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Report of the technical assessment of the proposed forest reference emission level of Côte d'Ivoire submitted in 2017

Summary

This report covers the technical assessment of the submission of Côte d'Ivoire, on a voluntary basis, on its proposed forest reference emission level (FREL), in accordance with decision 13/CP.19 and in the context of results-based payments. The FREL proposed by Côte d'Ivoire covers the activities “reducing emissions from deforestation” and “enhancement of forest carbon stocks”, which are two of the five activities included in decision 1/CP.16, paragraph 70. In its submission, Côte d'Ivoire has developed a national FREL. The FREL presented in the original submission, for the reference period 2000–2015, corresponds to 78,009,357 tonnes of carbon dioxide equivalent per year (t CO₂ eq/year). As a result of the facilitative process during the technical assessment, the FREL was modified to 38,052,641 t CO₂ eq/year, which includes emissions of 41,403,705 t CO₂ eq/year and removals of 3,351,065 t CO₂ eq/year. The assessment team notes that the data and information used by Côte d'Ivoire in constructing its FREL are transparent, complete and in overall accordance with the guidelines contained in the annex to decision 12/CP.17. This report contains the assessed FREL and a few areas identified by the assessment team for future technical improvement, according to the scope of the technical assessment in the annex to decision 13/CP.19.

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I. Introduction and summary

A. Overview

1. This report covers the technical assessment (TA) of the submission of Côte d'Ivoire on its proposed forest reference emission level (FREL),¹ submitted on 2 January 2017 in accordance with decisions 12/CP.17 and 13/CP.19. The TA took place (as a centralized activity) from 13 to 17 March 2017 in Bonn, Germany, and was coordinated by the UNFCCC secretariat.² The TA was conducted by two land use, land-use change and forestry experts from the UNFCCC roster of experts³ (hereinafter referred to as the assessment team (AT)): Mr. Sabin Guendehou (Benin) and Mr. Colas Robert (France). In addition, Mr. Brian Mantlana, an expert from the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention, participated as an observer⁴ during the centralized activity in Bonn. The TA was coordinated by Mr. Dirk Nemitz (UNFCCC secretariat).

2. In response to the invitation by the Conference of the Parties (COP) and in accordance with the provisions of decision 12/CP.17, paragraphs 7–15, and its annex, Côte d'Ivoire submitted its proposed FREL on a voluntary basis. The proposed FREL is one of the elements⁵ to be developed in the implementation of the activities referred to in decision 1/CP.16, paragraph 70. The COP decided that each submission of a proposed FREL, as referred to in decision 12/CP.17, paragraph 13, shall be subject to a TA in the context of results-based payments, pursuant to decisions 13/CP.19, paragraphs 1 and 2, and 14/CP.19, paragraphs 7 and 8.

3. Côte d'Ivoire provided its submission, supporting annexes, responses to questions raised by the AT and additional material in French.

4. The objective of the TA was to assess the degree to which the information provided by Côte d'Ivoire was in accordance with the guidelines for submissions of information on FRELs/forest reference levels (FRLs)⁶ and to offer a facilitative, non-intrusive, technical exchange of information on the construction of the FREL with a view to supporting the capacity of Côte d'Ivoire for the construction and future improvement of its FRELs/FRLs, as appropriate.⁷

5. The TA of the FREL submitted by Côte d'Ivoire was undertaken in accordance with the guidelines and procedures for the TA of submissions from Parties on proposed FRELs and/or FRLs as contained in the annex to decision 13/CP.19. This report on the TA was prepared by the AT following the same guidelines and procedures.

6. Following the process contained in those guidelines and procedures, a draft version of this report was communicated to the Government of Côte d'Ivoire. The facilitative exchange during the TA allowed Côte d'Ivoire to provide clarifications and information that were considered by the AT in the preparation of this report.⁸ As a result of the facilitative interactions with the AT during the TA, Côte d'Ivoire provided a modified version of its submission on 22 May 2017, which took into consideration the technical inputs of the AT. The modifications improved the clarity, transparency and accuracy of the submitted FREL. This TA report was prepared in the context of the modified FREL submission. The modified submission, containing the assessed FREL, and the original submission are available on the UNFCCC website.⁹

¹ The submission of Côte d'Ivoire is available at <http://unfccc.int/8414>.

