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Report on the technical assessment of the proposed forest reference emission level of Zimbabwe submitted in 2024

Summary

This report covers the technical assessment of the voluntary submission of Zimbabwe 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 Zimbabwe covers the activity reducing emissions from deforestation, which is among the activities included in paragraph 70 of decision 1/CP.16.

For its submission, Zimbabwe developed a national FREL. The FREL presented in the original submission, based on the reference period 2016–2021, corresponds to 4,255,249.2 tonnes of carbon dioxide equivalent per year. As a result of the facilitative process during the technical assessment, the FREL was modified to 5,187,697.6 tonnes of carbon dioxide equivalent per year.

The assessment team notes that the data and information used by Zimbabwe 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 information on the assessed FREL and a few areas identified by the assessment team for future technical improvement in accordance with the provisions on the scope of the technical assessment contained in the annex to decision 13/CP.19.

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
EF	emission factor
FAO	Food and Agriculture Organization of the United Nations
FRA	Global Forest Resources Assessment of the Food and Agriculture Organization of the United Nations
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
GIZ	German Agency for International Cooperation
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
LULUCF	land use, land-use change and forestry
NC	national communication
NFI	national forest inventory
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)
TA	technical assessment

I. Introduction and summary

A. Overview

1. This report covers the TA of the submission of Zimbabwe on its proposed FREL,[1] submitted on 22 January 2024, in accordance with decisions 12/CP.17 and 13/CP.19. The TA took place from 18 to 22 March 2024 and was coordinated by the secretariat.[2] The TA was conducted by the AT, consisting of two LULUCF experts from the UNFCCC roster of experts:[3] Javier Fernandez (Democratic Republic of the Congo) and Elisabeth Pagnac-Farbiaz (France). The Consultative Group of Experts was invited to participate in the TA as an observer,[4] but no representative was available. The TA was coordinated by Jenny Wong (secretariat).

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

3. Zimbabwe provided its submission in English. The submission is supported by an Excel spreadsheet containing data and estimates used for constructing the FREL, which was shared with the AT during the TA and enhanced the transparency and completeness of the FREL.

4. Zimbabwe underlined that the submission on the proposed FREL does not prejudge its nationally determined contribution under the Paris Agreement or any other national mitigation action, but serves as a benchmark for assessing its performance in implementing REDD+ activities.

5. The objective of the TA is to assess the degree to which the information provided by Zimbabwe 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 FREL with a view to supporting the capacity of Zimbabwe to construct and improve its FREL in the future, as appropriate.[7]

6. The TA of the FREL submitted by Zimbabwe 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.

7. Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of Zimbabwe. The facilitative exchange during the TA allowed Zimbabwe to provide clarifications and additional information, which were considered by the AT in preparing this report.[9] As a result of the facilitative interactions with the AT during the TA, Zimbabwe provided a modified version of its submission on 24 June 2024, which took into consideration the technical input of the AT. The modifications improved the clarity and transparency of the submitted FREL without needing to alter the approach used to construct it. This TA report was prepared in the context of the modified FREL submission.

[1] The submission of Zimbabwe is available at https://redd.unfccc.int/submissions.html?country=zwe.
[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.

B. Proposed forest reference emission level

8. In paragraph 70 of decision 1/CP.16, the COP encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances, in the context of providing adequate and predictable support. The FREL proposed by Zimbabwe, on a voluntary basis for a TA in the context of results-based payments, covers the activity reducing emissions from deforestation, which is one of the five activities referred to in paragraph 70 of decision 1/CP.16. The FREL covers all natural forests in Zimbabwe, comprising mostly dense or open woodlands dominated by mopane, miombo, teak and acacia, and excludes exotic and commercial tree plantations. It considers only CO_2 emissions from deforestation. For its submission, Zimbabwe applied a stepwise approach to developing its FREL in accordance with paragraph 10 of decision 12/CP.17, which enables Parties to improve their FREL or FRL by incorporating better data, improved methodologies and, where appropriate, additional pools.

9. The national FREL submitted by Zimbabwe in the modified submission corresponds to 5,187,697.6 t CO_2 eq/year, which represents the historical average of annual emissions from deforestation based on the reference period 2016–2021.[10] The table contained in annex I summarizes the main features of the FREL presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities, including the reference period, territorial coverage, and pools and gases included.

