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Report of the technical assessment of the proposed forest reference emission level of Suriname submitted in 2018

Summary

This report covers the technical assessment of the voluntary submission of Suriname on its proposed forest reference emission level (FREL), in accordance with decision 13/CP.19 and in the context of results-based payments. The FREL proposed by Suriname covers the activities "reducing emissions from deforestation" and "reducing emissions from forest degradation", which are among the activities included in decision 1/CP.16, paragraph 70. For its submission, Suriname developed a national FREL. The FREL presented in the original submission, for the reference period 2016–2020, corresponded to 14,441,113, 15,390,853, 16,340,593, 17,290,333 and 18,240,073 tonnes of carbon dioxide equivalent (t CO_2 eq) for the respective years. As a result of the facilitative process during the technical assessment, the FREL was modified to 14,627,465, 15,591,284, 16,555,103, 17,518,922 and 18,482,741 t CO_2 eq/year for 2016–2020, respectively. The assessment team notes that the data and information used by Suriname in constructing its FREL are transparent, complete and in overall accordance with the guidelines contained in the annex to decision 12/CP.17. This report contains the assessed FREL and a few areas identified by the assessment team for future technical improvement, in accordance with the provisions on the scope of the technical assessment contained in the annex to decision 13/CP.19.

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Contents

I. Introduction and summary

A. Overview

1. This report covers the technical assessment (TA) of the submission of Suriname on its proposed forest reference emission level (FREL),[1] submitted on 8 January 2018 in accordance with decisions 12/CP.17 and 13/CP.19. The TA took place (as a centralized activity) from 19 to 23 March 2018 in Bonn and was coordinated by the UNFCCC secretariat.[2] The TA was conducted by two land use, land-use change and forestry experts from the UNFCCC roster of experts[3] (hereinafter referred to as the assessment team (AT)): Mr. Craig Elvidge (New Zealand) and Mr. Mohan Poudel (Nepal). In addition, Mr. Thiago Mendes, an expert from the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention, participated as an observer[4] during the centralized activity in Bonn. The TA was coordinated by Mr. Peter Iversen (UNFCCC secretariat).

2. In response to the invitation of the Conference of the Parties (COP) and in accordance with the provisions of decision 12/CP.17, paragraphs 7–15, and its annex, Suriname submitted its proposed FREL on a voluntary basis. The proposed FREL is one of the elements[5] to be developed in the implementation of the activities referred to in decision 1/CP.16, paragraph 70. The COP decided that each submission of a proposed FREL and/or forest reference level (FRL), as referred to in decision 12/CP.17, paragraph 13, shall be subject to a TA in the context of results-based payments, pursuant to decision 13/CP.19, paragraphs 1 and 2, and decision 14/CP.19, paragraphs 7 and 8.

3. Suriname's submission is supported by six annexes, which enhanced transparency: a list of contributors to the submission (annex 1); multi-stakeholders involved in the land-use and land-cover mapping and scenario development (annex 2); above-ground carbon (in t carbon (C)/ha) by carbon pool for forest types in Suriname (annex 3); an overview of the inventory plot database (annex 4); an overview of the classes included in the deforestation maps and post-deforestation land-use and land-cover maps (annex 5); and background information on future scenarios of deforestation and forest degradation (annex 6).

4. Suriname's FREL was constructed and the submission written in-country by a national team, bringing together the most robust national forest-related data available with policy goals for the country's future. The purpose of the FREL is to obtain result-based payments for REDD-plus[6] implementation with a view to shifting the current mining paradigm in Suriname towards a more diversified, socially equitable economy in greater harmony with nature. In that way, Suriname can continue being a country with high forest cover and low deforestation in the future, with its forests offering a global service in terms of climate change mitigation.

