United Nations

Framework Convention on
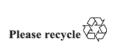Climate Change

FCCC/TAR/2020/DOM

Distr.: General
22 April 2021

English only

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

Summary

This report covers the technical assessment of the voluntary submission of the Dominican Republic 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 the Dominican Republic covers the activities reducing emissions from deforestation, reducing emissions from forest degradation and enhancement of forest carbon stocks, which are among the activities included in decision 1/CP.16, paragraph 70. For its submission, the Dominican Republic developed a national FRL. The FRL presented in the original submission, for the reference period 2006–2015, corresponds to 6,534,106 tonnes of carbon dioxide equivalent per year. As a result of the facilitative process during the technical assessment, the FRL was modified to 2,200,494 tonnes of carbon dioxide equivalent per year. The assessment team notes that the data and information used by the Dominican Republic in constructing its FRL are 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.

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Abbreviations and acronyms

AD	activity data
AT	assessment team
BUR	biennial update report
C	carbon
COP	Conference of the Parties
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
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)
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 the Dominican Republic on its proposed FRL,[1] submitted on 6 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): Carlos Bahamondez (Chile) and Marieke Sandker (Netherlands). 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 Luca Birigazzi and 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, the Dominican Republic 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 Dominican Republic provided its submission in Spanish.

4.   The objective of the TA is to assess the degree to which the information provided by the Dominican Republic 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 the Dominican Republic for the construction and future improvement of its FRL, as appropriate.[8]

5.   The TA of the FRL submitted by the Dominican Republic 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.

6.   Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of the Dominican Republic. The facilitative exchange during the TA allowed the Dominican Republic 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, the Dominican Republic provided a modified version of its submission on 31 July 2020, which took into consideration the technical input of the AT. The main modifications were replacing national SOC values with IPCC default values (see para. 18 below) and replacing the post-stratified AD estimator for all REDD+ activities included in the FRL with a simple random sampling estimator (see para. 21 below). The modifications improved the clarity and transparency of the submitted FRL. This TA report was prepared in the context of the modified FRL submission. The modified submission, containing the assessed FRL, and the original submission are available on the UNFCCC website.[11]

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[1] The submission of the Dominican Republic is available at https://redd.unfccc.int/submissions.html?country=DOM.

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

B. **Proposed forest reference level**

7. 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 the Dominican Republic, 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 and enhancement of forest carbon stocks, which are three of the five activities referred to in that paragraph. Pursuant to paragraph 71(b) of the same decision, the Dominican Republic developed a national FRL that covers its entire territory. For its submission, the Dominican Republic applied a stepwise approach 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.

8. The Party derived AD for all REDD+ activities from a systematic sample of spatial sample units. The land-use change for each sample unit was assessed through visual interpretation of available satellite imagery performed by remote-sensing experts using the Collect Earth tool (see para. 12 below). Information on EFs and removal factors was obtained from historical national data sets, namely the national forest inventory and the biomass and carbon content assessment system, as well as national and regional studies and the 2006 IPCC Guidelines (see para. 13 below). The FRL presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities for 2016–2025, corresponds to 2,200,494 t CO_2 eq/year.[12]

9. The proposed FRL includes the above-ground and below-ground biomass, litter and deadwood pools. In relation to the SOC pool, the submission includes CO_2 but does not include direct N_2O associated with the drainage of organic soils. Regarding GHGs, the FRL includes CO_2 only.

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, the Dominican Republic used methodologies that are consistent with those provided in the 2006 IPCC Guidelines. The Party's FRL is not subject to adjustment for national circumstances under the provisions of decision 12/CP.17, paragraph 9.

11. The FRL is based on the annual average historical net emissions and removals (in CO_2 eq) associated with the activities reducing emissions from deforestation, reducing emissions from forest degradation and enhancement of forest carbon stocks for the reference period 2006–2015, covering a 10-year period from 1 January 2006 to 31 December 2015. The validity period of the FRL is 2016–2025.

