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Report on the technical assessment of the proposed forest reference emission level of Liberia submitted in 2020

Summary

This report covers the technical assessment of the voluntary submission of Liberia 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 Liberia 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, Liberia developed two subnational FRELs for the two main forested regions of the country, with the aim of transitioning to a national FREL in the future. The FRELs presented in the original submission, for the reference period 2009–2018, correspond to 31,251,738 and 10,708,900 tonnes of carbon dioxide equivalent per year for the north-west region and south-east region, respectively. As a result of the facilitative process during the technical assessment, the FRELs were modified to 31,353,454.1 and 10,723,402.9 tonnes of carbon dioxide equivalent per year, respectively. The assessment team notes that the data and information used by Liberia in constructing its FRELs are transparent, complete and in overall accordance with the guidelines contained in the annex to decision 12/CP.17. This report contains the assessed FRELs 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.

Abbreviations and acronyms

AD	activity data
AT	assessment team
C	carbon
COP	Conference of the Parties
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	statistical database of the Food and Agriculture Organization of the United Nations
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
NC	national communication
NFI	national forest inventory
PL1	priority landscape 1 (forested region in the north-west of the country)
PL2	priority landscape 2 (forested region in the south-east of the country)
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)
Revised 1996 IPCC Guidelines	*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
SOC	soil organic carbon
TA	technical assessment
2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*

I. Introduction and summary

A. Overview

1. This report covers the TA of the voluntary submission of Liberia on its proposed FREL,[1] submitted on 30 December 2019, in accordance with decisions 12/CP.17 and 13/CP.19. The remote TA[2] took place from 15 to 19 June 2020 and was coordinated by the secretariat.[3] The TA was conducted by two LULUCF experts from the UNFCCC roster of experts[4] (hereinafter referred to as the AT): Mikhail Gitarskiy (Russian Federation) and Brian Zutta (Peru). The TA was coordinated by Peter Iversen (secretariat).

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

3. The objective of the TA is to assess the degree to which the information provided by Liberia is in accordance with the guidelines for submissions of information on reference levels[6] 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 Liberia for the construction and future improvement of its FREL, as appropriate.[7]

4. The TA of the FREL submitted by Liberia was undertaken in accordance with the guidelines and procedures for the TA of submissions from Parties on proposed FRELs and/or FRLs.[8] This report on the TA was prepared by the AT following the same guidelines and procedures.

5. Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of Liberia. The facilitative exchange during the TA allowed Liberia to provide clarifications and additional information, which were considered by the AT in the preparation of this report.[9] As a result of the facilitative interactions with the AT during the TA, Liberia provided a modified version of its submission on 22 July 2020, which took into consideration the technical input of the AT. The modifications improved the clarity and transparency of the submitted FREL without needing to alter the approach used to construct it. 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.[10]

B. Proposed forest reference emission level

6. 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 and in accordance with their respective capabilities and national circumstances, in the context of providing adequate and predictable support. The FREL proposed by Liberia, on a voluntary basis for a TA in the context of results-based

[1] The submission of Liberia is available at https://redd.unfccc.int/submissions.html.
[2] Owing to the circumstances related to the coronavirus disease 2019, the TAs of the FREL and FRL submissions of developing country Parties in 2020 had to be conducted remotely.
[3] Per decision 13/CP.19, annex, para. 7.
[4] Per decision 13/CP.19, annex, paras. 7 and 9.
[5] See decision 1/CP.16, para. 71(b).
[6] Decision 12/CP.17, annex.
[7] Decision 13/CP.19, annex, para. 1(a–b).
[8] Decision 13/CP.19, annex.
[9] Per decision 13/CP.19, annex, paras. 1(b), 13 and 14.
[10] https://redd.unfccc.int/submissions.html.

payments, covers the activities reducing emissions from deforestation and reducing emissions from forest degradation, which are two of the five activities referred to in that paragraph. Pursuant to paragraph 71(b) of the same decision, Liberia developed subnational FRELs for two regions, with the aim of transitioning to a national FREL incorporating all regions in the country in the future. The subnational FRELs were developed separately for the two main forested regions in the country, which were referred to as priority landscapes: PL1 in the north-west and PL2 in the south-east. The areas of forest land in PL1 and PL2 are 1,764.3 and 2,358.2 kha, respectively. Together these regions comprise 71.7 per cent of national forest land, while the remaining 28.3 per cent of forest land (1 625.7 kha) lies among predominantly agricultural and other permanent non-forest land in the central region of the country as well as further to the south-east of PL2. For its submission, Liberia applied a stepwise approach to developing its FREL in accordance with decision 12/CP.17, paragraph 10. The stepwise approach enables Parties to improve their FRELs or FRLs by incorporating better data, improved methodologies and, where appropriate, additional pools.