5. The objective of the TA was to assess the degree to which the information provided by Suriname was in accordance with the guidelines for submissions of information on reference levels[7] and to offer a facilitative, non-intrusive, technical exchange of information on the construction of the FREL with a view to supporting the capacity of Suriname for the construction and future improvement of its FREL, as appropriate.[8]

6. The TA of the FREL submitted by Suriname was undertaken in accordance with the guidelines and procedures for the TA of submissions from Parties on proposed FRELs and/or

[1] The submission of Suriname is available at http://unfccc.int/8414.
[2] Decision 13/CP.19, annex, paragraph 7.
[3] Decision 13/CP.19, annex, paragraphs 7 and 9.
[4] Decision 13/CP.19, annex, paragraph 9.
[5] Decision 1/CP.16, paragraph 71(b).
[6] In decision 1/CP.16, paragraph 70, the COP encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.
[7] Decision 12/CP.17, annex.
[8] Decision 13/CP.19, annex, paragraph 1(a) and (b).

FRLs.[9] This report on the TA was prepared by the AT following the same guidelines and procedures.

7. Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of Suriname. The facilitative exchange during the TA allowed Suriname to provide clarifications and additional information, which were considered by the AT in the preparation of this report.[10]

8. As a result of the facilitative interactions with the AT during the TA, Suriname provided a modified version of its submission on 2 June 2018, which took into consideration the technical inputs of the AT. The modifications improved the clarity, accuracy, completeness, consistency and transparency of the submitted FREL. This TA report was prepared in the context of the modified FREL submission. The modified submission, containing the assessed FREL, and the original submission are available on the UNFCCC website.[11]

B. Proposed forest reference emission level

9. The proposed national FREL presented in Suriname's modified submission covers development activities that are in the pipeline for the reference period 2016–2020 and corresponds to emissions of 14,627,465 (2016), 15,591,284 (2017), 16,555,103 (2018), 17,518,922 (2019) and 18,482,741 (2020) tonnes of carbon dioxide equivalent (t CO_2 eq) from deforestation as well as from forest degradation due to timber logging.

10. The FREL is based on emissions from deforestation, defined as the direct and/or induced conversion of forest cover to another type of land cover within a given time frame, and emissions from forest degradation, defined as the human-induced or natural loss of the goods and services provided by forest land, in particular forest carbon stocks, that does not qualify as deforestation, over a determined period of time.

11. The FREL estimation was based on historical emission trends for the period 2000–2015. In the absence of complete and consistent annual time series data, Suriname reported four data ranges between 2000 and 2015, of unequal time intervals: 2000–2009, 2009–2013, 2013–2014 and 2014–2015.

12. In decision 1/CP.16, paragraph 70, the COP encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances, in the context of the provision of adequate and predictable support.

13. The FREL proposed by Suriname, on a voluntary basis, for a TA in the context of results-based payments, covers the activities "reducing emissions from deforestation" and "reducing emissions from forest degradation", which are two of the five activities included in decision 1/CP.16, paragraph 70. Pursuant to paragraph 71(b) of the same decision, Suriname developed a national FREL covering its entire territory and incorporating all forests in the country.

14. The FREL includes the pools above-ground biomass, below-ground biomass and deadwood. It excludes litter and soil organic carbon in the absence of adequate data. Regarding greenhouse gases (GHGs), the FREL is based on the estimated trends in carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) emissions from deforestation and CO_2 emissions from forest degradation. Suriname shared with the AT the Excel tables showing all of its calculations and assumptions with relevant clarifications.

[9] Decision 13/CP.19, annex.
[10] Decision 13/CP.19, annex, paragraphs 1(b), 13 and 14.
[11] http://unfccc.int/8414.

II. Data, methodologies and procedures used in the construction of the proposed forest reference emission level

How each element in the annex to decision 12/CP.17 was taken into account in the construction of the forest reference emission level

1. Information that was used by the Party in the construction of the forest reference emission level

15. For the construction of the FREL, Suriname used the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF), and the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as 2006 IPCC Guidelines) for technical guidance.

16. Suriname included deforestation and forest degradation in its first national REDD-plus FREL submission. Regarding forest degradation, Suriname noted that only logging has been included so far and that it intends to include other types of forest degradation in the next FREL submission. The Party also intends to include the other REDD-plus activities (conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks) in future FREL submissions.

17. The FREL includes the gross emissions from deforestation, which is defined as direct and/or induced conversion of forest cover to another type of land cover, mainly due to gold mining, infrastructure development, urbanization and agriculture, and from forest degradation due to logging. Suriname applied area-based activity data (AD) for deforestation and volume-based AD for forest degradation.