² Decision 13/CP.19, annex, paragraph 7.

³ Decision 13/CP.19, paragraphs 7 and 9.

⁴ Decision 13/CP.19, paragraph 9.

⁵ Decision 1/CP.16, paragraph 71(b).

⁶ Decision 12/CP.17, annex.

⁷ Decision 13/CP.19, annex, paragraph 1(a) and (b).

⁸ Decision 13/CP.19, annex, paragraphs 1(b), 13 and 14.

⁹ <http://unfccc.int/8414>.

B. Proposed forest reference emission level

7. In decision 1/CP.16, paragraph 70, the COP encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances, in the context of the provision of adequate and predictable support. The FREL proposed by Côte d'Ivoire, on a voluntary basis, for a TA in the context of results-based payments for REDD-plus¹⁰ activities covers “reducing emissions from deforestation” and “enhancement of forest carbon stocks”, which are two of the five activities included in decision 1/CP.16, paragraph 70. Pursuant to paragraph 71(b) of the same decision, Côte d'Ivoire has developed a national FREL that covers its entire territory. In its submission, Côte d'Ivoire applies a stepwise approach to its development of the FREL, in accordance with decision 12/CP.17, paragraph 10. The stepwise approach enables Parties to improve their FREL/FRL by incorporating better data, improved methodologies and, where appropriate, additional pools.

8. The national FREL proposed by Côte d'Ivoire for the historical reference period 2000–2015 is the annual average of the carbon dioxide (CO₂) emissions associated with deforestation occurring in natural forest and the CO₂ removals associated with enhancement of forest carbon stocks, which covers only *Tectona grandis* plantations, considered the dominant forest plantations in Côte d'Ivoire.

9. The national FREL proposed by Côte d'Ivoire includes the above-ground biomass, below-ground biomass, litter and deadwood for deforestation and the above-ground biomass and below-ground biomass for enhancement of forest carbon stocks. Regarding greenhouse gases (GHGs), the submission includes CO₂ only.

10. The modified FREL submitted by Côte d'Ivoire varies between 41,155,937.57 t CO₂ eq for 2000–2001 and 20,569,766.02 t CO₂ eq for 2014–2015.¹¹ Côte d'Ivoire did not apply an adjustment to its modified FREL.

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

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

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

11. Côte d'Ivoire based the construction of its FREL on the Intergovernmental Panel on Climate Change (IPCC) *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines). The activity data used by Côte d'Ivoire include deforestation and afforestation areas over the time series 2000–2015. Côte d'Ivoire used a combination of country-specific parameters (e.g. above-ground biomass of strata) and default IPCC factors (e.g. carbon fraction of biomass, root-to-shoot ratio, carbon stock of litter) for carbon emissions and removals. For carbon emissions due to deforestation, Côte d'Ivoire used below-ground biomass and litter values from the 2006 IPCC Guidelines and country-specific values for above-ground biomass and deadwood. Each of the emission factors relates to one of the four forest strata defined in the submission (moist evergreen forest, dense semi-deciduous rainforest, dense semi-deciduous montane forest and dry tropical forest). For carbon removals due to enhancement of forest carbon stocks, that is afforestation via forest plantations, Côte d'Ivoire used country-specific

¹⁰ In decision 1/CP.16, paragraph 70, the COP encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.

¹¹ The annual numbers are listed in supplementary information provided by Côte d'Ivoire, which is available on the REDD-plus web platform: <http://redd.unfccc.int/submissions.html?country=civ>.

values for increment and IPCC default values for expansion factors. Emissions were calculated using activity data and emission factors for each stratum and for the whole 2000–2015 period. Mean annual carbon emissions and removals were then calculated for the total area.

