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Report on the technical assessment of the proposed forest reference level of Guyana submitted in 2025

Summary

This report covers the technical assessment of the voluntary submission of Guyana on its proposed forest reference level (FRL) in accordance with decision 13/CP.19 and in the context of results-based payments. The FRL proposed by Guyana covers the activities reducing emissions from deforestation, reducing emissions from forest degradation, conservation of forest carbon stocks and sustainable management of forests, which are among the activities included in paragraph 70 of decision 1/CP.16.

For its submission, Guyana developed a national FRL. The FRL presented in the original submission, based on the reference period 2018–2022, corresponds to 141,860,359 tonnes of carbon dioxide equivalent (t CO_2 eq) per year. As a result of the facilitative process during the technical assessment, the FRL was modified to a forest reference emission level (FREL) value of 32,695,707 t CO_2 eq/year for emissions from deforestation and forest degradation, with an adjustment for national circumstances, and a FRL value of –68,113,829 t CO_2 eq/year for removals from conservation of forest carbon stocks and sustainable management of forests.

The assessment team notes that the data and information used by Guyana in constructing its FREL/FRL are transparent, complete and in overall accordance with the guidelines contained in the annex to decision 12/CP.17. This report contains information on the assessed FREL/FRL 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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Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
2019 Refinement to the 2006 IPCC Guidelines	*2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
AGB	above-ground biomass
AT	assessment team
BTR	biennial transparency report
C	carbon
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
COP	Conference of the Parties
EF	emission factor
FREL	forest reference emission level
FRL	forest reference level
GFC	Guyana Forestry Commission
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
N_2O	nitrous oxide
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
SOC	soil organic carbon
TA	technical assessment

I. Introduction and summary

A. Overview

1. This report covers the TA of the submission of Guyana on its proposed FRL,[1] submitted on 18 December 2024, in accordance with decisions 12/CP.17 and 13/CP.19. The TA took place from 24 to 28 March 2025 and was coordinated by the secretariat.[2] The TA was conducted by the AT, consisting of two land use, land-use change and forestry experts from the UNFCCC roster of experts:[3] Tessia Boateng (Ghana) and Marieke Sandker (Kingdom of the Netherlands). The TA was coordinated by Keiichi Igarashi (secretariat).

2. In response to the invitation of the COP and in accordance with the provisions of paragraphs 7–15 of and the annex to decision 12/CP.17, Guyana submitted its proposed FRL on a voluntary basis. The proposed FRL is one of the elements[4] to be developed in implementing the activities referred to in paragraph 70 of decision 1/CP.16. Pursuant to paragraphs 1–2 of decision 13/CP.19 and paragraphs 7–8 of decision 14/CP.19, the COP decided that each submission of a proposed FRL, as referred to in paragraph 13 of decision 12/CP.17, 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 Guyana is in accordance with the guidelines for submissions of information on reference levels[5] and to offer a facilitative, non-intrusive, technical exchange of information on the construction of the FRL with a view to supporting the capacity of Guyana to construct and improve its FRL in the future, as appropriate.[6]

4. The TA of the FRL submitted by Guyana was undertaken in accordance with the guidelines and procedures for the TA of submissions from Parties on proposed FRELs and/or FRLs.[7] 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 Guyana. The facilitative exchange during the TA allowed Guyana to provide clarifications and additional information, which were considered by the AT in preparing this report.[8] As a result of the facilitative interactions with the AT during the TA, Guyana provided a modified version of its submission on 1 June 2025, which took into consideration the technical input of the AT. The modifications improved the clarity and transparency of the submitted FREL/FRL. This TA report was prepared in the context of the modified FREL/FRL submission.

B. Proposed forest reference level

6. In paragraph 70 of decision 1/CP.16, 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/FRL proposed by Guyana, on a voluntary basis for a TA in the context of results-based payments, covers the activities reducing emissions from deforestation, reducing emissions from forest degradation, conservation of forest carbon stocks and sustainable management of forests, which are four of the five activities referred to in paragraph 70 of decision 1/CP.16. The national FREL includes emissions from deforestation due to medium- and large-scale mining, agriculture, forestry and other infrastructure (only primary roads), settlements,

