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Report on the technical assessment of the proposed forest reference level of Belize submitted in 2020

Summary

This report covers the technical assessment of the voluntary submission of Belize 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 Belize 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 five activities included in decision 1/CP.16, paragraph 70. For its submission, Belize developed a national FRL. The FRL presented in the submission, for the reference period 2016–2020, corresponds to 4,606,875, 4,850,928, 5,094,981, 5,339,034 and 5,583,087 tonnes of carbon dioxide equivalent for 2016, 2017, 2018, 2019 and 2020, respectively. The assessment team notes that the data and information used by Belize in constructing its FRL are mostly transparent, complete and in overall accordance with the guidelines contained in the annex to decision 12/CP.17. This report contains the assessed FRL and a few areas identified by the assessment team for future technical improvement in accordance with the provisions on the scope of the technical assessment contained in the annex to decision 13/CP.19.

Abbreviations and acronyms

AD	activity data
AT	assessment team
BUR	biennial update report
CH_4	methane
COP	Conference of the Parties
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
fd	fraction of biomass lost in disturbance
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
NC	national communication
N_2O	nitrous oxide
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
2006 IPCC Guidelines	*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 Belize on its proposed FRL,[1] submitted on 14 January 2020, in accordance with decisions 12/CP.17 and 13/CP.19. The remote TA[2] took place from 1 to 5 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): Pervez Manan (Pakistan) and Zoltan Somogyi (Hungary). In addition, Rehab Ahmed Hassan, 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, Belize submitted its proposed FRL on a voluntary basis. The proposed FRL 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. The objective of the TA is to assess the degree to which the information provided by Belize 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 FRL with a view to supporting the capacity of Belize for the construction and future improvement of its FRL, as appropriate.[8]

4. The TA of the FRL submitted by Belize 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.

5. Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of Belize. The facilitative exchange during the TA allowed Belize to provide clarifications and additional information, which were considered by the AT in the preparation of the draft report.[10] As a result of the facilitative interactions with the AT during the TA, Belize provided a modified version of its submission on 4 August 2020, which took into consideration the technical input of the AT. The modifications improved the clarity and transparency of the submitted FRL without needing to alter the approach used to construct it. The AT prepared and finalized this report in the context of the modified submission, containing the assessed FRL,[11] and other documentation such as Excel spreadsheets containing a GHG inventory tool and the calculations made for the inventory (see annex II for details), and taking into consideration the Party's comments on the draft report.[12] In February 2021, the Party shared new supplementary information with the AT. The AT acknowledges the additional information and notes that Belize could consider including it in future submissions.

[1] The submission of Belize is available at https://redd.unfccc.int/submissions.html?country=blz.
[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.
[11] Available at https://redd.unfccc.int/submissions.html?country=blz.
[12] Provided on 23 December 2020.

B. Proposed forest reference level

6. In decision 1/CP.16, paragraph 70, the COP encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances, in the context of providing adequate and predictable support. The FRL proposed by Belize, on a voluntary basis for a TA in the context of results-based payments, 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 five activities referred to in that paragraph. Pursuant to paragraph 71(b) of the same decision, Belize developed a national FRL that covers its entire territory. For its submission, Belize applied a stepwise approach (referred to as the "gradual improvement of methods, as well as the future inclusion of additional carbon pools" in its submission) to developing its FRL in accordance with decision 12/CP.17, paragraph 10. The stepwise approach enables Parties to improve their FRELs or FRLs by incorporating better data, improved methodologies and, where appropriate, additional pools.

7. The FRL covers emissions and removals from all managed forests associated with all five REDD+ activities. The FRL was developed using data from the latest GHG inventory contained in the Party's first BUR, which was also being developed for the historical reference period 2001–2015 and was calculated as the mean of projected values for 2016–2020. These projected values were obtained by linear extrapolation of the historical data. The FRL values presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities for 2016–2020, correspond to 4,606,875, 4,850,928, 5,094,981, 5,339,034 and 5,583,087 t CO_2 eq for 2016, 2017, 2018, 2019 and 2020, respectively.

