United Nations

FCCC/TAR/2020/GNQ

Framework Convention on Climate Change

Distr.: General
1 February 2022

English only

Report on the technical assessment of the proposed forest reference emission level of Equatorial Guinea submitted in 2020

Summary

This report covers the technical assessment of the voluntary submission of Equatorial Guinea 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 Equatorial Guinea covers the activities reducing emissions from deforestation and reducing emissions from forest degradation, which are among the activities included in decision 1/CP.16, paragraph 70. For its submission, Equatorial Guinea developed a national FREL for the three regions continental, Bioko and Annobón. The FREL presented in the original submission, for the reference period 2014–2018, corresponds to 8,552,900 tonnes of carbon dioxide equivalent per year. As a result of the facilitative process during the technical assessment, the reference period was modified to 2013–2018, although the FREL remained the same. The assessment team notes that the data and information used by Equatorial Guinea in constructing its FREL are transparent, complete and in overall accordance with the guidelines contained in the annex to decision 12/CP.17. This report contains the assessed FREL and a few areas identified by the assessment team for future technical improvement in accordance with the provisions on the scope of the technical assessment contained in the annex to decision 13/CP.19.

Abbreviations and acronyms

AD	activity data
AT	assessment team
C	carbon
COP	Conference of the Parties
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
dm	dry matter
EF	emission factor
FAO	Food and Agriculture Organization of the United Nations
F_I	stock change factor for input of organic matter, dimensionless
F_{LU}	stock change factor for land use or land-use change type, dimensionless
F_{MG}	stock change factor for management regime, dimensionless
FRA	Global Forest Resources Assessment
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
MODIS	Moderate Resolution Imaging Spectroradiometer
NC	national communication
NFI	national forest inventory
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)
SEPAL	system for earth observations, data access, processing and analysis for land monitoring
SOC	soil organic carbon
TA	technical assessment
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*

I. Introduction and summary

A. Overview

1. This report covers the TA of the voluntary submission of Equatorial Guinea on its proposed FREL,[1] submitted in January 2020, in accordance with decisions 12/CP.17 and 13/CP.19. The remote TA[2] took place from 8 to 12 June 2020 and was coordinated by the secretariat.[3] The TA was conducted by two land use, land-use change and forestry experts from the UNFCCC roster of experts[4] (hereinafter referred to as the AT): Thelma Krug (Brazil) and Craig Wayson (United States of America). In addition, Gervais Ludovic Itsoua Madzous, an expert from the Consultative Group of Experts, participated as an observer[5] during the remote session. The TA was coordinated by Peter Iversen (secretariat).

2. In response to the invitation of the COP and in accordance with the provisions of decision 12/CP.17, paragraphs 7–15 and annex, Equatorial Guinea submitted its proposed FREL on a voluntary basis. The proposed FREL is one of the elements[6] to be developed in implementing the activities referred to in decision 1/CP.16, paragraph 70. Pursuant to decision 13/CP.19, paragraphs 1–2, and decision 14/CP.19, paragraphs 7–8, the COP decided that each submission of a proposed FREL or FRL, as referred to in decision 12/CP.17, paragraph 13, shall be subject to a TA in the context of results-based payments.

3. Equatorial Guinea provided its submission in Spanish. The submission is supported by an annex, in Spanish, listing the land-use and forest-cover classes used in the FREL, which enhances the transparency of the FREL.

4. The Party noted in its submission that its FREL was reported voluntarily to initiate the process of technical evaluation required to access REDD+ results-based payments in accordance with decision 13/CP.19 and as part of the country's efforts to evaluate reductions in GHG emissions from deforestation and forest degradation with a view to mitigating climate change.