12. Côte d'Ivoire selected two REDD-plus activities: reducing emissions from deforestation and enhancement of forest carbon stocks. The AT notes that the second activity only refers to afforestation via forest plantations. Two historical periods were analysed: 1986–2000 and 2000–2015. The analysis of the trend in deforestation shows a decrease in the latter period and Côte d'Ivoire consistently selected that period as the reference period for the construction of its FREL. The AT welcomes the Party's intention to include other activities, in particular forest degradation, in future FREL submissions.

13. Côte d'Ivoire calculated mean annual deforestation for the period 2000–2015. The activity data were constructed from the classification of Landsat images into forest and non-forest maps. The AT notes that, during the classification process, additional data provided by local authorities were also used to better classify the afforestation areas. Areas were stratified into the four above-mentioned strata. The AT commends Côte d'Ivoire for the work conducted on the generation of the maps and the accuracy assessment.

14. For carbon emissions due to deforestation, Côte d'Ivoire used a combination of country-specific parameters¹² and default factors from the 2006 IPCC Guidelines corresponding to each stratum. For carbon removals due to afforestation, Côte d'Ivoire only used mean annual increment values for *Tectona grandis* (teak) based on biomass volume tables provided by Dupuy et al.¹³ The mean annual increment values for each stratum were converted into dry matter total biomass annual increment (above-ground and below-ground) using mean expansion factors based on the default values for each stratum in the 2006 IPCC Guidelines. The AT understands Côte d'Ivoire's justification for using only teak increment values, which is that the majority of forest plantations are teak plantations, according to a document contained in an annex to the FREL submission and a publication referred to in the modified submission's bibliography.¹⁴ The AT notes that, according to the first document, other species could also be significant (e.g. *Fraké*, *Framiré*, *Gmelina* and *Cedrela*) and reporting on such other species is considered an area for future technical improvement.

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

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

15. To assess historical deforestation and enhancement of forest carbon stocks, Côte d'Ivoire stratified the forest land covering the entire territory of the country into four strata using the land classification of Guillaumet and Adjanohoun,¹⁵ the atlas of Côte d'Ivoire¹⁶ and the regional climate classification scheme of the 2006 IPCC Guidelines. The strata comprise tropical rainforest (in the southern part of Côte d'Ivoire), tropical moist deciduous forest (in the centre part) and dry tropical forest (in the northern part) in line with the 2006 IPCC Guidelines. The stratification of vegetation of Côte d'Ivoire was based on the analysis of historical archived data collected from different national institutions such as the Ministry of Water and Forest, the Ministry of Environment and Sustainable Development,

¹² Food and Agriculture Organization of the United Nations. 2017. *Données forestières de base pour la REDD+ en Côte d'Ivoire. Inventaire de la biomasse forestière pour l'estimation des facteurs d'émission*. Available at <http://www.fao.org/3/a-i8019f.pdf>.

¹³ Dupuy B, Maître HF and N'Guessan Kanga A. 1999. Table de production du teck (*Tectona grandis*): l'exemple de la Côte d'Ivoire. *Bois et Forêts des Tropiques*. 261: pp.5–16.

¹⁴ Cerutti PO, Tsanga R and Essiane E. 2015. *Le marché domestique du sciage artisanal en Côte d'Ivoire*. Bogor, Indonesia: Centre de recherche forestière internationale.

¹⁵ Guillaumet JL and Adjanohoun E. 1971. *La végétation de la Côte d'Ivoire*. Available at http://horizon.documentation.ird.fr/exl-doc/pleins_textes/pleins_textes_2/memoires/16372.pdf.

¹⁶ ORSTOM and IGT. 1979. *Végétation de côte d'ivoire* (map). Available at http://vmamapgn-test.mpl.ird.fr/IRD_SPHAERA/IRD_CIV_AAAA_1967-79_6400000-10000/02_scan_RC/Geo_WGS84/15445RC_IRD_CIV_VEGE_1979_2000000.png.

the Society of Development of Forests, the Ivorian Office of Parks and Reserves, and universities and research centres.