18. On the basis of a study completed in 2017,[12] Suriname identified mining (71 per cent), infrastructure (15 per cent), urbanization (4 per cent), agriculture and pasture (4 per cent) and burning (3 per cent) as the main drivers of deforestation in the country. The Party does not consider forest clearance due to shifting cultivation as deforestation; instead shifting cultivation is in most cases seen as a sustainable practice used by indigenous and tribal communities. Logging is the only source of forest degradation included in the FREL. Suriname informed the AT that the other drivers of forest degradation identified (e.g. mining, shifting cultivation and fire) will be included in future FREL submissions on the basis of ongoing work on methodologies for assessing the associated emissions and removals.

19. The FREL presents information on the entire forest area of the country (15.2 million ha), comprising four strata: mangrove, coastal plain, forest belt and forest in the interior. The strata were derived from the combination of administrative boundaries (e.g. protected areas, southern border of the forest belt) and physical elements (e.g. natural boundaries). As a result of the facilitative exchange during the TA, in its modified submission Suriname ensured that a consistent stratification was applied for emission factors (EFs) and AD. The AT considers that this improved the accuracy and consistency of the submission and commends Suriname for its efforts.

20. Suriname presented information on the contributions of the emissions from deforestation and forest degradation during the historical period 2000–2015, with deforestation contributing approximately 75 per cent and forest degradation due to logging contributing approximately 25 per cent of total emissions.

21. For its submission, Suriname applied a stepwise approach to developing the FREL, in accordance with decision 12/CP.17, paragraph 10. The stepwise approach enables Parties to

[12] National Institute for Environment and Development in Suriname, Foundation for Forest Management and Production Control, and UNIQUE forestry and land use. 2017. *Background study for REDD+ in Suriname: Multi-perspective analysis of drivers of deforestation, forest degradation and barriers to REDD+ activities*. Paramaribo, Suriname. Available at https://info.undp.org/docs/pdc/Documents/SUR/DDFDB+%20study%20national%20edition_2017-05-30.pdf.

improve their FRELs/FRLs by incorporating better data, improved methodologies and, where appropriate, additional pools.

22. Suriname used a combination of approaches 2 and 3 from the 2006 IPCC Guidelines to determine historical deforestation. Historical assessments of deforestation for the periods 2000–2009, 2009–2013, 2013–2014 and 2014–2015 were based on Landsat satellite images, which were used for the base map and all deforestation maps.

23. A semi-automatic method was used to determine deforested areas, which were also checked manually using the methodology described by Olofsson et al. (2014)[13] (see table 2 of the FREL submission). A minimum mapping unit of 1 ha was used and the deforested areas were divided into four strata (mangrove, coastal plain, forest belt and forest in the interior). The main driver of deforestation has been gold mining, which was estimated to account for about 71 per cent of the 90,322 ha deforested in the period 2000–2015. Suriname assumed a linear trend in projecting the level of deforestation for 2016–2020, which takes into account the time series 2000–2015 and assumes that foreign investment will continue in the future.

24. Suriname's deforestation EFs are based on the average total carbon stock 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 and 5 of the FREL submission). The used data are based on a 2017 study of 11 different forest inventory programmes.[14] As a result of the facilitative exchange with the AT, Suriname decided to use the default values for mangrove carbon stock from the 2006 IPCC Guidelines, owing to the lack of national estimates and high uncertainty.

25. Biomass in deadwood on the forest floor was estimated on the basis of tree volume and state of decay. Biomass in standing dead trees was estimated on the basis of diameter at breast height and adjusted by applying a biomass reduction factor representing 75 per cent of the individual total weight. Below-ground biomass was based on default values from the 2006 IPCC Guidelines for tropical forest and assumes below-ground biomass is 24 per cent of above-ground biomass.

26. An allometric equation from Chave et al. (2005)[15] was used as it includes data from the region. Suriname mentioned that a study to evaluate the equation will be carried out in 2018, which could lead to updated carbon stock data and EFs for future FREL submissions. The AT considers this is an important area for future technical improvement that will increase confidence in future FREL submissions. Suriname used a single carbon fraction value of 0.47 t C (t dry matter)$^{-1}$ from the 2006 IPCC Guidelines to convert dry matter into carbon.

