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

Summary

This report covers the technical assessment of the voluntary submission of Eswatini 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 Eswatini covers the 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, which are the activities included in paragraph 70 of decision 1/CP.16.

For its submission, Eswatini developed a national FRL. The FRL presented in the original submission, based on the reference period 2000–2020, corresponds to 0 tonnes of carbon dioxide equivalent (t CO_2 eq) per year. Eswatini proposed it with the aim of seeking results-based payments for net removals after considering all forest-related anthropogenic greenhouse gas emissions by sources and removals by sinks in the country (referred to as the zero FRL approach). As a result of the facilitative process during the technical assessment, the FRL was modified to a forest reference emission level (FREL) corresponding to 1,077,435 t CO_2 eq/year based on the reference period 2016–2020.

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

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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
BUR	biennial update report
C	carbon
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
COP	Conference of the Parties
dm	dry matter
EF	emission factor
FAO	Food and Agriculture Organization of the United Nations
FREL	forest reference emission level
FRL	forest reference level
GDP	gross domestic product
GHG	greenhouse gas
ICESat–GLAS	Ice, Cloud and Land Elevation Satellite–Geoscience Laser Altimeter System
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
MODIS	Moderate Resolution Imaging Spectroradiometer
N_2O	nitrous oxide
NC	national communication
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 Eswatini on its proposed FRL,[1] submitted on 8 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] Craig William Elvidge (New Zealand) and Manuel Estrada (Mexico). In accordance with paragraph 9 of the annex to decision 13/CP.19, the Consultative Group of Experts was invited to nominate one of its experts to participate in the TA as an observer. However, no representative of the Consultative Group of Experts was able to participate in the session. The TA was coordinated by Milan Dhungana and Keiichi Igarashi (secretariat).

2. In response to the invitation of the COP and in accordance with the provisions of paragraphs 7–15 of and the annex to decision 12/CP.17, Eswatini submitted its proposed FRL on a voluntary basis. The proposed FRL is one of the elements[4] to be developed in implementing the activities referred to in paragraph 70 of decision 1/CP.16. Pursuant to paragraphs 1–2 of decision 13/CP.19 and paragraphs 7–8 of decision 14/CP.19, the COP decided that each submission of a proposed FRL, as referred to in paragraph 13 of decision 12/CP.17, shall be subject to a TA in the context of results-based payments.

3. The submission is supported by two annexes, covering the area of land-use change (annex 1) and the protocol for land-use assessment (annex 2), which enhance the transparency of the FRL.

4. The objective of the TA is to assess the degree to which the information provided by Eswatini is in accordance with the guidelines for submissions of information on reference levels[5] and to offer a facilitative, non-intrusive, technical exchange of information on the construction of the FRL with a view to supporting the capacity of Eswatini to construct and improve its FRL in the future, as appropriate.[6]

5. The TA of the FRL submitted by Eswatini was undertaken in accordance with the guidelines and procedures for the TA of submissions from Parties on proposed FRELs and/or FRLs.[7] This report on the TA was prepared by the AT following the same guidelines and procedures.

6. Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of Eswatini. The facilitative exchange during the TA allowed Eswatini to provide clarifications and additional information, which were considered by the AT in preparing this report.[8] As a result of the facilitative interactions with the AT during the TA, Eswatini provided a modified version of its submission on 28 July 2026, which took into consideration the technical input of the AT. In the modified submission, Eswatini changed the scope of the submission from a proposed FRL to a proposed FREL and removed the information on removals. The modifications improved the clarity and transparency of the submitted FRL. This TA report was prepared in the context of the modified submission.

B. Proposed forest reference emission level

7. 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,

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

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 national FREL proposed by Eswatini, on a voluntary basis for a TA in the context of results-based payments, covers the activities reducing emissions from deforestation and reducing emissions from forest degradation, which are two of the five activities referred to in paragraph 70 of decision 1/CP.16. The national FREL proposed by Eswatini for the historical reference period 2016–2020 is the annual average of net CO_2 emissions for all forest types associated with deforestation and forest degradation. Emissions from deforestation are associated with clear-cut areas of natural forest and take into account post-deforestation carbon stocks. Emissions from forest degradation refer to gross emissions arising from timber extraction and disturbances in forest land remaining forest land, without accounting for post-degradation removals. For its submission, Eswatini 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.

