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Technical report on the technical analysis of the technical annex to the first biennial transparency report of Guyana submitted in accordance with paragraph 14 of decision 18/CMA.1 on 3 April 2024

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 Guyana on 3 April 2024 through its first biennial transparency report in accordance with paragraph 45 of decision 1/CP.24 and paragraph 14 of decision 18/CMA.1. 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 paragraph 70 of decision 1/CP.16, and covers the same national territorial forest area as the assessed forest reference emission level (FREL) proposed by Guyana in its modified FREL submission of 27 April 2015.

Guyana reported the results of implementing these activities for 2013–2022, which amount to 31,081,049 tonnes of carbon dioxide equivalent (t CO_2 eq) for 2013, 31,132,776 t CO_2 eq for 2014, 35,108,154 t CO_2 eq for 2015, 36,089,073 t CO_2 eq for 2016, 35,647,957 t CO_2 eq for 2017, 35,382,457 t CO_2 eq for 2018, 37,283,717 t CO_2 eq for 2019, 36,266,466 t CO_2 eq for 2020, 36,177,556 t CO_2 eq for 2021 and 37,155,285 t CO_2 eq for 2022 and were measured against the assessed FREL of 46,301,251 t CO_2 eq/year.

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

Abbreviations and acronyms

AD	activity data
ART	Architecture for REDD+ Transactions
BTR	biennial transparency report
C	carbon
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
FREL	forest reference emission level
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
MPGs	modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement
NFI	national forest inventory
NFMS	national forest monitoring 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)
TA	technical analysis
TERT	technical expert review team

I. Introduction, overview and summary

A. Introduction

1. This technical report covers the TA of the technical annex provided by Guyana on 3 April 2024 in accordance with paragraph 45 of decision 1/CP.24 and paragraph 14 of decision 18/CMA.1 as part of its BTR1, which was submitted in accordance with paragraph 3 of decision 18/CMA.1. In the technical annex, Guyana 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 paragraph 8 of decision 14/CP.19.

2. In accordance with paragraph 14 of decision 18/CMA.1, the TA of the technical annex to the BTR is carried out concurrently with the technical expert review of the BTR referred to in Article 13, paragraph 11, of the Paris Agreement. The TERT conducted the technical expert review of the information reported in the BTR1 of Guyana as per the scope of the review defined in paragraph 146 of the MPGs,[1] resulting in a separate technical expert review report.[2]

3. Guyana made its first FREL submission, in accordance with decision 12/CP.17, on 8 December 2014, which was subject to technical assessment following the guidance provided in decision 13/CP.19 and its annex. As a result of the facilitative interactions with the LULUCF experts during the TA, the Party provided a modified version of its FREL submission on 27 April 2015. The assessed FREL was included as one of the elements of the technical annex to its BTR1 in accordance with the guidelines contained in the annex to decision 14/CP.19. The findings from the technical assessment of the FREL are included in a separate report.[3]

B. Process overview

4. The technical expert review of the BTR1 of Guyana took place from 30 September to 4 October 2024 as an in-country review and was undertaken by a TERT drawn from the UNFCCC roster of experts on the basis of the criteria defined in paragraphs 172–182 of the MPGs. Oswaldo Ismael Carrillo Negrete (Mexico) and Maria José Sanz Sánchez (Spain) were the LULUCF experts who undertook the TA of the technical annex in accordance with paragraphs 10–13 of decision 14/CP.19. The TA was coordinated by Dirk Nemitz (secretariat).

5. The TA of the technical annex provided by Guyana 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 accordance with paragraph 14 of decision 14/CP.19.

6. During the TA and subsequent exchanges, the LULUCF experts and Guyana engaged in technical discussions, and Guyana provided clarifications in response to questions raised by the LULUCF experts, in order to reach an understanding on the identification of the areas for future technical improvement. As a result of the facilitative interactions with the LULUCF experts during the TA, Guyana provided a modified version of its technical annex on 3 November 2024, which took into consideration the technical input of the LULUCF experts. The modifications improved the clarity and transparency of the submitted technical annex.