8. The proposed FRL includes the pools above-ground and below-ground biomass and excludes the pools dead organic matter and soil organic carbon. Regarding GHGs, the submission includes CO_2 as well as CH_4 and N_2O emissions from biomass burning in forest land and forest land conversions.

9. Belize also reported in its submission the historical average emissions for the crediting period in order to fulfil the reporting requirements of the Green Climate Fund's programme for results-based payments. This information was not subject to the TA as assessing it would be beyond the scope mandated in decision 13/CP.19.

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

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

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

10. For constructing its FRL, Belize used data from its latest GHG inventory (see para. 7 above), which was developed using the 2006 IPCC Guidelines and the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* as the source of some default EFs. As part of its submission package, Belize provided the AT with Excel spreadsheets containing a GHG inventory tool and the calculations made for the inventory. While the submission is available on the UNFCCC REDD+ web platform, the Party noted that access to the Excel spreadsheets can be requested, if necessary, from the National Climate Change Office of Belize (see annex II). The AT considers that providing summary information and tables such as land-use change matrices in the submission itself could, in general, facilitate reconstruction and enhance completeness of the FRL. The AT considers this as an area for future technical improvement.

11. For constructing its FRL, Belize used both more recent data and more recent IPCC guidelines than were used for preparing the GHG inventory included in the NC3 (submitted

in 2016). The AT found that the FRL submission does not contain sufficient information to confirm whether it maintains consistency, in terms of sources of AD and EFs, with the NC3. In the submission, Belize reported that it was aiming to maintain consistency between the FRL and the GHG inventory included in its first BUR, which was also being prepared. Nevertheless, the AT considers that the transparency of the link between the Party's GHG inventory and FRL could be improved if data underlying the FRL were reported in the submission, and that maintaining consistency across submissions is an area for future technical improvement.

12. The AD used in constructing the FRL were derived from country-specific land use and land-use change assessments, which were conducted using the Collect Earth tool.[13] For estimating changes in forest carbon stock, Belize applied the gain–loss method.

13. The AT acknowledged that Belize has elected all five REDD+ activities identified in decision 1/CP.16, paragraph 70, in accordance with its national capabilities and circumstances. However, for constructing its FRL, the Party reported one value for emissions and removals covering all five activities rather than reporting emissions and removals by activity. In response to a question raised by the AT during the TA, Belize confirmed that it proposes a single FRL for all potential mitigation actions (REDD+ activities) where forests are relevant (i.e. forest land remaining forest land, forest land converted to other land types, and other land types converted to forest land). The Party explained that it followed a land-based approach, using the 2006 IPCC Guidelines as the methodological basis for reporting emissions and removals, and provided in the modified submission a table (i.e. table 1) illustrating the links between four of the REDD+ activities and the respective IPCC land-use categories. The AT considers the additional information provided useful and that a summary table showing the GHG inventory estimates by activity in addition to providing an aggregated FRL value for all five activities would further enhance transparency of the submission, and therefore notes this as an area for future technical improvement.

14. In response to a request of the AT during the TA, Belize provided in the modified submission country-specific definitions for the activities elected. The AT noted that, in accordance with the annex to decision 12/CP.17, the information provided in the FRL submission should be guided by the most recent IPCC guidance and guidelines, so Belize was correct in submitting relevant emissions and removals following the structure of the 2006 IPCC Guidelines, and, in accordance with paragraph 8 of the same decision, in maintaining consistency of the FRL with the GHG inventory being prepared for its first BUR. The AT considers that, in line with the 2006 IPCC Guidelines (vol. 4, chaps. 3.1–3.2), to clarify the land areas allocated to the various REDD+ activities, more explicit country-specific definitions of the activities and categories of land use and land-use change are necessary.