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[1] The submission of Guyana is available at https://redd.unfccc.int/submissions.html?country=guy.
[2] As per decision 13/CP.19, annex, para. 7.
[3] As per decision 13/CP.19, annex, paras. 7 and 9.
[4] See decision 1/CP.16, para. 71(b).
[5] Decision 12/CP.17, annex.
[6] Decision 13/CP.19, annex, para. 1(a–b).
[7] Decision 13/CP.19, annex.
[8] As per decision 13/CP.19, annex, paras. 1(b), 13 and 14.

biomass burning and shifting cultivation, and emissions from forest degradation (including secondary roads and skid trails) associated with legal and illegal logging and due to mining, and the national FRL includes removals from conservation of forest carbon stocks and sustainable management of forests, with all forests in Guyana under sustainable management. In constructing its FREL, Guyana applied an adjustment to account for its national circumstances as a high-forest, low-deforestation country. For its submission, Guyana applied a stepwise approach to developing its FREL/FRL in accordance with paragraph 10 of decision 12/CP.17, which enables Parties to improve their FREL or FRL by incorporating better data, improved methodologies and, where appropriate, additional pools.

7.   The FREL/FRL submitted by Guyana in the modified submission, based on the reference period 2018–2022, corresponds to 32,695,707 t CO_2 eq/year for emissions from deforestation and forest degradation (following application of an adjustment for national circumstances) and –68,113,829 t CO_2 eq/year for removals from conservation of forest carbon stocks and sustainable management of forests.[9] The table contained in annex I summarizes the main features of the FREL/FRL presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities, including reference period, territorial coverage, and pools and gases included.

8.   For constructing its FREL/FRL, Guyana used the 2006 IPCC Guidelines, multiplying each hectare of deforestation and forest degradation due to mining and infrastructure occurring annually by an EF, multiplying each cubic metre of timber harvested per year by an EF, and multiplying each hectare of standing forest by a removal factor.

9.   The AD used in constructing the FREL/FRL came from two main sources. To calculate emissions from deforestation and removals from conservation of forest carbon stocks and sustainable management of forests, Guyana used wall-to-wall maps produced annually by GFC. To calculate emissions from forest degradation, Guyana used national statistics of logged volumes and related disturbances (e.g. secondary roads and skid trails). In 2018–2022, the average of historical emissions from deforestation was 7,529,362 t CO_2 eq and from forest degradation 3,512,914 t CO_2 eq.

10.   GFC has used remote sensing to develop annual land-change maps since 2010, with polygons of change hand-drawn and assessed through visual interpretation. Assessments for 2011–2014 were based on RapidEye imaging with a 5 m resolution. However, this proved to be cost-prohibitive, and GFC started using a combination of Sentinel-2 and Landsat imaging from 2015. Assessments for 2018–2022 were based on the land-change map from 2017, with annual areas of change added to it. Areas of forest remaining forest in the map were used for the calculation of removals.

11.   In constructing its FREL/FRL, Guyana collected field data for 120 inventory plots. Two plots were not used, one because the plot encompassed savannah land and the other because the land therein had been burned. Of the remaining 118 plots, 91 plots were assessed in 2011–2015 and 27 plots in 2018–2019. Each plot consists of four subplots. In each subplot, all tree species were assessed and the diameter of the trees at breast height measured, with this information used to estimate AGB on the basis of the allometric equation from Chave et al. (2005). Litter was assessed in 76 plots, with only one subplot per plot considered.

12.   For its FREL submitted in 2014,[10] Guyana used field measurements collected between 2011–2014, which were post-stratified using an accessibility map, with different average AGB values per stratum, which at the time was considered the most efficient stratification method for obtaining distinct AGB values. Guyana amended this stratification method in 2018 after new field measurements were collected, using biogeographical characteristics instead, but concluded that this stratification method was not efficient. The most recent measurements, taken in 2018 and 2021, saw a decrease in AGB differences with accessibility used as a stratification method, with no statistical differences found across strata. For this

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[9] In its original submission, Guyana proposed a FRL of 141,860,359 t CO_2 eq/year. The difference between the original and the modified submission is due mostly to the correction of removals from conservation of forest carbon stocks and sustainable management of forests, which were initially presented as a positive value, to the inclusion of tree mortality in the calculation of removals and to the correction of the assumption of full oxidation in relation to emissions from SOC.

[10] The submission is available at https://redd.unfccc.int/submissions.html?country=guy.

submission, Guyana therefore opted against the stratification method and instead used a single average AGB value for all forests.