8. The FREL submitted by Eswatini in the modified submission corresponds to 1,077,435 t CO_2 eq/year based on the reference period 2016–2020.[9] 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 reference period, territorial coverage, and pools and gases included.

9. For constructing its historical data for its FRL and FREL, Eswatini used the 2006 IPCC Guidelines. It applied the gain-loss method to estimate historical emissions and removals for forest land remaining forest land and the carbon stock difference method for land converted to a new land-use category.

10. The AD for all land-use classes for the historical period 2000–2020 were derived from remote sensing products generated by the Ministry of Tourism and Environmental Affairs, the Ministry of Agriculture, the University of Eswatini and the Eswatini National Trust Commission. The data, covering the entire country, were collected between June and October 2023 following the systematic sampling approach recommended in the 2006 IPCC Guidelines (approach 3 for land representation). Eswatini used the Land Use Assessment application developed by the Coalition for Rainforest Nations to access and analyse the satellite images over time. The land-use assessment was performed by national experts over a four-month period in 2023 using the Land Use Assessment application, which provides access to satellite imagery of different resolutions, such as Planet (provided under Norway's International Climate and Forests Initiative), Sentinel–2, Landsat 5, 7 and 8, Bing Maps, MODIS and Google Earth Pro, as well as the normalized difference fraction, vegetation and water indices, which help the national team to assess land use, land-use changes and disturbances over time.

11. The information collected using the Land Use Assessment application was then imported into an Excel spreadsheet to estimate emissions and removals applying the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines, showing information by IPCC land-use class (forest land, grassland, etc.). The data were collected using a systematic sampling approach, where a systematic grid is superimposed over the national territory. In each plot, the land use and any disturbances (e.g. fires, agricultural practices, grazing) are assessed by national experts. The land-use assessment grid contains plots every 2.5 km, with a total of 7,702 plots. Each plot represents an area of 0.5 ha in line with the national forest definition. Each of the plots contains 49 samples to help with the visual interpretation. The Party assessed land use and land-use changes that occurred between 2000 and 2020, as no high-resolution images are available prior to 2000. The plot area of 0.5 ha was selected to align with the national forest definition, thereby facilitating the assessment process. The findings from the individual plot analysis were then projected to represent a larger area, which corresponds to 225 ha for Eswatini.

[9] In its original submission, Eswatini proposed a FRL of 0 t CO_2 eq/year. The difference between the original and the modified submission is due mostly to the reduction in scope from including all five REDD+ activities to including only reducing emissions from deforestation and reducing emissions from forest degradation, calculated as the annual average over the reference period 2016–2020.

12. The emission and removal factors used for estimating historical data were obtained both from default values in the 2006 IPCC Guidelines, which were also used for Eswatini's 2020 national GHG inventory for the LULUCF sector included in its first BUR (November 2024), and from the South African National Terrestrial Carbon Sink Assessment conducted by the Department of Environmental Affairs of South Africa in 2015. The methodology used for the South African study assesses the carbon stocks and fluxes using wall-to-wall mapping of land areas for the whole country in combination with geostatistical methods, models and remote sensing to extrapolate the large set of field measurements. Carbon stocks of biomass and dead organic matter were estimated using remotely sensed data on tree height from ICESat–GLAS and on canopy cover from MODIS, as well as data from the 2006 IPCC Guidelines. The EFs resulting from the South African study are considered to be tier 1 values.

