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Technical report on the technical analysis of the technical annex to the first biennial transparency report of Colombia submitted in accordance with paragraph 14 of decision 18/CMA.1 on 5 September 2025

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 Colombia on 5 September 2025 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 activity reducing emissions from deforestation, which is an activity 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 Colombia in its modified FREL submission of August 2020.

Colombia reported the results of implementing this activity for 2018–2022, which amount to –15,530,075 tonnes of carbon dioxide equivalent (t CO_2 eq) for 2018, 9,027,936 t CO_2 eq for 2019, 5,198,953 t CO_2 eq for 2020, 7,562,547 t CO_2 eq for 2021 and 36,566,496 t CO_2 eq for 2022 and were measured against the assessed FREL of 118,613,986 t CO_2 eq for 2018, 124,744,070 t CO_2 eq for 2019, 130,154,027 t CO_2 eq for 2020, 134,681,829 t CO_2 eq for 2021 and 138,219,454 t CO_2 eq for 2022.

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 Colombia in the technical annex are mostly transparent and 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

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
BTR	biennial transparency report
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
FREL	forest reference emission level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
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
QA/QC	quality assurance/quality control
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
SOC	soil organic carbon
TA	technical analysis

I. Introduction, overview and summary

A. Introduction

1. This technical report covers the TA of the technical annex provided by Colombia on 5 September 2025 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, Colombia 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 this context, Colombia underlined that the submission of the technical annex through its BTR1 does not modify or adjust its nationally determined contribution or any other legal instrument in Colombia or related to the Convention and the Paris Agreement.

3. 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 technical expert review team conducted the technical expert review of the information reported in the BTR1 of Colombia as per the scope of the review defined in paragraph 146 of the MPGs,[1] resulting in a separate technical expert review report.[2]

4. Colombia made its first, second and third FREL submissions, in accordance with decision 12/CP.17, on 8 December 2014, 6 January 2020 and 6 January 2024 respectively, which were 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 technical assessment, the Party provided a modified version of its second FREL submission on 18 August 2020. The assessed second FREL[3] 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 that FREL are included in a separate report.[4]

5. Colombia previously submitted technical annexes to its first and second biennial update reports on 17 February 2016 and 28 December 2018 respectively. The outcomes of the TAs thereof are contained in documents FCCC/SBI/ICA/2016/TATR.1/COL and FCCC/SBI/ICA/2019/TATR.2/COL. Previous FREL submissions, biennial update reports with technical annexes and associated technical assessment and analysis reports for the Party are available online.[5]

B. Process overview

6. The technical expert review of the BTR1 of Colombia took place from 27 to 31 October 2025 as an in-country review and was undertaken by a technical expert review team drawn from the UNFCCC roster of experts on the basis of the criteria defined in paragraphs 172–182 of the MPGs. Walter Oyhantçabal (Uruguay) and Maarten van der Eynden (Norway) 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 Keiichi Igarashi (secretariat).

[1] Decision 18/CMA.1, annex.
[2] FCCC/ETF/TERR.1/2024/COL.
[3] The Party's technical annex contained a FREL that was different from the assessed FREL owing to a calculation error identified in the modified FREL submission. In response to a discussion with the LULUCF experts, Colombia provided a transparent explanation of the change during the TA. See also finding ID# 8 in the table.
[4] FCCC/TAR/2020/COL, published on 18 February 2022.
[5] https://redd.unfccc.int/submissions/by-country/country_detail/col.html.

7. The TA of the technical annex provided by Colombia 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.

8. During the TA and subsequent exchanges, the LULUCF experts and Colombia engaged in technical discussions, and Colombia provided clarifications in response to questions raised by the LULUCF experts, in order to reach an understanding on the identification of the capacity-building needs of the Party and areas for future technical improvement. As a result of the facilitative interactions with the LULUCF experts during the TA, Colombia provided a modified version of its technical annex on 26 November 2025, which took into consideration the technical input of the LULUCF experts. The modifications improved the clarity and transparency of the submitted technical annex without needing to alter the values of estimated results.