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

[1] Decision 18/CMA.1, annex.
[2] FCCC/ETF/TERR.1/2024/GUY.
[3] FCCC/TAR/2015/GUY.

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

C. Summary of results

8. In paragraph 70 of decision 1/CP.16 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, Guyana, on a voluntary basis, proposed a national FREL covering the activities reducing emissions from deforestation and reducing emissions from forest degradation for the purpose of a technical assessment in accordance with decision 13/CP.19 and its annex. The activities are being implemented in Guyana's national territory. The assessed FREL of Guyana is 46,301,251 t CO_2 eq/year.

9. The Party's FREL is based on its approach to estimating the historical CO_2 emissions associated with the activities reducing emissions from deforestation and reducing emissions from forest degradation for the historical reference period 2001–2012. In accordance with paragraph 9 of decision 12/CP.17, Guyana adjusted its proposed FREL by using the combined reference level approach.[4] Guyana reported the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2013–2022, calculated against the FREL, which amount to emission reductions of 31,081,049 t CO_2 eq for 2013, 31,132,776 t CO_2 eq for 2014, 35,108,154 t CO_2 eq for 2015, 36,089,073 t CO_2 eq for 2016, 35,647,957 t CO_2 eq for 2017, 35,382,457 t CO_2 eq for 2018, 37,283,717 t CO_2 eq for 2019, 36,266,466 t CO_2 eq for 2020, 36,177,556 t CO_2 eq for 2021 and 37,155,285 t CO_2 eq for 2022. The table contained in annex II summarizes the main features of the results in the technical annex, with the aim of accessing results-based payments for REDD+ activities, including the results period, the assessed FREL, and the pools and gases included.

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

10. For the technical annex to the BTR1 submitted by Guyana, see annex I.[5]

11. The scope of the TA is outlined in paragraph 11 of decision 14/CP.19, according to which the TERT 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 paragraph 9 of decision 14/CP.19;

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

12. The table below describes the findings from the TA of the data, methodologies and procedures used by the developing country 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 within the scope of the TA outlined in paragraph 11 above.

[4] See document FCCC/TAR/2015/GUY, para. 9.

[5] As per decision 14/CP.19, para. 14(a).

Findings from the technical analysis of the data and information used by the developing country 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

Finding ID#	*Aspect of the scope of the TA (decision 14/CP.19, para. 11)*	*Description of the issue, additional information shared by the Party during the TA and conclusions of the LULUCF experts*	*Area for future technical improvement*
1	11(a) Consistency in methodologies, definitions, comprehensiveness and the information provided (para. 3 of the annex to decision 14/CP.19)	The LULUCF experts noted that some data and information provided by Guyana to estimate the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation were not consistent with the assessed FREL. Inconsistencies were noted in: (a) The satellite imagery sources used (Landsat for 2001–2009, a combination of the Disaster Monitoring Constellation and Landsat for 2010, RapidEye for 2011–2014 and a combination of Landsat and Sentinel for 2015–2022); (b) The migration from manual methods in the FREL to automated methods (through Google Earth Engine) in the results, for detecting land-cover changes; (c) The inclusion or exclusion of emissions from shifting cultivation: 200,000 ha was labelled as forest in the FREL but as non-forest in, and thus excluded from, the results, and the Party did not clearly describe how those excluded areas were treated in the FREL, which may have led to an inconsistency in land cover reported; (d) The coverage of carbon pools for emissions from deforestation between the FREL (which includes the carbon pools above-ground biomass and below-ground biomass) and the results (which include the carbon pools above-ground biomass, below-ground biomass and soil organic carbon); (e) The databases used for estimating the EFs for deforestation, which was estimated using 66 plots for the FREL and 118 plots for the results, leading to a lower EF for the results period; (f) The stratification used for estimating the EFs: three strata were used for the FREL and a single stratum was used for all forest for the results. During the TA, Guyana explained that: (a) It considers that the use of different satellite imagery sources for the FREL and the results did not impact the estimation of AD for reducing emissions from deforestation, as a standard minimum mapping unit of 1 ha was used for all years, meaning that only changes of 1 ha (continuous) or greater contributed to the annual deforestation rates. Guyana explained that the minimum mapping rule eliminates most bias between different satellite image sources with varying spatial resolution. The Party highlighted that anomalies in the trend in annual deforestation rates for 2011–2014 are in line with the gold price rather than the use of different satellite imagery sources (e.g. RapidEye). To support its statements, the Party shared with the LULUCF experts a paper showing how the methodology used avoids bias, but it remained unclear to the experts how consistency was	The LULUCF experts note ensuring consistency between the data and information used to estimate the results and the assessed FREL as an area for future technical improvement of the technical annex, namely by providing a description of the methodology used to ensure consistency in AD estimation when different satellite imagery sources are used and ensuring consistency in the treatment of emissions from shifting cultivation (200,000 ha) between the FREL and the results.