13. Eswatini presented an uncertainty assessment of the data for the historical period 2000–2020. The analysis includes the interpretation error, which represents the uncertainty related to the land-use assessment and the possibility that a plot has been wrongly interpreted, amounting to 18 per cent, as well as qualitative assessments of errors related to land in transition (in particular prior to 2000). Eswatini was not able to quantify uncertainties relating to the lack of images available, the difference in image resolution over time, and disturbances or logging activities that were missed because the area affected was too small. The assessment of random errors associated with the forest land estimates was calculated at 2 per cent. No information was provided on the uncertainty for the EF values obtained from the South African study, as this information was not provided in the study report. However, Eswatini acknowledged that, as these values are not country-specific, the uncertainties may be very high. In addition, the Party recognized that because the land-use classes used for assessing emissions and removals for South Africa and Eswatini are not the same, the uncertainty should be deemed to be even higher.

II. Technical assessment of the proposed forest reference level and forest reference emission level

14. 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 FRL and FREL within the scope of the TA in accordance with decision 13/CP.19 and its annex.

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

Finding ID#	*Aspect of the scope of the TA (decision 13/CP.19, annex, para. 2)*	*Description of the issue, additional information shared by the Party during the TA, and TA by the AT*	*Area for future technical improvement*
1	2(a) Consistency with the national GHG inventories	The AT noted that, overall, Eswatini did not maintain consistency, in terms of sources of AD and EFs used for the historical time series data for 2000–2020 reported in the FRL submission, with those used for the national GHG inventory included in its NC3 and for the 2020 national GHG inventory included in its first BUR. Data from FAO were extrapolated for the 2020 national GHG inventory, whereas newly collected AD for the historical time series were used for the FRL submission on the basis of a systematic sampling assessment undertaken using the Land Use Assessment application developed by the Coalition for Rainforest Nations. The EFs used in constructing the historical time series data are based on tier 1 default values from the 2006 IPCC Guidelines and data from the South African National Terrestrial Carbon Sink Assessment conducted by the Department of Environmental Affairs of South Africa in 2015. Eswatini noted in its submission that EFs from the South African study were used in the NC4 to estimate emissions and removals from the LULUCF sector. In order to maintain as much consistency as possible with the GHG inventory included in future reporting, most of the same EFs as those used in the GHG inventory were used in the FRL submission to estimate historical emissions and removals. In the modified submission, Eswatini clarified that owing to improvements in the data used for the historical data compared with the GHG inventory included in its NC3, consistency with previous national GHG inventories was not maintained. Furthermore, the Party noted that work on the national GHG inventory included in Eswatini's first BUR was not coordinated with the work on the FREL submission. As a result, the information on the GHG inventory included in the Party's first BUR submitted in 2024 is not consistent with the FREL submission either.	The AT notes that maintaining the consistency of the historical emission estimates included in the FREL submission with the national GHG inventories is an area for future technical improvement.
2	2(c) Transparency – AD	The AT noted that legacy effects from the five REDD+ activities prior to 2000 are excluded from the historical time series of emissions and removals for 2000–2020 as the AD are for 2000 onward. During the TA, Eswatini noted that owing to a lack of data prior to 2000, land-use changes occurring before the historical period were not included in the estimates, and that land in transition for 20 years was only accounted for from 2000 onward. Eswatini explained that it already presents a long time series including 20 years of AD and that obtaining AD from previous years is a technical challenge owing to the lack of availability of satellite imagery in the country. Eswatini is aware of this guideline by the IPCC, but, owing to a lack of data, it can only track land use and age classes for 2000 onward, as is common practice for the FRELs/FRLs submitted under the Convention to date.	