13. The proposed FREL/FRL includes the carbon pools AGB, below-ground biomass, deadwood, litter and SOC. Regarding GHGs, the submission includes CO_2, CH_4 and N_2O.

14. The FREL proposed by Guyana is its second FREL submitted in the context of applying the stepwise approach. The previous FREL was submitted on 8 December 2014 and was subject to a TA in 2015; it covered the activities reducing emissions from deforestation and reducing emissions from forest degradation based on the reference period 2001–2012 (12 years) and corresponded to 46,301,251 t CO_2 eq/year. It was therefore higher than the FREL proposed in the most recent submission (see finding ID# 16 in the table below for differences between the most recent FREL/FRL and the previous FREL).

15. Guyana applied a 90 per cent confidence interval to its EFs, which was calculated by combining the sampling errors of the field data for the different carbon pools considered. Guyana did not apply a confidence interval to the estimated areas of deforestation and forest degradation (i.e. buffer zones around mining areas), or to harvested timber volume, as these did not have an associated sampling error. Guyana specified the confidence intervals pertaining to the independent accuracy assessment for the estimate of the size of the deforestation area in the country performed by Durham University, providing stratified area estimates (i.e. area estimates based on sampling that correct for misclassifications in the land-change maps). The estimates were not produced using Guyana's land-change maps for stratification, meaning that the associated user and producer accuracy did not provide information on misclassifications in the maps. The methodology used for the Party's monitoring, reporting and verification system is designed to produce independent estimates for annual gross deforestation areas and provide a breakdown of the drivers of land-cover change and the uncertainty associated with each area estimate. Guyana is a high-forest and low-deforestation country where the tropical forests have high levels of cloud cover, making it extremely difficult to acquire good-quality satellite imagery for the entire country on an annual basis with a view to performing pixel-based satellite image classification. Therefore, GFC used a systematic process involving manual image interpretation to identify and map land-cover change. To assess the accuracy of the mapping carried out by GFC, change was estimated using a sample of higher-quality (best-quality) imagery to provide reliable interpretations of change (and the drivers thereof) and generate uncertainty estimates for observed changes in land area.

16. The approach selected for land-change mapping is a stratified two-stage cluster sampling, where the first stage primary sampling units were selected at random and the secondary sampling units were systematically sampled. Strata were determined by risk of deforestation and sampled proportionally. The method, which was entirely independent of the GFC mapping process, was used to provide estimates of area of change, and the rate of change and the associated uncertainty. The reference data for the strata at high risk of change were satellite data with very high spatial resolution and sub-metre pixel size. These data were manually interpreted on a hectare-by-hectare basis by comparing the image for the previous year with the image for the current year, thus providing an extremely reliable estimate of land-cover change. The reference data for the strata at low risk of change were a range of satellite data with medium to high spatial resolution, which was a better selection of images compared with those available to the GFC wall-to-wall mapping team and is usually adequate for interpreting change. The AT noted that it would be prohibitively expensive to sample the whole country using satellite data with a very high spatial resolution and sub-metre pixel size. Error matrices were generated, and standard errors were determined to inform overall uncertainty in area estimates used for the FREL/FRL. Guyana did not propagate the errors around EFs and AD or report the overall uncertainty pertaining to the FREL/FRL values.

II. Technical assessment of the proposed forest reference level

17. The table below describes the findings from the TA of the data, methodologies and procedures used by the developing country Party under assessment in constructing its FREL/FRL within the scope of the TA in accordance with decision 13/CP.19 and its annex.

Findings from the technical assessment of the data, methodologies and procedures used by the developing country Party under assessment in constructing its forest reference emission level and/or forest reference level