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

10. 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, Colombia, on a voluntary basis, proposed a national FREL covering the activity reducing emissions from deforestation for the purpose of a technical assessment in accordance with decision 13/CP.19 and its annex. The activity is being implemented in Colombia's national continental territory, which covers an area of 1,141,748 km^2. Colombia's islands, which cover an area of 52.7 km^2 (representing 0.005 per cent of the country's land area), were excluded from the construction of the FREL. The assessed FREL of Colombia is 118,613,986 t CO_2 eq for 2018, 124,744,070 t CO_2 eq for 2019, 130,154,027 t CO_2 eq for 2020, 134,681,829 t CO_2 eq for 2021 and 138,219,454 t CO_2 eq for 2022.

11. The Party's FREL is based on its historical emissions from gross deforestation in 2008–2017. In accordance with paragraph 9 of decision 12/CP.17, Colombia adjusted its proposed FREL upward as a result of the increase in deforestation areas expected following the conclusion of the peace agreement in the country in 2016.[6] The adjusted values were obtained by using a logistic model to project emissions from gross deforestation taking into consideration national forest coverage and the expected increase in deforestation rates in 2018–2022. This resulted in an estimated annual increase in emissions of 32–54 per cent for 2018–2022 compared with average historical emissions. Colombia reported the results of implementing the activity reducing emissions from deforestation for 2018–2022, calculated against the FREL, which amount to emission reductions of –15,530,075 t CO_2 eq for 2018, 9,027,936 t CO_2 eq for 2019, 5,198,953 t CO_2 eq for 2020, 7,562,547 t CO_2 eq for 2021 and 36,566,496 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.

12. Colombia submitted its first subnational FREL for technical assessment in 2014.[7] The assessed FREL was 51,599,618.7 t CO_2 eq/year for 2013–2017 for the reference period 2000–2012. Measured against this value, Colombia also submitted results amounting to

[6] Colombia included lagged SOC emissions from deforestation events that occurred in 2001–2007 in its total emissions for the historical reference period (2008–2017). See para. 31 of document FCCC/TAR/2020/COL.

[7] See document FCCC/TAR/2015/COL.

13,544,112.3 t CO_2 eq for 2013 and 15,439,415.1 t CO_2 eq for 2014, which were assessed in 2016, and 19,365,884.7 t CO_2 eq for 2015 and 12,109,048.8 t CO_2 eq for 2016, which were assessed in 2019.[8]

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

13. For the technical annex to the BTR1 submitted by Colombia, see annex I.[9]

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

15. 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 14 above.

[8] See documents FCCC/SBI/ICA/2016/TATR.1/COL and FCCC/SBI/ICA/2019/TATR.2/COL.