7. The subnational FRELs proposed by Liberia for the historical reference period 2009–2018 are annual averages of the CO_2 emissions associated with deforestation and forest degradation. The AD used in constructing the FRELs were derived from a historical time series of land-use maps developed from an analysis of satellite images, supplemented with data on agricultural land use. The FRELs presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities for 2019–2023, correspond to 31,353,454.1 and 10,723,402.9 t CO_2 eq/year for PL1 and PL2, respectively.[11]

8. The proposed FRELs include the pools above-ground biomass, below-ground biomass, deadwood and litter, and exclude the SOC pool. Regarding GHGs, the submission includes CO_2 only.

9. To enhance the transparency of its FREL submission, Liberia provided during the TA its NFI sampling design and field protocol and FREL calculation spreadsheets, all of which enable the process used for constructing the FRELs to be followed. Further, the Party provided timely responses to the questions raised by the AT during the TA. The AT commends Liberia for its support of the TA process.

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

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

1. Information used by the Party in constructing its forest reference emission level

10. For constructing its two subnational FRELs, Liberia used the 2006 IPCC Guidelines and the reference period was 2009–2018. The Party aims to obtain results-based payments on a biennial basis for 2019–2020, 2021–2022 and 2022–2023. The areas of land with intact and secondary (degraded) natural forests were defined as forest land. Non-forest land included areas permanently covered with shrubs, savannah grasslands, annual croplands, wetlands not classified as forests, managed and unmanaged water reservoirs, settlements, and perennial rubber, oil palm, cocoa and coffee plantations.

11. Liberia selected two key REDD+ activities: reducing emissions from deforestation and reducing emissions from forest degradation. The Party defines deforestation as the conversion of intact and secondary (degraded) forest land classes to non-forest land classes as a result of the removal of tree cover (i.e. a land-use change result). Forest degradation is defined as the human-induced partial removal of tree cover on forest land remaining forest land owing to selective logging forest management practices. The AT noted that ‘intact

[11] In its original submission, Liberia proposed subnational FRELs of 31,251,738 t CO_2 eq/year for PL1 and 10,708,900 t CO_2 eq/year for PL2 for 2019–2023. The difference between the original and the modified submission is due mostly to the correction of the carbon stock estimates for deadwood and litter that were used for constructing the FRELs.

forest' includes natural mature stands, mangroves and forest plantations (such as acacia) that are not considered perennial croplands, and that 'secondary forest' may include shifting cultivation in an advanced fallow phase, with the land being temporarily unstocked.

12. Liberia calculated mean annual data for the areas in which deforestation and forest degradation took place for the reference period (2009–2018). The AD were estimated by integrating a visual and a sample-based interpretation of land-cover change using the land-use maps created from a Collect Earth[12] analysis of a time series of high-resolution satellite images obtained from Google Earth, Bing Maps and Google Earth Engine. Each of the two priority landscapes (PL1 and PL2) was divided into three classes: deforestation of intact forest, deforestation of secondary forest and degradation of intact forest. In addition, AD uncertainty was assessed using the Collect Earth tool.

13. For estimating CO_2 emissions, Liberia used a combination of country-specific EFs (for the above- and below-ground biomass and deadwood pools) and default EFs from the 2006 IPCC Guidelines (for the litter pool). Six country-specific EFs were obtained from the NFI conducted in 2018 in the two priority landscapes – one EF for each of the three classes (deforestation of intact forest, deforestation of secondary forest and degradation of intact forest) in PL1 and PL2. The EFs were calculated as the sum of the carbon stock changes in the three pools. The AT noted that the CO_2 eq emission estimates in the FREL submission differ from the GHG estimates for the LULUCF sector provided in the NC1 (submitted in 2013). The differences are due to different land area coverage between the FREL and the NC1, as well as the use of AD from international data sources and default EFs from the Revised 1996 IPCC Guidelines for the GHG inventory for the LULUCF sector in the NC1.