5. The objective of the TA is to assess the degree to which the information provided by Equatorial Guinea is in accordance with the guidelines for submissions of information on reference levels[7] 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 Equatorial Guinea for the construction and future improvement of its FREL, as appropriate.[8]

6. The TA of the FREL submitted by Equatorial Guinea was undertaken in accordance with the guidelines and procedures for the TA of submissions from Parties on proposed FRELs and/or FRLs.[9] 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 Equatorial Guinea. The facilitative exchange during the TA allowed Equatorial Guinea to provide clarifications and additional information, which were considered by the AT in the preparation of this report.[10] As a result of the facilitative interactions with the AT during the TA, Equatorial Guinea provided a modified version of its submission on 14 October 2020. This TA report was prepared in the

[1] The submission of Equatorial Guinea is available at https://redd.unfccc.int/submissions.html?country=GNQ.
[2] Owing to the circumstances related to the coronavirus disease 2019, the TAs of the FREL and FRL submissions of developing country Parties in 2020 had to be conducted remotely.
[3] As per decision 13/CP.19, annex, para. 7.
[4] As per decision 13/CP.19, annex, paras. 7 and 9.
[5] As per decision 13/CP.19, annex, para. 9.
[6] See decision 1/CP.16, para. 71(b).
[7] Decision 12/CP.17, annex.
[8] Decision 13/CP.19, annex, para. 1(a–b).
[9] Decision 13/CP.19, annex.
[10] As per decision 13/CP.19, annex, paras. 1(b), 13 and 14.

context of the modified FREL submission. The modified submission, containing the assessed FREL, and the original submission are available on the UNFCCC website.[11]

B. Proposed forest reference emission level

8. In decision 1/CP.16, paragraph 70, the COP encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances, in the context of providing adequate and predictable support. The FREL proposed by Equatorial Guinea, 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 that paragraph. Pursuant to paragraph 71(b) of the same decision, Equatorial Guinea developed a national FREL that covers its entire territory. For its submission, Equatorial Guinea applied a stepwise approach to developing its FREL in accordance with decision 12/CP.17, paragraph 10. The stepwise approach enables Parties to improve their FRELs and/or FRLs by incorporating better data, improved methodologies and, where appropriate, additional pools.

9. The FREL includes the continental region that covers 92.7 per cent (26,000 km^2) of the national territory (28,051 km^2), with forest cover of approximately 79 per cent; and an insular region composed of two main islands, Bioko (2,017 km^2) and Annobón (17 km^2), with joint forest cover of 53 per cent. The areas of deforestation and forest degradation on two other islands within the national territory (Corisco and Elobey Grande, measuring 15 and 2.27 km^2, respectively) were included in the statistics for the continental region. Finally, the islands Elobey Chico (0.19 km^2) and Mbañe (0.3 km^2) are uninhabited and hence not subject to human activities.

10. The FREL proposed by Equatorial Guinea for the historical reference period 2013–2018 covers the annual average CO_2 emissions associated with deforestation, defined as the conversion of forest to another land-use category or reduction of the canopy cover to below 30 per cent; and forest degradation, defined as any change to forest that negatively affects the structure or function of the forest stand or the site, thereby reducing its capacity to provide products and/or services. The FREL takes into account CO_2 removals for the land-use category immediately after deforestation and excludes the conversion of forest plantations to other land uses and the conversion of natural forest to natural wetlands. Data on deforested and degraded areas used in constructing the FREL were taken from a historical time series of land-use maps developed by the Ministry of Agriculture, Livestock, Forests and Environment of Equatorial Guinea for 2014–2018, of which the 2014 base map was derived from a forest-class map comprising data for 2004 and 2013. The EFs used for estimating emissions from deforestation were based on default values from the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines. The FREL presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities for 2019 onward, corresponds to 8,552,900 t CO_2 eq/year.[12]

11. The proposed FREL includes the above- and below-ground biomass, litter and deadwood pools and excludes the SOC pool. The only GHG included in the submission is CO_2.

[11] https://redd.unfccc.int/submissions.html?country=GNQ.

[12] While this value remains unchanged, the reference period to which it applies has been extended by one year, from 2014–2018 to 2013–2018.

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

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

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

12. For constructing its FREL, Equatorial Guinea used the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines, as appropriate. The emissions from deforestation and forest degradation were estimated by multiplying AD (annual areas of deforestation and forest degradation) by the corresponding EFs.

13. The activities included in the FREL – reducing emissions from deforestation and reducing emissions from forest degradation – are considered to be the most significant in terms of forest-related emissions and removals in Equatorial Guinea. Removals for land-use categories after deforestation (settlements, fallow, grassland or agroforestry) were included in the calculation of the FREL using default values from the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines, where relevant.

