Framework Convention on
Climate Change

Report on the technical assessment of the proposed forest reference level of Timor-Leste submitted in 2023

Summary

This report covers the technical assessment of the voluntary submission of Timor-Leste 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 Timor-Leste covers the activities reducing emissions from deforestation and enhancement of forest carbon stocks, which are among the activities included in decision 1/CP.16, paragraph 70.

For its submission, Timor-Leste developed a national FRL. The FRL presented in the original submission, for the reference period 2017–2021, corresponds to –215,868 tonnes of carbon dioxide equivalent per year. As a result of the facilitative process during the technical assessment, the FRL was modified to –196,723 tonnes of carbon dioxide equivalent per year.

The assessment team notes that the data and information used by Timor-Leste in constructing its FRL are transparent, complete and in overall accordance with the guidelines contained in decision 12/CP.17, annex. This report contains the assessed 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 decision 13/CP.19, annex.

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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
AT	assessment team
C	carbon
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
COP	Conference of the Parties
FAO	Food and Agriculture Organization of the United Nations
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
NC	national communication
NFI	national forest inventory
PaMs	policies and measures
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 assessment

I.   Introduction and summary

A.   Overview

1.   This report covers the TA of the voluntary submission of Timor-Leste on its proposed FRL,[1] submitted on 24 January 2023, in accordance with decisions 12/CP.17 and 13/CP.19. The TA took place from 20 to 24 March 2023 and was coordinated by the secretariat.[2] The TA was conducted by two land use, land-use change and forestry experts from the UNFCCC roster of experts[3] (hereinafter referred to as the AT): Javier Fernandez (Costa Rica) and Anatoli Poultouchidou (Greece). In addition, Komlan Edou, an expert from the Consultative Group of Experts, participated as an observer[4] during the session. The TA was coordinated by Luca Birigazzi (secretariat).

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

3.   The objective of the TA is to assess the degree to which the information provided by Timor-Leste is in accordance with the guidelines for submissions of information on reference levels[6] and to offer a facilitative, non-intrusive, technical exchange of information on the construction of the FRL with a view to supporting the capacity of Timor-Leste to construct and improve its FRL in the future, as appropriate.[7]

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

5.   Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of Timor-Leste. The facilitative exchange during the TA allowed Timor-Leste to provide clarifications and additional information, which were considered by the AT in the preparation of this report.[9] As a result of the facilitative interactions with the AT during the TA, Timor-Leste provided a modified version of its submission on 24 May 2024, which took into consideration the technical input of the AT. The modifications improved the clarity and transparency of the submitted FRL. This TA report was prepared in the context of the modified FRL submission.

B.   Proposed forest reference level

6.   In decision 1/CP.16, paragraph 70, the COP encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances, in the context of providing adequate and predictable support. The FRL proposed by Timor-Leste, on a voluntary basis for a TA in the context of results-based payments, covers the activities reducing emissions from deforestation and enhancement of forest carbon stocks, which are two of the five activities referred to in that paragraph.

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[1]   The submission of Timor-Leste is available at https://redd.unfccc.int/submissions.html?country=tls.

[2]   As per decision 13/CP.19, annex, para. 7.

[3]   As per decision 13/CP.19, annex, paras. 7 and 9.

[4]   As per decision 13/CP.19, annex, para. 9.

[5]   See decision 1/CP.16, para. 71(b).

[6]   Decision 12/CP.17, annex.

[7]   Decision 13/CP.19, annex, para. 1(a–b).

[8]   Decision 13/CP.19, annex.

[9]   As per decision 13/CP.19, annex, paras. 1(b), 13 and 14.

Pursuant to paragraph 71(b) of the same decision, Timor-Leste developed a national FRL that covers its entire territory. For its submission, Timor-Leste applied a stepwise approach to developing its FREL in accordance with decision 12/CP.17, paragraph 10. The stepwise approach enables Parties to improve their FREL or FRL by incorporating better data, improved methodologies and, where appropriate, additional pools.