10. For constructing its FREL, Zimbabwe used a combination of national data and default factors and parameters (e.g. carbon densities, EFs) from the IPCC good practice guidance for LULUCF, the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines. National data were obtained from the NFI (conducted in 2017–2023) and a six-year national land-use change assessment. For estimating emissions from forest land conversions (i.e. deforestation), Zimbabwe employed methods consistent with those in the above-mentioned IPCC guidelines and guidance, with some simplifications as described in paragraph 14 below.

11. Zimbabwe applied a stratified area sampling approach to obtain sampling points across the national territory; a total of 7,499 points were used for estimating AD. The stratification was derived from a spatially explicit wall-to-wall analysis of change probability using the *k*-means algorithm. The change probability was determined by observing differences between a forest and a non-forest probability map. The forest and non-forest probability maps were produced using a classification method based on a variety of satellite imagery as input, including composite imagery from Landsat, Planet and ALOS-2 sensors.

12. Zimbabwe employed a sampling grid of 987,556 points as the starting point for the land classification in order to maintain consistency with its reporting for the FRA. The probability of forest stability and change in the historical reference period 2016–2021 was based on the estimation of forest cover in 2016 and 2022, and the change between the two. Probability maps were constructed using SEPAL, the System for Earth Observation Data Access, Processing and Analysis for Land Monitoring, a tool developed by FAO. The *k*-means algorithm and Neyman allocation method were used to allocate the number of samples across three distinct strata, with a total sample size of 7,499 points (1,100 for stable non-forest, 1,599 for stable forest and 4,800 for forest change).

13. The main driver of deforestation in Zimbabwe was identified as conversion of forest land to cropland, accounting for 89 per cent of the observed deforestation in the country during the historical reference period (see figure 4.5 in the modified FREL submission). The remaining 11 per cent of the deforestation observed is due to the collection of fuelwood, establishment of settlements, development of infrastructure or mining, and incidents of fire.

14. EFs for deforestation were estimated using both IPCC tier 1 default factors and tier 2 data from the NFI for carbon densities. For cropland and grassland, tier 1 default factors for carbon densities obtained from the 2006 IPCC Guidelines and the 2019 Refinement to the

[10] In its original submission, Zimbabwe proposed a FREL of 4,255,249.2 t CO_2 eq/year. The difference between the original and the modified submission is due mostly to the additional sampling conducted to reduce the uncertainty of the FREL estimates and an increase in the confidence interval from 90 to 95 per cent.

2006 IPCC Guidelines were used. Forest carbon stock was estimated using data collected through the NFI; a single value for forest carbon stock of 40.1 t C/ha was used. Post-deforestation or 'residual' carbon stock was assumed to be zero for settlements, wetlands and other land. The value for cropland was 4.7 t C/ha, while for grassland a value of 4.4 t C/ha was used, corresponding to tropical dry regions.

15. EFs were developed for estimating CO_2 emissions from deforestation, considering above-ground and below-ground biomass. The carbon pools for litter, deadwood and soil organic carbon and non-CO_2 emissions were excluded from the construction of the FREL.

16. The NFI data are based on three forest inventory exercises covering a total of 151 field measurement plots. Data collection started in 2018 and the data were used to validate the 2017 land-cover map. Field plots were added as part of the training of the forest inventory team to cover underrepresented woodland types and refine Zimbabwe's global forest survey grid, which is used to survey forests.

17. Biomass stocks were estimated using the allometric model developed by GIZ (2012) for southern Africa. After assessing 10 allometric models for African countries (see table 4.5 of the modified FREL submission), including models developed by Guy (1981) and Henry et al. (2011) for Zimbabwe, the Party selected this model because it produced the estimates with the lowest uncertainty (i.e. least random errors).

18. Zimbabwe estimated the uncertainty for the EFs and AD used and propagated the overall uncertainty for 2016–2021 using approach 1 of the 2006 IPCC Guidelines. The total emissions for 2016–2021 were reported as 31,126,185.1 t CO_2 eq/year with an uncertainty of 30.3 per cent. The average annual FREL value was reported as 5,187,697.6 ± 1,573,976.3 t CO_2 eq/year (uncertainty was estimated at the 95 per cent confidence interval).