16. Since mapping data on land cover were available sporadically, for the construction of the FREL Côte d'Ivoire acquired historical Landsat satellite imagery from the United States Geological Survey website,¹⁷ including Landsat 7 and Landsat 8 imagery for the years 1986, 2000 and 2015. In addition, an image from Sentinel 2 was used for 2015. In total, 223 Landsat images were downloaded and analysed for completeness and cloud coverage. As a result of the analysis, 21 images or scenes for each year of the time series (in total, 63 images for the three years) were deemed satisfactory to consider for processing. The acquisition dates of those 21 scenes covering all strata in Côte d'Ivoire were provided during the TA. The AT is of the view that Côte d'Ivoire considered the seasonality issue: images were taken during the same season (from December to April, corresponding to the dry season) in order to avoid biased interpretation. In addition to the stratification of vegetation, the image processing approach included supervised classification, the analysis of land-use change and the evaluation of accuracy. For the classification of forest and non-forest, Côte d'Ivoire used pixels of 30 m x 30 m (0.09 ha) in line with the forest definition (minimal land area of 0.1 ha) and analysed every scene for each year (1986, 2000 and 2015) using the approaches developed by Lassieur¹⁸ and by Girard and Girard.¹⁹ With regard to the analysis of land-use change, transition matrices were developed for the periods 1986–2000, 2000–2015 and 1986–2015. The maps for the three years 1986, 2000 and 2015 were combined pixel by pixel using the Open Foris Geospatial ToolKit²⁰ to produce a change map that was used to track the changes in land-use categories over the time series. For each comparison of maps, areas that remained forest, areas converted from non-forest to forest and areas converted from forest to non-forest were analysed.

17. For the evaluation of the accuracy of the classification, the method described by Olofsson et al.²¹ was applied and implemented independently by the REDD-plus office in Côte d'Ivoire with the technical assistance of the United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation team at the Food and Agriculture Organization of the United Nations. The AT considers the independent evaluation as a quality assurance activity to be in line with the 2006 IPCC Guidelines. To implement the independent verification, a stratified sampling approach was applied, which generated 1,252 sample points distributed randomly between all classes using statistical computing software. Of the 1,252 sample points, 1,098 points were validated (154 points rejected) in the quality assurance procedure, representing 88 per cent. The AT notes the effort made by Côte d'Ivoire to improve the accuracy of its land identification and classification. The detection of changes in forest areas and non-forest areas resulted in an estimated deforested area amounting to 1,992,827 ha and an afforested area estimated at 242,238 ha over the time period 2000–2015. These activity data were used by Côte d'Ivoire for the construction of the FREL.

18. Côte d'Ivoire reported expansion of agriculture (by 62 per cent), of forest operations (by 18 per cent) and of infrastructure (by 10 per cent) as the main drivers for deforestation. With regard to enhancement of forest carbon stocks, Côte d'Ivoire clarified during the TA that *Tectona grandis*, *Gmelina arborea* and *Terminalia superba* were the tree species used in the country, but, given that *Tectona grandis* was most frequently used, only *Tectona grandis* plantations were considered in the construction of the FREL.

¹⁷ <http://glovis.usgs.gov/>.

¹⁸ Lassieur S. 2006. *Utilisation de la télédétection et des techniques SIG pour détecter et prévenir les activités de déforestation illégales*. (unpublished report).

¹⁹ Girard MC and Girard CM. 1999. *Traitement des données de télédétection*. Paris: Dunod.

²⁰ <http://www.openforis.org/tools/geospatial-toolkit.html>.

²¹ Olofsson P, Foody GM., Stehman SV and Woodcock CE. 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: pp.122–131; and Olofsson P, Foody GM, Herold M, Stehman SV, Woodcock CE and Wulder MA. 2014. Good practices for estimating area and assessing accuracy of land change. *Remote Sensing of Environment*. 148: pp.42–57.