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

(a) Methodological information, including description of data sets, approaches and methods

14. Liberia constructed subnational FRELs for deforestation and forest degradation for two priority landscapes – one in the north-west and one in the south-east of the country. The central and far south-eastern regions of the country were considered non-priority landscapes and were excluded from construction of the FREL. In response to a question raised by the AT during the TA, the Party clarified that the non-priority landscapes were predominantly agricultural and other permanent non-forest land classes. The AT considers the development of a national FREL as an area for future technical improvement, and commends the Party for indicating its intention to include the entire national territory in future FREL submissions.

15. In its FREL submission, Liberia included two of the five REDD+ activities mentioned in decision 1/CP.16, paragraph 70, while the remaining three were not included (i.e. conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks). In its submission, the Party reported that the REDD+ activities not included in the FREL do occur in the priority landscapes, but their inclusion in the FREL is subject to data availability, and appropriate data were not available. During the TA, Liberia informed the AT of its plans for updating the national forest monitoring system and acquiring the data needed to report on all five REDD+ activities in future FREL submissions.

16. The AT noted that in section 8.1 of the FREL submission, post-deforestation carbon stocks were considered to be zero for deforestation events that occurred in intact (primary) and secondary forests. The AT considers the assumption that all carbon was lost during the conversions is incorrect, and indeed table 13 shows some carbon stocks remained after deforestation events (57 t C/ha for PL1 and 30 t C/ha for PL2). In response to a question raised by the AT during the TA, the Party provided updated information that consistently represents post-deforestation carbon stocks. In addition, the inconsistences between section 8.1 and table 13 were corrected in the modified version of the FREL submitted by Liberia.

[12] Information on the Collect Earth tool, developed by FAO, is available at http://www.openforis.org/tools/collect-earth.html.

17. The AT noted that the FRELs were calculated using country-specific EFs that imply carbon stock changes in the above- and below-ground biomass, deadwood and litter pools, with above-ground biomass being the largest contributor to carbon stock changes. The country-specific above-ground biomass value for intact forest varied from 206.97 t C/ha for PL1 to 260.55 t C/ha for PL2. The latter value is greater than the upper threshold of the default value for African tropical rainforest in table 4.7 of the 2006 IPCC Guidelines (vol. 4): 510 t dry matter/ha, equal to 249.9 t C/ha. In response to a question raised by the AT during the TA, Liberia clarified that the above-ground biomass data were obtained from the 2018 NFI, which found that in both priority landscapes, there were trees that reached 250–350 cm diameter at breast height and a height of 85–90 m. The AT commends the Party for developing country-specific EFs, but considers that further justifying country-specific EFs is an area for future technical improvement.

18. In table 10 of its FREL submission, Liberia reported the IPCC default value 1.029 t C/ha for the litter pool, with reference to table 2.2 of the 2006 IPCC Guidelines (vol. 4). The AT noted, however, that table 2.2 indicates the default value for litter in tropical forest is 2.1 t C/ha. In response to a question raised by the AT during the TA, the Party revised table 10 and updated the calculation spreadsheets. The revised table 10 was included in the modified version of the FREL submitted by Liberia.

19. It was not clear to the AT from table 10 of the submission what root-to-shoot ratio was used for constructing the FRELs. In response to a question raised by the AT during the TA, Liberia clarified that a moving average number between the minimum 0.235 (Mokany et al., 2006) and the maximum 0.35 (Waring and Powers, 2017) root-to-shoot ratio values was used on the basis of the particular forest class, growth conditions and precipitation in order to better represent the West African tropical forest context. The AT considered the clarification sufficient and agrees with the Party's choice of ratio.

20. Liberia used country-specific data from the 2018 NFI for some carbon pools. Pools measured in the NFI were above- and below-ground biomass, deadwood and litter. In the submission the Party reported that, after reviewing the NFI data, it decided not to use the national data on litter for the FREL, as these data were considered to have accuracy concerns. Therefore, default values from the 2006 IPCC Guidelines were used for the litter pool. Further, during the TA, Liberia explained that the subnational regions for which FRELs were developed are sufficiently different in precipitation and forest type – and therefore have significantly different dominant tree species – to warrant separate carbon pool quantification.