Finding ID#	*Aspect of the scope of the TA (decision 14/CP.19, para. 11)*	*Description of the issue, additional information shared by the Party during the TA and conclusions of the LULUCF experts*	*Area for future technical improvement*
		ensured in the estimation of AD between the FREL and the results when different satellite imagery sources were used; (b) The wall-to-wall mapping process, for which Esri's ArcMap/ArcGIS Pro software is used, has remained unchanged since 2009. Forest loss events are manually digitized and attributed to a forest loss driver. The automated tools and the data set created using Google Earth Engine are only used to support the mapping team by providing additional layers that can be used as reference material in the geographic information system. The LULUCF experts acknowledge this clarification and consider that the use of automated tools and a data set as ancillary resources do not change the mapping process used between the reference period and the results period; (c) The 200,000 ha land under shifting cultivation was included in the forest area in the FREL, but was excluded from the forest area in the results. Despite this difference between the FREL and the results, Guyana considers the approach conservative, as all emissions and removals from this area were excluded from the results. The LULUCF experts acknowledge that this is a conservative approach but note the importance of addressing the possible resulting inconsistency in land cover as an area for future technical improvement; (d) During the TA, the LULUCF experts asked for further information on the emissions from soils that were included in the results calculated in the Guyana ART workbook and in the original technical annex. For consistency with the FREL, Guyana removed emissions from soils from its calculation of the results in the modified technical annex. The LULUCF experts commend Guyana for addressing the inconsistency in the modified submission; (e) A total of 118 plots were used to estimate the EFs for deforestation for the results in the original technical annex, and 66 plots were used to estimate the EFs for deforestation for the FREL. Considering this inconsistency observed by the LULUCF experts, the Party estimated the EFs for deforestation for the modified technical annex using the same database, with 66 plots, as the FREL. The LULUCF experts commend Guyana for addressing the inconsistency in the modified submission; (f) Since no statistical differences on carbon densities were found at strata level when more data were available, a single stratum was used to estimate the EF for the results period. As a result of the TA, for the modified technical annex the Party applied the same stratification for estimating EFs as for the FREL. The LULUCF experts commend Guyana for addressing the inconsistency in the modified submission. The LULUCF experts conclude that Guyana improved the consistency between the FREL and the results in the modified submission by removing soil organic	