7.   The national FRL proposed by Timor-Leste for the historical reference period 2017–2021 is the annual average of the emissions and removals related to deforestation and afforestation. Deforestation is defined as the conversion of forest land to other land uses where the land no longer adheres to the Party's definition of forest. Afforestation is defined as the conversion of land subject to non-forest land uses to forest land. These conversions include natural forests (moist highland, moist lowland, dry lowland, montane, coastal and mangrove) and plantation forests (including eucalyptus, araucaria, pinus, acacia, terminalia, teak and rubber). Timor-Leste's national land classification system also covers grassland, shrubland and other wooded land, as well as cropland, settlements (including infrastructure), wetlands (including lakes, lagoons, reservoirs and rivers) and other land (mining, rock, sand and other bare land). The AD were obtained through point sampling, using a systematic 2 km × 2 km grid overlaid on the entire territory, including visual interpretation of 4,215 sampling points, while the emission and removal factors were obtained in an NFI testing phase, which involved 40 field plots established in 2022–2023. The FRL presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities for the reference period 2017–2021, corresponds to –196,723 t CO_2 eq/year.[10]

8.   The proposed FRL includes the pools above-ground and below-ground biomass. Regarding GHGs, the submission includes CO_2 only.

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

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

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

9.   For constructing its FRL, Timor-Leste applied an area-based, stock-difference method from the 2006 IPCC Guidelines to estimate the changes in carbon stocks resulting from land conversions to and from forest land, considering above-ground and below-ground biomass. Carbon stock changes were estimated on the basis of the difference between the initial and final carbon stocks associated with each land use, which the Party reported through land-use change matrices associated with emission and removal factors.

10.   Timor-Leste included two activities in its FRL, reducing emissions from deforestation and enhancement of forest carbon stocks. Historical data were provided for 2017–2021, covering entire calendar years. The FRL represents a net value and considers the historical average of emissions from deforestation (163,634 t CO_2 eq/year) and removals from afforestation (–360,357 t CO_2 eq/year), for a net balance of –196,723 t CO_2 eq/year.

11.   AD collection was performed using the FAO Collect Earth tool, which is based on a point sampling methodology. Data collection was performed for 4,215 sampling points, where 14 land-use categories were identified, consisting of the six default IPCC land-use categories and country-defined subcategories.

12.   For estimating the carbon stocks in the above-ground biomass pool, Timor-Leste collected data during its NFI testing phase for 2022–2023, which was developed under a Green Climate Fund REDD+ readiness project aimed at providing a starting point for

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[10]   In its original submission, Timor-Leste proposed a national FRL of –215,868 t CO_2 eq/year for 2017–2021. The difference between the original and the modified submission is due mostly to the inclusion of additional land-use and biomass data.

developing a complete NFI covering the entire country. The NFI testing phase covered 40 field plots, of which 36 were located in forest land and 4 were located in non-forest areas.

13.   Timor-Leste applied a seven-step process for estimating above-ground biomass using NFI data. Step 1 involved carrying out tree height corrections, including by using Chave et al. (2014) for estimating tree heights. Step 2 involved applying species-specific wood densities. Step 3 entailed estimating tree-level biomass using Chave et al. (2014). Step 4 involved estimating plot-level biomass. Step 5 involved extrapolating below-ground biomass estimates from the estimates of above-ground biomass using the default root-to-shoot ratios provided in the 2019 Refinement to the 2006 IPCC Guidelines. In step 6, biomass was estimated for each forest type, calculated as the average biomass stock at plot level. Forest biomass ranged from 45.2 to 96.6 t C/ha, with confidence intervals ranging from 37 to 132 per cent, depending on the forest type. Step 7 involved estimating carbon stock changes by subtracting the initial carbon stock from the final carbon stock, converting the values to tonnes of CO_2 and representing them in land-use matrix format.

14.   Removal factors, applicable to the enhancement of forest carbon stocks, were estimated as one twentieth of the full carbon stock of the forest type according to data from the NFI testing phase. Removal factors were applied to land conversions to forest land for a 20-year period, at the end of which the forest carbon stock is assumed to be fully restocked.

15.   For estimating land-use changes and AD, a systematic point sampling method was implemented using a hexagonal grid, which is consistent with the NFI and the country's reporting for the FAO Global Forest Resources Assessments. A systematic grid with 2 km × 2 km spacing (with each sampling point located at the centre of each hexagon) was selected in the light of the available human and financial resources. Sample plots with an area of 0.5 ha were designed in the shape of a square. Under this approach, each sampling point represents an area of 3.554735 km^2 within the country, and a total of 4,215 sampling points were defined. Data collection was performed at each of the points using the FAO Collect Earth tool. Satellite imagery was made available through Google Earth Pro, Bing Maps and Planet's base maps. In its modified submission, Timor-Leste provided interpretation rules and protocols for determining land-use changes over time, including criteria for interpreting plots with multiple land-cover elements.