15. In the modified submission, Belize provided the following definitions of activities: (1) deforestation is the conversion of a forest to another IPCC land-use category by humans or natural causes (e.g. pests, hurricanes); (2) forest degradation is the process wherein a forest is disturbed by humans (e.g. illegal logging, fire, shifting cultivation, infrastructure, livestock grazing) or natural causes (e.g. pests, hurricanes) but remains a forest; (3) sustainable forest management is the sustainable use and extraction of timber and non-timber forest resources under a sustainable forest management plan; (4) conservation is the non-extractive use and enjoyment of natural resources in protected areas (i.e. national parks, nature reserves, wildlife sanctuaries, natural monuments); and (5) enhancement of forest carbon stocks is the creation or restoration of forest carbon pools through human intervention, including restoration of degraded lands, reforestation, afforestation and use of agroforestry practices that enhance forest carbon pools (e.g. agroforestry, silvopasture, intercropping).

16. The AT considers that deforestation is always a human-induced activity, and that conversion of land after a natural disturbance can only happen with the deliberate use of the disturbed land for a purpose other than as forest land. The AT also considers that the Party's definition of sustainable forest management can be taken as its definition of the activity sustainable management of forests referred to in decision 1/CP.16, paragraph 70. Further, the AT noted that, according to table 1 of the submission, enhancement of forest carbon stocks

[13] The tool was developed by the Food and Agriculture Organization of the United Nations, and information on it is available at http://www.openforis.org/tools/collect-earth.html.

includes areas of both forest land remaining forest land and land converted to forest land. The AT considers that clarity and understanding of the submission could be further improved by explicitly linking the categories of land under the activity enhancement of forest carbon stocks to the respective GHG inventory subcategories, and identifies this as an area for future technical improvement.

17. Belize reported that the FRL was calculated on the basis of the annual emission and removal estimates for 2001–2015 included in the national GHG inventory. However, the AT noted that the only time-series information in the submission can be found in figures 2–3, which each report a different time series. In the submission, the time series is reported neither by activity nor in tabular format. Although the Party made its Excel spreadsheets of inventory calculations available to the AT during the TA, the AT was unable to reproduce figure 2 or to allocate estimated emissions and removals to the elected activities using the information provided. The AT considers reporting consistent time series in the submission by activity as an area for future technical improvement.

18. Belize assessed its implementation of REDD+ activities from 2016 to 2020, for which it used projections obtained by linear extrapolation of emissions and removals in the historical reference period 2001–2015. During the TA, the Party clarified that its choice of trend projections was based on statistical principles; that is, linear extrapolation was considered to be the best-fit model for the historical data. In support of this, Belize explained that, for example, as hurricane impacts have increased over time, this has also caused an increase in anthropogenic emissions.

19. To identify land use and land-use change, Belize implemented approach 3 from the 2006 IPCC Guidelines through nationwide sampling using the Collect Earth tool, which uses various remote sensing products as its main inputs. Using a sampling grid of 1 km by 1 km, the Party established 21,991 sampling points and associated sample plots of 0.5 ha consistent with its forest definition. It then obtained a time series of annual spatially explicit data for 2000–2017. Alongside the spatial information on the plots, auxiliary information such as district, climatic zone, conservation area and forest concession could be utilized. For each plot and year, it was possible to deduce the land use or land-use change. Belize also used information on human impacts (i.e. anthropogenic disturbances) and natural disturbances (e.g. hurricanes, fires, pests) when defining land use and land-use change. This system allows for a detailed annual analysis of the dynamics of land use in the country.

20. The EFs used in constructing the FRL were obtained from research studies (for country-specific values), IPCC guidelines (for default values) and expert judgment. The AT noted that EFs are crucial for estimating emissions and removals and, especially when country-specific values are used, EFs representative of forest type are needed to reduce the level of uncertainty. The AT considers that some of the Party's EFs (e.g. those for above-ground biomass growth and pine forests) may not be representative and, therefore, the Party may wish to consider using representative EFs as an area for future technical improvement.

