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Report on the technical assessment of the proposed forest reference level of Solomon Islands submitted in 2019


Summary

This report covers the technical assessment of the voluntary submission of Solomon Islands 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 Solomon Islands 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, Solomon Islands developed a national FRL. The FRL presented in the original submission, for the reference period 2001–2017, corresponds to 15,359,822 tonnes of carbon dioxide equivalent (t CO₂ eq) for 2018, 16,207,233 t CO₂ eq for 2019, 17,054,643 t CO₂ eq for 2020 and 17,902,053 t CO₂ eq for 2021. As a result of the facilitative process during the technical assessment, the FRL was modified to 15,335,717 t CO₂ eq for 2018, 16,181,627 t CO₂ eq for 2019, 17,027,538 t CO₂ eq for 2020 and 17,873,448 t CO₂ eq for 2021. The assessment team notes that the data and information used by Solomon Islands 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.

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Abbreviations and acronyms

AD	activity data
AT	assessment team
C	carbon
CH ₄	methane
COP	Conference of the Parties
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
EF	emission factor
FAO	Food and Agriculture Organization of the United Nations
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
NC	national communication
NE	not estimated
NFI	national forest inventory
N ₂ O	nitrous oxide
QA/QC	quality assurance/quality control
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
SOC	soil organic carbon
TA	technical assessment
2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>

I. Introduction and summary

A. Overview

1. This report covers the TA of the voluntary submission of Solomon Islands on its proposed FRL,¹ submitted on 24 December 2018, in accordance with decisions 12/CP.17 and 13/CP.19. The TA took place (as a centralized activity) from 18 to 22 March 2019 in Bonn and was coordinated by the secretariat.² The TA was conducted by two LULUCF experts from the UNFCCC roster of experts³ (hereinafter referred to as the AT): Pierre Brender (United Kingdom of Great Britain and Northern Ireland) and Sabin Guendehou (Benin). In addition, Gervais Ludovic Itsoua Madzous, an expert from the Consultative Group of Experts, participated as an observer⁴ during the centralized activity in Bonn. The TA was coordinated by Nalin Srivastava (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, Solomon Islands submitted its proposed FRL on a voluntary basis. The proposed FRL is one of the elements⁵ to be developed in the implementation of 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 Solomon Islands is in accordance with the guidelines for submissions of information on reference levels⁶ 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 Solomon Islands for the construction and future improvement of its FRL, as appropriate.⁷

4. The TA of the FRL submitted by Solomon Islands was undertaken in accordance with the guidelines and procedures for the TA of submissions from Parties on proposed FRELs and/or FRLs.⁸ This report on the TA was prepared by the AT following the same guidelines and procedures.

5. Following the process set out in those guidelines and procedures, a draft version of this report was communicated to the Government of Solomon Islands. The facilitative exchange during the TA allowed Solomon Islands to provide clarifications and additional information, which were considered by the AT in the preparation of this report.⁹ As a result of the facilitative interactions with the AT during the TA, Solomon Islands provided modified versions of its submission on 21 June 2019 and 19 July 2019, 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. 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.¹⁰

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,

¹ The submission of Solomon Islands is available at <http://unfccc.int/8414>.

² Per decision 13/CP.19, annex, para. 7.

³ Per decision 13/CP.19, annex, paras. 7 and 9.

⁴ Per decision 13/CP.19, annex, para. 9.

⁵ See decision 1/CP.16, para. 71(b).

⁶ Decision 12/CP.17, annex.

⁷ Decision 13/CP.19, annex, para. 1(a–b).

⁸ Decision 13/CP.19, annex.

⁹ Per decision 13/CP.19, annex, paras. 1(b) and 13–14.

¹⁰ <http://unfccc.int/8414>.

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 Solomon Islands, 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” (see para. 33 below), which are three of the five activities referred to in that paragraph. Pursuant to paragraph 71(b) of the same decision, Solomon Islands developed a national FRL that covers its entire territory incorporating all regions and forests in the country. The main forest types in Solomon Islands are natural tropical rainforest (lowland forest, hill forest, freshwater swamp and riverine forest), montane forest (upland rainforest), mangrove and plantation forest (industrial plantation and community woodlot). For its submission, Solomon Islands 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 and/or FRLs by incorporating better data, improved methodologies and, where appropriate, additional pools.