16.   Timor-Leste applied QC procedures for the results of the visual interpretation of sample plots carried out using Collect Earth by reassessing around 10 per cent of the total sample (425 plots). Total accuracy was found to be 73 per cent; however, Timor-Leste, in its original submission, reported interpretation errors of 85 and 100 per cent for afforestation and deforestation respectively. In its modified submission, Timor-Leste provided a revised interpretation error estimate after reassessing 245 plots where interpretations were found to be erroneous. Interpretation errors were reduced to 76 and 92 per cent for afforestation and deforestation respectively. The Party reported that the sample size needs to be increased, and training needs to be provided for interpreters considering the distribution and types of land use and land-use change in the country.

17.   For tracking afforested lands, Timor-Leste developed an afforestation registry, where lands are tracked annually with the purpose of applying removal factors and determining whether deforestation of afforested areas is occurring. This registry started in 2017 in line with the historical reference period.

18.   Uncertainty was estimated for AD and emission factors on the basis of sampling error. Uncertainty was propagated using approach 1 from the 2019 Refinement to the 2006 IPCC Guidelines. The estimated uncertainties for historical emissions from deforestation and historical removals from afforestation are 68 and 11 per cent respectively, and the total uncertainty for the net FRL value is 60 per cent.

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

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

19. To estimate forest carbon stocks, Timor-Leste used data collected from 36 field plots established through a preliminary testing phase of the NFI (see para. 12 above), which had a limited budget, meaning that plots were located relatively close to roads. Table 5 in the modified submission includes information on the number of plots for each forest type, noting that no plots were established in moist highland forest. When comparing the sampling intensity for each forest type in the NFI testing phase with the extent of these forests according to the 2021 map in the modified submission, the AT noted that moist highland and dry lowland forests were underrepresented in the NFI testing phase. Overall, the AT commends Timor-Leste for its efforts to collect national data and considers that the Party may wish to finalize the NFI with a view to obtaining nationally representative biomass carbon stock data and using them to produce unbiased estimates. The AT considers that, for the completion of the NFI, all sampling units should have equal sampling probability. Therefore, the AT notes increasing the sampling intensity of the NFI, including by obtaining data on biomass stocks for moist highland forest, as an area for future technical improvement.

20. In its modified submission, Timor-Leste provided information on above-ground biomass and carbon stocks based on the NFI testing phase data, as well as their CO_2 equivalences. The AT noted that some units are missing from table 4 (columns 2 and 5), while the units in column 6 are incorrect ("t CO_2/ha" rather than "t C/ha"). Despite these editorial errors, the AT was able to reproduce the emission and removal factors using tables 4–6 of the modified submission. The AT considers that Timor-Leste could report the appropriate units in the tables in future FRL submissions to increase clarity and transparency.

21. With respect to the removal factors selected for land conversions to forest land, Timor-Leste applied an area-based carbon stock difference method, where the removal factor was calculated as one twentieth of the total carbon stock change, considering the initial and final land uses. The AT noted that this simplified assumption is acceptable as long as the removal factor is not applied for more than 20 years. The AT also noted that, according to the methodological approach selected by the Party, these removal factors are only applied to land conversions that occurred during the historical reference period. In the case of land conversions to forest land that occurred prior to the first year of the historical reference period, land is classified as forest land remaining forest land by default and assigned the full carbon stock associated with the specific forest type. The AT acknowledges that Timor-Leste applied a simplified approach until more data are collected through the NFI, and commends the Party for its efforts.

22. Owing to lack of data, Timor-Leste assumed the same forest carbon stock for moist highland forest and moist lowland forest (88.8 t C/ha, with a 37 per cent confidence interval). The AT acknowledges the Party's lack of data for moist highland forest and considers collecting data for this forest type to be an area for future technical improvement. However, the AT noted that the assumption that the confidence interval is the same for moist highland forest, for which no data were collected, does not take into account the systematic error introduced by this assumption; that is, a lack of representativeness, as described in the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines. Therefore, the AT considers that the uncertainty of the forest carbon stock for moist highland forest has been underestimated, and notes that the uncertainty assessment for future FRL submissions, equivalent to that provided in section 9 of the modified submission, could take this into consideration.