21. The AT noted that the calculations for carbon pools in table 12 of the submission are consistent with the calculations in the spreadsheets provided by Liberia with the submission in order to enhance the transparency of the FREL construction. However, the EFs for calculating the FRELs were derived from table 13 of the submission, which contains carbon stock values that differ from those in table 12. In response to a question raised by the AT during the TA, the Party provided updated information that consistently represents EFs and carbon stock values. In addition, the inconsistences between tables 12 and 13 were corrected in the modified version of the FREL submitted by Liberia. The AT commends the Party for enhancing the transparency and consistency of its FREL submission.

22. The AT noted there is an almost threefold difference between the FRELs for PL1 and PL2. During the TA, Liberia explained that the difference is attributable to carbon stock diversity in the two priority landscapes arising from their different forest type and different degree of forest degradation. PL1 has predominantly semi-deciduous forest subject to significant human intervention that results in a notable decrease in forest cover. PL2 is characterized by evergreen forest with greater forest cover and is subject to far fewer human activities. In addition, growth conditions in PL2 are more favourable owing to increased precipitation. Taking all this into account, the growing stock in PL2 is more than double that in PL1. The AT commends the Party for this clarification, and considers that the information could help to improve the transparency of its future FREL submissions and help to build confidence in the emission estimates.

23. Liberia provided information on the uncertainties associated with EFs and AD. EF uncertainty was disaggregated by the six country-specific EFs described in paragraph 13 above. The overall uncertainties for EFs and AD were estimated using error propagation, as

described in the 2006 IPCC Guidelines (vol. 1, chap. 3). The Party followed the stratified area estimation approach of Olofsson et al. (2014) for all area-based estimates. The uncertainty calculations were performed using the Collect Earth tool.

24. The AT commends Liberia for including forest land data for the reference years 2009 and 2018 despite the technical difficulties related to analysing the area changes. However, with the historical data available, the AT found it difficult to follow the changes in area of different land uses, in particular for areas of human-induced deforestation and forest degradation, making it impossible to assess the cumulative emissions for 2009 onward. The AT considers the acquisition of reliable historical data, in particular for areas of land on which human-induced deforestation and forest degradation took place in 2009 and 2018, as an area for future technical improvement.

(b) Description of relevant policies and plans, as appropriate

25. Liberia provided a description of relevant policies and plans in its FREL submission, including institutional arrangements for implementing REDD+ interventions. The interventions include forestry and forest conservation, environmental assessment and monitoring, agroforestry and sustainable agriculture, and the establishment of mining concessions and provisions for artisanal mining on forest land. Institutional arrangements and responsibilities for coordinating the measurement, reporting and verification system and preparing national GHG inventories were also presented in the submission.

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

26. According to decision 12/CP.17, annex, paragraph (c), reasons for omitting a pool and/or activity in constructing the FREL should be provided, noting that significant pools and/or activities should not be excluded.

27. The pools included in the Party's FRELs are above-ground biomass, below-ground biomass, deadwood and litter. The SOC pool was not included.

28. With regard to emissions from the SOC pool, the AT requested clarification of the reasons for omitting the pool. In response, Liberia explained that it considers that emissions from this pool would be insignificant because SOC is relatively stable during forest degradation, which is mainly due to selective logging (a practice that does not expose the soil) or shifting cultivation (after which regrowth occurs within four to seven years). The emissions would be significant only for long-term conversions of forest land to non-forest land over 20–25 years. Nevertheless, Liberia intends to include SOC estimates in its future FREL submissions, and informed the AT of this intention. The AT considers that the exclusion of the SOC pool was adequately justified by the Party. The AT commends Liberia for including four carbon pools in its first FREL submission and for its intention to obtain better information on the SOC pool with the aim of including it in the FREL in future as part of the stepwise approach. The AT notes that the Party may wish to use default values from the 2006 IPCC Guidelines for the SOC pool in its FREL estimate for future submissions.

29. Liberia included only CO_2 emissions from deforestation and forest degradation in the FREL. Non-CO_2 emissions from fires were not included because the Party does not consider the current data on fires and area burned to be reliable. The Party also believes that cumulative emissions from non-CO_2 gases, as estimated from FAOSTAT burned area data, are not significant when compared with total CO_2 emissions from deforestation and forest degradation. The AT considers the treatment of non-CO_2 gases as an area for future technical improvement.