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 AT concludes that the explanation provided by the Party during the TA could be included in the FRL submission to increase transparency. Eswatini could also enhance the transparency of the submission by including an explanation of the possible impact that the exclusion of activities prior to 2000 could have on the historical time series for 2000–2020. In the modified submission, Eswatini removed the activities conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks. This issue is therefore not applicable to the modified submission.	
3	2(c) Transparency – AD	The AT noted that it was unclear how the emissions from logging and removals from replanting were calculated, in particular the assumed time lag between the logging event (emissions) versus the replanting (removals) and regrowth. During the TA, Eswatini provided additional information on how the gains and losses from logging activities were calculated. Eswatini also explained that the gains and losses from logging activities were applied to the whole country on an annual basis, independently of where the logging occurred. The Party further explained that this assumption currently best reflects logging activities owing to a lack of specific data, and that replanting occurs just after the logging takes place. In the modified submission, Eswatini accounts for emissions from forest degradation without accounting for any subsequent removals. This issue is therefore not applicable to the modified submission.	
4	2(c) Accuracy – AD	The AT noted that Eswatini included emissions from logging on forest plantations, wattle forests and woodlots, where the management practice is to expect some wood extraction over time, as well as emissions from logging on natural forests, where extraction of wood is illegal and not planned. Eswatini explained that values for carbon stocks and carbon stock changes were derived from IPCC default values and data from the South African National Terrestrial Carbon Sink Assessment conducted by the Department of Environmental Affairs of South Africa in 2015. The AT considers that on the basis of this information it may be difficult to accurately estimate emissions from forest degradation resulting from planned and unplanned logging activities, such as annual carbon stock variations due to logging and regrowth in areas that are already degraded. In the modified submission, Eswatini accounts for emissions from forest degradation without accounting for any subsequent removals and provides specific uncertainty estimates for the emissions. The issue concerning the treatment of removals following logging is therefore not applicable to the modified submission. The AT noted, however, that the modified submission provides inconsistent information on the uncertainty associated with the area of land affected by logging. While the text of the modified submission indicates an interpretation error of 18 per cent for the	The AT notes that ensuring consistency in the uncertainty values reported for the area of land affected by logging, including by clearly documenting the uncertainty value applied and the basis for its estimation, is an area for future technical improvement that would enhance the accuracy of the FREL.

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*
		area of land affected by logging, the corresponding tables report an uncertainty of 16.6 per cent for all forest categories. The AT considers that further clarification is needed on the uncertainty value applied to the area of land affected by logging and the reason for the difference between the values reported.	
5	2(c) Accuracy – AD	The AT noted a difference in the reported total area covered by forest plantations. In the FRL submission, Eswatini reported that around 130,000 ha are covered by forest plantations, of which about 25,000 ha (20 per cent) are not designated for planting and are used for infrastructure purposes and for protecting biodiversity and ecosystems. However, in the calculation sheets submitted by Eswatini, forest plantations are reported as representing around 125,575 ha. During the TA, Eswatini explained that for land planning areas, each parcel of land is allocated to a designated land development plan. However, the remote sensing data have not been calibrated to align with these land planning areas. Consequently, any infrastructure detected within the 20 per cent of plantations not designated for planting would be categorized in the remote sensing data set as either settlements/woody settlements (if the forest definition thresholds are not met) or as forest subject to degradation due to its use for infrastructure purposes. In the modified submission, Eswatini stated that it will undertake further work to adjust these areas in line with the observed areas of forest plantations using remote sensing data to ensure full monitoring of the forest land over the time series, as part of the stepwise approach. The AT commends Eswatini for its willingness to carry out this work aimed at improving the accuracy of the AD.	The AT notes that calibrating the remote sensing data with land planning areas is an area for future technical improvement that would enhance the accuracy of the FREL.
6	2(c) Transparency – AD	In its submission, Eswatini explained how it estimated annual carbon losses in biomass due to disturbance in forest land remaining forest land. The Party estimated the area of forest disturbed by different factors, then applied a value for biomass affected by disturbance and multiplied it by the fraction of biomass due to the different types of disturbance. Table 26 of the original submission presents information on the biomass affected during disturbance, showing a value of 19 t dm/ha/year, which represents the average above-ground biomass for indigenous forest and plantations. During the TA, the AT asked Eswatini to explain how this value was obtained, and how it could be assumed to be similar for plantations and indigenous forests. In response, Eswatini acknowledged the discrepancy in the reported value and confirmed that it should be 36 t dm/ha/year, which represents the average for indigenous forests of 20 t dm/ha/year and for forest plantations of 52 t dm/ha/year, with a carbon fraction of 0.47 t C/t dm. Eswatini included these corrections in table 28 of its modified submission.	The AT notes that further clarifying and documenting how expert judgment is applied in determining the disturbance fraction, including its relationship with the assumptions regarding biomass loss for different disturbance types, is an area for future technical improvement that would enhance the transparency of the FREL submission.