19. Zimbabwe indicated that the current FREL will remain valid for six years (2022–2027), with the possibility of it being updated and an improved FREL being submitted within that period. This depends on factors such as the availability of data on currently excluded carbon pools and new methods for estimating emissions from forest degradation, and improvements in data quality as a result of additional field measurements undertaken through the NFI.

II. Technical assessment of the proposed forest reference emission level

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

III. Conclusions

21. The FREL presented in the modified submission, based on the reference period 2016–2021, corresponds to 5,187,697.6 t CO_2 eq/year.

22. The AT acknowledges that Zimbabwe included in its FREL the most significant activity, the most important forest types and the most significant pools in terms of emissions from forests. The AT considers that, in doing so, Zimbabwe followed paragraph 70 of decision 1/CP.16, on activities undertaken, and paragraph 10 of decision 12/CP.17, on applying the stepwise approach. The AT commends Zimbabwe for providing information on its ongoing work to include other REDD+ activities in future FREL submissions.

23. As a result of the facilitative interactions with the AT during the TA, Zimbabwe provided a modified FREL submission that took into consideration the technical input of the AT. The AT notes that the transparency and completeness of the information provided were significantly improved in the modified FREL submission and commends Zimbabwe on its efforts. The new and additional information provided in the modified submission, mainly in updated calculation spreadsheets, increased the reproducibility of the FREL calculations.

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

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

Finding ID#	*Aspect of the scope of the TA (decision 13/CP.19, annex, para. 2)*	*Description of the issue, additional information shared by the Party during the TA, and TA by the AT*	*Area for future technical improvement*
1	2(a) Consistency with the national GHG inventories	The AT noted that, overall, Zimbabwe did not maintain consistency, in terms of sources of AD and EFs used for its FREL, with those used for the national GHG inventory (for 1990–2017) included in its NC4 (2022). The FREL submission presents new methods for land representation, resulting in different estimates for deforestation from those in the national GHG inventory. During the TA, Zimbabwe explained that for the national GHG inventory default EFs from the 2006 IPCC Guidelines and the IPCC EF database were used, while improved EFs based on data from the NFI were used to construct the FREL. According to the Party, the data and EFs used for the FREL will also be used in preparing its future NCs and biennial transparency reports.	The AT notes maintaining consistency between future FRELs and the corresponding estimates in future national GHG inventories as an area for future technical improvement of the FREL.
2	2(b) How historical data have been taken into account	The FREL takes into account historical data on emissions for 2016–2021 and was constructed on the basis of the average emissions from deforestation during that period.	
3	2(c) Accuracy – AD	For stratifying the sampling points used for estimating AD, Zimbabwe used forest and non-forest probability maps for 2016 and 2022. The AT noted that the 2022 map falls outside the historical reference period (2016–2021), which may introduce bias in the AD. In other words, the 2022 map introduces information outside the historical reference period, as the sampling is informed by deforestation that occurred in 2022. During the TA, Zimbabwe explained that the fact that the probability maps underpinning the stratification comprise information for 2022 does not introduce bias because the sampling points used for estimating AD were for 2016–2021 only. Further, Zimbabwe explained that 2022 was used in the stratification process to ensure that there were no omissions in the sampling of areas of deforestation during the historical reference period.	The AT notes providing more information on how equal probability is ensured in the sampling design, including how stratification to produce the estimates for deforestation leads to unbiased AD that are representative of the historical reference period (2016–2021), as an area for future technical improvement of the FREL.
4	2(c) Accuracy – AD	The AT noted that Zimbabwe did not observe any conversions of forest land to grassland in 2016–2021. However, the modified FREL submission refers to drivers of deforestation, such as unsustainable grazing and firewood extraction, that may lead to conversions of forest land to grassland. The AT also noted that, in the latest national GHG inventory, forest land converted to grassland was a key category in the forestry and land-use sector (see table 2.5 of the NC4), with a contribution of 19,357 Gg CO_2 eq in 2010. Further, it was mentioned in the NC4 that one of the major drivers of deforestation in the country is increased numbers of livestock. During the TA, Zimbabwe explained that there is a possibility that certain areas of forest land were converted to grassland. However, these drivers of deforestation often directly correlate with smallholder farming, which explains why cropland was	The AT notes clearly identifying forest land conversions to grassland and cropland, separately, as an area for future technical improvement of the FREL, including describing the land-use and management practices leading to those conversions and how the conversions are identified through Collect Earth, in the light of the significant emissions from forest land-