12. AD were collected through visual interpretation performed by remote-sensing experts of spatial sample units distributed over the country in a systematic grid measuring 5 × 5 km. The remote-sensing experts used the Collect Earth tool for classifying the spatial sample units. The spatial sample units were post-stratified using a forest-area change map developed by the Ministry of Environment and Natural Resources (Ovalles, 2018) to evaluate whether some land-use change classes in the map were undersampled. As a result of this exercise, the

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[12] In its original submission, the Dominican Republic proposed a national FRL of 6,534,106 t CO_2 eq/year for 2006–2015. The difference between the original and the modified submission is due mostly to replacing national SOC values with IPCC default values.

density of the systematic grid was augmented from 5 × 5 to 1 × 1 km for the map strata "conversion of pine forest to woody vegetation" and "conversion of pine forest to non-woody vegetation". The systematic grid measuring 5 × 5 km consisted of 1,942 spatial sample units, which increased to 2,083 units following the intensification of the grid for the above-mentioned strata.

13. The Dominican Republic used mostly country-specific data complemented by data from regional studies and IPCC default values for estimating the EFs and removal factors for all REDD+ activities included in the FRL.

14. In calculating the EFs for deforestation, the Dominican Republic considered the post-deforestation carbon content of the land use replacing the forest. Information on the deforestation EFs for above-ground biomass, deadwood and litter was obtained from the national forest inventory for the carbon content of forest land, and from the biomass and carbon content assessment system for the carbon content of non-forest land, both of which were developed by the Ministry of Environment and Natural Resources. The Dominican Republic applied a regression equation from Cairns et al. (1997) using above-ground biomass values to calculate below-ground biomass, which corresponds to an average root-to-shoot ratio of 0.24/0.25 per forest type. The deforestation EFs for SOC were derived using tier 1 values from the 2019 Refinement to the 2006 IPCC Guidelines. Country-specific above-ground biomass values were used to derive the EFs for broadleaf forest, dry forest, pine forest, tree plantations, and woody and non-woody vegetation.

15. To calculate the EFs for forest degradation and the removal factors for enhancement of forest carbon stocks on forest land remaining forest land, the Dominican Republic created a linear regression model based on 270 field observations for three forest types: broadleaf forest, dry forest and pine forest. The field observations were grouped into three categories of canopy cover (low, medium and high), against which the average above-ground biomass content was plotted. Accordingly, the linear regression model was created on the basis of the three data points. The resulting model was used to convert decreases or increases in canopy cover observed in the spatial sample units into estimates of associated biomass loss or gain.

16. To calculate the removal factors for non-forest land converted to forest land, the Dominican Republic used values from national and regional studies. Biomass growth rates for above-ground biomass were differentiated into growth rates for secondary forests and perennial cultivation, specifically broadleaf or dry secondary forest, pine secondary forest and tree cultivation. For assessing growth in secondary forest, the Party applied country-specific biomass growth rates from Sherman et al. (2012), and, for assessing growth in agroforestry systems, it applied regional (Central American) biomass growth rates from Somarribas et al. (2013).

17. The proposed FRL is based on the assumption that existing domestic policies and current regulations governing forest management will continue over time. Namely, the Party is committed to implementing plans, programmes and projects to stop deforestation and degradation (see section 1.3 of the FRL submission).

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

18. Information on the EFs for deforestation for changes in SOC in the original FRL submission was obtained from a national soil inventory. The AT notes that the EFs used by the Party were much higher (by over 300 per cent) than the IPCC default values for changes in SOC. The Dominican Republic explained that the data in the national soil inventory had not been collected applying good practice and therefore emissions from SOC associated with deforestation may have been overestimated. As a result of the exchange with the AT, in its modified FRL submission the Dominican Republic replaced the originally reported SOC estimates with tier 1 estimates using the default values provided in the 2019 Refinement to the 2006 IPCC Guidelines. In the original submission, emissions from SOC accounted for 68 per cent of the emissions from deforestation, while in the modified submission they

accounted for 28 per cent of emissions from deforestation. As a result of this correction, the reported emissions from deforestation decreased from 9,075,025 t CO_2 eq/year to 4,449,565 t CO_2 eq/year. The AT commends the Dominican Republic for the change implemented, which improved the accuracy of the proposed FRL.