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

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

21. In table 2 of its submission, Belize reported data on the area of managed and unmanaged land in the country in 2001–2018. However, it is not clear whether the data represent an average for the period or, for example, the area as at the end of the period, or how land use of managed and unmanaged land and by activity changed over time. Because land-use change is an important driver of emissions and removals in the land-use sector, the AT considers it important to transparently report on the dynamics of land use under the elected activities and therefore that the transparency of the Party's reporting could be improved if it reported a full time series for 2001–2015 (or 2018) for the GHG inventory categories relating to REDD+, including estimated area at the start of the time series, estimated annual area change and estimated area at the end of the time series. The AT considers providing such information in the submission as an area for future technical improvement.

22. While correctly reporting emissions and removals from managed land only in its REDD+ estimates, Belize reported in figure 1 of its submission both aggregate anthropogenic emissions and removals from managed land and emissions and removals from natural sources for unmanaged land. However, according to the 2006 IPCC Guidelines (vol. 4, chap. 1, p.1.5), emissions and removals do not need to be reported for unmanaged land. The Party's approach could therefore create confusion and reduce transparency with respect to the reported emissions and removals relating to REDD+. The AT considers that transparency could be improved if Belize reported in its submission the GHG inventory totals for managed forests only.

23. According to the 2006 IPCC Guidelines, care should be taken when inferring land use from land-cover information. In its submission, Belize correctly inferred a conversion of forest land to cropland. However, it is not clear how temporary unstocking – if it happens at all given the management of forests in cycles (e.g. in plantations) – is distinguished from deforestation. In response to a question raised by the AT during the TA, Belize confirmed that its operators, in their interpretation of the data, were aware of the differences between assigning land use and land-cover change, and followed the land-use history of a sample plot through the high-resolution satellite images available for that plot. Regenerating forests remained in the forest category but different EF values were used for them in the GHG inventory tool. The AT considers including this information in the submission as an area for future technical improvement.

24. To identify whether a particular area of land is managed or unmanaged, Belize used the Collect Earth tool. In response to a question raised by the AT during the TA, the Party clarified that it defines unmanaged land as land on which "anthropogenic activities" do not take place. These areas are usually forest land not subject to human disturbance but subject to the impacts of hurricanes and other phenomena that are considered natural processes. Managed land is land on which human activity is the main driver of emissions and removals. Belize considers forest plantations managed, even in cases when they seem undisturbed (in terms of human disturbance), because they need maintenance such as pruning. Hurricanes are the main natural disturbance in these plantations. The AT acknowledges this and other information, including remotely sensed images provided as examples of managed and unmanaged land, included in the modified submission.

25. To estimate biomass carbon stock changes, Belize applied mainly IPCC default EF values. Country-specific EFs were applied for the following forest types: broadleaf, for which allometric models have been developed by destructive sampling of 304 trees of 48 species; mangrove, for which data from research plots are available; and pine, for which an equation has been parametrized using data from one sample plot. The AT considers that this country-specific database may not be representative of some managed forests. In response to a question raised by the AT during the TA, Belize indicated that it could improve the pine forest equation with data from additional permanent sample plots as part of the improvement plan for its FRL. The AT considers using data from additional sample plots as an area for future technical improvement.

26. To estimate biomass growth (using equation 2.10 from vol. 4 of the 2006 IPCC Guidelines), Belize relied on repeated measurements taken at permanent sample plots: seven plots for undisturbed mature broadleaf forests, seven plots for hurricane-disturbed mature broadleaf forests, two plots for mature broadleaf forests disturbed by logging and one plot for pine forests. In addition to these country-specific EFs the Party used IPCC default values in combination with various fractional values based on the assessment of managed and unmanaged land using the Collect Earth tool and expert judgment. Because of the relevance of these parameters, Belize considers the forest dynamics following hurricanes and other natural disturbances in its estimation of biomass growth. In response to a question raised by the AT during the TA, the Party explained that it has installed three more plots in pine forests that have little to no disturbance to a high level of disturbance, and that it could continue to remeasure all plots, as resources become available, to continually improve the data used for constructing the FRL. The AT commends Belize for its efforts to improve its database on biomass growth, and considers that, as biomass growth is an important parameter, the Party should include this work in the improvement plan for its FRL.