23. Timor-Leste used systematic point sampling for estimating land-use areas and REDD+ activities. The sampling intensity was defined on the basis of a 2 km × 2 km grid over the entire national territory, including a total of 4,215 sampling points. The AT noted that, in the five-year historical reference period, only 10 of the 4,215 plots showed signs of deforestation (less than 1 per cent of the national territory). In the same period, afforestation was observed in 131 of the 4,215 sampling points (representing 3.1 per cent of the national territory). During the TA, the Party explained that this sampling size is not optimal and is

linked to the available financial and human resources. The AT considers increasing the sampling size as an area for future technical improvement but commends Timor-Leste on its efforts to improve sampling in order to accurately estimate land-use changes. The AT notes the Party's intention to increase the intensity of the sampling to a 1 km × 1 km grid, thereby increasing the number of sampling points to 14,954, resulting in a lower sampling error.

24.   As part of the QC procedures for its AD, Timor-Leste reassessed 425 plots to quantify the accuracy of interpretation. According to the modified submission, the overall accuracy was 73 per cent, with an interpretation error of 76 and 92 per cent for afforestation and deforestation respectively, the two activities included in the FRL (see para. 16 above). Noting that the interpretation error is very high and that, along with additional sampling, training for national experts serving as interpreters could help to reduce the number of disagreements and improve the accuracy of interpretation, the AT considers this to be an area for future technical improvement.

25.   The AT identified differences in the data, methods and assumptions used between the latest national GHG inventory and the modified FRL submission. For the NC2, submitted in 2020, Timor-Leste applied a gain–loss method, including land-use categories, carbon pools and GHGs that are excluded from the current FRL. Furthermore, the latest national GHG inventory covers the time series 2005–2015, while the historical reference period for the FRL is 2017–2021. Overall, the AT notes that there is no consistency between the FRL and the latest national GHG inventory. During the TA, the Party explained that for its FRL it aimed to use country-specific data, while for the NC2 mostly default values and methods from the 2006 IPCC Guidelines were used. The AT welcomes this explanation and notes ensuring consistency with the national GHG inventory as an area for future technical improvement.

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

26.   According to decision 12/CP.17, annex, paragraph (b), the information submitted by Parties should include descriptions of relevant policies and plans relevant to the construction of FRELs and/or FRLs. During the TA, the AT noted that this information was missing from the original submission. In its modified submission, the Party included information on its efforts to combat climate change, including references to the most relevant pieces of legislation with respect to environmental management. The AT welcomes the provision of this information by the Party and considers that Timor-Leste could provide a description of PaMs related to the REDD+ activities included in future FRL submissions, noting this as an area for future technical improvement.

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

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

28.   The Party included two REDD+ activities in its FRL, following the stepwise approach. The activity reducing emissions from forest degradation was excluded owing to lack of data. The AT noted that this activity is very likely to be significant, although Timor-Leste did not provide a justification for its exclusion based on the significance of the activity. Moreover, the AT noted that the canopy cover threshold of 15 per cent included in the country's forest definition would result in a large portion of forest-related emissions being associated with forest degradation, rather than deforestation (since tree cover must drop below 15 per cent for deforestation to be identified and for the associated emissions to be included in the FRL). Overall, the AT considers that Timor-Leste could include the activity reducing emissions from forest degradation in future FRL submissions, and in the interim could consider updating the canopy cover threshold in its forest definition to avoid mixing the activities, especially for dense tropical forests with higher carbon stocks.

29.   Timor-Leste also excluded the activities conservation of forest carbon stocks and sustainable management of forests owing to lack of data and methodological approaches. The Party explained during the TA that it was unable to include these activities in the FRL because no information was available. The Party noted that possible future methodological improvements include increasing the sample size for estimating AD, and that new spatial

data may be useful for considering carbon fluxes in standing forests, potentially leading to the inclusion of these activities in the FRL in the future. The AT acknowledges the practical challenges involved in determining the significance of activities for which data are not available, and notes that Timor-Leste could include additional activities in future FRL submissions following the stepwise approach, or continue to exclude them and provide more information justifying their omission.

30.   Timor-Leste explained during the TA that it excluded the deadwood, litter and SOC pools from the FRL owing to lack of data. The Party also explained that the development of its NFI may enable it to include more carbon pools in future FREL or FRL submissions, following the stepwise approach. The AT welcomes this explanation and notes that the Party did not exclude these pools on the basis of their significance. The AT therefore considers that Timor-Leste could include these pools in future FRL submissions, or continue to exclude them and provide more information justifying their omission.

31.   The AT noted that non-CO_2 emissions were excluded from the FRL. According to the modified submission and the explanations provided by the Party during the TA, the occurrence, magnitude and frequency of forest fires are unknown, and there are no reliable data on the distribution of organic soils and their potential drainage; overall, the Party lacks the data required to include non-CO_2 emissions, even though they may occur in the national territory associated with the REDD+ activities included in constructing the FRL. The AT considers that Timor-Leste could continue its efforts to develop its NFI and a national forest monitoring system for collecting additional data, which may help to enhance understanding of the occurrence, magnitude and frequency of non-CO_2 emissions from biomass burning and any drainage of peatlands, if appropriate.