[9] 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 with the guidelines in paragraph 3 of the annex to decision 14/CP.19 (consistency with the assessed FREL/FRL)	The LULUCF experts noted that Colombia maintained consistency between its assessed FREL and estimated results of implementing the activity reducing emissions from deforestation in 2018–2022 with regard to the following elements: (a) Using consistent methodologies, approaches and data to generate AD on deforestation, in particular including deforestation of natural forests only (forest plantations were excluded), considering gross deforestation and using the same forest monitoring system to detect deforestation; (b) Using consistent methodologies and data to generate EFs, in particular the same stratification of natural forests and data from the NFI; (c) Covering the same three carbon pools: above-ground biomass, below-ground biomass and SOC in mineral soils; (d) Covering the same gas: CO_2 (non-CO_2 gases were not included); (e) Covering the same area: the five continental biomes making up Colombia's national continental territory (the country's islands were excluded); (f) Assuming that all carbon from above- and below-ground biomass is lost in the year of the deforestation event and from the SOC pool is lost completely within a 20-year time frame after land is deforested; (g) Using the same forest definition: canopy cover of at least 30 per cent, height (in situ) of 5 m or more and minimum area of 1 ha. The LULUCF experts conclude that Colombia ensured overall consistency between its assessed FREL and estimated results.	
2	11(b) Approaches – Accuracy	The LULUCF experts noted that Colombia assumed that all carbon from the SOC pool is lost within a 20-year time frame after land is deforested. The LULUCF experts do not consider this approach to be in line with the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 2), which states that, after land is converted to another land use, carbon stock change in the SOC pool occurs during the transition to a new equilibrium SOC over a default period of 20 years. To reflect this methodologically, the 2019 Refinement to the 2006 IPCC Guidelines includes equation 2.25 (vol. 4, chap. 2.3.3), whereby SOC stock changes are estimated as the difference between SOC at time point 0 and SOC at time point 20, divided by the transition period. The IPCC tier 1 method for estimating emissions and removals from SOC provides default reference SOC stocks and stock-change factors (see, for example, vol. 4, chap. 4.3.3, of the 2006	The LULUCF experts reiterate that the finding that reporting SOC and post-deforestation carbon stocks in line with the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines, identified in the report on the technical assessment of Colombia's second FREL, is 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*
		IPCC Guidelines). Assuming that all SOC is lost reduces accuracy and could lead to SOC emissions being overestimated. Both the established FREL and the results obtained for 2018–2022 from implementing the activity reducing emissions from deforestation are based on the assumption that all carbon stocks (in all three pools considered) are reduced to zero when a hectare of land is deforested. The LULUCF experts noted that this could potentially lead to an overestimation of emissions from deforestation, as a portion of the carbon stock will remain depending on how the land is used and managed following deforestation. The assumption that all carbon is lost following a deforestation event also represents an inconsistency with the national GHG inventory. This issue was also raised during the technical assessment of the FREL. During the TA, Colombia explained that the assumption that all carbon is lost following a deforestation event was adopted because no information was available on how land was used following deforestation. Nevertheless, the Party acknowledged the issue and, as explained in section 10.3 of its third modified FREL submission, concerning its FREL for 2023–2027, will improve its approach in the future. The LULUCF experts note that information on land conversion is needed to apply the IPCC methods for estimating emissions from SOC and commend the Party for its progress in identifying post-deforestation land uses.	
3	11(b) Approaches – Accuracy	The LULUCF experts noted that within both the FREL reference period and the results period Colombia included CO_2 emissions from SOC for areas deforested since 2001, which is before the beginning of the FREL reference period (2008–2017). The LULUCF experts consider that, in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 2), carbon stock changes to be accounted for in the FREL and in the results should, in the case of living biomass, be those carbon stock changes attributable to deforestation in the years in which deforestation occurs and, in the case of SOC, should be those carbon stock changes attributable to deforestation during the 20 years that follow a deforestation event. In this regard, the inclusion of any emissions from earlier years and from other lands does not correspond to the IPCC approach and may reduce accuracy and result in an overestimation of emissions from deforestation. During the TA, Colombia explained that the approach of including CO_2 emissions from SOC for areas deforested since 2001 was adopted to make use of the SOC data available for 2001 onward, with the intention of increasing the transparency of the emission estimates for SOC.	The LULUCF experts note that ensuring that SOC emissions are only included for areas deforested within the FREL and results periods, in accordance with the 2006 IPCC Guidelines, is an area for future technical improvement that would increase the accuracy of the technical annex.
4	11(b) EFs – Accuracy	The LULUCF experts noted that Colombia used data from its NFI to develop country-specific EFs for CO_2 emissions from living biomass in each of its five	The LULUCF experts note that using more refined country-specific EFs and

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*
		continental biomes. The threshold for defining deforestation is the clearing of canopy cover to a level below 30 per cent. In theory, applying this threshold could mean that a patch of land with, for example, 20–25 per cent canopy cover and significant remaining carbon stocks could be considered as having emitted all its carbon, which could lead to an overestimation of emissions from deforestation and reduction of accuracy. During the TA, Colombia explained that the general deforestation method used in the country is slash and burn and that it is rare for a significant amount of carbon to remain in the trees. Nevertheless, the LULUCF experts are of the view that potential overestimation of emissions could still occur. In addition, the assumption that the average carbon stock of a biome is an accurate estimation of emissions across all areas within that biome could benefit from further refinement to improve accuracy, for example by considering climatic or edaphic variations, differences in floristic compositions and forest types, and different levels of forest degradation. The Party recognized the need to analyse the potential benefits of improving stratification within its biomes. Colombia also explained that it is working to modify the stratification criteria by introducing two strata: core forest (intact forest) and edge forest (forest with a certain level of degradation and a lower carbon density than core forest). The LULUCF experts commend Colombia for its efforts to increase the accuracy of the estimates of emissions from deforestation.	improved stratification within each biome, including further substratification where relevant, is an area for future technical improvement that would increase the accuracy of the technical annex.
5	11(b) AD – Transparency, completeness and accuracy	The LULUCF experts noted that, according to the technical annex, Colombia relies primarily on Landsat satellite imagery when estimating changes in forest cover. The LULUCF experts asked Colombia whether it also made use of other, particularly higher-resolution, satellite imagery to calculate changes in forest cover, and sought clarification as to why ground truthing or other reference data were apparently not used to assess accuracy or correct for bias when estimating changes in forest cover. During the TA, Colombia explained that it used several additional sources of satellite imagery, including Sentinel-2, PlanetScope, RapidEye, WorldView, the China-Brazil Earth Resources Satellite and the Advanced Spaceborne Thermal Emission and Reflection Radiometer. Colombia also explained that it has developed thematic accuracy assessments for natural forest cover maps and deforestation maps, following the recommendations and guidelines of Olofsson et al. (2013 and 2014) and the methods and guidance of the Global Forest Observations Initiative (2020), in which other types of satellite imagery are also used. Colombia indicated that it has developed a Quantum Geographic Information System plug-in called AcATaMa, which is used to help detect changes in land cover.	