27. In the original submission, the second biomass equation for mangrove forests was incorrect. In response to a request of the AT, Belize corrected the equation in the modified submission along with a few other minor errors. The AT commends Belize for its efforts in this regard.

28. Belize included in its FRL carbon losses due to harvest, but it was not clear in the original submission how this was done. During the TA, the Party explained that forest management in the country is based on selective logging, which does not eliminate forest cover at any point in the silvicultural regime, and losses due to harvest were estimated only for the forest land remaining forest land subcategory "disturbed by logging". To estimate the losses for this subcategory, partially harvested plots were identified for the four main forest types: mature, secondary, mangrove and pine. For these plots, an fd value (i.e. where the disturbance was logging) was determined, for each forest type, using the Collect Earth tool and expert validation. The harvest volume to forest loss ratio was not estimated because the tool was not designed for this purpose.

29. To determine above-ground biomass stock changes, Belize used data from various studies, and for plantations, expert judgment. While acknowledging the detailed description of the estimation methodology provided in the original submission, during the TA, the AT requested further information on the values measured at permanent sample plots in forests both before and after disturbance, as well as clarification of the nature of the expert judgment. In responding to these requests and several related questions, the Party referred to its GHG inventory tool spreadsheet. The AT considers that, to improve transparency of reporting, all information on the estimation methodology should be reported in the submission, and commends Belize for providing most of the requested information in the modified submission.

30. During the TA, the AT requested Belize to provide a more comprehensive explanation of the biomass value used for disturbances without land-use change, including how the effects of logging were excluded from non-anthropogenic disturbances, or with land-use change (i.e. deforestation). The Party explained that the biomass value used for disturbances without land-use change or for deforestation was estimated using equation 2.14 from the 2006 IPCC Guidelines (vol. 4, chap. 2) and parameters for fd under each land-use category in the GHG inventory tool spreadsheet. Belize reported that the fd values were obtained using Collect Earth: all operators determined the percentage of the plot that was affected by each disturbance, and then the average agreed upon by the operators was assigned as the fd value. There was one fd value for each combination of a specific forest type and disturbance. Belize clarified that the effects of logging were excluded by using values from plots that were not affected by logging, and indicated that the methodology used for measuring stocks is presented in the supporting document provided during the TA on diversity, dynamics and carbon budget of tropical forests subject to hurricane and anthropogenic disturbances (in section 2 on tree remeasurement). The AT notes that, as an area for future technical improvement, Belize may wish to consider including a description of this methodology in future submissions.

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

31. Belize included in the submission information on its legal and policy frameworks as part of the description of its national legislation. It referred to the development over the last decade of several policy frameworks for sustainable development and climate change, including the Horizon 2030 strategy, the National Energy Policy Framework, the Sustainable Energy Action Plan 2014–2033, the National Climate Resilience Investment Plan, the Growth and Sustainable Development Strategy 2016–2019 and the National Climate Change Policy, Strategy and Action Plan 2015–2020.

32. In its submission, Belize stated that in 2020 it undertook a comprehensive review of existing forestry and land-use policies with the aim of enhancing their effectiveness and better aligning them with national climate change commitments. In addition, the Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development undertook a detailed policy review of the legal and institutional framework for implementing REDD+ activities in Belize.