Finding ID#	*Aspect of the scope of the TA (decision 13/CP.19, annex, para. 2)*	*Description of the issue, additional information shared by the Party during the TA, and TA by the AT*	*Area for future technical improvement*
		the dominant post-conversion land use observed during the historical reference period.	use changes reported in the national GHG inventory.
5	2(c) Transparency – AD	The AT noted that Zimbabwe classified all its land as managed. During the TA, the AT requested clarification of how the land meets the IPCC definition of managed land, namely that managed land is land where human interventions and practices have been applied to perform production, ecological or social functions. In addition, according to the 2006 IPCC Guidelines, all land definitions and classifications should be specified at the national level, described in a transparent manner and applied consistently over time.	The AT notes clarifying how all Zimbabwe's land meets the IPCC definition of managed land as an area for future technical improvement of the FREL. In addition, the AT is of the view that, following the 2006 IPCC Guidelines (vol. 4, chap. 3, p.3.6), Zimbabwe may wish to describe the methods and definitions used to determine areas of managed and unmanaged land in order to increase the transparency of future FREL submissions.
6	2(c) Transparency – AD	The sampling-based modelling approach used by Zimbabwe for estimating AD involves multiple steps, tools, assumptions and methodological decisions in a complex technical procedure. According to the 2006 IPCC Guidelines, when using models, the assumptions and principles should be transparently described, and the Party should provide any validation and/or QA of the model. The AT noted that the modified FREL submission includes an in-depth description of the methodological approach and associated assumptions, and commends Zimbabwe for its efforts. At the same time, during the TA, the AT requested more information on whether an independent third party had conducted QA of the model. Zimbabwe acknowledged that no QA/QC was undertaken specifically for the AD. However, the Party confirmed that the FREL submission underwent overall QA/QC by stakeholders involved in development of the FREL. Nevertheless, the AT notes that information on the outcome of the QA/QC process was not included in the modified submission.	The AT considers that including the results of any QA performed by an independent third party on the sampling-based modelling approach would increase the transparency and clarity of future FREL submissions.
7	2(c) Accuracy – EFs	The sampling-based approach to estimating AD was based on the probability of forest stability and change in 2016 and 2022, and on the assumption of a single forest class for the entire national territory. For the purpose of assigning an appropriate EF, Zimbabwe grouped all forest types identified in the NFI into a single forest category for which a single carbon stock value was employed (40.1 t C/ha). During the TA, the Party explained that the method for estimating AD was restricted to one forest type, even though multiple forest types have been identified in the country.	The AT is of the view that Zimbabwe may wish to consider, as an area of future technical improvement, the different forest types occurring in the country in estimating AD and EFs for future FREL submissions in order to improve the representativeness of the different woodland types and to increase the accuracy of the estimates of emissions from deforestation.