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*
		As part of the TA process, Colombia provided additional information on its use of satellite imagery and on the accuracy assessments it has developed for its natural forest cover maps and deforestation maps. In the modified technical annex, Colombia provided additional information, in particular links to more detailed information on the accuracy assessments and use of satellite imagery. The LULUCF experts commend Colombia for its efforts to increase the transparency and ensure the completeness of the data and information provided. The LULUCF experts also commend Colombia for providing additional information in the modified technical annex.	
6	11(b) AD – Transparency and accuracy	The LULUCF experts noted that Colombia excluded forest plantations from the forest land for which it reports deforestation. This approach is unproblematic, provided that the Party can clearly distinguish natural forests from forest plantations in its reporting. During the TA, Colombia explained that most forest plantations in its continental territory consist of pine and eucalyptus species. The Party indicated that it can identify plantations with medium accuracy using Landsat and Sentinel imagery and that plantations of broadleaf species are usually indistinguishable from natural forests. However, Colombia further explained that it makes use of secondary information from the plantation's registry held by the Ministry of Agriculture and Rural Development to help it identify plantations and ensure that they are not accounted for as natural forests. In the modified technical annex, Colombia provided additional information, in particular links to more information on the identification and exclusion of forest plantations. The LULUCF experts commend Colombia for its efforts to strengthen its capacity to differentiate deforestation in natural forests from clear-cutting and temporary unstocking in forest plantations. The LULUCF experts also commend Colombia for providing additional information in the modified technical annex.	
7	11(b) AD – Transparency and accuracy	The LULUCF experts noted that the impact of natural disturbances on deforestation is unclear and asked Colombia how loss in forest cover related to natural disturbances could affect the deforestation estimates. During the TA, Colombia explained that it is possible to differentiate between deforestation and loss in forest cover related to natural disturbances such as wind and landslides. However, the NFMS does not treat temporary loss in forest cover as a separate category, meaning that loss in forest cover related to natural disturbances is also counted as deforestation in the NFMS. Colombia further explained that this issue is partially addressed in the forest degradation reports forming part of its third FREL submission.	The LULUCF experts note that providing a more explicit estimation of loss in forest cover related to natural disturbances is an area for future technical improvement that would increase the transparency and accuracy 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*
		The LULUCF experts appreciate the explanation provided by the Party and commend Colombia for its efforts to include information on how forest degradation is defined in the NFMS.	
8	11(c) Consistency with the guidelines in paragraphs 1–2 of the annex to decision 14/CP.19 (summary information and results)	Colombia provided information on the assessed FREL, the activity implemented, the territorial forest area, the date of the FREL submission, the date of the final technical assessment report, the periods of the FREL and results in t CO_2 eq/year. However, the LULUCF experts noted that the FREL values in the summary of the FREL provided in the technical annex differ from those provided in the modified FREL submission of August 2020 and included in the corresponding technical assessment report (document FCCC/TAR/2020/COL). The LULUCF experts sought clarification on the differences in the FREL values between the documents. During the TA, Colombia explained that it identified an error in the modified FREL submission of August 2020. Specifically, emissions from the SOC pool from 2000 were included in the FREL, despite the historical calculation period for the FREL beginning in 2001. This resulted in emissions from the SOC pool being taken into account in the FREL for one additional year compared with emissions from the other carbon pools included in the FREL, causing the FREL values provided in the modified FREL submission to be slightly higher than those provided in the technical annex. The LULUCF experts commend Colombia for providing this clarification and have analysed the reported results in the context of the corrected FREL values provided in the technical annex.	The LULUCF experts note that potentially strengthening QA/QC procedures is an area for future technical improvement.