27. AD for forest degradation were estimated applying the same historical periods as applied for deforestation. The volume-based AD were determined by the annual timber production, which were extracted from the records of the Foundation for Forest Management and Production Control and are published on an annual basis. The records are based on the registration that took place of all legal logs and confiscated illegal logs.

28. Illegal logging was not included in the FREL submission owing to lack of updated information on illegal harvesting. Earlier records indicate that 20 per cent (on average) of the total timber volume originates from illegal logging, including timber transported to Guyana. Suriname explained that this percentage includes illegal logs that were confiscated and registered and so, to avoid possible double counting, any additional illegal logging was not

[13] Olofsson P, Foody GM, Herold M, Stehman SV, Woodcock CE and Wulder MA. 2014. Good practices for estimating area and assessing accuracy of land change. *Remote Sensing of Environment*. 148: pp.42–57.

[14] Foundation for Forest Management and Production Control, Centre for Agricultural Research in Suriname, Tropical Agricultural Research and Higher Education Center, and Anton de Kom, University of Suriname. 2017. *State-of-the-art study: Best estimates for emission factors and carbon stocks for Suriname*. Technical report. Paramaribo, Suriname. Available at http://sbbsur.com/wp-content/uploads/2017/04/TechnischrapportEmissieFactors_CarbonStocks.pdf.

[15] Chave J, Andalo C, Brown S, Cairns MA, Chambers JQ, Eamus D, Fölster H, Fromard F, Higuchi N, Kira T, Lescure JP, Nelson BW, Ogawa H, Puig H, Riéra B and Yamakura T. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. *Oecologia*. 145: pp.87–99.

included in the FREL. Suriname considers this a conservative approach that is in accordance with IPCC guidance.

29. Suriname explained that it is developing a national forest monitoring system (NFMS), incorporating its sustainable forestry information system Suriname (SFISS) and near real time monitoring system, and believes that these subsystems will strengthen the monitoring of AD and EFs from different management regimes, including both legal and illegal logging. The AT commends Suriname for these efforts and considers this an important area for future technical improvement.

30. Suriname also explained that approaches to including community monitoring as part of the NFMS are being investigated with a view to ensuring that national and local initiatives support each other.

31. The EF for forest degradation was estimated assuming instantaneous oxidation of the direct loss in living biomass due to logging, namely the extracted logs, unextracted wood, incidental logging damage to other trees caused by tree felling, haul road establishment and the skid-trail establishment. Since the IPCC good practice guidance for LULUCF and the 2006 IPCC Guidelines do not provide enough detail on how to calculate emissions from logging activities, Suriname applied the methodology developed by Pearson et al. (2014).[16] According to the methodology, a total EF (in t C emitted/m^3 timber extracted from selective logging) is estimated as the sum of carbon from the extracted logs plus carbon from deadwood due to logging on the logging site and carbon from deadwood due to the establishment of skid trails and haul roads, all measured in t C/m^3 timber extracted.

32. To obtain the required input data, a random stratified sampling approach was conducted over the whole range of active logging concessions. Above-ground biomass was estimated using a methodology from Chave et al. (2005) without including tree height, which Suriname explained maintains consistency when calculating the above-ground biomass of dead standing, fallen and damaged trees. Skid-trail emissions were estimated using data from damaged trees detected and measured in the field. The total EF for forest degradation due to logging was estimated to be 1.58 t C/m^3 with an uncertainty of 15.96 per cent. The uncertainties of the EFs for carbon from extracted logs, carbon from deadwood on the logging site and carbon from deadwood due to the establishment of skid trails were 55.26, 20.62 and 4.74 per cent, respectively (see table 7 of the FREL submission). Suriname explained that the large variation between samples in the field and the small sample size (n=10) caused the high uncertainty for carbon from extracted logs.

33. No measurements were taken in areas of overlapping land use, mainly gold mining, because this could have resulted in an over- or underestimation of emissions from selective logging.

2. Transparency, completeness, consistency and accuracy of the information used in the construction of the forest reference emission level

Methodological information, including description of data sets, approaches and methods

34. The AT considers that the modified submission and the annexes provided by Suriname, together with the clarifications given during the facilitative exchange of the TA, constitute a complete, transparent and accurate description of the construction of the FREL, including the data sets, approaches and methods used. The additional scenarios modelled by Suriname also increased confidence in the FREL. Suriname also provided a detailed list of the areas requiring further development and improvement.