30. The AT acknowledges that Liberia included the most significant activities, reducing emissions from deforestation and reducing emissions from forest degradation, of the five activities identified in decision 1/CP.16, paragraph 70, in accordance with its national capabilities and circumstances. According to the Party, it does not have enough information to include the remaining three activities – conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks – at this time. However, the AT acknowledges Liberia's stated intention to include other activities in future submissions when new and adequate data and better information become available as part of the stepwise approach.

4. Definition of forest

31. Liberia provided in its submission the definition of forest used in constructing its FREL. In accordance with the national context, forest was defined as land with a minimum area of 1.0 ha that contains a stand with canopy cover of at least 30 per cent, with the trees having a minimum height of 5 m or the capacity to reach this height in their mature state. Fallow lands from shifting cultivation that meet the forest definition criteria thresholds were also classified as forests. The AT noted that the definition of forest is different from the one used by FAO for the 2015 Global Forest Resources Assessment. In response to a question raised by the AT during the TA, Liberia clarified that it did not provide information to FAO for that assessment. Further, the Party noted that the forest definition applied in the FREL submission is the first national forest definition used in official national reporting, and it was developed in 2018.

III. Conclusions

32. The information used by Liberia in constructing its FREL for reducing emissions from deforestation and reducing emissions from forest degradation is transparent and complete and is in overall accordance with the guidelines for submissions of information on reference levels.

33. The two subnational FRELs presented in the modified submission, for the reference period 2009–2018, correspond to 31,353,454.1 and 10,723,402.9 t CO_2 eq/year for PL1 and PL2, respectively.

34. The AT acknowledges that Liberia included in its FREL the most significant activities, the most important areas and the most significant pools in terms of emissions from forests. The AT considers that, in doing so, Liberia followed decision 1/CP.16, paragraph 70, on activities undertaken, and paragraph 71(b), on elaborating a subnational FREL as an interim measure, and decision 12/CP.17, paragraph 10, on applying the stepwise approach. The AT commends Liberia for providing information on its ongoing work to develop FRELs for other activities, as well as for other areas, as a step towards constructing a national FREL.

35. As a result of the facilitative interactions with the AT during the TA, Liberia provided a modified submission that took into consideration the technical input of the AT. The AT notes that the transparency and completeness of the information provided were significantly improved in the modified FREL submission, without having to alter the approach used to construct the FREL, and commends Liberia on its efforts. The new information provided in the modified submission, including the modified EFs and the explanation of how the estimates of CO_2 emissions from deforestation and forest degradation were calculated, increased the clarity and reproducibility of the FREL calculations.

36. The AT notes that FRELs were calculated for two subnational regions using a combination of country-specific AD and EFs from the latest NFI (2018) for the above- and below-ground biomass and deadwood pools and default data from the 2006 IPCC Guidelines for the litter pool. The AT also notes that, overall, the FREL does not maintain consistency, in terms of sources of AD and EFs, with the GHG inventory included in Liberia's NC1.[13]

37. Pursuant to decision 13/CP.19, annex, paragraph 3, the AT identified the following areas for future technical improvement:

(a) The acquisition of reliable historical data for areas of land on which human-induced deforestation and forest degradation have taken place (see para. 24 above);

(b) Further justification of country-specific EFs used in constructing the FREL as the value used is greater than the upper threshold of the default value for African tropical rainforest in table 4.7 of the 2006 IPCC Guidelines (see para. 17 above);

(c) The maintenance of consistency between future FREL submissions and GHG inventories, in particular for forest-related emissions and removals (see para. 13 above);

[13] In reference to the scope of the TA, as per decision 13/CP.19, annex, para. 2(a).

(d) The development of a national FREL covering all forested areas of the country as resources become available (see para. 14 above);

(e) The inclusion of all relevant REDD+ activities as resources become available (see para. 15 above).

38. Pursuant to decision 13/CP.19, annex, paragraph 2(f), in assessing the pools and gases included in the FREL the AT noted that the pools and gases excluded by Liberia are likely to be insignificant in the context of the FREL. Nevertheless, pursuant to decision 13/CP.19, annex, paragraph 3, the AT identified the following additional areas for future technical improvement regarding the exclusion of pools and gases from the FREL:

(a) Treatment of emissions from the SOC pool following deforestation and forest degradation using default values from the 2006 IPCC Guidelines (see para. 28 above);

(b) Treatment of emission estimates of non-CO_2 gases for forest land converted to other land uses and for forest fires resulting in forest degradation (see para. 29 above).