9	11(c) Consistency with the guidelines in paragraph 5 of the annex to decision 14/CP.19 (reconstruction of the results)	The LULUCF experts noted that it was not clear from the information provided in the technical annex how much SOC contributed to emissions each year during the FREL reference period and the results period. The LULUCF experts also noted that it was not clear how SOC was accounted for during parts of the reference period in which forest monitoring was conducted every other year rather than annually. The LULUCF experts sought clarification on whether this information was available. During the TA, Colombia shared detailed spreadsheets showing which carbon pools contributed to emissions in each year of both the FREL reference period and the results period. Colombia explained that for parts of the reference period in which forest monitoring was conducted every other year, the corresponding emissions were divided by two, with half of the emissions being assigned to one year within the two-year interval and half being assigned to the other year within the two-year interval.	The LULUCF experts note that including more detailed information on the contribution of SOC to emissions each year during the FREL reference period and the results period or links to such information is an area for future technical improvement that would increase the completeness and transparency 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*
		The LULUCF experts commend Colombia for providing this information and thereby increasing the completeness and transparency of the reported results.	
10	11(c) Consistency with the guidelines in paragraph 5 of the annex to decision 14/CP.19 (reconstruction of the results)	The LULUCF experts noted that it was not possible to fully reconstruct the reported results owing to the limited level of detail provided in the technical annex on several topics related to the estimation of the results. During the TA, Colombia provided additional information on several aspects related to the calculation of the reported results that were not described in detail in the technical annex. Specifically, Colombia provided the LULUCF experts with spreadsheets presenting the FREL and results calculations in greater detail than in the technical annex and shared links to several websites containing detailed information on its NFMS. In the modified technical annex, Colombia provided additional information, in particular links to more detailed information related to the calculation of the reported results, thereby increasing the completeness and transparency of the reported results. The LULUCF experts commend Colombia for providing this additional information in the modified technical annex.	The LULUCF experts note that including more comprehensive information that would enable easier reconstruction of the results is an area for future technical improvement that would increase the completeness of the technical annex.
11	11(d) Accuracy of the results proposed in the technical annex	Colombia provided some information on the uncertainty associated with the results reported in the technical annex. The LULUCF experts noted that the uncertainties presented in table 5.1 of the technical annex are identical to those included in the modified FREL submission of August 2020 and are of the view that those uncertainties cover the years of the reference period from 2008 to 2017 but not the results period. The LULUCF experts therefore asked Colombia whether it assessed uncertainties for the emissions reported for the results period (2018–2022). During the TA, Colombia explained that it assessed the uncertainties associated with natural forest maps and deforestation maps following the recommendations and guidelines of Olofsson et al. (2013 and 2014) and the methods and guidance of the Global Forest Observations Initiative (2020) and that the results of these accuracy assessments were available for the results period (2018–2022). Colombia clarified that these accuracy assessments are not used directly to adjust the results of the initial analysis of AD, but rather they are used to express uncertainties and as part of the QA/QC procedures related to the estimation of AD. Colombia explained that several issues related to the uncertainty assessment identified by the team that assessed the FREL in the modified submission of August 2020 are being addressed and incorporated into the NFMS following a stepwise approach.	The LULUCF experts note that providing additional information on the uncertainty associated with the reported results is an area for future technical improvement that would increase the accuracy 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*
		The LULUCF experts commend Colombia for providing additional information on the assessment of uncertainty, and thereby increasing the completeness and transparency of the reported results. The LULUCF experts conclude that the issues related to the uncertainty assessment identified during the technical assessment of the FREL remain relevant for the results reported in the technical annex and commend Colombia for continuing to improve the uncertainty assessment in line with a stepwise approach.	
12	11(d) Accuracy of the results proposed in the technical annex	The LULUCF experts noted that Colombia performed QC procedures for the REDD+ results but did not implement QA procedures in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 6). During the TA, Colombia confirmed the lack of QA procedures performed for the results proposed in the technical annex and acknowledged that this is an area for future technical improvement.	The LULUCF experts note that implementing QA procedures by conducting a basic expert peer review of the REDD+ results in accordance with the 2006 IPCC Guidelines is an area for future technical improvement that would increase the accuracy of the technical annex.