35. In its modified FREL submission Suriname made a number of improvements as a result of the facilitative exchange with the AT, which increased the accuracy, transparency and consistency of the submission.

36. During the facilitative exchange, Suriname provided further information on the stratification used for the construction of the FREL and it included this information in the

[16] Pearson TRH, Brown S and Casarim FM. 2014. Carbon emissions from tropical forest degradation caused by logging. *Environmental Research Letters*. 9(3).

modified submission. The Party does not have a nationally approved method for area estimation of different forest types, but a national forest inventory (NFI) is planned and other stratification approaches are being tested, including an approach that takes into consideration geomorphological landscapes and climate zones. The AT commends Suriname for these efforts and considers this an important area for future technical improvement.

37. Suriname increased accuracy and completeness by including emissions of non-CO_2 gases (i.e. CH_4 and NO_2) from deforestation. It also increased the accuracy of the FREL submission by applying a tier 1 value for above-ground carbon for mangrove forest.

38. The Party ensured a consistent approach by applying the same stratification as used for EFs and deforestation to estimate carbon stocks and deforestation at the national level. Suriname presented emissions in the modified submission in t CO_2 eq.

39. The FREL does not fully coincide with the GHG inventory included in the Party's most recent national communication. Suriname explained that the emission estimates in the GHG inventory were determined before NFMS was established and were estimated on the basis of expert knowledge and research. The Party assured that for future GHG inventories the data used will be those provided by NFMS as used for the FREL. Suriname updated the national forest definition, which will be used in a consistent manner for its third national communication and other forthcoming documents.

40. Suriname increased transparency by adding additional information on the status and plans of SFISS and on how illegal logging can be tracked in the future. It also increased understanding and transparency by separating projected emissions from deforestation and forest degradation and by including a definition of deforestation and forest degradation in the modified submission.

41. Suriname used data collated from sample plots over the period 1970–2015 but has not yet implemented a full NFI owing to the costs involved. However, during the facilitative exchange, the Party expressed its intention to implement an NFI that will include information on litter and soil organic carbon while first prioritizing sample plots in the mangrove strata. The AT commends the Party for such improvements, and notes that NFI data could also be used for providing information relevant to additional activities not yet included in the FREL.

42. Suriname further increased the transparency of its submission by including an annex on scenario models for future deforestation and future projected forest degradation. It included a section on capacity-building and a summary table of its policies and plans. It also included a land-use change matrix for the periods 2000–2009, 2009–2013 and 2013–2015 based on mapped areas, and made other general improvements to the submission that increased understanding and transparency.

43. During the facilitate exchange, the AT noted that assuming instantaneous oxidation of all deadwood left in forests after logging could lead to the overestimation of emissions for years with above-average logging activities and underestimation of emissions for years with below-average logging activities. Instead, a 20-year default decay period could be applied. Suriname agreed to consider applying the default 20-year period for deadwood decaying residue from the 2006 IPCC Guidelines for future FREL submissions.

44. During the facilitative exchange, Suriname explained why some of the issues raised by the AT can only be addressed in future FREL submissions. The Party improved the method used to estimate the logging infrastructure factor and the logging damage factor. However, this resulted in even higher uncertainties. Suriname informed the AT that it plans to address this issue in future FREL submissions (additional information and details on Suriname's improvement plan can be found in section 6 of its modified submission).

Description of relevant policies and plans, as appropriate

45. In response to a question raised by the AT, Suriname provided a detailed list and summary of information on domestic drivers, national circumstances, policies and plans in the modified submission. Suriname's main instrument for guiding development planning is the national development plan, which details planned social and economic development for a period of five years (2017–2021) and is based on four main areas: strengthening

developmental capacity, economic growth and diversification, social progress, and the use and protection of the environment.

3. Pools, gases and activities included in the construction of the forest reference emission level

46. According to decision 12/CP.17, annex, subparagraph (c), reasons for omitting a pool and/or activity from the construction of the FREL should be provided, noting that significant pools and/or activities should not be excluded.