Finding ID#	Aspect of the scope of the TA (decision 13/CP.19, annex, para. 2)	Description of the issue, additional information shared by the Party during the TA and conclusion of the AT	Area for future technical improvement
1	2(a) Consistency with the national GHG inventories	The AT noted that Guyana did not maintain consistency, in terms of the removals reported as part its FRL, with those reported in the GHG inventory included in its BTR1. Specifically, as explained by Guyana in its BTR1 and during the technical expert review process (see ID# 6.L.7 in document FCCC/ETF/TERR.1/2024/GUY), the estimates of removals from standing forests reported in the BTR1 were refined and reported as revised totals as part of the FRL.	
		During the TA, Guyana explained that, in determining removals for its BTR1, it applied a single removal factor of 2.34 t C/ha, as taken from Roopsind et al. (2018). However, as a result of the interactions with the technical expert review team during the technical expert review of its BTR1, Guyana revised its approach by replacing the removal factor applied to protected forests and State forests such as mining areas, unallocated forest areas and conservation areas with the IPCC default factor of 0.47 t C/ha (see ID# 6.L.7 in document FCCC/ETF/TERR.1/2024/GUY).	
		The AT commends Guyana for the clarification provided.	
2	2(c) Approaches – accuracy	The AT noted that Guyana applied the assumption of immediate oxidation of SOC after deforestation. However, the AT noted that, according to the tier 1 and tier 2 methods presented in the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 2, equation 2.25), SOC changes in mineral soils should be presented as annual changes.	
		In response to the AT request for clarification, Guyana explained that it assumed that all SOC emissions occurred in the year in which deforestation took place in order to simplify reporting and enhance transparency. The AT acknowledged that, though this approach does simplify reporting, the current treatment of SOC emissions is not fully consistent with IPCC guidance and may have led to emissions from deforestation being overestimated.	
		For its modified submission, Guyana used annual SOC losses over a 20-year period based on updated tier 1 methods, replacing immediate 100 per cent SOC oxidation. This resulted in revised average emissions, from 67.0 to 4.2 t CO_2 eq/ha/year. The AT commends Guyana for this technical improvement.	
3	2(c) Approaches – transparency	Guyana, being a high-forest, low-deforestation country, applied an adjustment to account for its national circumstances equivalent to 0.1 per cent of its forest carbon stock, namely 21,653,431 t CO_2 eq/year. This adjustment resulted in a 196 per cent increase in historical emissions from deforestation and forest degradation between 2018 and 2022, which amounted to 11,042,276 t CO_2 eq/year in this period.	
		In its original submission, Guyana explained that the country is experiencing increasing pressure related to infrastructure development and population in forest land as a result	

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		of its growing population, socioeconomic development and rising prices of gold and timber.	
		During the TA, in response to a question from the AT, Guyana noted that, though only some aspects of the analyses were conducted using historical data to quantify the relationship between the aforementioned drivers and deforestation, for 2009–2015 the price of gold in the country peaked in 2012, a year that also saw one of the highest deforestation rates, at 0.079 per cent. Based on this, Guyana applied an upward adjustment of 0.1 per cent to be conservative.	
		In its modified submission, Guyana provided detailed justification for applying the 0.1 per cent adjustment. The AT commends Guyana for providing this additional information.	
4	2(c) Approaches – accuracy, transparency	The AT noted that, in paragraph 21 of the report on the TA of the proposed FREL of Guyana submitted in 2014, Guyana indicated that there is a risk of double counting its AD for 2013 onward owing to the entry into force of a regulation requiring commercial timber extraction to be requested before deforestation.	The AT notes that identifying whether deforestation occurred in previously degraded forest areas and providing information on the locations of forest degradation, particularly related to mining, and subsequent deforestation with a view to including deforestation happening in degraded areas, using an appropriate EF and avoiding double counting and underestimation of emissions, is an area for future technical improvement that would improve the accuracy and transparency of the FREL submission.
		In the light of this, during the TA, the AT asked whether emissions from deforestation and forest degradation may have been double counted in constructing the FREL, particularly as AD for timber extraction are reported in cubic metres, without information on the locations of the harvesting. In response, Guyana clarified that the regulation had been misinterpreted during the previous TA. It explained that timber extraction takes place almost exclusively within the scope of forest concessions, while deforestation occurs primarily outside these areas, thereby minimizing any potential overlap.	
		The AT also noted that an independent accuracy assessment for the estimate of the size of the deforestation area in Guyana by Durham University indicated that a portion of deforestation occurred in previously degraded forests (e.g. in 2022, 28 per cent of deforestation occurred in degraded forests). In response, Guyana explained that its own area estimates applied buffer zones around areas of mining-related deforestation to determine surrounding forest degradation and concluded that there is no spatial overlap between deforestation and forest degradation. However, the AT noted that screenshots of the GFC map for 2022, published in Guyana's monitoring, reporting and verification system assessment report (2023), show that many new areas of deforestation appear to be located adjacent to areas of deforestation from previous years, which may suggest an overlap between the buffer zones applied by the Party and newly deforested areas.	
		As part of the modified submission, Guyana provided documentation explaining how overlapping forest degradation buffer zones with areas of deforestation reported for subsequent years will not result in emissions being double counted. However, the AT noted that Guyana would need to further review how areas of deforestation occurring in degradation buffers from previous years are determined. For the modified submission,	