39. The AT acknowledges and welcomes the Party's intention to:

(a) Include in the FREL the remaining subnational regions as part of its efforts to move towards constructing a national FREL;

(b) Continue working on distinguishing forest plantations, reforested areas and natural forests in terms of their AD in an effort to report on the management of forests and the enhancement of carbon stocks;

(c) Increase the sample size of reference data and enhance the national forest monitoring system to enable the inclusion of the additional three REDD+ activities (conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks) in future FREL submissions;

(d) Evaluate methodologies for time-series analysis of satellite images to increase the frequency of land-use change detection to yearly intervals;

(e) Continue collecting data for the NFI in order to understand and quantify biomass change resulting from forest degradation and regrowth.

40. In conclusion, the AT commends Liberia for showing strong commitment to continuously improving its FREL estimates in line with the stepwise approach. A number of areas for the future technical improvement of Liberia'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 providing adequate and predictable support.[14] The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Liberia.

41. The table contained in annex I summarizes the main features of Liberia's proposed FREL.

[14] Per decisions 13/CP.19, annex, para. 1(b); and 12/CP.17, para. 10.

Annex I

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

Main features of the FREL		*Remarks*
Proposed FREL	PL1: 31 353 454.1 t CO_2 eq/year PL2: 10 723 402.9 t CO_2 eq/year	The subnational FRELs include CO_2 emissions from deforestation and forest degradation (see paras. 7–8 of this document)
Type and reference period of FREL	The two subnational FRELs are annual average CO_2 emissions for the reference period 2009–2018	Subnational FRELs were constructed for the two main forested regions in the country following the stepwise approach. Data from the latest NFI (2018), historical data from satellite image analysis and agricultural land-use data were used in their construction (see paras. 6, 7 and 10 of this document)
Application of adjustment for national circumstances	No	
National/subnational	Subnational	The forest land areas for PL1 and PL2 are 1 764.3 and 2 358.2 kha, respectively. Together they comprise 71.7 per cent (4 122.5 kha) of national forest land, while the remaining 28.3 per cent (1 625.7 kha) lies in predominantly agricultural landscapes (see para. 6 of this document)
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation	For the FREL, deforestation is defined as the conversion of intact or secondary forests to non-forest land, and forest degradation is defined as the reduction in carbon stock and forest density in forest land remaining forest land (see para. 11 of this document)
Pools included	Above-ground biomass Below-ground biomass Deadwood Litter	Liberia justified the exclusion of the SOC pool from the two selected REDD+ activities as being due to the lack of data for this pool (see paras. 8 and 27 of this document)
Gas included	CO_2	See paragraphs 8 and 29 of this document
Forest definition	Included	Forest was defined as land with a minimum area of 1.0 ha that contains a stand with canopy cover of at least 30 per cent, with the trees having a minimum height of 5 m or the capacity to reach this height in their mature state. Fallow lands from shifting cultivation that meet the forest definition criteria thresholds were also classified as forests. Forest lands may be natural intact and secondary (degraded) forests, mangroves

Main features of the FREL		*Remarks*
		and forest plantations. The NC1 did not include a forest definition and Liberia has not previously reported a forest definition to international organizations (see paras. 11 and 31 of this document)
Consistency with latest GHG inventory	Methods used for estimating the FREL are not consistent with those used for the latest GHG inventory (2013)	The FRELs were calculated using a combination of country-specific AD from the latest NFI (2018) and default values from the 2006 IPCC Guidelines. In contrast, the latest GHG inventory for the LULUCF sector (2013) was developed using international data and default values from the Revised 1996 IPCC Guidelines (see para. 13 of this document)
Description of relevant policies and plans	Included	See paragraph 25 of this document
Description of assumptions on future changes to domestic policies, if included in the construction of the FREL	Not applicable	
Description of changes to previous FREL	Not applicable	This was Liberia's first FREL submission
Identification of future technical improvements	Included	Several areas for future technical improvements were identified (see paras. 37–38 of this document)

Annex II

Documents and information used during the technical assessment

A. Reference documents

First FREL submission of Liberia. Available at https://redd.unfccc.int/submissions.html.

"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/sites/default/files/resource/docs/2013/cop19/eng/10a01.pdf#page=36.

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B. Other documents

The following references have been reproduced as received:

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