19.   The Dominican Republic explained in its FRL submission that, to facilitate reporting, emissions from soil following a deforestation event that would normally happen over a period of 20 years were considered as occurring entirely in the year in which the deforestation was detected. The AT asked the Party whether this would result in an overestimation of emissions. In response, the Dominican Republic recalculated the emissions from SOC applying the assumption that the emissions are released yearly over a 20-year period, and included emissions from soils originating from deforestation events that occurred during the 20 years preceding the reference period and that were still occurring during the reference period. If the delayed emissions occurring over the reference period were included, the emissions from SOC would be higher than those currently included in the FRL because the deforestation rate before the start of the reference period was higher. The AT commends the Dominican Republic for providing this explanation. The AT notes that reporting all future emissions from SOC in the year in which the deforestation is detected would enhance the transparency of the reporting.

20.   Increases in SOC associated with the conversion of non-forest land to forest land were not included in the FRL submission. The AT acknowledges that including removals from the SOC pool poses the same challenges as referred to in paragraph 19 above. The AT also recognizes that, if the Dominican Republic had included removals from SOC by applying a similar approach (i.e. reporting instant increases in SOC as opposed to an increment over 20 years after conversion of non-forest land to forest land), this would have resulted in an overestimation of removals. Nonetheless, the current exclusion of removals from the SOC pool associated with the conversion of non-forest land to forest land results in an underestimation of removals. Therefore, the AT considers including removals from SOC associated with afforestation as an area for future technical improvement.

21.   For its original FRL submission, the Dominican Republic post-stratified the 2,083 spatial sample units using a forest-area change map (see para. 12 above) to estimate AD. For the modified FRL submission, the Dominican Republic instead calculated the forest-area changes directly from the systematic sample, using a simple random sampling estimator. The Party explained that this change in method was due to the use of the IPCC default SOC values. To reassess soil emissions, the deforested area was disaggregated by soil type. Owing to time limitations, it was not possible to prepare a new land-use change map by soil type to reproduce the post-stratification applied for the original FRL submission.

22.   Though post-stratification would generally be expected to increase the efficiency and precision of the estimates (Saborowski and Cancino, 2007), the AT notes that post-stratification with the detailed 28 land-use change classes used by the Dominican Republic for its original submission had very little impact on the final estimated AD and very little impact on the associated confidence interval. The confidence interval for the deforestation estimate calculated with post-stratification considering 28 detailed land-use change map classes was slightly larger (17.7 per cent compared with 17.4 per cent for deforestation) than the confidence interval without post-stratification. As such, the AT notes that the post-stratification based on the above-mentioned map classes was not effective. Hence, the replacement of the post-stratified AD estimator used for the original submission with a simple random sampling estimator for the modified submission can be considered an improvement.

23.   When assessing the modified FRL submission, the AT noted that all spatial sample units were given equal weight in the calculation of AD. However, the map strata used for the conversion of pine forest had a higher sampling intensity (1 × 1 km instead of 5 × 5 km) and therefore should have received a lower weight. When the AT pointed this out to the Dominican Republic, the Party agreed with the observation but noted that correcting for this issue would also require it to recalculate the uncertainty analysis. The Party indicated that it would not correct for this calculation error at the time, but will address it for future submissions since it is also aiming to assess the entire country using the intensified systematic sample grid.

24.   The AT recalculated the deforestation emission estimate applying the correct weights and found the deforestation area and emission estimate to be overestimated by 11 and 13 per cent, respectively. Applying the correct weights, the FRL value would have been 1,608,598 t CO_2 eq instead of 2,200,494 t CO_2 eq, or 27 per cent below the value reported in the modified FRL submission. The AT therefore considers applying the correct weights for calculating the deforestation area and emissions to be an area for future technical improvement.

25.   When considering the information shared with it by the Dominican Republic during the TA, the AT noted that the above-ground biomass in forest ranges between 27 and 48 t C/ha, while the 2019 Refinement to the 2006 IPCC Guidelines suggests a range of 35.5–144 t C/ha for secondary and primary forest in tropical North and South America. The AT therefore found the above-ground biomass values used for the Dominican Republic's forest to be rather low. When the AT shared this observation with the Dominican Republic, the Party explained that the values are low because the majority of forest in the country is currently degraded. This information helped the AT to understand the data.