33. Belize referred to the following legislation, policies, guidelines and other instruments related to the forestry and land-use sector in its submission (the year of implementation is given in parentheses):

(a) Strategic policy frameworks: National Development Framework 2010–2030, Horizon 2030 strategy (2016), Revised Low Carbon Development Roadmap: Growth and Sustainable Development Strategy 2016–2019 (2016), National Climate Change Policy, Strategy and Action Plan (2014);

(b) Framework environmental protection law: National Environmental Policy and Strategy 2014–2024 (2014), National Environmental Action Plan 2015–2020 (2014), Environmental Protection (Amendment) Act of 2009;

(c) Forest: National Forest Policy (2015), Forests (Amendment) Act of 2017, regulation on the protection of mangroves (2018), regulation on the protection of trees (2010), Private Forests (Conservation) Act of 2000, Forest Fire Protection Act of 2000, sustainable forest management licences;

(d) Agriculture: National Food and Agriculture Policy 2002–2020 (2003), National Agriculture and Food Policy 2015–2030 (2015), Agriculture Development Management and Operational Strategy (2005), National Adaptation Strategy to address climate change in the agriculture sector (2014), Agricultural Fires Act of 2000;

(e) Land tenure: National Land Use Policy and Integrated Planning Framework for Land Resource Development (2012), National Lands Act of 2003, Land Utilization (Amendment) Act of 2017, Land Tax Act of 2003, Land Acquisition Act of 2000;

(f) Spatial planning: National Protected Areas Policy and System Plan (2015), National Protected Areas System Act of 2015, Protected Areas Conservation Trust (Amendment) Act of 2017, Integrated Coastal Zone Management Plan (2016), Coastal Zone Management Act of 2003;

(g) Biodiversity: National Biodiversity Strategy and Action Plan 2016–2020 (2018), Biodiversity Initiative and Biodiversity Policy and Institutional Review (draft, 2018);

(h) Taxation: Environmental Tax (Amendment) Act of 2017, Fiscal Incentive Program (2016), Fiscal Incentives Act of 2011, Finance and Audit (Reform) Act of 2011, Mines and Minerals Act Revised Edition (2011).

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

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

35. The pools included in the Party's FRL are above-ground and below-ground biomass. The dead organic matter and soil organic carbon pools were not included owing to lack of data, recalling decision 12/CP.17, paragraph 10, which allows for the gradual improvement of the data and methods used to construct the FRL, including additional pools, as appropriate. Belize chose to focus its efforts on the accuracy of the biomass pools. The AT considers that the exclusion of the dead organic matter and soil organic carbon pools was adequately justified by Belize and commends Belize for its efforts to obtain accurate data for the biomass pools. However, the AT noted that the 2006 IPCC Guidelines provide a method for estimating carbon stock change in the non-biomass pools. The AT also noted that the contribution from deforestation dominates the net emissions estimated for the Party's FRL and that a substantial amount of emissions can occur from the dead organic matter and soil organic carbon pools during deforestation. The AT therefore considers the treatment of emissions from the dead organic matter and soil organic carbon pools, especially for deforestation, as an area for future technical improvement.

36. Belize included CO_2 as well as non-CO_2 (CH_4 and N_2O) emissions from biomass burning in its FRL. The AT commends Belize for its efforts to report on all these gases. The AT considers that maintaining consistency with the GHG inventory in terms of the gases reported will remain important in the future. In this regard, the AT noted that CO_2 is not mentioned in section 2.6 of the submission on GHGs included in the FRL. In response to a

question raised by the AT during the TA, Belize explained that the FRL includes CO_2 emissions and removals associated with biomass carbon stock changes for relevant categories and that the GHG inventory tool spreadsheet includes information on which carbon pools and gases are included and excluded. The AT notes that, as an area for future technical improvement, Belize may wish to consider ensuring consistency in the submission as to which gases are included in the FRL.

37. The AT acknowledges that Belize included all five activities identified in decision 1/CP.16, paragraph 70, for which it reported a single FRL.

4. Definition of forest

38. Belize provided in its submission the definition of forest used in constructing its FRL. The definition is the same as the one that the Party uses for its national GHG inventory (i.e. minimum area of 0.5 ha, height of mature trees of 5 m or more and at least 30 per cent canopy cover). The AT noted that Belize included in its forest definition most forest types, including some (such as dwarf mangrove) that do not meet the 5 m minimum height criterion but that are well documented in the country. In response to a question raised by the AT during the TA, the Party explained that these land areas were included when conducting the assessment using Collect Earth because they are a known land use. The AT considers reporting transparently on these areas while ensuring consistency over time as an area for future technical improvement.