14. In its submission, the Party presented two sets of methodologies for determining AD, the first covering 2004–2014 and the second 2014–2018. For constructing the FREL, Equatorial Guinea chose to use only information for 2013–2018. The AD were derived by creating mosaics of the best cloud-free pixels for the activities, which were then categorized as either forest or non-forest for 2014 using the data for 2004–2014. The forest category was further divided into the subcategories intact or degraded, defined as the loss of 30 per cent or more in canopy cover while still remaining forest by definition. A second map for 2018 was created using segmentation to group together areas with similar spectral signatures. Visual data taken from the University of Maryland's Global Forest Change study were superimposed over the maps to help to classify AD into the reported subcategories. A stratified random sample of 1,860 points over the relevant area was visually examined by a team of image interpreters to generate an error matrix and to map accuracy statistics. These data were then used to adjust area estimations using the stratified area estimator analysis module in SEPAL. The resulting data on area adjustments, shared by the Party during the TA, showed an upward adjustment of 74 per cent in deforested areas and 2 per cent in degraded areas.

15. Areas of deforestation and forest degradation were not estimated for individual years of the reference period. However, forest loss data from the Global Forest Change study are available for each year and deforested and degraded areas were corrected in SEPAL on the basis of a visual interpretation of satellite images for the first and last years of the reference period. The Party noted that it would be very difficult to correct annual maps of deforestation and forest degradation using this method given the lack of available satellite imagery unimpeded by cloud cover. Hence, in the submission (table 12, p.54), which contains a summary of the information used for constructing the FREL, the deforestation and forest degradation values for 2013–2018 are divided by five to estimate the annual areas of deforestation and forest degradation. The AT noted, however, that these estimates were not updated following the adjustment of the reference period from 2014–2018 to 2013–2018.

16. Satellite imagery was used to identify four different forest types with different carbon densities: (1) tropical moist and monsoon/low Afromontane forest, (2) araliaceous/high Afromontane forest, (3) mangrove and (4) palm grove forest. Although there are other types of forest in the country, the Party explained that 97.7 per cent of deforestation and 100 per cent of forest degradation affect the first class. None of the samples from Collect Earth falls under mangrove or palm grove forest.

17. The EFs used for estimating emissions from deforestation were based on default values from the 2006 IPCC Guidelines, which were supplemented by data from Saatchi et al. (2011) and expert judgment and compared with the values reported by neighbouring countries. For forest degradation, the EFs were estimated as a percentage of forest-cover loss on the basis of samples used in estimating deforestation and forest degradation.

18. Carbon stock in above- and below-ground biomass was different for the continental region than it was for Bioko and Annobón. The above-ground biomass assumed for the continental region and for Bioko and Annobón was 262.2 and 199.2 t dm/ha, respectively. For below-ground biomass, a root-to-shoot ratio of 0.37 was used in accordance with the default value for tropical rainforest given in the 2006 IPCC Guidelines (vol. 4, chap. 4, table 4.4). Carbon stock in total biomass was estimated as 168.83 t C/ha for the continental region and 128.26 t C/ha for Bioko and Annobón, applying the carbon fraction value of 0.47 t C/t dm given in the 2006 IPCC Guidelines (vol. 4, chap. 4, table 4.3). The AT agrees with these values, which are consistent with those used in the country's first NC, submitted in October 2019, and with other publications. The AT commends the Party for indicating that country-specific values may be used in the future, subject to the implementation of the NFI, which is under development.

19. For the litter and deadwood pools, Equatorial Guinea used the default values for tropical forests from the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 2, table 2.2), which are 2.5 and 17.7 t C/ha, respectively.

20. Loss of carbon stock due to forest degradation was estimated on the basis of data on forest-cover loss from the 98 Collect Earth samples where degradation was observed. In the original submission, Equatorial Guinea assumed mean forest-cover loss of 25.5 per cent. However, this value was altered in the modified submission to 27.6 per cent. This percentage was used as a proxy to estimate the loss of carbon stock in degraded forests, resulting in mean carbon stock loss of 171.1 t CO_2/ha for the continental region and 130 t CO_2/ha for Bioko and Annobón.