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8	2(c) Accuracy – EFs	Zimbabwe estimated biomass stocks using an allometric model developed by GIZ (2012) for southern Africa that was selected over nine other allometric models as it produced the estimates with the lowest uncertainty (least random errors) (see also para. 17 above). In its modified FREL submission, Zimbabwe mentioned its plan to develop national allometric models. The AT notes that the model was selected primarily because it produced the least random errors, and that other criteria may be used for selecting a model in order to ensure good representation of national circumstances, such as using a model developed in Zimbabwe.	As an area for future technical improvement, the AT is of the view that Zimbabwe may wish to test the representativeness of current allometric models and their accuracy by using non-destructive techniques (e.g. terrestrial Lidar) and national data prior to developing new allometric models using destructive sampling. In addition, such testing would allow an assessment of whether these existing models are good predictors of Zimbabwean tree allometry. Other criteria could also be used for model selection in order to ensure good representation of national circumstances.
9	2(c) Accuracy – EFs	To estimate below-ground biomass, a root-to-shoot ratio of 0.48 was selected from the IPCC good practice guidance for LULUCF. During the TA, the AT noted that updated values based on the latest research and scientific literature were published in the 2019 Refinement to the 2006 IPCC Guidelines. Zimbabwe clarified that it chose the root-to-shoot value of 0.48 as it considered it more suitable for woodlands and savannahs, which are the dominant forest types in the country. However, the Party stated its plan to use the updated values in the 2019 Refinement to the 2006 IPCC Guidelines when updating its national GHG inventory. Furthermore, Zimbabwe noted that it is evaluating the implications of using the updated value for root-to-shoot ratio (i.e. 0.54), which is a far higher value, on accuracy of the FREL. The AT notes that for the modified FREL submission the original value from the IPCC good practice guidance for LULUCF was used.	The AT considers that updating the values used for root-to-shoot ratio to the defaults presented in the 2019 Refinement to the 2006 IPCC Guidelines, which are based on the latest research and scientific studies, may increase the accuracy of the FREL and considers this as an area of future technical improvement.
10	2(c) Transparency – EFs	Zimbabwe implemented three field data-collection campaigns that are collectively referred to as the NFI (see table 4.4 of the modified FREL submission). The aggregation of the three forest inventory exercises resulted in a total of 151 field measurement plots. During the TA, the AT requested more information in order to check the consistency of the data-collection methods, as well as the location of the plots and the full data set for completeness. As part of the modified submission, Zimbabwe shared the full data set and a map with the location of the plots, which the AT commends the Party for, but it did not provide a description of the data-collection methods. Further, field data collection for the NFI spanned 2018–2023, but the selected historical reference	The AT notes providing more information on the NFI, such as describing the data-collection methods for all inventory exercises and explaining the methodological differences between the exercises, if any, as an area for future technical improvement of the FREL to increase the transparency of future FREL submissions. The AT considers that

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		period is 2016–2021. Thus, the AT notes that some of the NFI data are not representative of the years included in the historical reference period.	Zimbabwe should exclude NFI data that lies outside the historical reference period to avoid inaccuracies in the estimation of forest carbon stocks within that period.
11	2(d) Description of relevant policies and plans, as appropriate	In its modified FREL submission, Zimbabwe included two tables with information on the policies and strategies for forest conservation in the country and the key measures that contribute to reducing emissions from deforestation and forest degradation. The Party included a description of the current Forest Act and the National Forest Policy for 2024, among other relevant policies and plans. Further, it included details of the main projects being implemented to reduce deforestation. The AT commends Zimbabwe for the provision of this clear information.	
12	2(f) Pools – dead organic matter and soil organic carbon	Deadwood, litter and soil organic carbon were excluded from the FREL. According to paragraph (c) of the annex to decision 12/CP.17, reasons for omitting a pool in constructing the FREL should be provided, noting that significant pools should not be excluded. In its modified FREL submission, Zimbabwe stated that accurate data and estimation methods were not available for these pools. Further, default factors and literature-based values were not employed owing to the associated high uncertainty. During the TA, the AT requested more information on the potential significance of these excluded pools but this information was not provided in the modified submission. The AT notes that the IPCC provides tier 1 estimation methods and default EFs for these pools, and that including them may enhance the accuracy and representativeness of the estimates associated with emissions from deforestation. The AT considers the deadwood and litter pools to be of particular importance considering the relevance of fuelwood collection in Zimbabwe to carbon stocks in these pools. Pursuant to paragraph 2(f) of the annex to decision 13/CP.19, in assessing the carbon pools included in the FREL, the AT notes that the modified submission does not include sufficient information for it to be able to conclude whether the pools excluded by Zimbabwe are significant in the context of the FREL.	The AT considers the treatment of emissions from deadwood, litter and soil organic carbon (i.e. including the pool or providing more information justifying its omission based on its significance) to be an area for future technical improvement of the FREL.
13	2(f) Gases – non-CO_2 gases	Zimbabwe included CO_2 emissions only in the FREL and excluded non-CO_2 gases. In its modified FREL submission, Zimbabwe explained that CO_2 is the main greenhouse gas of concern and the one for which reliable data are available. It also stated that anthropogenic sources such as wildfires, landfills and agricultural activities result in the release of other non-CO_2 gases, which may be considered in future FREL submissions. However, further research will have to be conducted regarding the significance of the contribution of these other gases before they are reported.	The AT considers the treatment of non-CO_2 gases to be an area for future technical improvement of the FREL, so as to maintain consistency with the national GHG inventory and because fires in woodland forests could lead to significant non-CO_2 emissions.