39. In its original submission, Belize described areas as "undisturbed" or "disturbed" when identifying managed and unmanaged forests, without explicitly defining the terms. In response to a question raised by the AT during the TA, Belize clarified that undisturbed areas are those for which no anthropogenic or natural disturbances were identified using Collect Earth and disturbed areas are those for which either or both anthropogenic and natural disturbances were identified. Further, the Party explained that forest management in the country is based on selective logging (which does not eliminate forest cover at any point in the silvicultural regime), and that any loss of forest cover (within or outside forest management areas) is therefore considered to be deforestation. The exception is areas where forest cover is temporarily lost after a hurricane. Only areas in which people took advantage of natural forest loss and converted the forest land to grassland or cropland were classified as managed land under the appropriate category, for example forest land converted to cropland.

III. Conclusions

40. The information used by Belize in constructing its FRL for 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 is mostly transparent and in overall accordance with the guidelines for submissions of information on reference levels.

41. The FRL presented in the submission, for the reference period 2016–2020, corresponds to 4,606,875, 4,850,928, 5,094,981, 5,339,034 and 5,583,087 t CO_2 eq for 2016, 2017, 2018, 2019 and 2020, respectively.

42. The AT acknowledges that Belize included in its FRL all the activities, the most important forest types and areas, and the most significant pools in terms of emissions from forests. The AT considers that, in doing so, Belize 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 Belize for providing information on its ongoing work to develop FRLs for pools currently excluded as a step towards constructing a more comprehensive FRL.

43. As a result of the facilitative interactions with the AT during the TA, Belize provided a modified submission that took into consideration the technical input of the AT. The AT notes that the transparency and completeness of the information provided were significantly improved in the modified FRL submission, without having to alter the approach or values

used to construct the FRL, and commends Belize on its efforts. The new information provided in the modified submission increased the reproducibility of the FRL calculations.

44. However, the AT notes that the FRL submission does not contain sufficient information to confirm whether it maintains consistency, in terms of sources of AD and EFs, with the GHG inventory included in Belize's NC3.[14] For constructing its FRL, the Party used both more recent data and more recent IPCC guidelines than were used for preparing the GHG inventory included in the NC3. In the submission, Belize reported that it was aiming to maintain consistency between the FRL and the GHG inventory included in its first BUR.

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

(a) Including all relevant GHG inventory data, complete definitions for all five REDD+ activities, and detailed descriptions of the selected activities and links between the GHG inventory, the activities and the FRL (see paras. 10, 13, 15 and 17 above);

(b) Clarifying more explicitly the land areas allocated to the various REDD+ activities as well as country-specific definitions of the activities and categories of land use and land-use change (see para. 14 above);

(c) Including the time series of land-use changes underlying relevant GHG inventory information to enhance clarity and understanding (rather than in a separate GHG inventory tool spreadsheet) such as AD by REDD+ activity and the associated trends over time (see paras. 19 and 21 above); information on land use versus land cover (see para. 23 above); information on natural versus anthropogenic disturbances on managed land (see para. 24 above); consistent data on emissions and removals from managed land (see para. 22 above); and methodological information relating to these data and information (see paras. 29–30 above);

(d) Ensuring that EFs (e.g. for above-ground biomass growth, in particular for pine forests) are representative of forest type (see paras. 20, 25 and 26 above);

(e) Transparently reporting the definition of forest and ensuring consistency in applying this definition over time (see para. 38 above).

46. Pursuant to decision 13/CP.19, annex, paragraph 2 (f), in assessing the pools and gases included in the FRL, the AT noted that some pools and gases excluded by Belize could be substantial in the context of the FRL, especially with regard to deforestation. 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 FRL:

(a) Treatment of emissions from dead organic matter and soil organic carbon (i.e. including the pools or providing more information justifying their omission) (see para. 35 above);

(b) Improving clarity by providing detailed methodological descriptions of the treatment of both CO_2 and non-CO_2 emissions (see para. 36 above).