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

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

21. Areas of deforestation and forest degradation were not estimated for individual years of the reference period and were corrected using the stratified area estimator analysis module in SEPAL. The AT notes that the AD were generated in such a way that they were difficult to reproduce without utilizing the same software platform used by the Party (i.e. SEPAL). Conserving and sharing the intermediate products used in constructing the FREL in more common formats (e.g. GeoTIFF, GeoJSON) would increase the overall transparency of the submission.

22. The mean CO_2 emissions from deforestation and forest degradation reported in the original submission covered the original reference period (2014–2018) and were divided by five to generate the FREL (see para. 15 above). The AT considers that the division should be by four, instead of five, since 2014 serves as the base (reference) year for observing any changes in forest cover (in 2014–2015, 2015–2016, 2016–2017 and 2017–2018). The AT raised this concern during the technical exchange with Equatorial Guinea. In the modified submission, the reference period was extended by one year (2013–2018) but no changes were made to the estimated overall emissions or the FREL. To enhance transparency, a list of dates for the source data could be provided.

23. Default EFs from the 2006 IPCC Guidelines were used to estimate emissions from deforestation, which are consistent with the values applied in the national GHG inventory in Equatorial Guinea's first NC. Default values from the 2019 Refinement to the 2006 IPCC Guidelines were used to calculate carbon content in litter and deadwood and in agroforestry systems following deforestation. The Party estimated that, of all conversions of forest land to other land uses, 77.3 per cent were to settlements, 13.6 per cent to fallow, 6.8 per cent to grassland and 2.3 per cent to agroforestry. The FREL submission (table 9, p.52) provides the mean carbon content for these four categories, based on values from the 2019 Refinement to the 2006 IPCC Guidelines. For forest land converted to settlements, grassland and agroforestry, the Party assumed a mean carbon stock in total biomass after deforestation of zero, 7.6 t C/ha and 65.9 t C/ha, respectively. The Party estimated the mean carbon stock for that particular land cover as the average of the mean values for agroforestry and grassland, equal to 36.7 t C/ha. This value is consistent with the estimated value for fallow in tropical

regions contained in table 5.1 of the 2019 Refinement to the 2006 IPCC Guidelines, which provides a default value for above-ground biomass of 22.1 t C/ha for a five-year cycle, and the default below-ground biomass accumulation rate of 2.54 t C ha^{-1} provided in table 5.2. Considering the cycle of five years, the living biomass of fallow is 34.8 t C ha^{-1}. On the basis of the percentages of forest land conversions and carbon stock values, the mean carbon stock for all four land categories after deforestation was estimated at 7.02 or 25.7 t CO_2 ha^{-1}. The Party explained that fallow is maintained for five years or more. The AT is of the view that information on fallow and its dynamics, including the fallow period and the type of shifting cultivation that precedes it, should be included in future submissions to enhance the transparency of the report and make it easier to evaluate the average of the mean values for agroforestry and grassland.

24. The AT noted that the above-ground biomass value adopted for the FREL estimation (262.2 t dm/ha) corresponds to the value associated with mixed forest (degraded, dense forest relics and agroforestry combined) in the national GHG inventory. In addition, the CO_2 emissions associated with deforestation on Bioko for 2013 (9,191.33 t CO_2) significantly exceed those for the continental region (778.03 t CO_2), which is not consistent with the pattern of deforestation reported in the submission. Moreover, the methods for generating the AD in the national GHG inventory are inconsistent with those applied for the FREL. The national GHG inventory includes only the above-ground biomass pool in estimates of deforestation (forest land converted to other land uses) and only CO_2 emissions are covered.

25. Equatorial Guinea reported different values for carbon stock in total biomass for the continental region (168.83 t C/ha) and Bioko and Annobón (128.26 t C/ha). However, it reported the same values for carbon stock in litter and deadwood – 2.5 and 17.7 t C/ha, respectively – for both regions. The AT notes that, since the total biomass value is lower for Bioko and Annobón than for the continental region, the stock of litter and deadwood per unit area should also be smaller, unless forest types differ between the two regions. In an exchange of views with the Party, the AT suggested that values of 1.9 and 13.5 t C/ha be used for carbon stock in litter and deadwood, respectively, for Bioko and Annobón, since these would be proportionate to carbon stock in total biomass. The modified submission did not incorporate this suggestion.