32.   The AT acknowledges the Party's intention to collect additional land-use and land-use change data by increasing sampling intensity, and to develop the NFI, to improve future FRL submissions following the stepwise approach.

4.   Definition of forest

33.   Timor-Leste provided in its submission the definition of forest used in constructing its FRL. The Party's forest definition specifies, inter alia, an area of at least 0.5 ha, with trees of actual or potential height greater than 5 m, which have grown naturally, forming a natural ecosystem, or which have been planted, exceeding the canopy cover threshold of 15 per cent. During the TA, the AT noted that, according to the Party's submission, naturally occurring forests in Timor-Leste are usually very dense (having carbon stocks of 45–97 t C/ha), and that a higher canopy cover threshold may be more appropriate for distinguishing between deforestation and forest degradation processes, especially given that the activity reducing emissions from forest degradation was not included in the proposed FRL. During the TA, the Party explained that there are savannah-like forest types, and the 15 per cent threshold was selected to ensure that this vegetation type can be classified as forest. The AT noted that, according to the Party's modified submission (table 5), shrubland and grassland were not classified as forest in its NFI or for the FRL. The AT considers that Timor-Leste could select a canopy cover threshold that enables it to better distinguish between deforestation and forest degradation, and provide information in future FRL submissions on how savannah-like forests are included in its land classification.

34.   Timor-Leste's forest definition differs from the definition used for its reporting to FAO. According to the Party, the definition was changed to more accurately reflect land use and land-use change in its national territory. Furthermore, the AT noted that, since the Party's most recent NC (the NC2) did not include information on the forest definition used, the AT was unable to check whether the definition used for the NC is consistent with the one used for the FRL. During the TA, the Party clarified that it used the same definition for its latest national GHG inventory submission and FRL. The AT considers that, to enhance the clarity and transparency of the information provided, Timor-Leste could explain in future FRL submissions why and how the forest definition differs for other reporting processes and the reasons for selecting definitions, including information on consistency between the FRL and the national GHG inventory and reporting to international organizations such as FAO.

35.   The AT found a grammatical error in the forest definition reported by the Party in its original submission that created ambiguity. During the TA, the Party explained that this was due to an error in translating the text of law 14/2017 on establishing a legal regime for forestry into English, which was only available in Portuguese. Although Timor-Leste updated its forest definition for the modified submission, the AT notes that the wording "or are to which the classification of forest, in terms of the law" is still unclear. The AT considers that the Party could check this translation and update its definition for future FRL submissions.

III.   Conclusions

36.   The information used by Timor-Leste in constructing its FRL for 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 reference levels.

37.   The FRL presented in the modified submission, for the reference period 2017–2021, corresponds to –196,723 t CO_2 eq/year.

38.   The AT acknowledges that Timor-Leste included in its FRL two of the most significant activities and the most significant pools in terms of emissions from forests. The AT considers that, in doing so, Timor-Leste followed decision 1/CP.16, paragraph 70, on activities undertaken, and decision 12/CP.17, paragraph 10, on applying the stepwise approach. The AT commends Timor-Leste for providing information on its ongoing work to collect additional data that could be useful for including information on additional significant activities in future FRL submissions.

39.   As a result of the facilitative interactions with the AT during the TA, Timor-Leste 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 FRL submission and commends Timor-Leste on its efforts. The new information provided in the modified submission increased the reproducibility of the FRL calculations.

40.   The AT notes that, overall, Timor-Leste did not maintain consistency, in terms of sources of AD and emission factors used for its FRL, with those used for the GHG inventory included in its NC2 (2020).[11]

41.   Pursuant to decision 13/CP.19, annex, paragraph 3, the AT identified the following additional areas for future technical improvement regarding pools and gases excluded from the FRL:

        (a)   Treatment of emissions from deadwood, litter and SOC (i.e. including the pools or providing more information justifying their omission, depending on their significance) (see para. 30 above);

        (b)   Treatment of non-CO_2 gases (i.e. to maintain consistency with the GHG inventory included in the Party's NC and/or biennial update report) (see para. 31 above).