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

(a) Improve the pine forest equation with data from additional permanent sample plots in the relevant ecosystem (see para. 25 above);

(b) Continue remeasuring permanent sample plots as resources become available (see para. 26 above).

48. In conclusion, the AT commends Belize for showing strong commitment to continuously improving its FRL estimates in line with the stepwise approach. A number of areas for the future technical improvement of Belize's FRL have been identified in this report. At the same time, the AT acknowledges that such improvements are subject to national capabilities and policies, and notes the importance of providing adequate and predictable

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

support.[15] The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Belize.

49. The table contained in annex I summarizes the main features of Belize's proposed FRL.

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

Annex I

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

Main features of the FRL		*Remarks*
Proposed FRL (t CO_2 eq)	4 606 875 for 2016 4 850 928 for 2017 5 094 981 for 2018 5 339 034 for 2019 5 583 087 for 2020	The FRL covers emissions and removals from all five REDD+ activities (see para. 7 of this document)
Type and reference period of FRL	FRL = based on projections obtained by linear extrapolation of historical net emissions and removals in 2001–2015	See paragraph 7 of this document
Application of adjustment for national circumstances	No	
National/subnational	National	Belize included emissions and removals from managed land, applying a managed land proxy (see paras. 6 and 39 of this document)
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation Conservation of forest carbon stocks Sustainable management of forests Enhancement of forest carbon stocks	See paragraph 6 of this document
Pools included	Above-ground biomass Below-ground biomass	See paragraphs 8 and 35 of this document
Gases included	CO_2, CH_4, N_2O	See paragraphs 8 and 36 of this document
Forest definition	Included	Minimum area of 0.5 ha, height of mature trees of 5 m or more and at least 30 per cent canopy cover; some other forest types and areas (e.g. dwarf mangrove) that do not meet the 5 m minimum height criterion are also included (see para. 38 of this document)
Consistency with latest GHG inventory	Methods used for estimating the FRL are not consistent with those used for	The most recent GHG inventory, which Belize was preparing at the same time as the FRL submission and shared with the AT during the TA, is not consistent with the GHG inventory (2016) included in

Main features of the FRL		*Remarks*
	the latest GHG inventory (2016)	the NC3. The Party reported that it was aiming to maintain consistency between the FRL and the GHG inventory included in its first BUR (see para. 11 of this document)
Description of relevant policies and plans	Included	See paragraphs 31–33 of this document
Description of assumptions on future changes to domestic policies, if included in constructing the FRL	Not applicable	
Description of changes to previous FRL	Not applicable	
Identification of future technical improvements	Included	Several areas for future technical improvement were identified (see paras. 45–46 of this document)

Annex II

Documents and information used during the technical assessment

A. Reference documents

First (original and modified) FRL submission of Belize. Available at https://redd.unfccc.int/submissions.html?country=blz.

"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. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/.

B. Other documents

The following references have been reproduced as received:

Belize Collect Earth/Open Foris Land Use and Land Use Change Assessment Protocol.

Excel Spreadsheet: Final_GHGI_Belize_Database (FREL_REDD Results)_2020_01_10.xlsx. Requests for access to the Excel spreadsheets should be made to the Chief Executive Officer (ceo@environment.gov.bz) or the Chief Climate Change Officer (coord.cc@environment.gov.bz) at the National Climate Change Office.

Interim pine permanent sample plot methodology.

Neil Bird (1998). Sustaining the yield: improved timber harvesting practices in Belize 1992–1998.

Percival Cho (2013). Diversity, dynamics and carbon budget of tropical forests subject to hurricane and anthropogenic disturbance: Field Research Methods.

P.C. Almada-Villela, P.F. Sale, G. Gold-Bouchot and B. Kjerfve (2003). Manual of methods for the MBRS synoptic monitoring program.