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 AT commends Eswatini for revising the values for biomass affected during disturbance in its modified submission. The AT also noted that Eswatini explained in its modified submission that the disturbance fraction was determined on the basis of expert judgment regarding whether all or only part of the biomass present in the disturbed area was lost. However, the modified submission specifies the assumed biomass losses for different disturbance types, including complete biomass loss for infrastructure, mining, agriculture, grazing and firebreaks and partial biomass loss for fires, pests and storms or floods. The AT noted that it remains unclear how expert judgment was applied in determining the disturbance fraction in light of these assumed biomass losses.	
7	2(c) Accuracy – AD	The AT noted that according to the Party's submission, when land is converted to forest land, only a fraction of the removals (5 per cent) occurs during the year of conversion for the respective land conversion category. The remainder of the removals are calculated under forest land remaining forest land. Eswatini explained in its submission that this method is used to avoid double counting. However, the AT noted that to ensure transparency, and based on the 2006 IPCC Guidelines, land converted to forest land should remain in the land transition category for 20 years. During the TA, Eswatini noted the difficulty in differentiating between forest land remaining forest land and land converted to forest land within its land-use change matrix owing to the lack of national values for carbon stocks. Eswatini noted this as an area for future improvement once national values for carbon stocks become available. In the modified submission, Eswatini excludes emissions and removals associated with conversions from non-forest land to forest land. This issue is therefore not applicable to the modified submission.	
8	2(c) Transparency – AD	In section 3.2 (p.26) of the original submission, Eswatini stated that all land is classified as managed land, consistently with the definition in the 2006 IPCC Guidelines (vol. 4, chap. 3), under which land is considered managed if it is subject to human interventions or practices for production, ecological or social purposes. The 2006 IPCC Guidelines also emphasize that all land definitions and classifications should be specified at the national level, described transparently and applied consistently over time. However, the AT found no supporting information in the submission to substantiate Eswatini's claim that all forest land in the country qualifies as managed land. During the TA, Eswatini clarified that the policies and measures outlined in its FRL submission apply to all land in its national territory, as it considers all land to be managed land. In response to the AT's request for further information in line with the 2006 IPCC Guidelines, specifically the requirement that all land definitions and classifications be specified at the national level, described transparently and applied	The AT notes that including a description of managed land in line with the 2006 IPCC Guidelines, properly identifying areas qualifying as managed land and explaining the rationale for any discrepancies with other national reports such as the FAO Global Forest Resources Assessment report are areas for future technical improvement that would enhance the transparency of the FREL submission.

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*
		consistently over time, Eswatini explained that its classification of all land as managed land is both clear and applied consistently across the time series, as it covers the entire national territory consistently for the 20 years of historical data submitted as part of the FRL, also as stated in section 3.2.1 (p.28) of the modified submission. Eswatini also clarified that, according to the 2006 IPCC Guidelines (vol. 4, chap. 4), the definition of managed land is determined at the national level and should encompass forests subject to human intervention, including those managed for protection, plantation establishment, natural regeneration, commercial timber production and non-commercial fuelwood extraction, as well as previously managed land that has been abandoned. Eswatini is of the view that it is applying the 2006 IPCC Guidelines consistently with regard to the definition of managed land, is providing transparent information by stating that all land is considered managed land and is also applying the definition of managed land consistently across the time series. In its modified submission, Eswatini provided additional information specifying that the policies and measures presented in its FREL submission, including details on national forest-related measures and programmes (as outlined in table 6 of the modified submission), apply universally to all forest land, thereby classifying all forest land as managed land. The AT welcomed the inclusion of this information. However, the AT observed that, according to the FAO Global Forest Resources Assessment 2020 report for Eswatini (p.38), the Party identified large forest areas, representing over half of the total reported forest area, where the primary designated management objective was classified as “none/unknown”. This suggests that significant areas of forest in the country may, in fact, not be managed. In response, Eswatini clarified that the data in the FAO Global Forest Resources Assessment 2020 report are based on information submitted during an earlier reporting cycle and therefore differed from the data used for constructing the FREL.	
9	2(c) Accuracy – EFs	Table 36 of the Party’s original submission presents forest-related emissions and removals for the historical period 2000–2020. The AT noted that the value for “forest converted to land” for 2005 is negative, which does not appear to be correct, since land converted to forest (the process that the AT would usually associate with a negative forest conversion to other land) is covered in the related column of the table. After reviewing the calculations and data, Eswatini observed that its interpretation of “forest converted to land” for 2005 indicated that drier acacia forests were being transformed into annual cropland, and riparian forests into perennial crops.	