19. The AT notes that the information reported by Côte d'Ivoire in its submission and the additional information submitted during the TA were transparent enough to understand how historical data on land area and changes in land area were derived.

20. In response to a question raised by the AT, Côte d'Ivoire explained that the larger forest area and increase in forest area across the time series 1986–2015 reported for Côte d'Ivoire in the Global Forest Resources Assessment²² include perennial cropland such as cashew nuts, hevea, and cocoa, which are excluded from the forest definition used for the construction of the FREL.

21. For deforestation, Côte d'Ivoire calculated separately emission factors for above-ground biomass, below-ground biomass, litter and deadwood for each stratum. To that end, Côte d'Ivoire used country-specific data on above-ground biomass (t dry matter (d.m.) ha⁻¹), country-specific data on deadwood (t d.m. ha⁻¹) collected during a data collection campaign conducted in 2016, and default data on ratio of below-ground biomass to above-ground biomass (t root d.m. (t shoot d.m.)⁻¹), carbon fraction of biomass (t carbon (C) (t d.m.)⁻¹) and carbon stock in litter (t C ha⁻¹) from the 2006 IPCC Guidelines. Emissions were then calculated for each pool mentioned above and summed to estimate emissions for each stratum. For the deadwood and litter pools, Côte d'Ivoire assumed instantaneous oxidation, which means that all the carbon from the pools is emitted to the atmosphere in the year in which the deforestation occurs. The emission estimates for the strata were then summed to estimate emissions attributable to deforestation. The AT identified that Côte d'Ivoire did not take into account the carbon stock in biomass after deforestation, in particular the biomass carbon stocks present after conversion of forest land to cropland, which, according to the information provided in the submission,²³ represents 62 per cent of deforestation in Côte d'Ivoire. Not accounting for those carbon stocks is not in line with the 2006 IPCC Guidelines and leads to higher estimated emissions from deforestation. During the technical exchange, Côte d'Ivoire acknowledged that finding. In the modified submission, Côte d'Ivoire did not include in the change in biomass carbon stocks due to deforestation the component “annual decrease in biomass carbon stocks due to losses (e.g. harvesting, fuel wood gathering and disturbances)” that occurs in perennial cropland established after deforestation. The AT considers it an area for future technical improvement to include the annual decrease in biomass carbon stocks due to losses following conversion of forest land to perennial cropland in the construction of the FREL in order to improve its accuracy.

22. With regard to the enhancement of forest carbon stocks, Côte d'Ivoire used a combination of country-specific values for annual increment in above-ground biomass for *Tectona grandis* (m³ ha⁻¹ year⁻¹) from Dupuy et al.,²⁴ assuming a class age of three years (detectable by remote sensing), default data on biomass conversion and expansion factor (BCEF) (t d.m. m⁻³) and the ratio of below-ground to above-ground biomass from the 2006 IPCC Guidelines to estimate historical removals. The AT identified from the modified submission that Côte d'Ivoire had changed the BCEF used for *Tectona grandis* plantations from conifers to natural forest since the 2006 IPCC Guidelines provide a BCEF for natural forest and conifers only. Applying data for natural forest to plantations may not be appropriate because the ecosystems and the tree species are different. The AT considers it an area for future technical improvement for Côte d'Ivoire to identify and collect from literature available on West Africa data on BCEFs (or biomass expansion factor and wood density to derive the BCEF) for *Tectona grandis*.

23. The AT identified that *Tectona grandis* plantations are used for multiple purposes, such as commercial felling and fuelwood. During the TA, Côte d'Ivoire clarified that wood removals from those plantations were taken into account, and provided data on tree density.

²² Food and Agriculture Organization of the United Nations. 2015. *Global Forest Resources Assessment 2015*. Available at <http://www.fao.org/3/a-i4808e.pdf>.

²³ Bureau National d'Études Techniques et de Développement (BNETD), Etc Terra and Rongead. 2016. *Analyse qualitative des facteurs de déforestation et de dégradation des forêts en Côte d'Ivoire*. Available at <https://www.etcterra.org/download/161216081210-161214-analyse-facteurs-def-deg-ci-rapport-final.pdf>.