Finding ID#	*Aspect of the scope of the TA (decision 14/CP.19, para. 11)*	*Description of the issue, additional information shared by the Party during the TA and conclusions of the LULUCF experts*	*Area for future technical improvement*
		carbon emissions in the results period; using the same data set, with 66 plots, to estimate the EFs for deforestation; and using the same strata. The LULUCF experts commend Guyana for implementing these improvements in the modified technical annex in order to increase consistency with the FREL.	
2	11(b) Accuracy – approaches	The LULUCF experts noted that emission reductions reported in the technical annex were estimated by comparing the emissions in the results with the emissions under the combined reference level approach (see para. 9 above). As explained in the report on the technical assessment of Guyana's FREL, the baseline was calculated as the midpoint between the rate of deforestation in Guyana from 2000 to 2009 (0.03 per cent) and the average deforestation rate for developing countries between 2005 and 2009 (0.52 per cent) using Baccini et al. (2012) and Harris et al. (2012). The LULUCF experts understand that this was an interim approach considering that (1) the combined reference level approach was developed in 2009, before any relevant decisions of the Conference of the Parties were adopted, and (2) no clear link is made to the national circumstances of Guyana. The LULUCF experts also noted that, for the results period, the average emission reduction is 35,132,449 t CO_2 eq/year, calculated against the FREL, when the combined reference level approach is applied, whereas if the average annual historical emissions over the results period (11,168,802 t CO_2 eq) are compared with the average annual historical emissions over the reference period (9,366,891 t CO_2 eq), the net balance is annual emissions of 1,801,911 t CO_2 eq. The LULUCF experts conclude that the combined reference level approach is limited in terms of its ability to accurately reflect emission reductions and commends Guyana for expressing its intention to further improve the approach used for the FREL in future submissions in order to ensure that the results of REDD+ activities are more accurately reflected.	The LULUCF experts note that the limitations of the combined reference level approach for estimating emission reductions, identified in the report on the technical assessment of Guyana's FREL, also apply to the technical annex being analysed. They also note updating the approach used for the FREL to address these limitations as an area for future technical improvement.
3	11(b) Completeness – EFs	The LULUCF experts noted that the biomass EFs for deforestation range between 239 and 330 t C/ha, which is high compared with figures provided in literature related to tropical forests, including the value of 190 t C/ha calculated using IPCC default values. During the TA, Guyana explained that the biomass EFs for deforestation are high owing to the wood densities of some tree species in Guyana's forest, which are very high compared with average wood densities in other countries. Another factor is the large number of trees with a large diameter at breast height found in many of the NFI plots where data were collected. As part of the TA process, Guyana provided additional information on the wood densities and NFI data. After analysing this information, the LULUCF experts	The LULUCF experts note including a comprehensive explanation for the high EFs for deforestation as an area for future technical improvement of the technical annex, also noting that this would increase the transparency and completeness of the submission.

Finding ID#	*Aspect of the scope of the TA (decision 14/CP.19, para. 11)*	*Description of the issue, additional information shared by the Party during the TA and conclusions of the LULUCF experts*	*Area for future technical improvement*
		confirmed that the EFs for deforestation estimated by Guyana are correct according to the wood densities in the plot data used.	
4	11(b) Completeness – EFs	The LULUCF experts noted that the statistical formulas used to estimate sampling errors for the EFs for deforestation were not clearly referenced. During the TA, Guyana shared documentation on the statistical formulas used to estimate sampling errors for the EFs for deforestation, which the LULUCF experts reviewed, concluding that they consider the statistical formulas reasonable.	The LULUCF experts note including a comprehensive explanation of the statistical formulas used to estimate sampling errors for the EFs for deforestation as an area for future technical improvement of the technical annex, also noting that this would increase the transparency and completeness of the submission.
5	11(b) Completeness – EFs	The LULUCF experts noted that they were unable to understand and reproduce the EFs for forest degradation as: (a) The formula used to estimate the EFs in the Guyana ART workbook was different from the one included in the technical annex; (b) A description of the approach and raw data (and the time series for logged timber volume and deadwood fraction) used to estimate the parameters (logging damage factor, wood density of timber harvested and logging infrastructure factor (skid trails)) required to calculate forest degradation was not included; (c) The actual data set for estimating the uncertainty of the EFs was not provided. As part of the TA process, Guyana provided the data set and information on the process used to estimate the EFs for forest degradation. While the LULUCF experts noted that this database does not contain the EFs for forest degradation used in the technical annex, they commend Guyana for its efforts to increase the transparency and ensure the completeness of the data and information provided, thus allowing for reconstruction of the results.	The LULUCF experts note sharing the correct version of the database that contains the EFs for forest degradation reported in the technical annex as an area for future technical improvement of the technical annex, also noting that this would increase the transparency and completeness of the submission.
6	11(b) Transparency, completeness – AD	The LULUCF experts noted that the Guyana ART workbook contains an approach for estimating standard errors of adjusted AD in the AD spreadsheet, but the Party's use of the approach was not explained or justified in the technical annex. During the TA, Guyana explained the approach used in the Guyana ART workbook for attributing standard errors of the adjusted AD and the rationale for using the approach, which, it clarified, was used for its reporting to ART. The LULUCF experts noted that, for the modified submission, the Party did not include the explanation for or use the approach in the Excel tool. The LULUCF experts conclude that no further information is necessary for future submissions, as	