47. The pools included in the FREL are above-ground biomass, below-ground biomass and deadwood. Litter and soil organic carbon were not included. Suriname assumed that litter contributes insignificant emissions (less than 5 per cent of the total emissions from deforestation and forest degradation), referring to Crabbe et al. (2012).[17] However, Suriname did not consider Crabbe et al. (2012) in relation to soil organic carbon despite the assumption that soil organic carbon holds 14 per cent of the forest carbon. Suriname noted that the data used by Crabbe et al. (2012) were collected from few sample plots distributed in a limited area of the country. Given the available information, Suriname assumed annual carbon changes in soil organic carbon and litter to remain at zero (in equilibrium). However, the Party intends to undertake further studies on soil organic carbon in the future to obtain higher-tier information, on the basis of which further decisions will be taken, following the stepwise approach.

48. Suriname excludes litter with diameter less than 5 cm in its FREL The AT considers that this exclusion will not have a significant impact of the forest management reference level, and the non-inclusion at this time is adequately justified by Suriname. The AT commends the Party for its efforts to obtain this information within the NFI, with the aim of including litter in the FREL as part of the stepwise approach.

49. The exclusion of soil organic carbon was justified by Suriname given the low level of samples and coverage. The AT commends the Party for its efforts to obtain better information on the pools in the future with the aim of including them in the FREL as part of the stepwise approach. However, the AT notes that the IPCC good practice guidance for LULUCF provides a method for estimating carbon stock changes in the omitted pool (soil organic carbon) and a corresponding default EF. Therefore, the AT considers the treatment of emissions from soil organic carbon to be an area for future technical improvement of the FREL.

50. Suriname reported that some drivers of deforestation and forest degradation might have resulted in emissions of non-CO_2 (i.e. CH_4 and N_2O) gases. As a result of the facilitative exchange, Suriname included non-CO_2 emissions from deforestation due to forest fires in the modified submission. Deforestation due to forest fires accounted for 3 per cent of total deforestation during the period 2000–2015.

51. The AT acknowledges that Suriname included the most significant activities (i.e. reducing emissions from all types of deforestation as well as from forest degradation due to timber logging) of the five activities identified in decision 1/CP.16, paragraph 70, in accordance with its national capabilities and circumstances. The AT notes that other activities could also be significant, in particular forest degradation as a result of other drivers (e.g. mining, shifting cultivation, illegal and unsustainable harvesting/consumption of forest resources, and enhancement of forest carbon stocks). According to Suriname, lack of adequate and reliable data and limited country capacity to establish an effective monitoring system are the main reasons for the exclusion of those activities. The AT notes that combining multi-temporal spatial analysis with field measurements could help Suriname to estimate emissions and removals from other activities, and considers the inclusion in the FREL of other activities leading to forest degradation as an area for future technical improvement.

[17] Crabbe S, Somopawiro R, Hanoeman W, Playfair M, Tjon K, Djosetro M, Pinas B, Wortel V, Sanches M, Sanches C and Soetosenojo A. 2012. *Results of forest carbon assessment and monitoring project Suriname*. Technical report. Available at http://sbbsur.com/wp-content/uploads/2015/06/FINAL-Carbonreport.pdf.

52. The AT notes that the exclusion of enhancement of forest carbon stocks, conservation of forest carbon stocks, sustainable management of forests and degradation due to other drivers (e.g. illegal harvesting, shifting cultivation) from the FREL appears to be conservative. Overall, the AT commends Suriname for the information provided in its submission. The AT acknowledges Suriname's intention to identify necessary improvements to the FREL submission once new, adequate data and better information become available, as part of the stepwise approach.

4. Definition of forest

53. Suriname provided in its submission the definition of forest used in the construction of its FREL (minimum area 1 ha, minimum height 5 m at maturity and in in-situ conditions and at least 30 per cent canopy cover) and also increased the transparency of the definition in the modified submission in response to the initial findings of the AT. The definition is within the boundaries of the thresholds established in the Marrakesh Accords and is also consistent with the definition that was used by Suriname for its reporting to the Food and Agriculture Organization of the United Nations.