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		Guyana reassessed the areas of deforestation reported in response to the questions raised by the AT, reducing them from an average of 9,535 ha/year to 8,002 ha/year given that some deforestation areas overlapped with degradation areas and would otherwise be double counted.	
		The AT notes that areas of deforestation that overlap with a buffer zone of forest degradation from an earlier year should not be excluded from the calculations, as this will result in the area of deforestation being underestimated. Such areas should be included in the calculations but associated with a lower EF in order to avoid double counting when also considering emissions from forest degradation.	
5	2(c) Approaches – accuracy	The AT noted that, in its original FRL submission, Guyana included removals from conservation of forest carbon stocks and sustainable management of forests as positive values and added them to emissions from deforestation, forest degradation and the adjustment for national circumstances.	
		During the TA, the AT pointed out that removals should be denoted as negative values since CO_2 is not added to the atmosphere but removed from it. In response, Guyana modified the initial FRL value of 141,860,359 t CO_2 eq/year to a FREL value of 32,695,707 t CO_2 eq/year for emissions from deforestation and forest degradation (taking into account an adjustment for national circumstances) and a FRL value of – 68,113,829 t CO_2 eq/year for removals from conservation of forest carbon stocks and sustainable management of forests.	
		The AT commends Guyana for this update.	
6	2(c) EFs – accuracy	The AT noted that Guyana used a gross EF for forest degradation, applying two separate removal factors to the total standing forest area, both excluding logging.	The AT notes that including removals from post-degradation regrowth expected based on volume of timber harvested is an area for future technical improvement.
		In response to a question from the AT during the TA, Guyana explained that removals from post-degradation regrowth were not specifically taken into account or directly associated with the areas harvested for timber.	
		The AT noted that using a gross EF for forest degradation is likely to result in an overestimation of emissions from forest degradation. This concern is supported by Roopsind et al. (2018), which found that merchantable timber stocks fully recovered 20 years after logging and even increased by 7 per cent in the case of low-intensity reduced-impact logging and by 15 per cent in the case of moderate-intensity reduced-impact logging involving the use of liberation treatments.	
7	2(c) EFs – accuracy	The AT noted that Guyana did not account for post-deforestation carbon stocks in land converted from forest land, assuming that the carbon content in such land after conversion is zero.	
		The AT noted that, while a zero value may be reasonable for land-use categories falling under settlements, such as infrastructure and mining areas, it would expect carbon	

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		stocks to have a non-zero value for land-use categories falling under agriculture, especially shifting cultivation. It therefore noted that using a gross EF for deforestation without considering post-deforestation carbon stocks is expected to result in an overestimation of emissions from deforestation.	
		For its modified submission, Guyana updated its EFs for deforestation by using the applicable tier 1 values for a post-deforestation assessment, namely 4.7 t C/ha for agriculture (default value for annual cropland in the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.9)) and 6.1 t C/ha for shifting cultivation (GFC and Winrock International, 2019). The AT commends Guyana for this technical improvement.	
8	2(c) EFs – accuracy	The AT noted that Guyana calculated removals using two different removal factors across all standing forest areas. The IPCC default factor of 0.47 t C/ha/year (2006 IPCC Guidelines, vol. 4, chap. 4, table 4.3) was used for protected forests and State forests such as mining areas, unallocated forest areas and conservation areas, while a higher factor of 2.34 t C/ha/year, sourced from Roopsind et al. (2018), was used for State forests used as timber harvesting areas, State land (agricultural activities) and Amerindian lands (subsistence forestry activities). The AT noted that the value of 2.34 t C/ha/year reflects the gross periodic annual increment in unlogged forests.	
		During the TA, in response to a question from the AT about why the gross periodic annual increment was used instead of the net annual increment of 1.02 t C/ha/year, which accounts for tree mortality, Guyana explained that the relevant forests and lands were under sustainable management, with tree mortality expected to be low. However, the AT noted that, while no logging occurred in the control plots where the value 2.34 t C/ha/year was used, tree mortality still occurred because this is a natural feature in forests. As a result, the AT concluded that the use of the gross periodic annual increment may result in an overestimation of removals in standing forests.	
		For its modified submission, Guyana revised its treatment of removals to include net removal factors for various forest management types. This resulted in the revision of removals from standing forests from -106.5 Mt CO_2 eq/year to -68.1 Mt CO_2 eq/year. The AT commends Guyana for this technical improvement.	
9	2(c) EFs – accuracy	The AT noted that Guyana did not apply a stratification method to its forests and instead used a single average AGB value to calculate the EF for deforestation.	The AT notes that stratifying by forest type and increasing the number of inventory plots to ensure sufficient measurements per forest type are areas for future technical improvement that would increase the accuracy of the FREL/FRL submission.
		During the TA, Guyana explained that stratifying forests by accessibility categories, as was done for its 2014 FREL submission, resulted in mean values that were not statistically different. The AT asked whether Guyana has considered a method of stratification by forest type instead of by accessibility. In response, Guyana noted that a stratification method based on biogeographical characteristics was tested out in 2018, with additional plot data used to assess the potential for stratification based on forest type, rainfall, elevation, soil type and latitude. However, none of these factors were	