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*
		According to the tier 1 carbon stock estimates used in the submission, the carbon stocks in perennial crops exceed those in riparian forests, resulting in the net removals reported in table 36 (table 38 in the modified submission). In the modified submission, Eswatini does not account for removals in the development of its FREL. This issue is therefore not applicable to the modified submission.	
10	2(c) Accuracy – EFs	In its FREL submission, Eswatini noted that it used EFs from the South African National Terrestrial Carbon Sink Assessment to estimate emissions and removals from the LULUCF sector for its NC4. To maintain consistency with the latest national GHG inventory, Eswatini mostly used the same EFs for constructing the FREL. However, the AT could not identify sufficient justification for using these EFs, for example evidence demonstrating comparability in terms of contexts, forest types and species between South Africa and Eswatini. In the FREL submission, only table 13 outlines links between land-use classes in the two countries but does not provide further rationale. In response to a question raised by the AT, Eswatini explained that financial constraints prevent it from conducting an independent assessment of carbon stocks, which is an activity identified as a priority for future improvement. Eswatini also highlighted that agroecological conditions in South Africa closely resemble those in Eswatini owing to shared borders and that forest management practices in both countries are similar, as many forest plantations in Eswatini are managed by South African companies. Furthermore, Eswatini noted that its land was covered by the scope of the South African National Terrestrial Carbon Sink Assessment conducted by the Department of Environmental Affairs of South Africa in 2015, which reported average carbon stock values for the area covering Eswatini (as shown in Map 2 thereof). Although the South African study incorporated data on biomass and litter from Eswatini, it did not include data on soil organic carbon. Despite this, Eswatini assumed that carbon stock values from the South African study would better represent its national conditions than IPCC default values. The AT commends Eswatini for providing this explanation in its modified submission.	The AT notes that developing a national assessment of carbon stocks is an area for future technical improvement that would enhance the accuracy of the FREL submission.
11	2(d) Description of relevant policies and plans, as appropriate	Eswatini provided a summary of its main policies relevant to climate change, including the Constitution of the Kingdom of Eswatini Act 1 (2005), the National Climate Change Policy (2016), the National Development Strategy, the draft National Land Policy (2000), the draft National Environment Policy (1999), the National Biodiversity Strategy and Action Plan (2016–2022), the draft National Wetlands Policy (2020) and the National Wetlands Strategic Action Plan (2021–2030). In addition, Eswatini provided brief descriptions of its forest-related policies, such as the Flora Protection Act 5 (2001) and the National Forest Policy (2002).	