Finding ID#	*Aspect of the scope of the TA (decision 14/CP.19, para. 11)*	*Description of the issue, additional information shared by the Party during the TA and conclusions of the LULUCF experts*	*Area for future technical improvement*
		the approach was not used in the estimation of the uncertainty of AD for the technical annex or the FREL.	
7	11(b) Transparency, completeness – AD	The LULUCF experts noted that although Guyana's AD estimates are adjusted to correct errors, the AD in the technical annex are based on pixel counting, which is an approach that can frequently lead to bias. As part of the TA process, the Party explained that the AD in the technical annex were obtained using pixel counting in order to ensure consistency with its FREL. While the LULUCF experts agree with using the same approach for AD estimation in the technical annex and the FREL in order to ensure consistency, they consider that using adjusted AD avoids bias in the estimation of AD. During the TA, Guyana provided additional documentation on the accuracy assessment of land-cover change maps for all years in the time series. On the basis of this information, the LULUCF experts noted that the Party has robust estimates of adjusted AD for each year from 2013 to 2022, which deviate from the AD obtained using pixel counting in several cases. The LULUCF experts consider that this illustrates the advantages and importance of using adjusted AD instead of pixel counting in terms of avoiding underestimation or overestimation of AD.	The LULUCF experts note the use of unbiased AD based on a sample-based approach as an area for future technical improvement of the technical annex.
8	11(b) Transparency, completeness – AD	The LULUCF experts noted that the Party did not provide information on the specific criteria or workflow for labelling each sample used in the accuracy assessment, for example the criteria for labelling a plot as deforested. As part of the TA process, Guyana provided additional information on the methodology used for labelling samples used for the accuracy assessment. The LULUCF experts commend Guyana for its efforts to increase the transparency and ensure the completeness of the data and information provided, thus allowing for reconstruction of the results, and for including a clarification in the modified technical annex.	
9	11(c) Consistency with the guidelines in paragraph 4 of the annex to decision 14/CP.19	The LULUCF experts noted that Guyana provided a general description of the NFMS and a summary of the roles and responsibilities of the agencies and institutions involved in measurement, reporting and verification of the results in the technical annex, together with weblinks for accessing further information. The forest monitoring system is a national system covering forest areas. The system is built around spatial and temporal change and involves, inter alia, the use of satellite imagery and a method of processing the imagery to provide layers of change over time. Data collected from the field allow for the verification of spatial information and enable the monitoring of forest activities. A combination of spatial information and field-based monitoring data provides an annual snapshot of forest change and generates data. The Forest Area Assessment Unit of the Guyana Forestry Commission interprets and analyses the data and generates maps and the	The LULUCF experts note the inclusion of a description of the systems used to collect and analyse the NFI data, compile information on emissions and removals and implement the uncertainty analysis as an area for future technical improvement of the technical annex.