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		found to improve carbon stock estimates. Guyana also shared average carbon stock measurements per plot of land and per forest type.	
		The AT noted that 89 per cent of the inventory plots used in constructing the FREL/FRL were located in mixed forests, 6 per cent in swamp/marsh forests and 5 per cent in dakama/wallaba forests. No plots were located in montane/steep forests. Additionally, the AT noted that the carbon stocks of some forest types showed no overlap in their 90 per cent confidence intervals, suggesting statistically relevant differences. Guyana explained that it plans to develop carbon plots in montane/steep forests, to a limited extent, in a new field inventory cycle. It also clarified that, given that montane/steep forests are largely inaccessible, the level of threat of deforestation is low and, consequently, impacts on emissions are also low.	
		The AT commends Guyana for its planned development of plots in montane/steep forest areas.	
10	2(c) EFs – accuracy	The AT noted that SOC emissions are higher when forests are converted to mining areas compared with when they are converted for agricultural purposes.	
		During the TA, Guyana explained that it used default stock change factors from the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.5, on cropland) for forest areas converted to mining areas.	
		The AT noted that mining falls under the category other land, for which the default values can be found in the 2006 IPCC Guidelines (vol. 4, chap. 9), with the Guidelines assuming full SOC loss following conversion of land to other land. Therefore, the AT considers that using cropland stock change factors for forest areas converted to mining areas is likely to result in an underestimation of SOC emissions from deforestation due to mining.	
		For its modified submission, Guyana used near-zero SOC retention values for forest converted to other land, applying a tier 1 method. The AT commends Guyana for this improvement.	
11	2(c) AD – transparency	The AT noted that the independent accuracy assessment for annual deforestation area carried out by Durham University since 2010 was not conducted on the GFC forest-change map, but rather on an independently created map with three strata: non-forest, low-risk and high-risk forest.	The AT notes that including Guyana's forest-change assessment as a separate stratum in third-party assessments of annual deforestation in the country is an area for future technical improvement that would increase the transparency of the FREL submission.
		In response to a question from the AT about why the assessment was not conducted on the GFC forest-change map, Guyana explained that the area of Durham University's map classified as having changed is very small and that conducting stratified estimation of this area would likely have resulted in wide confidence intervals. Guyana provided to the AT all annual deforestation assessment reports used in constructing its FREL, namely those from both GFC and Durham University, which enabled the AT to calculate the average annual area of deforestation for 2018–2022. The average area of	