7. The FRL presented in the modified submission, with the aim of accessing results-based payments for REDD+ activities for 2018–2021, corresponds to 15,335,717 t CO₂ eq for 2018, 16,181,627 t CO₂ eq for 2019, 17,027,538 t CO₂ eq for 2020 and 17,873,448 t CO₂ eq for 2021.¹¹

8. The national FRL proposed by Solomon Islands for each year of the period 2018–2021 is a linear extrapolation of the net CO₂ emissions (emissions minus removals) associated with deforestation and forest degradation from the historical reference period 2001–2017.

9. The proposed FRL includes the pools above-ground biomass and below-ground biomass. Regarding GHGs, the submission includes CO₂ only.

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

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

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

10. For the construction of its FRL, Solomon Islands used methodologies provided in the 2006 IPCC Guidelines. The Party classified its national land-use categories into the six land-use categories of the 2006 IPCC Guidelines, further stratifying forest on the basis of the global ecological zones of FAO, in order to select the appropriate default values for carbon stocks from the 2006 IPCC Guidelines. The Party calculated the historical annual emissions and removals using EFs appropriate to various forest strata derived from several sources (see para. 15 below) and AD on land areas obtained using Collect Earth (see para. 14 below). The FRL values for 2018–2021 were projected using a linear regression model (see para. 23 below).

11. The scope of the FRL includes deforestation, forest degradation and enhancement of forest carbon stocks, although no emissions or removals related to the enhancement of forest carbon stocks were included (see para. 33 below).

12. Solomon Islands defined deforestation as the conversion of a forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10 per cent threshold (as used in the forest definition) and forest degradation as the long-term reduction of the overall potential supply of benefits from a forest, including carbon, while maintaining a tree canopy cover above 10 per cent. Deforestation was further classified into primary

¹¹ In its original submission, Solomon Islands proposed a national FRL of 15,359,822 t CO₂ eq for 2018, 16,207,233 t CO₂ eq for 2019, 17,054,643 t CO₂ eq for 2020 and 17,902,053 t CO₂ eq for 2021. The difference between the original and the modified submission is due mostly to the correction of the output from the application of the linear regression equation, and an adjustment made to the assumptions regarding the regrowth of deforested land.

deforestation, defined as the conversion of primary forest to a non-forest land use, and secondary deforestation, defined as the conversion of degraded forest to a non-forest land use. In the modified submission, the Party provided a definition for carbon stock enhancement: the emissions and removals that occur in areas where non-forest grows into forest and in areas where forest remains forest.

13. Solomon Islands chose 2001–2017 as the reference period for the historical emissions because more reliable land-use change data became available from 2001, following the launch of Landsat 7 in 1999.

14. The AD on historical land use and land-use change were obtained from the analysis of a combination of high- and low-resolution satellite images performed using Collect Earth, an open-source tool developed by FAO.¹² The analysis covered the annual historical time series of land use and land-use change, as well as forest disturbances, for 2000–2017. The analysis of forest disturbances covered (1) anthropogenic impacts from activities such as commercial logging, portable saw milling, temporary gardening, grazing, mining and fires, and (2) natural disturbances, namely landslides, floods and cyclones. This characterization was then used to differentiate forests degraded by human activities from those degraded by natural disturbances.

15. Solomon Islands used EFs from a variety of sources, including default data from the 2006 IPCC Guidelines, the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* and the *Good Practice Guidance for Land Use, Land-Use Change and Forestry*; country-specific data from Papua New Guinea; and data from the IPCC Emission Factor Database.¹³ Because Solomon Islands has not yet derived country-specific EFs from an NFI, the EFs applied to the deforestation of tropical rainforests were based on default values of above- and below-ground biomass carbon stocks mainly from the 2006 IPCC Guidelines. The EFs applied to forest degradation stemming from all types of disturbances and management practices assume that the carbon stocks in degraded forests are 65.5 per cent of those in the primary forests. This percentage is based on the modified FRL submission of Papua New Guinea in 2017 (see para. 20 below).

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

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

16. Solomon Islands used Collect Earth for identification and classification of land and calculation of land area (see para. 14 above). However, the AT found that the Party did not include transparent information in the submission on the QA/QC procedures implemented to validate the outputs of the Collect Earth analysis. In response to a question from the AT during the TA, the Party provided in its modified submission a description of its QA/QC procedures. The AT commends Solomon Islands for providing this additional information, which improves transparency regarding the QA/QC procedures implemented.