²⁴ Dupuy B, Maître HF and N'Guessan Kanga A. 1999. La sylviculture du teck. *Bois et forêts des tropiques*. 261(3).

The AT considers it an area for future technical improvement for Côte d'Ivoire to include information in future FREL submissions to demonstrate that the decrease in carbon stocks from *Tectona grandis* due to wood removals is considered in the FREL.

24. During the TA, Côte d'Ivoire confirmed that a data collection campaign in the field took place between October 2016 and February 2017 and enabled the collection of data on biomass from over 150 plots in order to estimate emission factors for above-ground biomass and deadwood (see para. 21 above). In response to a question raised by the AT, Côte d'Ivoire acknowledged that the 150 plots were not representative of the entire country and that the decision on the number of plots was based on budget constraints. The AT considers it an area for future technical improvement to increase the size of the sampling in order to derive emission factors that are more representative. However, except for tropical dry forest, for which the above-ground biomass value derived from the sampling is higher than the upper limit of the default range in the 2006 IPCC Guidelines, the AT also notes that the values for the other strata are within the IPCC default ranges.

25. Pursuant to decisions 12/CP.17 and 13/CP.19 related to consistency with corresponding anthropogenic forest-related GHG inventories, the AT compared the estimated emissions from deforestation used to calculate the FREL with those associated with forest and grassland conversion reported by Côte d'Ivoire, in line with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), in its most recent GHG inventory, which at the time of the TA was that included in the second national communication submitted in 2010 and developed for the year 2000 only. In the GHG inventory, emissions from forest and grassland conversion were reported together, and the estimate of historical emissions associated with deforestation used to calculate the FREL (excluding the litter and deadwood pools) was two times higher than the estimates of emissions from forest and grassland conversion. The emissions from deforestation should be lower. This finding suggests the existence of inconsistencies between the FREL submission and the GHG inventory. The AT identified that the difference in the approaches used for land classification by Côte d'Ivoire could be one of the reasons for the inconsistency. With regard to afforestation, the AT found insufficient information on the increase in carbon stock in plantations in the second national communication to assess consistency. During the technical exchange, Côte d'Ivoire acknowledged this and clarified that its third national communication and first biennial update report will include information and estimates that are fully consistent with the FREL submission with regard to definition, methods, activity data and emission factors.

Description of relevant policies and plans, as appropriate

26. At the time of the submission of the FREL, the national REDD-plus strategy of Côte d'Ivoire had not been finalized. During the TA, Côte d'Ivoire provided the AT with a draft of the strategy that includes policies and measures for REDD-plus as well as the institutional arrangements and measurement, reporting and verification system for the implementation of the strategy. The policies include plans to reduce deforestation, in particular the expansion of cropland from forest conversion, the reduction of wood removals from forests, sustainable energy, sustainable management of forests, reforestation and restoration of degraded land.

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

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

28. The pools included in the FREL are above-ground biomass, below-ground biomass, litter and deadwood. Soil organic carbon was not included owing to lack of data.

29. Considering reducing emissions from deforestation, the AT acknowledges that national values were used for above-ground biomass and deadwood, and default factors from the 2006 IPCC Guidelines were used for assessing the other carbon pools, except for soil organic carbon, which was excluded from the FREL owing to lack of data. From Côte

d'Ivoire's submission the AT notes that, when converting from one forest use to another, the majority of the carbon emissions is from the living biomass carbon pools, and therefore the AT welcomes the use of national emission factors derived from the field survey conducted in 2016–2017. However, the AT cannot conclude whether the excluded pool is significant. The AT notes the inclusion of soil organic carbon as an area for future technical improvement of the FREL.

30. Considering enhancement of forest carbon stocks, the AT notes that specific factors were constructed, using both IPCC expansion factors and information from other literature, for each stratum. The AT notes that above-ground biomass and below-ground biomass were included and litter, deadwood and soil were omitted. The AT considers the inclusion of litter, deadwood and soil to be an area for future technical improvement.