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		deforestation reported by GFC was 9,535 ha/year, while Durham University reported 7,715 ha/year, which is 19 per cent lower on average over the five years. Guyana noted that, given that deforestation is relatively rare in Guyana and the area assessed was small relative to the national area, the 19 per cent difference between the two estimates was considered small.	
		The AT commends Guyana for its continued efforts to conduct annual forest-change assessments and commission independent third-party assessments. Nonetheless, the AT suggests that future third-party assessments take into account Guyana's forest-change assessments as a separate stratum. This will enable the calculation of the user and producer accuracy for the annual deforestation area, providing insights into omission and commission errors in Guyana's forest-change maps.	
12	2(c) AD – accuracy	The AT noted that, to estimate emissions from timber extraction, Guyana applied a single logging damage factor and a single wood density factor, which were multiplied by the annual volume of timber extracted. However, the AT also observed that Guyana appears to have detailed data on the volume of timber harvested per species each year, noting that using this species-specific information could result in more accurate estimates of emissions from timber extraction.	The AT notes that using timber-species-specific wood density values in conjunction with the volume of timber extracted for each species, where such information is available, is an area for future technical improvement that would increase the accuracy of the FREL submission.
13	2(c) AD – transparency	The AT noted inconsistencies in the forest area values for 2022 reported in Guyana's FRL submission, with varying values presented in different sections.	
		During the TA, Guyana explained that these differences were due to the removal of historical forest loss areas that no longer meet the forest definition being applied, which led to variations in the reported values.	
		In its modified submission, Guyana reported a consistent forest area value for 2022.	
14	2(c) AD – accuracy	The AT noted that Guyana calculated removals using the 2018 forest area, which thus excluded any deforestation and forest degradation that occurred during the reference period used for the FRL, and noted that using average annualized values to estimate removals associated with standing forests would be more accurate.	
		For its modified submission, Guyana estimated its removals annually, as suggested by the AT. The AT commends Guyana for this improvement.	
15	2(d) Description of relevant policies and plans, as appropriate	Guyana's forests are managed sustainably through a range of activities embedded in its national forest policy, national forest plan and associated codes of practice.	
		The forest area in Guyana is categorized into three types: State forest areas, titled Amerindian land and protected areas, each managed under sustainable management plans, either by the State or by Indigenous Peoples and local communities.	

Finding ID#	Aspect of the scope of the TA (decision 13/CP.19, annex, para. 2)	Description of the issue, additional information shared by the Party during the TA and conclusion of the AT	Area for future technical improvement
16	2(e) Changes to previously submitted FREL	In its FREL/FRL submission, Guyana described the following changes from previously submitted information in accordance with paragraph (b) of the annex to decision 12/CP.17: (a) Expanding the scope of activities covered to include conservation of forest carbon stocks and sustainable management of forests; (b) Expanding the scope of carbon pools covered to include litter and SOC; (c) Expanding the scope of gases covered to include non-CO_2 GHGs; (d) Expanding the drivers of deforestation to include deforestation associated with settlements, biomass burning and shifting cultivation; (e) Revising the forest stratification method, from using six strata based on accessibility to using a single stratum. The AT concludes that the FREL/FRL proposed in the most recent submission differs from the FREL proposed in the modified 2014 submission previously assessed owing mainly to the change in the scope of activities, pools and gases and the different period covered.	
17	2(g) Definition of forest	Guyana provided in its submission the definition of forest used in constructing its FREL/FRL. The definition is a minimum area of land of 1 ha, at least 30 per cent canopy cover and a minimum height of 5 m at maturity in situ. The definition is the same as that used by the Party for its national GHG inventory and differs from that used in its reporting to the Food and Agriculture Organization of the United Nations for the Global Forest Resources Assessment.	

III. Conclusions

18.   The FREL/FRL submission presents Guyana's second FREL and first FRL.

19.   The FREL/FRL presented in the most recent modified submission, based on the reference period 2018–2022, corresponds to 32,695,707 t CO_2 eq/year for emissions from deforestation and forest degradation (including an adjustment for national circumstances) and –68,113,829 t CO_2 eq/year for removals from conservation of forest carbon stocks and sustainable management of forests.

20.   The AT acknowledges that Guyana included in its FREL/FRL the most significant activities in terms of emissions from forests. The AT considers that, in doing so, Guyana followed paragraph 70 of decision 1/CP.16, on activities undertaken, and paragraph 10 of decision 12/CP.17, on applying the stepwise approach.

21.   As a result of the facilitative interactions with the AT during the TA, Guyana 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/FRL submission and commends Guyana on its efforts. The new information provided in the modified submission and the examples of how estimates of CO_2 emissions from deforestation were calculated (namely by using the appropriate SOC estimates) increased the reproducibility of the FREL/FRL calculations.

22.   Pursuant to paragraph 3 of the annex to decision 13/CP.19, the AT identified areas for future technical improvement (see the table above).

23.   The information used by Guyana in constructing its FREL/FRL for reducing emissions from deforestation, reducing emissions from forest degradation, conservation of forest carbon stocks and sustainable management of forests is transparent, complete and in overall accordance with the guidelines for submissions of information on reference levels.