17. Solomon Islands used a systematic sampling approach at 0.02 by 0.02 degree resolution for identification and classification of land and calculation of land area. While acknowledging that this approach can provide an unbiased estimate of the FRL, the AT noted that it may lead to large uncertainties in estimates for categories such as freshwater swamps that cover relatively small areas but have the potential to contribute significantly to overall net emissions because of their large carbon stocks. The AT notes that Solomon Islands may wish to consider ways of increasing the accuracy of the assessment of changes affecting land-cover categories with potentially large contributions to overall net emissions (e.g. freshwater swamps) and considers this an area for future technical improvement.

18. The AT noted that in its original FRL submission Solomon Islands included different values for the total number of sampling points in figure 3, table 10 and annex 3. In its

¹² Augmented visual interpretation for land monitoring. Available at <http://www.openforis.org/tools/collect-earth.html>.

¹³ <https://www.ipcc-nggip.iges.or.jp/EFDB/main.php>.

modified submission, as a result of the technical exchange with the AT, the Party clarified that the number of sampling points reported in annex 3 (5,777) is the correct value, and revised the values in figure 3 and table 10 accordingly. Solomon Islands explained in its modified FRL submission that, between 2000 and 2017, only 98 sampling points could not be analysed (i.e. these were recorded as “no data”) because of cloud cover (28 points), image noise and other technical issues (4 points), or being located in the sea, despite the application of a sea mask (68 points). The AT commends Solomon Islands for improving transparency regarding the sampling methodology in the modified submission. The AT also noted that only minor deviations from the initial systematic sampling occurred, even if some land-use categories were disproportionately affected by the absence of data (e.g. sampling points in mangrove were discarded owing to the initial sea mask used and those in undisturbed upland rainforest were hidden by permanent cloud cover), and that the provinces were affected relatively evenly by these issues: the shares of sampling points for which land use could not be evaluated were in the range of 0.4–6.0 per cent for all provinces, as per table 10 in the modified submission.

19. Solomon Islands included a quantitative analysis of the random errors in sampling in the calculation of AD in its FRL submission. However, the AT noted that the modified FRL submission included only qualitative information on the QA/QC procedures implemented to minimize bias in the analysis of remote sensing images; a quantitative analysis of associated errors (e.g. an estimate of the classification accuracy of the assessment) was not included. During the TA, in response to a question from the AT, the Party identified a few sources of systematic errors in the remote sensing analysis, such as the difficulty in identifying small-scale logging disturbances in low-resolution images (16 per cent of the plots were not covered by high-resolution images, and for most of the remaining plots, only one high-resolution image was available for the reference period). While acknowledging the challenges in detecting non-contiguous small-scale anthropogenic forest degradation, the AT considers the performance of a quantitative assessment of bias associated with the analysis of plots not covered by high-resolution images in the assessment year and the application of appropriate corrections to them to be an area for future technical improvement.

20. The EFs applied to forest degradation stemming from all types of disturbances and management practices assume that the carbon stocks in degraded forests are 65.5 per cent of those in the primary forests. This percentage is based on the FRL submission of Papua New Guinea in 2017, which was estimated using measurements of commercially logged-over low-altitude forests in Papua New Guinea (Fox et al., 2010). CO₂ removals after forest disturbance were assumed to be implicitly included in the EF for forest degradation. During the TA, in response to a question from the AT, the Party explained that the ratio of carbon stocks between degraded and primary forests from Papua New Guinea is applicable to Solomon Islands because of the floristic and structural similarity of commercial forests in the two countries as well as the occurrence of largely unplanned logging activities with high harvesting intensity in both countries. Solomon Islands also explained that owing to the greater level of supervision by the forest authorities in Papua New Guinea, the frequency of “re-entry” logging in secondary forests in that country is lower than in Solomon Islands; consequently, commercial forests in Solomon Islands are likely to be more degraded than those in Papua New Guinea. While acknowledging the Party’s assertion that 65.5 per cent is a conservative assumption, the AT noted that, because of the differences in the carbon stocks of the two countries, estimating the FRL of Solomon Islands on the basis of the ratio from Papua New Guinea is neither accurate nor in line with the relevant provisions for FREL/FRL reporting and the TA. The AT, therefore, considers the following to be an area for future technical improvement: the development of an EF for forest degradation on the basis of measurements of reduction in carbon stocks in degraded forest in the country, including, if possible, the development of different EFs for each type of forest disturbance and the further stratification of forests degraded owing to logging into (1) forests where logging occurred only once and (2) forests where re-entry into secondary forests also occurred.