III. Conclusions

16. The LULUCF experts conclude that Colombia reported the results of implementing one activity, reducing emissions from deforestation, which is defined as the deforestation of natural forests, and followed a national approach covering Colombia's continental territory. The results include estimates of CO_2 emissions from three carbon pools: above-ground biomass, below-ground biomass and SOC in mineral soils for 2018–2022. The results of the activity were estimated and reported using methodologies, definitions, assumptions and information that are consistent with those used for constructing the assessed FREL.

17. The LULUCF experts also conclude that the results presented of implementing the activity reducing emissions from deforestation are consistent with the assessed FREL. The LULUCF experts commend Colombia for ensuring consistency of data and methodologies between the FREL submission for 2018–2022 and the technical annex with the results for 2018–2022.

18. The LULUCF experts noted that Colombia did not fully provide in the technical annex all the information necessary for reconstructing the results of implementing the activity reducing emissions from deforestation. Nevertheless, during the TA, Colombia provided additional information that helped to increase the completeness and transparency of the results reported in the technical annex. Colombia also provided extensive additional information in the modified technical annex, which significantly enhanced the completeness and transparency of the data and information provided in the technical annex. As a result, the LULUCF experts conclude that the data and information provided in the technical annex are considered to be mostly transparent (see finding ID# 7 in the table above), consistent, mostly complete (see finding ID#s 9–10 in the table above) and mostly accurate (see finding ID#s 2–4 and 7 in the table above), to the extent possible.

19. 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 that are 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 the measurement, reporting and verification of the results; some of 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 (see finding ID#s 8–10 in the table above). The main inconsistency is related to the LULUCF experts being unable to reconstruct the results using the information provided in the technical annex. However, as noted in paragraph 18 above, the information provided during the TA and in the modified technical annex significantly enhanced the completeness of the data and information provided in the technical annex.

20. The results are partially accurate to the extent possible based on the assumptions used (see finding ID#s 2–4, 7 and 11–12 in the table above).

21. Pursuant to paragraph 14 of decision 14/CP.19, the LULUCF experts identified areas for future technical improvement (see the table above). The LULUCF experts conclude that the following areas for future technical improvement identified in the report on the technical assessment of Colombia's second FREL also apply to the provision of information on the results:

(a) Assessing whether other REDD+ activities occurring on forest land remaining forest land are significant;

(b) Assessing whether REDD+ activities occurring on land converted to forest land are significant in relation to forest-related emissions and removals;

(c) Assessing the significance of CO_2 and non-CO_2 emissions from organic soils under forest land, as these could be highly significant;

(d) Continuing to collect data on deadwood and litter carbon stocks through the NFI and considering including the dead organic matter pool;

(e) Considering including non-CO_2 gases so as to maintain consistency with the national GHG inventory;

(f) Considering including Colombia's islands' biome in the FREL, if practicable;

(g) Making use of data from the first cycle of the NFI to improve the estimation of forest carbon stocks in all carbon pools;

(h) Introducing additional stratification of the biomes with a view to increasing the accuracy of estimates by addressing intrabiome variability;

(i) Clarifying the definition of deforestation by describing how it relates to the methods for identifying deforestation areas;

(j) Continuing efforts to identify any temporarily unstocked forest land that could be classified as deforestation;

(k) Expanding the QC procedures to cover the entire historical reference period and not just the six years prior to the events in order to avoid double counting deforestation events;

(l) Monitoring land use after deforestation to enable application of IPCC methods and equations for the living biomass and SOC pools;

(m) Adopting a consistent approach to the treatment of different carbon pools by ensuring a consistent historical reference period when measuring these pools, for example by avoiding the inclusion of SOC emissions generated on other deforested land in years prior to the FREL reference period;

(n) Including in the uncertainty assessment other potential sources of error and bias;

(o) Enhancing the consistency of the FREL and reported results with the national GHG inventory;

(p) Including non-CO_2 emissions from biomass burning, which would improve the accuracy of the FREL and the technical annex and enhance the consistency thereof with the GHG inventory.