31. CO₂ is the only gas included in the submission. During the TA, Côte d'Ivoire indicated that methane (CH₄) and nitrous oxide (N₂O) were omitted because emissions from forest fires were not estimated owing to lack of reliable data. The AT welcomes the aim mentioned in the submission of including CH₄ in the FREL in the future. The AT considers the inclusion of CH₄ and N₂O to be an area for future technical improvement.

32. The AT acknowledges that Côte d'Ivoire included one significant activity (reducing emissions from deforestation) of the five activities identified in decision 1/CP.16, paragraph 70, in accordance with its national capabilities and circumstances. However, the AT did not find enough information to conclude that the other activities are not significant, in particular reducing emissions from forest degradation. Indeed, it is possible that forest degradation is increasing since deforestation is decreasing. However, the AT notes Côte d'Ivoire's plan to include other activities in future FREL submissions as part of the stepwise approach provided that sufficient and relevant data are available.

4. Definition of forest

33. Côte d'Ivoire provided in its submission the definition of forest used in the construction of the FREL. The AT found that the definition is different from the one used by Côte d'Ivoire for its latest GHG inventory included in its second national communication. However, the AT notes that the definition is consistent with the one submitted by Côte d'Ivoire to the UNFCCC under the clean development mechanism and also used to develop the GHG inventory of the agriculture, forestry and other land use sector for its first biennial update report (i.e. minimum land area of 0.1 ha, minimum tree height at maturity of 5 m and minimum canopy cover of 30 per cent). The definition includes bamboo-covered areas and forest plantations as well as forest paths, firebreaks and small clearings. The AT notes that Côte d'Ivoire distinguishes forest plantations (e.g. *Tectona grandis*) reported under forest from perennial cropland (e.g. hevea, cocoa, rubber, cashew trees) considered as agricultural land (see para. 17 above). The AT also notes that Côte d'Ivoire distinguishes temporary loss of forest cover (e.g. clear cuts) from deforestation.

III. Conclusions

34. The information used by Côte d'Ivoire in constructing its FREL for the activities "reducing emissions from deforestation" and "enhancement of forest carbon stocks" is transparent, complete and in overall accordance with the guidelines for submissions of information on FRELs/FRLs (as contained in the annex to decision 12/CP.17).

35. The AT acknowledges that Côte d'Ivoire included in the FREL the most significant activity, the most important biome and the most significant pools in terms of emissions from forests. In doing so, the AT considers that Côte d'Ivoire followed decision 1/CP.16, paragraph 70, on activities undertaken, paragraph 71(b), on elaboration of a subnational FREL as an interim measure, and decision 12/CP.17, paragraph 10, on implementing a stepwise approach. The AT commends Côte d'Ivoire for the information provided on the ongoing work on the development of FRELs for other activities and other biomes as a step towards constructing a national-level FREL.

36. As a result of the facilitative interactions with the AT during the TA session, Côte d'Ivoire submitted a modified submission that took into consideration the technical inputs of the AT. The AT notes that the transparency and completeness of information was improved significantly in the modified FREL submission and commends Côte d'Ivoire for the efforts made. The new information provided in the modified submission and the examples of how estimates of CO₂ emissions from deforestation and removals from enhancement of forest carbon stocks were calculated increased the reproducibility of the FREL calculations.

37. The AT notes that the FREL is not consistent with the information reported in the second national communication of Côte d'Ivoire, which was prepared using the Revised 1996 IPCC Guidelines and different activity data.²⁵ The AT notes Côte d'Ivoire's indication that its third national communication and first biennial update report, currently under development, will include information and estimates that are fully consistent with the FREL submission (see para. 25 above).