Finding ID#	*Aspect of the scope of the TA (decision 14/CP.19, para. 11)*	*Description of the issue, additional information shared by the Party during the TA and conclusions of the LULUCF experts*	*Area for future technical improvement*
		associated spatial layers required to meet annual reporting requirements. Two external audits are carried out as part of the accuracy assessment process and in order to review and verify methods and analytical processes aimed at meeting reporting requirements. According to paragraph 4(b) of decision 11/CP.19 the NFMS should enable the assessment of different types of forest in the country, including natural forest. During the TA, the Party explained that it did not consider different types of forest because Guyana's tropical forest is very homogeneous. The LULUCF experts noted that the description of the NFMS does not include a description of the system used to collect the NFI data or the system for compiling information on emissions and removals and implementing the uncertainty analysis.	
10	11(c) Consistency with the guidelines in paragraph 6 of the annex to decision 14/CP.19	Guyana provided a description of how IPCC guidance and guidelines were taken into account in accordance with paragraph 1(c) of decision 4/CP.15. For estimating emission reductions, Guyana used the methodology provided in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* for estimating carbon stocks in forest land converted to other land uses. Accordingly, emissions from deforestation and forest degradation were estimated for 2013–2022 by combining AD with the appropriate EFs.	
11	11(d) Accuracy of the results proposed in the technical annex	The accuracy of results depends on whether the same methodology was used for estimating AD and EFs for the FREL and the technical annex. However, the LULUCF experts noted that 200,000 ha land under shifting cultivation was included in the forest area for the FREL but excluded from the forest area for the technical annex, which may affect the accuracy of the estimates. During the TA, Guyana explained that the 200,000 ha land was removed from the forest area and reclassified as non-forest in 2018 and continues to be excluded from the total forest area. For the results period, the corresponding carbon stocks for this area were also removed from the country's forest carbon stocks. The LULUCF experts noted that the exclusion of the emissions from shifting cultivation (200,000 ha, labelled as non-forest) in the results period could result in an underestimation of emissions, which could affect the accuracy of the results, because in the FREL this area was included as forest where deforestation potentially occurred.	The LULUCF experts note that including emissions from shifting cultivation on the 200,000 ha labelled as non-forest in the results period would avoid underestimation of emissions in the results period and consider this as an area for future technical improvement of the technical annex.
12	11(d) Accuracy of the results proposed in the technical annex	Guyana provided some information related to the uncertainty analysis. The LULUCF experts noted that (1) the sources of uncertainties in the results period (sampling errors of AD and EFs) were different from the sources of errors included in the FREL (measurement, model and sampling errors for EFs for deforestation); (2) the baseline (21,145,837 t CO_2 eq) used to calculate the uncertainties of emission reduction estimates (with a Monte Carlo simulation) was different to that reported in the FREL (46,301,251 t CO_2 eq); and (3) the	The LULUCF experts consider improving the uncertainty analysis in all of the areas identified as an area for future technical improvement of the technical annex.

Finding ID#	*Aspect of the scope of the TA (decision 14/CP.19, para. 11)*	*Description of the issue, additional information shared by the Party during the TA and conclusions of the LULUCF experts*	*Area for future technical improvement*
		information provided was not sufficient to enable them to reproduce the uncertainty analyses for the average emissions for the results period or the emission reductions. The LULUCF experts also noted that the low uncertainty estimates for emission reductions may be a result of a mathematical artefact. During the TA, Guyana explained that it planned to update and improve the uncertainty analysis for the modified submission. The LULUCF experts conclude that the information provided in the modified technical annex on the uncertainty analysis remains incomplete and inaccurate, and that the information in the technical annex needs to be further improved with a view to better addressing the estimation of uncertainty for emission reductions.	

III. Conclusions

13. The LULUCF experts conclude that Guyana reported the results of implementing two activities, namely reducing emissions from deforestation (defined as land-use changes in a minimum mapping unit of 1 ha for 2013–2022) and reducing emissions from forest degradation, and followed a national approach covering the country's forest, which represents more than 80 per cent of the national territory. The results include estimates of CO_2 emissions from two carbon pools: above-ground biomass and below-ground biomass. The results of the activities were estimated and reported using methodologies, definitions, assumptions and information that are mostly consistent with those used for constructing the assessed FREL.

14. The LULUCF experts conclude that the results presented of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation are mostly consistent with the assessed FREL. The LULUCF experts commend Guyana for ensuring consistency of data and methodologies between the FREL submission for 2001–2012 and the technical annex with the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation for 2013–2022.

15. The LULUCF experts conclude that Guyana provided most of the information necessary for reconstructing the results of implementing the activities reducing emissions from deforestation and reducing emissions from forest degradation. The data and information provided in the technical annex are considered to be mostly transparent, mostly consistent, mostly complete and mostly accurate, to the extent possible.

16. The LULUCF experts acknowledge that the technical annex includes 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 the results are consistent with those used to establish the assessed FREL; a description of the forest monitoring system and institutional roles and responsibilities in measurement, reporting and verification of the results; the information necessary for reconstructing the results; and a description of how the elements contained in paragraph 1(c–d) of decision 4/CP.15 have been taken into account. The LULUCF experts conclude that the data and information provided in the technical annex are mostly consistent with the guidelines referred to in paragraph 9 of decision 14/CP.19.