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

        (a)   Increasing the sampling intensity of the NFI, including by obtaining data on biomass stocks for moist highland forest, which are currently not represented in the NFI (see para. 19 above);

        (b)   Ensuring consistency of reporting for biomass, carbon stocks and emission and removal factors throughout the submission, including with regard to the units reported (see para. 20 above);

        (c)   Providing a more accurate representation of the uncertainty associated with biomass stocks in moist highland forest (see para. 22 above);

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

(d) Increasing sampling intensity by using a denser sampling point grid to give a more accurate representation of REDD+ activities within the national landscape (see para. 23 above);

(e) Increasing the sample size for reassessment to improve the representation of the interpretation's accuracy and, on the basis of this, improving sample interpretation training for national experts (see para. 24 above);

(f) Improving the consistency of the FRL with the national GHG inventory (see para. 25 above);

(g) Providing more information on the PaMs associated with REDD+ activities (see para. 26 above);

(h) Reviewing the definition of forest and selecting a canopy cover threshold that enables a more balanced representation of deforestation and forest degradation in the light of the country's climate and vegetation (see para. 33 above);

(i) Ensuring that the English translation of the definition of forest is accurate (see para. 34 above).

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

(a) Collect additional land-use and land-use change data, using a land-cover, object-based system to reduce sampling error;

(b) Increase the intensity of the sampling grid to 1 km × 1 km, or denser, to better identify forest areas and track forest-area changes and ensure a more accurate representation of REDD+ activities;

(c) Provide additional training to national experts with a view to enabling them to more accurately interpret land uses and land-use changes;

(d) Transition, over time, to a full-scale, multipurpose NFI, including by implementing additional QA/QC procedures to ensure data quality.

44. In conclusion, the AT commends Timor-Leste for showing strong commitment to continuously improving its FRL estimates in line with the stepwise approach. A number of areas for the future technical improvement of Timor-Leste's 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.[12] The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Timor-Leste.

45. The table contained in annex I summarizes the main features of Timor-Leste's proposed FRL.

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[12] 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 Timor-Leste

Main features of the FRL		*Remarks*
Proposed FRL	–196 723 t CO_2 eq/year	The net FRL value includes the historical average of emissions from deforestation (163,634 t CO_2 eq/year) and removals from afforestation (–360,357 t CO_2 eq/year) (see para. 10 above10 of this document)
Type and reference period of FRL	FRL = average of historical emissions and removals in 2017–2021	See paragraph 10 of this document
Application of adjustment for national circumstances	No	–
National/subnational	National	The FRL covers the entire national territory including all islands (see para. 6 of this document)
Activities included	Reducing emissions from deforestation Enhancement of forest carbon stocks	Reducing emissions from forest degradation, conservation of forest carbon stocks and sustainable management of forests were excluded owing to lack of data and methodological approaches (see paras. 28–29 of this document)
Pools included	Above-ground biomass Below-ground biomass	The deadwood, litter and SOC pools were excluded owing to lack of data, not on the basis of their significance (see para. 30 of this document)
Gas included	CO_2	Non-CO_2 emissions were excluded owing to lack of data (see para. 31 of this document)
Forest definition	Included	Area of at least 0.5 ha, with trees of actual or potential height greater than 5 m and minimum canopy cover of 15 per cent. The definition differs from the one used for reporting to FAO. The AT was unable to confirm whether the definition is consistent with the one used for the national GHG inventory (see paras. 33–34 of this document)
Consistency with latest GHG inventory	Methods used for estimating the FRL are not consistent with those used for the latest GHG inventory (2020)	The methods, data and assumptions are not consistent with those used for the latest national GHG inventory, reported in the NC2 (see para. 25 of this document)
Description of relevant policies and plans	Not included	The modified submission includes references to relevant environmental legislation, but does not provide a description of the PaMs related to the REDD+ activities (see para. 26 of this document)

Main features of the FRL		*Remarks*
Description of assumptions on future changes to domestic policy, if included in constructing the FRL	Not applicable	–
Description of changes to previous FRL	Not applicable	–
Identification of future technical improvements	Included	Several areas for future technical improvement have been identified (see paras. 41–42 of this document)

Main features of the FRL		*Remarks*

Annex II

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.

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B. UNFCCC documents

First and modified FRL submissions of Timor-Leste. Available at https://redd.unfccc.int/submissions.html?country=tls.

"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.

NC2 of Timor-Leste. Available at https://unfccc.int/non-annex-I-NCs.

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:

Chave et al. (2014). Improved allometric models to estimate the aboveground biomass of tropical trees. Global Change Biology (2014) 20, 3177–3190.