26. The AT noted that applying the EFs for deforestation and forest degradaton for the continental region to the islands of Corisco and Elobey Grande may lead to an overestimation of emissions as the EFs for the islands may not be similar, as noted in paragraph 25 above. However, as explained by the Party, the island of Elobey Grande is not inhabited and presents little human activity. In addition, the island of Corisco contributes little to the GHG emissions of Equatorial Guinea given its small geographical coverage (15 km^2) and population (150 inhabitants). The AT considers this explanation satisfactory given that human and financial resources should be prioritized for reporting of key category sources and sinks.

27. During the TA, Equatorial Guinea mentioned the difficulties encountered in differentiating primary tropical moist forest from secondary vegetation. The AT questioned the Party about the potential overestimation of emissions from deforestation calculated on the assumption that all deforestation occurred in primary rainforest. In response, the Party noted that the estimates of total biomass used in constructing the FREL (168.83 t C/ha for the continental region and 128.26 t C/ha for Bioko and Annobón) were based on a mix of values for primary and secondary forest. By way of comparison, the Party cited the default values from the 2019 Refinement to the 2006 IPCC Guidelines for primary and secondary tropical rainforest in Africa (291 and 153 t C/ha, respectively). It added that the reported values were supported by other studies (e.g. Saatchi et al., 2011) and consultations with national experts. The AT considers that the additional information provided by Equatorial Guinea in its modified submission increases the transparency of the proposed FREL.

28. During the TA, the AT requested clarification of the estimates of carbon loss from forest degradation, which were based on a percentage applied to the total biomass of primary forest. It was not clear whether the degradation led to a loss of below-ground biomass. Equatorial Guinea clarified that forest degradation always led to loss of below-ground biomass, since the causes of degradation were related to agriculture (40 per cent), urbanization (36 per cent) and wood collection (14 per cent). The Party's assumption of proportional below-ground biomass loss may not be valid given those causes of degradation.

This explanation was not included in the modified submission owing to an error and will be provided in future submissions. The AT notes that including this explanation in the FREL submission would increase transparency of reporting.

29. During the TA, the AT asked how the uncertainty values for the emission estimates for all activities were combined to estimate the overall uncertainty of the FREL. No explanation of how this was done was included in the modified submission. The AT notes that including an explanation in the FREL submission would increase transparency of reporting.

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

30. Equatorial Guinea has finalized its national REDD+ strategy and national REDD+ investment plan. The country has legislation establishing the legal, economic and administrative framework for forest use (act 1/1997), which is harmonized and updated concurrently with the Environmental Act to ensure sufficient protection for nature and biodiversity. The Government has restructured the National Forestry Institute to create the Forestry Development Institute, which promotes the sustainable development of forests in the country. In addition, the aims of the National Programme for Forest Action, created in 2000, are to (1) protect and preserve national forests and their environments and ecosystems; (2) ensure that natural resources contribute to the long-term socioeconomic development of the country; and (3) promote training, capacity-building and research at all levels to ensure the rational and sustainable use of natural resources. Furthermore, the National System of Protected Areas, established under act 4/2000, is aimed at increasing protected areas in the country from 17 to 40 per cent. Finally, the National Plan for Economic and Social Development of 2013 promotes economic diversification on the basis of a more sustainable timber extraction policy. The ban on the exportation of roundwood under decree 182/2018 has already led to a reduction in timber extraction rates in forests. The AT commends Equatorial Guinea for providing in its submission extensive information on policies and plans related to forests and REDD+.

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

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

32. The pools included in the Party's FREL are above- and below-ground biomass, litter and deadwood. The Party noted that there were currently insufficient data on forest SOC to include a mineral SOC pool. It added that the NFI, which is under development, will enable it to generate its own data and improve its reporting in future submissions, although this will depend on the availability of funding. The AT commends the Party for providing this information and indicating its planned actions, noting this as an area for future technical improvement.