26.   In relation to the requirements of decision 12/CP.17, paragraph 8, the AT notes that the methods used by the Dominican Republic for its BUR are different from those applied for the FRL submission. In its modified FRL submission, the Dominican Republic explained that the BUR does not include emissions and removals from conversion of forest land use. For the calculation of removals from forest land remaining forest land for its BUR, the Party used default values. In this respect, the AT notes a lack of consistency regarding the methodology, sources of AD and EFs used. During the TA, the Party explained that it is working to ensure consistency between its BUR and FRL submission. The AT commends the Party's efforts to improve its FRL in this regard, which are due to be concluded in the near future.

27.   The AT sought clarification on how the degradation and enhancement of forest carbon stocks were assessed and under what circumstances. In response, the Party explained that, for these two activities, it included emissions and removals from forests where a change in canopy cover was detected. Emissions and removals from forests where no changes in canopy were detected were not included under these two activities and were assumed to equal zero.

28.   When comparing the removals from forest land remaining forest land reported in the BUR (calculated using IPCC default values for growth) and in the FRL submission (calculated using observed increases in canopy cover in the spatial sample units), the AT noted a large discrepancy: the removal estimates reported in the BUR were –12.6 and –10.9 Mt CO_2 eq for 2010 and 2015, respectively, while the removal estimate reported in the FRL submission was –1.1 Mt CO_2 eq/year for 2006–2015. The Dominican Republic explained that this difference may be associated with the fact that forest degradation was not considered in the BUR. The AT suggests that the difference may be associated with the methodology used for the FRL submission, since gradual increases in canopy cover may not be perceived in the spatial sample units, while biomass growth is occurring even in the absence of a visible increase in canopy cover. As such, the AT concludes that removals from forest land remaining forest land may have been underestimated as a result of applying the methodology used for the FRL submission. The AT therefore considers improving the accuracy of the removal estimates for forest land remaining forest land to be an area for future technical improvement.

29.   The AT notes that there is no clear distinction in the FRL submission between forest management and forest degradation, which could result in an overestimation of emissions. The Party explained that the emissions and removals from public and private protected lands or land under forest management were included in the emission estimates for deforestation and forest degradation. The AT notes that the Party's efforts to clarify this issue enhanced the transparency of the information provided.

30.   The AT notes that forest degradation for the forest types broadleaf, pine and dry forest was estimated applying a linear regression model (see para. 15 above). However, this model was not used for estimating forest degradation for the forest type tree plantations. The AT therefore asked the Dominican Republic to clarify how forest degradation was estimated for tree plantations. The Party clarified that, for this class, emissions were estimated using the

stock-difference method, and provided the data table and Excel spreadsheet used for the calculations. The AT commends the Party for the clarification, which enhanced the transparency and completeness of the information. The AT notes that the values related to the different carbon pools provided by the Party were presented in an aggregated format. Following a request from the AT for a table with more disaggregated data, including separate data for above-ground and below-ground biomass, dead organic matter and litter, the Party provided full access to the database used for estimating the EF, which also includes the disaggregated average carbon values for each pool. The AT commends the Party for its efforts to enhance transparency.

31.   The Dominican Republic explained to the AT that it is planning to assess and validate newly available maps (TerraPulse) to potentially post-stratify the sample data more efficiently in the future, and indicated that the collection of additional spatial sample plots is planned. The Party explained that these activities may be considered in the future to improve the accuracy and precision of the AD but would not be part of the current FRL submission owing to time limitations. The AT commends the Party for its efforts to continue improving the accuracy and precision of AD, and notes that applying the correct weights for each map stratum would also resolve the overestimation referred to in paragraph 24 above.

32.   The FRL submission includes a comparison of the visual interpretations carried out by each of the remote-sensing experts who assessed the remotely sensed images (see para. 12 above). In response to a question raised by the AT during the TA, the Dominican Republic indicated that, during the training session for interpreters, the agreement among the remote-sensing experts regarding the evaluation of spatial sample units was found to exceed 90 per cent when the experts evaluated some units jointly. The AT notes that, although the overall comparison is useful in order to understand whether there is a specific bias among the remote-sensing experts, it would be much more informative to provide information on the level of agreement between the independent interpretation of the same subset of spatial sample units by different remote-sensing experts disaggregated by forest class (stable forest, stable non-forest, forest loss, forest gain). The AT considers providing this information to be an area for future technical improvement.