Finding ID#	*Aspect of the scope of the TA (decision 13/CP.19, annex, para. 2)*	*Description of the issue, additional information shared by the Party during the TA, and TA by the AT*	*Area for future technical improvement*
14	2(f) Activities – reducing emissions from forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks	The REDD+ activities reducing emissions from forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks were not included in the FREL. Pursuant to paragraph (c) of the annex to decision 12/CP.17, reasons for omitting an activity in constructing the FREL should be provided, noting that significant activities should not be excluded. With respect to reducing emissions from forest degradation, Zimbabwe included an annex to the FREL submission with information on the estimation of AD. However, it was not possible to estimate the associated emissions owing to the lack of relevant data in the NFI. The area of forest degradation reported was 83,006 ha ± 42.8 per cent at a 95 per cent confidence interval. The AT commends Zimbabwe for taking steps towards estimating emissions from forest degradation. With respect to conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks, the AT noted that these activities could be significant. Zimbabwe stated in its modified FREL submission that it lacks the capacity to accurately report on these activities, thus including them in the FREL is considered an area for future technical improvement. On the basis of the information provided by the Party, the AT acknowledges that Zimbabwe included in its FREL the most significant of the five activities identified in paragraph 70 of decision 1/CP.16, reducing emissions from deforestation, in accordance with its national capabilities and circumstances. The AT also acknowledges the Party's intention to include additional significant activities in future FRELs when new and adequate data and better information become available as part of the stepwise approach.	The AT considers the inclusion in future FRELs of the activities reducing emissions from forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks or their exclusion on the basis of those activities being deemed not significant to be an area for future technical improvement of the FREL.
15	2(g) Definition of forest	Zimbabwe provided in its submission the definition of forest used in constructing its FREL. Forest is defined as land with a minimum area of 0.5 ha and 10 per cent canopy cover from trees that are capable of exceeding 5 m in height. This definition excludes exotic or commercial tree plantations. On the exclusion of tree plantations, the AT acknowledges that the definition of forest is nationally determined in accordance with the 2006 IPCC Guidelines and relevant COP decisions. During the TA, the AT requested the Party to provide information on the area of exotic plantations over time with a view to understanding if the area is changing. Zimbabwe clarified that plantation forests, despite being temporarily unstocked on occasion, are considered as forests or areas capable of reaching the thresholds stipulated in the forest definition. Zimbabwe explained that exotic plantations are subject to rotational management and that the area of exotic plantations at the national level is approximately 93,000 ha.	The AT notes that, even though exotic plantations are not included in the FREL, Zimbabwe may wish to monitor exotic plantations over time to confirm that they are temporarily unstocked rather than deforested and to include the result of the monitoring in future FREL submissions.
16	2(g) Definition of forest	The definition of forest adopted by Zimbabwe for the purpose of the FREL is different to that used to report to FAO for the FRA. For the 2020 FRA, Zimbabwe included primary forest, other naturally regenerated forest and planted forest in the	The AT notes that, according to paragraph (d) of the annex to decision 12/CP.17, a Party should include in its

Finding ID#	*Aspect of the scope of the TA (decision 13/CP.19, annex, para. 2)*	*Description of the issue, additional information shared by the Party during the TA, and TA by the AT*	*Area for future technical improvement*
		definition. For the FREL, exotic or commercial plantations were excluded. With respect to the consistency of the definition with that used for the latest national GHG inventory, included in Zimbabwe's NC4, the AT was unable to find such a definition. The AT is of the view that Zimbabwe may wish to use the same forest definition consistently, especially for the national GHG inventory as the national inventory also includes emissions from forest and land-use change.	submission an explanation of why and how the forest definitions used across its reporting differ. Thus, the AT notes providing such clarification and using the same forest definition consistently as an area for future technical improvement of the FREL.

25. The information used by Zimbabwe in constructing its FREL for the activity reducing emissions from deforestation is transparent, complete and in overall accordance with the guidelines for submissions of information on reference levels (see the table above).