33. Equatorial Guinea cited a lack of reliable data and the complex dynamics of the soil pool as justification for omitting the SOC pool from its submission. However, the Party provided an estimate of changes in carbon stock in mineral soils resulting from the conversion of forest land to other land uses, calculated using default values from the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines. For the modified submission, it applied equation 2.25 from the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 2, section 2.3.3.1) on the following assumptions: (1) soil composition: 63.6 per cent low-activity clay, 26.4 per cent high-activity clay and 10 per cent sandy soil; (2) reference SOC stock of 53.5 t C/ha, estimated as a weighted average of the reference default values for tropical wet climate zones given in the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 2, section 2.3.3.1, table 2.3): 52 t C/ha for low-activity clay, 60 t C/ha for high-activity clay and 46 t C/ha for sandy soil; (3) conversion of forest land to other land uses: 77 per cent to settlements, 14 per cent to fallow land, 7 per cent to grassland and 2 per cent to agroforestry; and (4) the product of the soil stock change factors F_{LU}, F_{MG} and F_I used for equation 2.25 from the 2019 Refinement to the 2006 IPCC Guidelines was assumed equal to 1 for grassland and agroforestry and 0.8 for settlements and fallow land, using the default values from the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap.

5, tables 5.5 and 5.10, pp.5.27 and 5.44). CO_2 emissions associated with change in carbon stock in SOC resulting from the conversion of forest land to other land-use categories were calculated as 1.8 t CO_2/ha/year, which corresponds to 0.26 and 0.34 per cent of the CO_2 emissions per unit area deforested in the continental region and in Bioko and Annobón, respectively. The AT commends Equatorial Guinea for applying a tier 1 method to estimate the relative importance of emissions from the SOC in mineral soils and agrees that, given the likely insignificance of these emissions, the omission of the SOC in constructing the FREL is justified.

34. The FREL includes only CO_2 emissions from deforestation and forest degradation. Non-CO_2 gases from forest fires were not included in the FREL owing to their low frequency, as noted in the FAO FRA 2015[13] on the basis of burned area data from MODIS. Indeed, fires are rare in wet, tropical countries with abundant precipitation, and non-CO_2 emissions from fires were not estimated for the Party's first NC. Nonetheless, Equatorial Guinea indicated in its submission that this issue is the subject of ongoing research and estimates of non-CO_2 emissions from fires may be included in a future submission once NFI data are available. The AT commends Equatorial Guinea for its ongoing efforts to estimate non-CO_2 emissions from forest fires, noting this as an area for future technical improvement.

35. The AT acknowledges that Equatorial Guinea included in its FREL the activities reducing emissions from deforestation and reducing emissions from forest degradation, which are two of the five activities identified in decision 1/CP.16, paragraph 70, in accordance with its national capabilities and circumstances. The AT acknowledges the Party's intention to include other REDD+ activities in a future FREL/FRL submission when new data and improved information become available, as part of the stepwise approach. Specifically, Equatorial Guinea plans to include information on the enhancement of carbon stocks through reforestation, for which there are as yet no reliable data.

4. Definition of forest

36. Equatorial Guinea provided in its submission the definition of forest used in constructing its FREL. Forest is defined with the following minimum parameters: area 1 ha, height 5 m and canopy cover 30 per cent. The definition is the same as the one that the Party used for its historical analysis of deforestation and forest degradation for 2004–2014. Deforestation is defined as the conversion of forest to other land-use categories, or the long-term reduction of canopy cover to below 30 per cent. Degradation is defined as any change to forest that negatively affects its structure or function, thereby reducing its capacity to provide products or services. The Party justified its definition of forest by noting that it was approved by national experts and reflects the forest definition criteria set out in the NC and the definition established for reporting under the Kyoto Protocol. The Party has applied the same definition for its reporting to FAO for the FRA since 2020 to ensure consistency with the definition used for the FREL.

37. The definitions of deforestation and forest degradation used by Equatorial Guinea made it difficult to estimate the areas affected by those activities. It was unclear whether the method for estimating deforestation can consistently detect canopy cover change to below 30 per cent. In addition, the deforestation estimates provided in the submission all relate to forest land converted to other land-use categories and it was unclear whether the canopy cover could fall to below 30 per cent without a clear change in land-use category. The definition of forest degradation is similarly difficult to apply. The AT commends the Party for indicating in its submission the need to identify ways of compensating for high cloud cover in satellite imagery, such as using multitemporal time series, ground data and radar data. However, it notes that internal discussion is required to determine whether the definitions of deforestation and forest degradation, as presented, provide a sound basis for identifying whether those activities occur. The AT considers this an area for future technical improvement.