33.   The FRL submission includes an uncertainty assessment of sampling error uncertainties for both AD and EFs. The aggregate uncertainties for the emission estimates were calculated using a Monte Carlo simulation. The FRL submission provides combined uncertainties through simple error propagation, as proposed in the 2006 IPCC Guidelines (vol. 1, chap. 3). The overall uncertainty of the proposed FRL is provided through a 90 per cent confidence interval, which is ±89 per cent.

34.   The AT notes that the Party providing the information and data used for estimating the emissions and removals reported in the FRL submission (in specific Excel files made available online) enhanced the transparency of the submission. The FRL submission includes information available online, with detailed information in the format of Excel spreadsheets, including a land-use change matrix, which facilitated the reconstruction of the proposed FRL by the AT.

35.   The AT notes that no reference was made in the submission to the planned validity period of the FRL. Upon request, the Party clarified that the validity period is 2016–2025. The AT commends the Party for clarifying this issue, which improved the transparency and completeness of the proposed FRL.

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

36.   The submission includes an overview of the conventions (namely the Convention on Biological Diversity and the United Nations Convention to Combat Desertification) to which the Dominican Republic is a signatory and a description of some relevant projects, such as the Quisqueya Green National Plan (a social investment project implemented by the Ministry of Environment aimed at alleviating extreme poverty through reforestation and recovery of natural green areas) and a Green Climate Fund project for landscape restoration in the Los Baos river basin in Vallejuelo, San Juan province. No mention is made of any relevant policies. During the TA, the Party informed the AT that a list of relevant policies, including

REDD+ policies, will be included in the next FRL submission. The AT welcomes this intention.

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

37.   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/or activities should not be excluded.

38.   The pools included in the Party's FRL are above-ground and below-ground biomass, litter, deadwood and SOC. No pools were omitted.

39.   The AT notes that only a small area of deforestation (459 ha/year, or 0.4 per cent of the total deforestation area) occurs on organic soils, yet it is responsible for 20 per cent of the total soil emissions and 8 per cent of the total emissions from deforestation. Direct N_2O emissions associated with the drainage of organic soils are not included in the FRL. Given that deforestation on organic soils is occurring, the AT considers the treatment of non-CO_2 gases to be an area for future technical improvement so as to maintain consistency with the GHG inventory included in the Party's first BUR.

40.   The AT acknowledges that the Dominican Republic did not omit emissions or removals from any REDD+ activities. The Party did not define sustainable management of forests or conservation of forest carbon stocks separately, but included the associated emissions and removals under the REDD+ activities enhancement of forest carbon stocks and reducing emissions from forest degradation (see para. 27 above).

4. Definition of forest

41.   The Dominican Republic provided in its submission the definition of forest used in constructing its FRL. The Party's BUR does not include a definition of forest. During the TA, the Dominican Republic informed the AT that the definition of forest used in constructing the FRL is the same as the one that the Party used for its latest BUR. However, the definition of forest used in constructing the FRL is different from the one that the Party uses for its reporting to the Food and Agriculture Organization of the United Nations for the Global Forest Resources Assessment (i.e. minimum area of 0.81 ha (the area of 3×3 Landsat pixels), height of 5 m or more (3 m or more for dry forest) and at least 30 per cent canopy cover). The forest definition used in constructing the FRL includes agroforestry systems that match the above criteria.

42.   The AT notes that, in its forest definition, the Party used a different tree height threshold to define dry forests (see para. 41 above), while the same canopy cover threshold was applied for all forest types. The AT sought clarification as to whether dry forest, compared with the other forest types, also differs in terms of average tree density, and whether this difference could affect the canopy cover and consequently the emission estimates. The Party clarified that, on average and given equal canopy cover, dry forests have a lower biomass compared with the other forest types, and that this is duly taken into account by the national biomass model provided in figure 9 of the FRL submission. The AT commends the Party for the clarifications, which improved the transparency and reproducibility of the FRL calculations.

III. Conclusions

43.   The information used by the Dominican Republic in constructing its FRL for reducing emissions from deforestation, reducing emissions from forest degradation and enhancement of forest carbon stocks is transparent, complete and in overall accordance with the guidelines for submissions of information on reference levels.

44.   The FRL presented in the modified submission, for the reference period 2006–2015, corresponds to 2,200,494 t CO_2 eq/year.

