2015 for the FREL and shared worksheets containing the uncertainty calculations for the AD, EFs and emissions for the results for 2016–2019. For estimating the overall uncertainty of emissions from deforestation, Suriname applied the error propagation method from the IPCC good practice guidance for LULUCF. It mentioned in the technical annex that the accuracy of the AD on deforestation used for the FREL was determined on the basis of the map accuracy assessment suggested by Olofsson et al. (2014) and the Global Forest Observations Initiative (2017). The LULUCF experts noted that the uncertainty of the AD on deforestation was low, in particular for 2018–2019. Suriname explained that this was due to the use of high-resolution data. The LULUCF experts also noted that the Party could enhance the transparency of future FREL submissions by including confusion matrices and presenting commission and omission errors together with confidence intervals.

C.   Areas identified for future technical improvement

35.   The LULUCF experts concluded that the following areas for future technical improvement identified in the report on the technical assessment of Suriname's FREL also apply to the provision of information on the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation:

(a)   Validating and potentially updating the stratification used for AD and EFs;

(b)   Implementing a full NFI, including data on litter and SOC, as part of the NFMS;

(c)   Expanding NFI plots within mangrove forests to minimize uncertainty;

(d)   Developing a national methodology for assessing emissions from forest degradation due to mining and net emissions related to the conversion of primary forests to areas subject to shifting cultivation, combining multitemporal spatial analysis with field measurements;

(e)   Developing an NFMS, incorporating the national sustainable forestry information system and near-real-time monitoring system in order to strengthen the monitoring of AD and EFs for different logging activities, and to trace illegal logging activities;

(f)   Establishing near-real-time monitoring within the national sustainable forestry information system to improve the recording of illegal logging and thus avoid possible double counting when estimating related emissions;

(g)   Investigating whether emissions from SOC are significant and, if relevant, identifying ways to include them in future FRELs;

(h)   Considering applying the 20-year IPCC default period for deadwood decaying in forests.

D.   Comments and responses of the Party

36.   During the consultation process, Suriname noted a number of areas of capacity-building needs. Addressing those needs could enable Suriname to improve its data and methodologies and include additional activities and gases in future FREL submissions. After exchanges with the LULUCF experts, Suriname identified the following capacity-building needs:

(a)   Improving a cost-efficient NFI that uses statistical estimation procedures, including a carbon inventory;

(b)   Integrating MRV systems at the national and community level and building capacity at those levels in order to support the NFMS and the implementation of the National REDD+ Strategy;

(c)   Building a single harmonized NFMS database that facilitates the preparation of up-to-date emission reports for the GHG inventory, the calculation of uncertainties and the reporting on criteria and indicators for, inter alia, the Convention on Biological Diversity, the Global Forest Resources Assessment and the International Tropical Timber Organization. This includes methods for calculating EFs related to conversions from forest land to a land use with remaining biomass, such as agriculture and pasture;

(d)   Conducting research into carbon stock changes and associated EFs related to rotational shifting cultivation activities;

(e)   Strengthening the capacity to estimate emissions from forest degradation using field-based measurements and spatially explicit methods;

(f)   Conducting research into ways to include other REDD+ activities in future FREL or forest reference level submissions;

(g)   Constructing an updated FREL on the basis of average emissions during historical periods.

III.   Conclusions

37.   The LULUCF experts conclude that Suriname reported the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation. The results include estimates of emissions of CO_2, CH_4 and N_2O from three carbon pools, namely above-ground biomass, below-ground biomass and deadwood, for 2016–2019. The results of the activities were estimated and reported using methodologies, definitions, assumptions and information that are consistent with those used for constructing the assessed FREL.

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

39.   The LULUCF experts find the data and information provided in the technical annex to be consistent with the guidelines referred to in decision 14/CP.19, paragraph 9.

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

41.   In conclusion, the LULUCF experts commend Suriname for showing strong commitment to continuously improving the data and information used for calculating the results, in line with the stepwise approach, which are consistent with those used for constructing its assessed FREL. Some areas for future technical improvement and capacity-building needs identified by Suriname 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.[7] The LULUCF experts also acknowledge that the TA process was an opportunity for a facilitative and constructive technical exchange of views and information with Suriname.[8]

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[7] As per decision 2/CP.17, para. 57.
[8] As per 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 has not been reproduced here. It is available at https://unfccc.int/BURs.

Annex II

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

Key elements		Remarks
Results reported (t CO_2 eq)	9 178 978	The results were presented as emission reductions over a four-year period. See paragraph 9 of this document
Results period	2016–2019	See paragraph 9 of this document
Assessed FREL (t CO_2 eq/year)	14 627 465 (2016) 15 591 284 (2017) 16 555 103 (2018) 17 518 922 (2019)	See the report on the technical assessment of Suriname's FREL, published 23 November 2018 (FCCC/TAR/2018/SUR) (see para. 8 of this document)
Reference period	2000–2015	See paragraph 8 of this document and paragraph 11 of the report on the technical assessment of Suriname's FREL
National/subnational	National	Suriname developed a national FREL covering its entire territory and all forests in the country (see para. 8 of this document and para. 13 of the report on the technical assessment of Suriname's FREL)
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation	See paragraph 9 of this document
Pools included	Above-ground biomass Below-ground biomass Deadwood	See paragraph 14 of this document
Gases included	CO_2, CH_4, N_2O	The FREL is based on estimated trends in CO_2, CH_4 and N_2O emissions from deforestation and CO_2 emissions from forest degradation (see para. 31 of this document)
Consistency with assessed FREL	Methods, definitions and information used for the assessed FREL are consistent with those used for the results	Suriname applied consistent parameters, land-use maps and estimation equations for both the assessed FREL and the results. See paragraphs 14–15 of this document
Description of NFMS and institutional roles	Included	See paragraph 28 of this document
Identification of future technical improvements	Included	Several areas for future technical improvement have been identified (see para. 35 of this document)

Annex III

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl.

B. UNFCCC documents

First modified FREL submission of Suriname. Available at https://redd.unfccc.int/submissions.html?country=sur.

"Guidelines and procedures for the technical assessment of submissions from Parties on proposed forest reference emission levels and/or forest reference levels". Decision 13/CP.19, annex. Available at https://unfccc.int/sites/default/files/resource/docs/2013/cop19/eng/10a01.pdf#page=36.

"Guidelines for submissions of information on reference levels". Decision 12/CP.17, annex. Available at https://unfccc.int/sites/default/files/resource/docs/2011/cop17/eng/09a02.pdf#page=19.

Report on the technical assessment of the proposed FREL of Suriname submitted in 2018. FCCC/TAR/2018/SUR. Available at https://unfccc.int/sites/default/files/resource/tar2018_SUR.pdf.

C. Other documents

The following references may not conform to UNFCCC editorial style as some have been reproduced as received or as cited in the submission:

Global Forest Observations Initiative (GFOI), Global Observation of Forest and Land Dynamics (GOFC-GOLD), Norwegian Space Center (NSC), 2017. 2nd Expert workshop on lessons learned from Accuracy Assessments in the context of REDD +. Oslo, pp. 1–12.

Olofsson, P., Foody, G.M., Herold, M., Stehman, S. V., Woodcock, C.E., Wulder, M.A., 2014. Good practices for estimating area and assessing accuracy of land change.

Pearson, T.R.H., Brown, S., Casarim, F.M., 2014. Carbon emissions from tropical forest degradation caused by logging. Environ. Res. Lett. 9, 34017.

SBB, CELOS, CATIE, ADEKUS, 2017a. Technical Report State-of-the-art study: Best estimates for emission factors and carbon stocks for Suriname 1–56.