[13] Available at http://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/en.

III. Conclusions

38. The information used by Equatorial Guinea in constructing its FREL for reducing emissions from deforestation and reducing emissions from forest degradation is transparent and in overall accordance with the guidelines for submissions of information on reference levels. However, the AT notes that the FREL cannot easily be reproduced outside the specific analysis platform used by the Party (i.e. SEPAL) and provision of the intermediate products used by the Party in constructing its FREL would greatly enhance the transparency of the submission.

39. Except for the EF for above-ground biomass, which was estimated on the basis of multiple sources and expert consultations, all other EFs used to estimate emissions from deforestation in the continental region are default EFs. The AT notes that the submission does not clarify why above-ground biomass for Bioko and Annobón is 24 per cent lower than for the continental region or if this discrepancy is attributable to difference in forest types. The AT holds the view that, unless the Party demonstrates that the forest types on Bioko and Annobón are similar to those in the continental region, deforestation statistics should be included in the totals for Bioko and Annobón, or presented separately. Noting that the statistics for the continental region include deforestation and forest degradation values and hence also EFs for deforestation for the islands of Corisco and Elobey Grande, the AT notes that emissions for these islands could be overestimated.

40. Equatorial Guinea indicated in its submission that the FREL includes net emissions from deforestation, since it considered, in constructing the FREL, removals for land-use categories after deforestation. The AT notes that removals from secondary forests are not explicitly mentioned in the submission. During the TA, the Party mentioned the difficulties encountered in differentiating primary forests from secondary forests. In future FREL submissions, Equatorial Guinea could enhance the transparency and accuracy of its reporting by providing information on how it addresses secondary vegetation.

41. The AT acknowledges that Equatorial Guinea included in its FREL the most significant activities, the most important forest types and the most significant pools in terms of emissions from forests. The AT considers that, in doing so, Equatorial Guinea followed decision 1/CP.16, paragraph 70, on activities undertaken, and decision 12/CP.17, paragraph 10, on applying the stepwise approach. The AT commends the Party for providing in the submission proposed improvements that, if implemented, will make future FRELs more accurate, consistent and transparent.

42. As a result of the facilitative interactions with the AT during the TA, Equatorial Guinea provided a modified submission that took into consideration some of the technical input of the AT. The AT notes that the transparency of the information provided was improved in the modified FREL submission, without having to alter the approach or values used to construct the FREL. However, an explanation should be provided for the addition of one year to the reference period in the modified version without changing the original FREL. The new information provided in the modified submission, including the data made available online[14] and the examples of how estimates of CO_2 emissions from deforestation and forest degradation were calculated, increased the transparency of the FREL calculation.

43. The AT notes that the information provided in the first national GHG inventory is not detailed enough to enable a fair assessment of the level of consistency between the FREL and the GHG inventory.[15]

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

(a) Ensuring that methods for estimating deforestation and forest degradation are consistent with the definitions for forest, deforestation and forest degradation used by the Party (see paras. 36–37 above);

[14] https://drive.google.com/drive/u/0/folders/1_5CBAL5GH9lHhMDfs64GAaJwvLz6xdlm.

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

(b) Applying methods that enable the estimation of deforestation and forest degradation for individual years of the time series and/or sharing the intermediate products used in constructing the FREL that can be analysed using a variety of tools (see para. 21 above);

(c) Clearly indicating the dates of the source data for the satellite imagery used to produce the FREL (see para. 22 above);

(d) Developing methods for estimating post-degradation carbon density that do not depend on percentage of canopy-cover loss (see paras. 28 and 36 above);

(e) Applying methods that differentiate between deforestation in primary forests and secondary forests (see para. 27 above);

(f) Explaining in the submission the dynamics of fallow land and developing an EF consistent with the fallow period, using data provided in scientific literature or reported by neighbouring countries (see para. 23 above);

(g) Providing more information on why carbon loss from forest degradation also affects the below-ground biomass pool (see para. 28 above);

(h) Providing additional information on why the same EFs are used for litter and deadwood for the continental region and for Bioko and Annobón, given that the biomass values for the continental region are higher than for Bioko and Annobón (see para. 25 above);

(i) Including the method(s) used to calculate and propagate uncertainty values for the emission estimates for all activities (see para. 29 above);

(j) Providing the rationale for including emissions for the islands of Corisco and Elobey Grande in those for the continental region (see para. 26 above).