45.   The AT acknowledges that the Dominican Republic included in its FRL emissions and removals associated with all REDD+ activities, even though two activities (sustainable

management of forests and conservation of forest carbon stocks) were not defined or assessed separately in the submission (see paras. 27 and 40 above). The AT considers that, in doing so, the Dominican Republic followed decision 1/CP.16, paragraph 70, on activities undertaken. The FRL covers the national territory and includes all pools in terms of emissions and removals from forests, although the SOC pool is not covered for the activity enhancement of forest carbon stocks (see para. 20 above). The Party omitted emissions of non-CO_2 gases from its FRL. The AT commends the Dominican Republic for the completeness of its FRL submission.

46.   As a result of the facilitative interactions with the AT during the TA, the Dominican Republic provided a modified submission that took into consideration the technical input of the AT. The AT notes that the accuracy, transparency and completeness of the information provided were significantly improved in the modified FRL submission. The FRL estimate provided in the modified submission is 76 per cent lower than the value reported in the original submission. The AT commends the Dominican Republic on its efforts to improve transparency.

47.   The AT notes that, overall, the FRL does not maintain consistency, in terms of sources of AD and EFs, with the GHG inventory included in the Dominican Republic's latest national communication and BUR (see para. 28 above).[13]

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

        (a)   Applying the correct weights to the spatial sample units in order to avoid overestimating emissions from deforestation (see paras. 23–24 above);

        (b)   Improving the accuracy of the assessment of removals from forest land remaining forest land to ensure that they are not underestimated (see para. 28 above);

        (c)   Providing detailed information on the level of agreement concerning the interpretation of spatial sample units (see para. 32 above).

49.   Pursuant to decision 13/CP.19, annex, paragraph 2(f), in assessing the pools and gases included in the FRL, the AT noted that the gases excluded by the Dominican Republic are likely to be insignificant in the context of the FRL. 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 FRL:

        (a)   Treatment of non-CO_2 gases in order to maintain consistency with the GHG inventory included in the Party's national communication and BUR (see para. 39 above);

        (b)   Treatment of removals from SOC for non-forest land converted to forest land (see para. 20 above).

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

        (a)   Increase the sampling intensity for the future assessment of AD to enable more accurate estimation (see para. 23 above);

        (b)   Create an improved forest-area change map to continue exploring the possibility of using such a map in the future to post-stratify the collected spatial sample units in order to increase the precision of the AD (see paras. 21–22 above);

        (c)   Ensure that new data collected and used for the FRL to estimate emissions and removals from forests are used in future GHG inventory reporting, so as to ensure consistency between future BUR and FRL submissions (see para. 26 above);

        (d)   Reassess SOC following the guidance provided in the 2019 Refinement to the 2006 IPCC Guidelines to replace IPCC default SOC values with accurate country-specific values in the future (see para. 18 above).

51.   In conclusion, the AT commends the Dominican Republic 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 the Dominican Republic's FRL

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

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

52.   The table contained in annex I summarizes the main features of the Dominican Republic's proposed FRL.

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[14] 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 the Dominican Republic

Main features of the FRL		Remarks
Proposed FRL	2 200 494 t CO_2 eq/year	See paragraph 8 of this document
Type and reference period of FRL	FRL = average of historical emissions and removals in 2006–2015	See paragraph 11 of this document
Application of adjustment for national circumstances	No	–
National/subnational	National	See paragraph 7 of this document
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation Enhancement of forest carbon stocks	The AD cover the activities reducing emissions from deforestation, reducing emissions from forest degradation and enhancement of forest carbon stocks, which are three of the five activities referred to in decision 1/CP.16, paragraph 70. Pursuant to paragraph 71(b) of the same decision, emissions from sustainable management of forests and conservation of forest carbon stocks were included under the emissions from deforestation and forest degradation (see paras. 29 and 40 of this document)
Pools included	Above-ground biomass Below-ground biomass Deadwood Litter Soil	In relation to the SOC pool, CO_2 is included but N_2O emissions associated with the drainage of organic soils are not included (see paras. 9 and 39 of this document)
Gas included	CO_2	The FRL includes CO_2 only and excludes methane, carbon monoxide and N_2O (see para. 9 of this document)
Forest definition	Included	The Dominican Republic defines forest as a minimum area of 0.81 ha (the area of 3 × 3 Landsat pixels), a height of 5 m or more (3 m or more for dry forest) and at least 30 per cent canopy cover. This definition is different from the one that the Party uses for its reporting to the Food and Agriculture Organization of the United Nations for the Global Forest Resources Assessment (see para. 41 of this document)
Consistency with latest GHG inventory	Methods used for estimating the FRL are not consistent with those used for	The Dominican Republic should include the treatment of non-CO_2 gases as an area for future technical improvement so as to maintain consistency with the GHG