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*
		Eswatini noted that it is in the process of formulating the national REDD+ strategy. In its modified submission, Eswatini included an additional table (table 6) describing national forest-related measures and programmes. The AT commends Eswatini for providing additional information on relevant national forest-related measures and programmes, which enhances the transparency of the submission.	
12	2(d) Description of relevant policies and plans, as appropriate	Eswatini provided information on the status of the National Forest Policy (section 2.1.1 of the modified submission), where it mentioned that the National Forest Policy was developed in 2002; however, the Party subsequently referred to it as a "draft policy". During the TA, the AT enquired about the status of the policy. Eswatini explained that the National Forest Policy is a document that was approved by the Government in 2002 and is no longer a draft. The AT noted that, in the modified submission, Eswatini deleted the word "draft" on page 23 in reference to the National Land Policy; however, other policies and programmes included in the submission are referred to as "drafts" (e.g. the draft National Environment Policy and the draft National Wetlands Policy). The AT concludes that clarifying the status of the programmes, policies and measures described in the submission would improve the transparency of the FREL.	
13	2(f) Activities	Eswatini included all five REDD+ activities in the estimates of historical data in its original submission by applying a land-based approach through which it estimated forest-related emissions and removals, but it did not describe the separate REDD+ activities in its original submission. In response to a question raised by the AT on this issue, Eswatini explained that it used a land-based methodology for its FRL, in accordance with the annex to decision 12/CP.17, which mandates developing countries to adhere to the most recent IPCC guidance and guidelines, as adopted or encouraged by the COP, for REDD+. The AT also noted that the Party consistently used the term "degradation" in its original submission to describe any type of disturbance, whether anthropogenic or natural, including deforestation. During the TA, Eswatini clarified that the term "degradation activities" was used provisionally in its original submission and that it intended to specify in its modified submission that the term refers to any agent or practice that causes emissions in forest land remaining forest land. The AT considered that including this specification would not be sufficient to avoid confusion for the reader of the submission. The AT further noted that COP decisions establish that Parties should identify activities within the country (para. 1(b) of decision 4/CP.15), that such activities should be fully measured, reported and verified (para. 73 of decision 1/CP.16) and	The AT notes that further clarifying the contribution of substantial removals to the historical estimates, including their relationship with the REDD+ activities not covered by the FREL and the rationale for excluding these removals from the FREL, is an area for future technical improvement.

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*
		that the FRLs are benchmarks for assessing each country's performance in implementing such activities (para. 7 of decision 12/CP.17). The AT also noted that, regardless of whether the historical data are estimated by activity or using a land-based approach, Eswatini should provide definitions of the five REDD+ activities included to enhance the transparency of the submission and to allow the AT to understand how such activities contribute to the historical emissions and removals, particularly in the case of forest land remaining forest land. Eswatini provided in its modified submission detailed information on the activities covered by the FREL, namely the activities reducing emissions from deforestation and reducing emissions from forest degradation. The AT commends Eswatini for the information provided in the modified submission, which enabled the AT to understand the activities covered by the FREL. The AT noted, however, that the historical data reported by Eswatini include substantial removals. In view of the relative magnitude of these removals, the AT considers that providing further information on the contribution of these removals to the historical estimates and their relationship with the REDD+ activities not covered by the FREL would enhance the transparency of the submission, as would explaining the rationale for excluding these removals from the FREL.	
14	2(g) Definition of forest	Eswatini provided in its modified submission the definition of forest used in constructing its FREL. According to the submission, forest is defined as having a minimum mapping unit of 0.5 ha, at least 10 per cent canopy cover and the potential to reach a minimum height at maturity (in situ) of 5 m.	
15	2(g) Definition of forest	The definition of forest is the same as that used by Eswatini for its national GHG inventory, as explained by the Party in its submission. Eswatini noted that in line with the FAO definition of forest, this land-use category refers to all land with woody vegetation, whereas in its submission, forest land is disaggregated into two forest types, namely plantations and indigenous forests.	

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*
16	Zero FRL approach	The AT notes that, in its original submission, Eswatini provided data and information on the estimation of historical anthropogenic GHG emissions by sources and removals by sinks, which it used to justify its zero FRL approach. The AT is of the view that, taking into consideration the annex to decision 12/CP.17, even significant changes in the data, methodologies and procedures used for estimating emissions and removals would not change the reported FRL value of 0 t CO_2 eq/year. The AT therefore concluded that a TA of the FRL value is not possible. In particular, the AT noted that the FRL value of 0 t CO_2 eq/year does not take into account historical data as required by paragraph 7 of decision 4/CP.15 and that it was not possible to reconstruct the FRL value in assessing completeness in accordance with paragraph 2(c) of the annex to decision 13/CP.19. Furthermore, the AT observed that the following aspects of the FRL cannot be assessed: (a) The extent to which the FRL value of 0 t CO_2 eq/year maintains consistency with corresponding anthropogenic forest-related GHG emissions by sources and removals by sinks as contained in the national GHG inventories; (b) The pools, gases and activities included in the FRL; (c) The accuracy and uncertainty of the FRL. As a result of the facilitative process during the TA, Eswatini provided a modified submission with a FREL developed using the average of historical net emissions during the reference period 2016–2020. Consequently, the FRL value was revised from 0 t CO_2 eq/year to a FREL corresponding to 1,077,435 t CO_2 eq/year. The AT commends Eswatini for the modified submission, which enabled the AT to complete the TA.	