45. Pursuant to decision 13/CP.19, annex, paragraph 2(f), in assessing the pools and gases included in the FREL, the AT noted that the pools and gases excluded by Equatorial Guinea are likely to be insignificant in the context of the FREL. Nevertheless, pursuant to decision 13/CP.19, annex, paragraph 3, the AT identified the following additional areas for future technical improvement regarding the exclusion of pools and gases from the FREL:

(a) Provision of an explanation for the use of the soil stock change factors F_{LU}, F_{MG} and F_I to justify that emissions from SOC are insignificant for all forest converted to other land-use categories (see para. 33 above);

(b) Treatment of non-CO_2 emissions from fires and consistency of information on non-CO_2 gases provided in the FREL and other reporting, such as the NC and the biennial update report (see para. 34 above).

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

(a) Improve forest monitoring with a view to differentiating forests by type of degradation or carbon content;

(b) Explore the use of alternative methods that enable annual estimates of deforestation and forest degradation;

(c) Implement an NFI that will enable country-specific estimates of all carbon pools to be used in future FRELs;

(d) Include the SOC pool in a future FREL, subject to the allocation of specific resources to the NFI;

(e) Include non-CO_2 emissions from fires in future submissions, subject to the availability of financial resources;

(f) Automatize the national forest monitoring system using updated tools;

(g) Improve the capacity and autonomy of the country to further develop its inventory and future FRELs.

47. In conclusion, the AT commends Equatorial Guinea 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 the Party'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.[16] The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Equatorial Guinea.

48. The table contained in annex I summarizes the main features of Equatorial Guinea's proposed FREL.

[16] 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 Equatorial Guinea

Main features of the FREL		*Remarks*
Proposed FREL	8 552 900 t CO_2/year	See paragraph 10 of this document
Type and reference period of FREL	FREL = average of historical emissions for 2013–2018	See paragraphs 10 and 22 of this document
Application of adjustment for national circumstances	No	
National/subnational	National	The FREL covers the continental area and the most relevant islands (Bioko, Annobón, Corisco and Elobey Grande) in estimating deforestation and forest degradation. See paragraph 9 of this document
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation	See paragraph 8 of this document
Pools included	Above-ground biomass Below-ground biomass Deadwood Litter	See paragraphs 11, 32 and 33 of this document
Gas included	CO_2	See paragraphs 11 and 34 of this document
Forest definition	Included	Forest is defined as an area of land at least 1 ha in size, of which at least 30 per cent is covered by tree canopy, with trees at least 5 m tall. This is different from the definition used for the FAO FRA. See paragraph 36 of this document
Consistency with latest GHG inventory	Methods used for estimating the FREL are not consistent with those used for the latest GHG inventory (2019)	See paragraph 24 of this document
Description of relevant policies and plans	Included	See paragraph 30 of this document

Main features of the FREL		*Remarks*
Description of assumptions on future changes to domestic policies, if included in the construction of the FREL	Not applicable	
Description of changes to previous FREL	Not applicable	
Identification of future technical improvements	Included	Several areas for future technical improvement were identified. See paragraphs 44–45 of this document

Annex II

Documents and information used during the technical assessment

A. Reference documents

First FREL submission of Equatorial Guinea. Available at https://redd.unfccc.int/submissions.html?country=GNQ.

"Guidelines and procedures for the technical assessment of submissions from Parties on proposed forest reference emission levels and/or forest reference levels". Annex to decision 13/CP.19. Available at https://unfccc.int/sites/default/files/resource/docs/2013/cop19/eng/10a01.pdf#page=36.

"Guidelines for submissions of information on reference levels". Annex to decision 12/CP.17. Available at https://unfccc.int/sites/default/files/resource/docs/2011/cop17/eng/09a02.pdf#page=19.

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.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/.

B. Other documents

The following references have been reproduced as received:

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Cadena de procesamiento para la generación de datos de actividad para el proceso REDD+ de Guinea Ecuatorial. Available at https://github.com/frel-guinea-ecuatorial/GNQ_DD_14_18/blob/master/README_ES.md.

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