Main features of the FRL		Remarks
	the latest GHG inventory (2015)	inventory included in its first BUR (see para. 39 of this document)
Description of relevant policies and plans	Included	See paragraph 36 of this document
Description of assumptions on future changes to domestic policies, if included in the construction of 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. 48–49 of this document)

Annex II

Documents and information used during the technical assessment

A. Reference documents

First FRL submission of the Dominican Republic. Available at https://redd.unfccc.int/submissions.html?country=DOM.

"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:

Cairns MA, Brown S, Helmer EH, et al. 1997. *Root biomass allocation in the world's upland forests*. Oecologia. 111(1): pp.1–11. Available at https://doi.org/10.1007/s004420050201.

Ovalles, P. 2018. *Elaboración de mapa de Uso y Cobertura del suelo 2015, Análisis de Cambios y Mapa de Deforestación en la República Dominicana. Proyecto Reducción de Emisiones por Deforestación y Degradación de los Bosques (REDD+). Informe Final*. Santo Domingo, República Dominicana. Available at https://app.box.com/s/ghhf1zeb4ds1homyqh3i1h80ms10enq7.

Saborowski, J., Cancino, J. 2007. *About the benefits of poststratification in forest inventories*. J. For. Sci, 53(4), 139-148. Available at https://www.agriculturejournals.cz/publicFiles/00161.pdf.

Sherman, R. E., Fahey, T. J., Martin, P. H., Battles, J. J. 2012. *Patterns of growth, recruitment mortality and biomass across altitudinal gradient in a neotropical montane forest, Dominican Republic*. Journal of Tropical Ecology, 28(5), 483-495. Retrieved from http://doi.org/10.1017/S0266467412000478.

Somarribas, E., Cerda, R., Orozco, L., Cifuentes, M., Dávila, H., Espina, T., D., O. 2013. *Carbon stocks and cocoa yields in agroforestry systems of Central America*. Agriculture, Ecosystems and Environment, 173, 46-57. Available at https://doi.org/10.1016/j.agee.2013.04.013.

The following documents were provided by the Party in response to requests for clarification or additional information during the TA:

1. Terms of reference and measurement protocols

Protocolo de Evaluación Visual multitemporal para la obtención de datos de referencia para la estimación de la incertidumbre de los datos de actividad para el proceso REDD+. 2019. Available at https://app.box.com/s/pdkqxqjxab12ygeo02sk5zzpj90cq3aq.

The terms of reference for the project on the determination of the organic carbon balance of the soil due to deforestation in the main types of forests in the Dominican Republic. Available at https://www.dropbox.com/s/l7fm47nh180s2au/ToR_RD_WP_1_ENG.docx?dl=0.

The terms of reference for the project on the estimation of emission factors for primary and secondary forests in the Dominican Republic. Available at https://www.dropbox.com/s/3dbiccwlp32zmmj/ToR_RD_WP2_Eng.docx?dl=0.

2. Data and workbooks

The database used to estimate the carbon density for each forest type, including the average carbon content of each forest carbon pool. Available at https://app.box.com/s/1szokt8ezuvqndjruxveyjwue5eulkxx.

The spreadsheet used to develop the linear regression biomass models for Broadleaf wet and dry forest and Pine forest. The spreadsheet also includes the NFI sample units used to fit them and calculated RMS used to estimate the uncertainty of the Removal and Emission factors for stable forest lands. Available at https://app.box.com/s/bp0xje9oo6vwko0fizpjen6azzzs0nkb.

The spreadsheet used to estimate the emissions and removals from the degradation of "Tree plantations". Available at https://app.box.com/s/t86jdn80txorhnowbx62qh3s572ylj89.

The workbook used to calculate emissions from SOC for forest lands converted to non-forest lands. Available at https://www.dropbox.com/s/0kstyudeveyw9y6/SOCemissionsDR_rw.xlsm?dl=0.