III. Conclusions

15. The FREL presented in the modified submission, based on the reference period 2016–2020, corresponds to 1,077,435 t CO_2 eq/year.

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

17. As a result of the facilitative interactions with the AT during the TA, Eswatini 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 submission and commends Eswatini on its efforts to develop the historical data included in the submission. The new information provided in the modified submission, arising from the change in approach from a zero FRL to a FREL based on the average of historical forest-related emissions, increased the reproducibility of the FREL calculations.

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

19. The information used by Eswatini in constructing its FREL for reducing emissions from deforestation and reducing emissions from forest degradation is mostly transparent (see finding ID#s 6 and 8 in the table above), complete and partially in accordance with the guidelines for submissions of information on reference levels (see finding ID#s 1, 4, 5, 10 and 13 in the table above).

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

(a) Carry out additional research to ensure that areas disturbed by specific management practices, such as agriculture and grazing, are fully recorded over time;

(b) Carry out further studies to ensure that the areas affected by fires are accurately captured;

(c) Undertake further analysis to generate better quality information on local wood extraction practices;

(d) Improve the emission and removal factors by obtaining funding to undertake a national forest inventory;

(e) Improve the uncertainty analysis to enable the inclusion of a quantitative uncertainty estimation using the propagation of error approach from the 2006 IPCC Guidelines;

(f) Carry out work to include the harvested wood products carbon pool in its future FRELs/FRLs.

21. In conclusion, the AT commends Eswatini 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 Eswatini'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.[10] The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Eswatini.

[10] 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 Eswatini

Main features of the FREL		*Remarks*
Proposed FREL	1 077 435 t CO_2 eq/year	See paragraph 8 of this document
Type and reference period of FREL	FREL = average of historical emissions in 2016–2020 (five years)	See paragraph 8 of this document
Application of adjustment for national circumstances	No	
National/subnational	National	
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation	Emissions from deforestation take into account post-deforestation carbon stocks, while emissions from forest degradation exclude post-degradation removals (see finding ID# 13 of this document)
Pools included	Above-ground biomass Below-ground biomass Deadwood Litter Soil organic matter	
Gases included	CO_2, CH_4 and N_2O	
Forest definition	Included	See also finding ID#s 14–15 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 (2020)	See also finding ID# 1 in the table in this document
Description of relevant policies and plans	Included	See also finding ID#s 11–12 in the table in this document
Description of assumptions on future changes to domestic policy, if included in constructing the FREL	Not included	
Description of changes to previous FREL/FRL	Not applicable	
Identification of future technical improvements	Included	Several areas for future technical improvement have been identified (see finding ID#s 1, 4–6, 8, 10 and 13 in the table in this document)

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.

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

B. UNFCCC documents

First FRL and modified FREL submissions of Eswatini. Available at https://redd.unfccc.int/submissions.html?country=swz.

First BUR of Eswatini. Available at https://unfccc.int/BURs.

"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.

NC1, NC2, NC3 and NC4 of Eswatini. 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:

South African National Terrestrial Carbon Sinks Assessment. Department of Environment Affairs, Pretoria, South Africa 2015. Available at: https://www.dffe.gov.za/sites/default/files/docs/nationalterrestrial_carbonsinksassessment_sect1.pdf.

Global Forest Resources Assessment 2020 Report, Eswatini. FAO, Rome, 2020. Available at: https://openknowledge.fao.org/server/api/core/bitstreams/97860e55-3570-4e12-8630-00ff4c1f32aa/content.

Ministry of Tourism and Environmental Affairs, October 2020, Eswatini National Greenhouse Gas Inventory: Agriculture, Forestry and Land use (AFOLU), Sector Report.