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

(a) Include the annual decrease in biomass carbon stocks due to losses following conversion of forest land to perennial cropland in the construction of the FREL (see para. 21 above);

(b) Improve the BCEF for *Tectona grandis* using data from literature available on West Africa and include other plantation types in the estimation for enhancement of forest carbon stocks (see para. 22 above);

(c) Include the decrease in carbon stocks from *Tectona grandis* plantations due to wood removals in the calculation of the FREL (see para. 23 above);

(d) Increase the sample size for biomass measurement in order to derive emission factors that are more representative for deforestation, in particular for above-ground biomass and deadwood (see para. 24 above);

(e) Include emissions from soils for deforestation, and from soils, litter and deadwood for enhancement of forest carbon stocks (see paras. 29 and 30 above);

(f) Include non-CO₂ gases in the FREL to take into account disturbances such as fires and mineralization of soil organic matter following deforestation (see para. 31 above).

39. The AT acknowledges and welcomes the intention expressed by Côte d'Ivoire to include forest degradation and other REDD-plus activities in future FREL submissions.

40. In conclusion, the AT commends Côte d'Ivoire for showing a strong commitment to the continuous improvement of its FREL estimates in line with the stepwise approach. A number of areas for future technical improvement of Côte d'Ivoire's FREL have been identified in this report. At the same time, the AT acknowledges that such improvements are subject to national capabilities and policies, and notes the importance of adequate and predictable support.²⁶ The AT also acknowledges that the assessment process was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Côte d'Ivoire.

41. The table contained in the annex summarizes the main characteristics of Côte d'Ivoire's proposed FREL.

²⁵ See decision 13/CP.19, annex, paragraph 2(a).

²⁶ Decision 13/CP.19, annex, paragraph 1(b), and decision 12/CP.17, paragraph 10.

Annex

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

	<i>Main features of the FREL</i>	<i>Remarks</i>
Proposed FREL (in t CO ₂ eq/year)	41,155,937.57 in 2000–2001 to 20,569,766.02 in 2014–2015 ^e	In the modified submission, Côte d'Ivoire provided a FREL for each year of the time series 2000–2015 (see para. 10 of this document)
Type and duration of FREL	FREL = historical emissions 2000–2015	
Adjustment for national circumstances	No	
National/subnational ^a	National	
Activities included ^b	Deforestation and enhancement of forest carbon stocks	Other activities, in particular forest degradation, are planned to be included (see para. 12 of this document)
Pools included ^b	AB, BB, L and DW	Soil organic carbon was omitted due to lack of data (see para. 29 of this document)
Gases included	CO ₂	N ₂ O and CH ₄ will be included when data become available (see para. 31 of this document)
Forest definition ^c	Included	Minimum area of 0.1 ha, height at maturity of 5 m or more and at least 30% canopy cover) (see para. 33 of this document)
Relationship with latest GHG inventory	Methods used for FREL are not consistent with latest GHG inventory	During the technical exchange, Côte d'Ivoire acknowledged this and clarified that its third national communication and first biennial update report will include information and estimates that are fully consistent with the FREL submission (see para. 25 of this document)
Description of relevant policies and plans ^d	Included	Côte d'Ivoire provided a draft of the national REDD-plus strategy (see para. 26 of this document) ^e
Description of assumptions on future changes in policies ^d	Not applicable	
Descriptions of changes to previous FREL	Not applicable	
Future improvements identified	Yes	Several areas for future technical improvement were identified (see paras. 14, 21–24 and 29–31 of this document)

Abbreviations: AB = above-ground biomass, BB = below-ground biomass, DW = deadwood, FREL = forest reference emission level, GHG = greenhouse gas, L = litter.

^a If subnational, comments should include information on the treatment of displacement of emissions.

^b In the case of omitted pools or activities, comments should include the justification provided by the country.

^c The forest definition should be summarized, and it should be stated if it differs from the definition used in the greenhouse gas inventory or in reporting to other international organizations.

^d May be relevant to the description of national circumstances, which is required in the case of adjustment.

^e The annual FREL numbers are listed in supplementary information provided by Côte d'Ivoire, which is available on the REDD-plus web platform: <http://redd.unfccc.int/submissions.html?country=civ>.