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

18. Pursuant to paragraph 14 of decision 14/CP.19, the LULUCF experts identified areas for future technical improvement (see the table above).

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

(a) Improving the way in which the effects of national circumstances and national policies and programmes are quantified and reflected;

(b) Assessing the significance of emissions from the deadwood, litter and soil pools with a view to determining whether such emissions should be considered in the results pursuant to subparagraph (c) of the annex to decision 12/CP.17;

(c) Estimating emissions of non-CO_2 gases when additional sources of emissions are included.

20. In conclusion, the LULUCF experts commend Guyana 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 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.[6] The LULUCF experts also acknowledge that the TA process was an opportunity for a facilitative and constructive technical exchange of views and information with Guyana.[7]

[6] As per decision 2/CP.17, para. 57.
[7] As per decision 14/CP.19, paras. 12–13.

Annex I

Technical annex to the biennial transparency report

Owing to the complexity and length of the submitted technical annex to the BTR, and in order to maintain the original formatting, the technical annex has not been reproduced here; it is available at https://unfccc.int/first-biennial-transparency-reports.

Annex II

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

Key element		*Remark(s)*
Results reported	31 081 049 t CO_2 eq for 2013, 31 132 776 t CO_2 eq for 2014, 35 108 154 t CO_2 eq for 2015, 36 089 073 t CO_2 eq for 2016, 35 647 957 t CO_2 eq for 2017, 35 382 457 t CO_2 eq for 2018, 37 283 717 t CO_2 eq for 2019, 36 266 466 t CO_2 eq for 2020, 36 177 556 t CO_2 eq for 2021 and 37 155 285 t CO_2 eq for 2022	See paragraph 9 of this document. See also finding ID# 2 in the table in this document
Results period	2013–2022	See paragraph 9 of this document
Assessed FREL	46 301 251 t CO_2 eq/year	See document FCCC/TAR/2015/GUY and the modified version of its latest FREL submission of October 2015. See also paragraph 8 of this document
Reference period	2001–2012	See paragraph 9 of this document
National/subnational	National	See paragraph 8 of this document
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation	See paragraphs 8–9 and 12 of this document
Pools included	Above-ground biomass Below-ground biomass	See paragraph 19(b) of this document. See also finding ID# 1 in the table in this document
Gas included	CO_2	See paragraph 19(c) of this document
Consistency with assessed FREL	Methods, definitions and information used for the assessed FREL are mostly consistent with those used for the results	See finding ID# 1 in the table in this document
Description of NFMS and institutional roles	Included	See finding ID# 8 in the table in this document
Identification of future technical improvements	Included	Several areas for future technical improvement have been identified (see finding ID#s 1–5, 7, 9 and 11–12 in the table and para. 19 in this document)

Annex III

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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 Guyana. Available at https://redd.unfccc.int/submissions.html?country=guy.

"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.

"Guidelines for elements to be included in the technical annex referred to in decision 14/CP.19, paragraph 7". Annex to decision 14/CP.19. Available at https://unfccc.int/sites/default/files/resource/docs/2013/cop19/eng/10a01.pdf#page=42.

"Guidelines for submissions of information on reference levels". Annex to decision 12/CP.17. 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 Guyana submitted in 2014. FCCC/TAR/2015/GUY. Available at https://unfccc.int/documents/8884.

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 technical annex:

Baccini A, Goetz SJ, Walker WS, Laporte NT, Sun M, Sulla-Menashe D, Hackler J, Beck PSA, Dubayah R, Friedl MA, Samanta S and Houghton RA. 2012. Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps. Nature Climate Change. 2: pp.182–185.

Harris NL, Brown S, Hagen SC, Saatchi SS, Petrova S, Salas W, Hansen MC, Potapov PV and Lotsch A. 2012. Baseline map of carbon emissions from deforestation in tropical regions. Science. 336: pp.1573–1576.