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

(a) Include emissions from forest degradation in future FRELs, once technical improvements have been made to the NFI to enable the stratification of forest areas and measurement of carbon stocks for forest degradation and to minimize uncertainties in estimates of emissions from forest degradation;

(b) Develop tier 2 EFs for all non-forest land-use categories and local allometric equations for modelling above-ground biomass;

(c) Collect and process accurate data on deadwood carbon stocks as part of the planned improvements to the NFI and to include the pool in future FRELs;

(d) Include additional carbon pools, REDD+ activities and forest-related removals in future FRELs;

(e) Refine the NFI to facilitate forest stratification and sampling of all land-use and land-cover classes;

(f) Improve the NFI to enable accurate assessment of carbon removals resulting from conservation, recovery and regrowth of forests;

(g) Enhance knowledge on emissions from fire and their significance as part of the collaborative efforts of its designated national authority, the Environmental Management Agency and academic and research institutions;

(h) Seek access to higher-resolution remote sensing imagery and collect more field-based training and validation data points;

(i) Perform a thorough QA/QC exercise to further refine the identification of the REDD+ activities and the estimation of areas of land-use change;

(j) Review and update existing forest-related policies and legislation to align with international best practices and climate-related goals;

(k) Enhance coordination and oversight of forestry activities, including monitoring and reporting of emissions;

(l) Improve the transparency, consistency and accuracy of estimates for its first biennial transparency report, NC5 and future FRELs.

27. Zimbabwe identified the following capacity-building needs:

(a) Strengthening technical capacity for collecting accurate data on forest-related removals;

(b) Increasing the efficiency and reducing the labour costs of undertaking the NFI;

(c) Increasing the accuracy of locally developed allometric models, as recommended in the 2006 IPCC Guidelines;

(d) Ensuring safe data storage and archiving and efficient data-sharing.

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

[11] As per decisions 13/CP.19, annex, para. 1(b); and 12/CP.17, para. 10.

Annex I

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

Main features of the FREL		*Remarks*
Proposed FREL	5 187 697.6 t CO_2 eq/year	See also paragraph 9 of and finding ID# 2 in the table in this document
Type and reference period of FREL	FREL = average of historical emissions in 2016–2021	See also paragraph 9 of and finding ID# 2 in the table in this document
Application of adjustment for national circumstances	No	
National/subnational	National	See also paragraph 8 of this document
Activity included	Reducing emissions from deforestation	See also paragraph 8 of and finding ID# 14 in the table in this document
Pools included	Above-ground biomass Below-ground biomass	Deadwood, litter and soil organic carbon pools excluded owing to lack of appropriate estimation methodology and accurate data (see also para. 15 of and finding ID# 12 in the table in this document)
Gas included	CO_2	Non-CO_2 gases not considered but may be considered in future FREL submissions (see also para. 15 of and finding ID# 13 in the table in this document)
Forest definition	Included	The forest definition differs from that used for reporting to FAO. Consistency with the forest definition used for the national GHG inventory could not be assessed (see also finding ID#s 15–16 in the table in this document)
Consistency with latest national GHG inventory	Methods used for estimating the FREL are not consistent with those used for the latest national GHG inventory (2017)	See also finding ID# 1 in the table in this document
Description of relevant policies and plans	Included	See also finding ID# 11 in the table in this document
Description of assumptions on future changes to domestic policy, if included in constructing the FREL	Not applicable	
Description of changes to previous FREL	Not applicable	This is the first FREL submission (see para. 2 of this document)
Identification of future technical improvements	Included	Several areas for future technical improvement have been identified (see the table in this document)

Annex II

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry.* J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html.

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

“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.

NC4 of Zimbabwe. Available at https://unfccc.int/non-annex-I-NCs.

Original and modified FREL submissions of Zimbabwe. Available at https://redd.unfccc.int/submissions.html?country=zwe.

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:

GIZ. 2012. *Development of IPCC Compliant MRV Systems Manual for Southern Africa, 2012*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit.

Guy, PR. 1981. Changes in the biomass and productivity of woodlands in the Sengwa Wildlife Research Area, Zimbabwe. *Journal of Applied Ecology*. 18(2).

Henry M, Picard N, Trotta C, Manlay, R, et al. 2011. Estimating tree biomass of sub-Saharan African forests: a review of available allometric equations. *Silva Fennica*. 45(3B). DOI:10.14214/sf.38.