III. Conclusions

54. The information used by Suriname in constructing its FREL is in overall accordance with the guidelines for submissions of information on reference levels (as contained in the annex to decision 12/CP.17). The documentation on methods, data and assumptions used, as well as the additional information provided by Suriname during the TA, facilitated a transparent and complete understanding of how the FREL was calculated.

55. The annexes to the FREL submission provided a significant amount of additional technical material, which increased understanding and transparency. The AT believes that the FREL was calculated in a manner consistent with the methods described. Suriname also provided a detailed list of where the submission can be improved, which is consistent with the stepwise approach.

56. Pursuant to decision 13/CP.19, annex, paragraph 3, the AT identified a number of areas for future technical improvement, most of which were already proposed by Suriname in the modified submission as planned improvements to be reflected in future FREL submissions:

(a) Validate and potentially update the stratification used for AD and EFs (see para. 36 above);

(b) Consider implementing an NFI as part of the NFMS, including with information on other carbon pools such as litter and soil organic carbon, as well as provide information on the other REDD-plus activities (see para. 41 above);

(c) Prioritize NFI plots within mangrove forest to minimize existing uncertainty (see para. 41 above);

(d) Develop a national methodology to assess emissions from forest degradation related to mining and net emissions related to conversion of primary forests to shifting cultivation, combining multi-temporal spatial analysis with field measurements (see para. 51 above);

(e) Operationalize SFISS, incorporating impact indicators, which will help to generate accurate information on the different impacts of different logging management types (see para. 29 above);

(f) Establish near real time monitoring within SFISS to improve the registration of illegal logging so as to avoid possible double counting when assessing emissions from illegal logging (see para. 29 above);

(g) Investigate whether emissions from soil organic carbon are significant and, if relevant, identify ways to include them in future FRELs (see para. 49 above);

(h) Consider applying the 20-year IPCC default period for deadwood decaying in forest (see para. 43 above);

(i) Minimize sources of error in estimated carbon stocks and EFs by validating the pan-tropical allometric equation applied in constructing the FREL (see para. 26 above).

57. In conclusion, the AT commends Suriname for showing a strong commitment to the continuous improvement of its FREL estimates in line with the stepwise approach. A number of areas for future technical improvement of Suriname's FREL have been identified in this report. At the same time, the AT acknowledges that such improvements are subject to national capabilities and policies, and notes the importance of adequate and predictable support.[18] The AT also acknowledges that the assessment process was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Suriname.

58. The table contained in the annex summarizes the main characteristics of Suriname's proposed FREL.

[18] Decision 13/CP.19, annex, paragraph 1(b), and decision 12/CP.17, paragraph 10.

Annex

Summary of the main features of the proposed forest reference emission level based on information provided by Suriname

Main features of the FREL		*Remarks*
Proposed FREL (in t CO_2 eq/year)	14 627 465 for 2016 15 591 284 for 2017 16 555 103 for 2018 17 518 922 for 2019 18 482 741 for 2020	The FREL covers emissions from deforestation and from forest degradation See paragraph 9 of this document
Type and duration of FREL	FREL = linear projection for 2016–2020 based on historical trends over the period 2000–2015	See paragraphs 10 and 11 of this document
Adjustment for national circumstances	Yes	Anticipated/planned development activities were explained to justify the adjustment See paragraphs 9 and 34 of this document
National/subnational	National	The FREL covers the complete forest area of Suriname (15.2 million ha) See paragraph 19 of this document
Activities included	Deforestation and forest degradation (due to logging)	See paragraph 16 of this document
Pools included	Above-ground biomass, below-ground biomass and deadwood	See paragraphs 47 of this document
Gases included	CO_2, N_2O and CH_4 for deforestation and CO_2 for forest degradation	See paragraph 50 of this document
Forest definition	Included	See paragraph 53 of this document
Relationship with latest GHG inventory	Data used, emission factors and some methodologies used for the FREL are not consistent with the latest GHG inventory, included in the Party's second national communication	See paragraph 39 of this document
Description of relevant policies and plans	Included	See paragraphs 42 and 45 of this document
Description of assumptions on future changes in policies	Not applicable	
Descriptions of changes to previous FREL	Not applicable	
Future improvements identified	Yes	See paragraph 56 of this document

Abbreviations: FREL = forest reference emission level, GHG = greenhouse gas.