24.   In conclusion, the AT commends Guyana for showing strong commitment to continuously improving its FREL/FRL estimates in line with the stepwise approach. A number of areas for the future technical improvement of Guyana's FREL/FRL 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.[11] The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Guyana.

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[11] As 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 level based on information provided by Guyana

Main features of the FREL/FRL		*Remarks*
Proposed FREL	32 695 707 t CO_2 eq/year	For emissions from deforestation, emissions from forest degradation and an adjustment for national circumstances
		See paragraph 7 of this document
Proposed FRL	–68 113 829 t CO_2 eq/year	For removals from conservation of forest carbon stocks and sustainable management of forests
		See paragraph 7 of this document
Type and reference period of FREL/FRL	FREL = average of historical emissions in 2018–2022 (five years)	See paragraph 7 of this document
	FRL = average of historical removals in 2018–2022 (five years)	
Application of adjustment for national circumstances	Yes	See finding ID# 3 in the table in this document
National/subnational	National	See paragraph 6 of this document
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation Conservation of forest carbon stocks Sustainable management of forests	See paragraph 6 of this document
Pools included	AGB Below-ground biomass Deadwood Litter SOC	See paragraph 13 of this document
Gases included	CO_2, CH_4, N_2O	See paragraph 13 of this document
Forest definition	Included	See also finding ID# 17 in the table in this document
Consistency with latest national GHG inventory	Methods used for estimating the FREL/FRL are consistent with those used for the latest national GHG inventory (2024)	See also finding ID# 1 in the table in this document
Description of relevant policies and plans	Included	See also finding ID# 15 in the table in this document
Description of assumptions on future changes to domestic policy, if included in constructing the FREL/FRL	Not included	
Description of changes to previous FREL/FRL	Included	See also finding ID# 16 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 4, 6, 9, 11 and 12 in the table in this document)

Annex II

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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IPCC. 2019. *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.* E Calvo Buendia, K Tanabe, A Kranjc, et al. (eds.). Geneva: IPCC. Available at https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html.

B. UNFCCC documents

BTR1 of Guyana. Available at https://unfccc.int/first-biennial-transparency-reports.

First biennial update report of Guyana. Available at https://unfccc.int/BURs.

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

First, second and third national communications of Guyana. Available at https://unfccc.int/non-annex-I-NCs.

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

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

Report on the TA of the proposed FREL of Guyana submitted in 2014. FCCC/TAR/2015/GUY. Available at https://unfccc.int/documents/8884.

Report on the technical expert review of the BTR1 of Guyana. Addendum. FCCC/ETF/TERR.1/2024/GUY/Add.1. Available at https://unfccc.int/documents/647937.

C. Other documents

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

Accuracy Assessment Report Year 7 Guyana REDD+ MRVS by Durham University and Royal School of Military Survey. Available at https://forestry.gov.gy/wp-content/uploads/2018/11/Accuracy-Assessment-Guyana-MRVS-Year-7.pdf.

Chave, J, C. et al. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. *Oecologia*, 145:87-99.

GFC and Winrock International, Recommendations Paper Shifting Cultivation and REDD+ in Guyana September 2019. Available at https://1drv.ms/b/c/7bb42105c0f4d416/EVeHOVcoj9BPnVV-lkIveMsB3xpybU2QX4lK7SIlEx8FiQ?e=ahG0BX.

Guyana Forestry Commission Guyana REDD+ Monitoring Reporting and Verification System (MRVS) Accuracy Assessment Final Report by Durham University. Available at https://forestry.gov.gy/wp-content/uploads/2015/09/Accuracy-Assement-Year-1.pdf.

Guyana Monitoring Reporting & Verification System (MRVS) Assessment Report. Available at https://forestry.gov.gy/guyana-monitoring-reporting-verification-systemmrvs-assessment-report/.

GUYANA REDD+ Monitoring Reporting and Verification (MRV) System Report Year 2023. Available at https://forestry.gov.gy/wp-content/uploads/2024/08/Guyana-MRVS-Year-2023-Report.pdf.

MRVS Interim Measures Reports. Available at https://forestry.gov.gy/mrvs-interim-measures-reports/.

Roopsind A, et al. 2018. Trade-offs between carbon stocks and timber recovery in tropical forests are mediated by logging intensity. *Glob Chang Biol*, 24(7), 2862-2874.