22. The LULUCF experts acknowledge and welcome the Party's intention to:

(a) Identify post-deforestation land uses and use this information for estimating post-deforestation carbon stocks;

(b) Continue to improve the uncertainty assessment in line with the stepwise approach;

(c) Improve the consistency of the reported results with the national GHG inventory;

(d) Continue efforts to include deadwood and litter, as well as non-CO_2 emissions from biomass burning;

(e) Continue to develop the NFI and significantly increase the number of sampling plots, thereby increasing the accuracy and representativeness of the EFs used in estimating emissions from deforestation.

23. During the consultation process, Colombia identified one capacity-building need. Addressing that need could enable Colombia to improve its data and methodologies for future FREL submissions. After exchanges with the LULUCF experts, Colombia identified enhancing national technical capacity to estimate carbon stock changes in soils as a capacity-building need.

24. In conclusion, the LULUCF experts commend Colombia for showing strong commitment to continuously improving the data and information used for calculating the results, in line with the stepwise approach, which are consistent with those used for

constructing its assessed FREL. Some areas for future technical improvement and a capacity-building need identified by Colombia 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.[10] The LULUCF experts also acknowledge that the TA process was an opportunity for a facilitative and constructive technical exchange of views and information with Colombia.[11]

[10] As per decision 2/CP.17, para. 57.
[11] 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 Colombia

Key element		*Remark(s)*
Results reported	–15 530 075 t CO_2 eq for 2018, 9 027 936 t CO_2 eq for 2019, 5 198 953 t CO_2 eq for 2020, 7 562 547 t CO_2 eq for 2021, 36 566 496 t CO_2 eq for 2022	See paragraph 11 of this document
Results period	2018–2022	See paragraph 11 of this document
Assessed FREL	118 613 986 t CO_2 eq for 2018, 124 744 070 t CO_2 eq for 2019, 130 154 027 t CO_2 eq for 2020, 134 681 829 t CO_2 eq for 2021, 138 219 454 t CO_2 eq for 2022	See document FCCC/TAR/2020/COL and the modified version of the Party's second FREL submission of August 2020. See paragraphs 4 and 10, and footnote 3 of this document
Reference period	2008–2017	See paragraph 11 of this document
National/subnational	National	See paragraph 10 of this document
Activity included	Reducing emissions from deforestation	See paragraph 10 of this document
Pools included	Above-ground biomass Below-ground biomass SOC in mineral soils	See finding ID# 1 in the table in this document
Gas included	CO_2	See finding ID# 1 in the table in this document
Consistency with assessed FREL	Methods, definitions and information used for the assessed FREL are consistent with those used for the results	See finding ID# 1 in the table in this document
Description of NFMS and institutional roles	Included	
Identification of future technical improvements	Included	Several areas for future technical improvement have been identified (see finding ID#s 2–4 and 7–12 in the table in and para. 21 of 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.

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

First, second and third modified FREL submissions of Colombia. Available at https://redd.unfccc.int/submissions/by-country/country_detail/col.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.

"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 Colombia submitted in 2014. FCCC/TAR/2015/COL. Available at https://unfccc.int/documents/8901.

Report on the technical assessment of the proposed FREL of Colombia submitted in 2020. FCCC/TAR/2020/COL. Available at https://unfccc.int/documents/460829.

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:

Global Forest Observations Initiative (GFOI) 2020. Methods and Guidance Document: Edition 3.0. Available at: https://www.reddcompass.org/mgd/en-3/.

Olofsson, et al. 2013. Making better use of accuracy data in land change studies: Estimating accuracy and area and quantifying uncertainty using stratified estimation. *Remote sensing of environment*. 129 (2013): 122-131. Available at: https://www.sciencedirect.com/science/article/abs/pii/S0034425712004191.

Olofsson, et al. 2014. Good practices for estimating area and assessing accuracy of land change. *Remote sensing of Environment*. 148 (2014): 42-57. Available at: https://www.sciencedirect.com/science/article/abs/pii/S0034425714000704.