21. The AT noted that the approach used by Solomon Islands for calculating emissions from deforestation in its FRL did not include removals due to regrowth occurring during the reference period in areas deforested before 2001. The inclusion of these removals would result in lower values of net emissions for 2001–2017. In addition, the AT noted that the emission calculation methodology applied by the Party did not consider the limited periods

of regrowth of various crops in deforested areas in line with the default periods of regrowth of one or eight years provided in the 2006 IPCC Guidelines. Instead, the Party assumed that regrowth continues until the end of the reference period in all cases. While commending Solomon Islands for its efforts to represent post-deforestation regrowth in its FRL, the AT considers taking into account the impact on the net emissions for 2001–2017 of the regrowth associated with the deforestation occurring before 2001 and using limited periods of regrowth of crops in deforested areas in line with the 2006 IPCC Guidelines to be an area for future technical improvement.

22. The AT noted that, although Solomon Islands is affected by natural disturbances such as cyclones, landslides and floods, the emissions from these disturbances were not accounted for in the construction of the FRL. The AT also noted that the Party did not include transparent information in its submission demonstrating that no human activities occur on lands affected by these disturbances. During the TA, in response to a question from the AT, Solomon Islands explained that no logging activities took place in areas affected by natural disturbances and that the Collect Earth analysis did not find any evidence of historical fuelwood gathering owing to the limited image resolution. In addition, the Party highlighted that both the extent of forest areas affected by natural disturbances and the frequency of natural disturbances are relatively small. The AT considers the inclusion of transparent information justifying that anthropogenic activities do not occur on lands affected by natural disturbances to be an area for future technical improvement.

23. Solomon Islands performed linear extrapolation of the net CO₂ emissions (emissions minus removals) associated with deforestation and forest degradation in the historical reference period 2001–2017 to estimate the FRL for each year of the period 2018–2021. The Party explained in the FRL submission and during the TA that Solomon Islands is a high-forest, low-deforestation country with historically low emissions from deforestation. However, in the recent past, logging activities, which are the major driver of forest degradation (and overall emissions) in Solomon Islands, have increased and are highly likely to continue to increase in the absence of significant policy changes. Resource availability is likely to become a limiting factor after only one or two decades. On this basis, the Party considers that the projection of net CO₂ emissions using linear extrapolation better represents the national circumstances. In its modified submission, the Party explained that using linear regression based on historical annual emissions for 2001–2017 to estimate the average annual emissions for 2013–2017 underestimates the actual average annual emissions for that period by only 5 per cent. This approach is thus a better predictor of actual emissions than using an average of historical emissions for different periods until 2013, which would underestimate the actual values by 46–60 per cent. The AT commends Solomon Islands for providing in the modified submission an additional explanation for the use of the linear extrapolation model for projecting emissions. The AT considers the use of independent data (e.g. for 2001–2012) to establish that a linear trend better reflects emissions over 2013–2017 than any average of emissions over different periods until 2013 to be an area for future technical improvement.

24. As a result of the technical exchange with the AT during the TA, Solomon Islands corrected the errors identified in the application of the linear regression model, which led to modified FRL values for 2018–2021. The AT commends Solomon Islands for this correction, which improved the accuracy of the FRL in the modified submission. The AT, however, noted that the Party did not correct in the modified submission the regression equation used to calculate the FRL values provided in table 20 (equation 5, section 7). The AT considers the inclusion of the correct regression equation used to calculate the FRL in future submissions to be an area for future technical improvement.

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

25. The AT took note of a number of policies and plans reported by Solomon Islands in its FRL submission, in particular, the National Development Strategy 2016–2035 and the Medium-Term Development Plan 2016–2020. While the National Development Strategy is being implemented to improve the social and economic livelihoods of all Solomon Island citizens, it also has the specific aims of ensuring that the environment is developed and managed sustainably and increasing support for climate change mitigation. Forest sector-specific policies include the new National Forestry Policy, finalized in 2018 and awaiting

approval by the Government; the Logging Sustainability Policy 2018, containing measures aiming to prevent the depletion of timber resources; the Forest Resources and Timber Utilisation Act 1969, currently at the final stage of a review, which provides the legal basis for the implementation of relevant policies and programmes in the forest sector; the Protected Areas Act 2010; the Environment Act 1998; and the Wildlife Protection and Management Act 1998. In its FRL submission, Solomon Islands highlighted that improved policies and legislation for the agriculture and land-use sectors are required to better address deforestation and forest degradation in order to reduce emissions in the forest sector.

26. Solomon Islands reported in its FRL submission that it developed the FRL aiming to achieve several objectives, including assessing the effectiveness of national policies and measures to reduce emissions from the forest sector, demonstrating its national contribution to the global efforts to mitigate climate change, and reducing emissions from deforestation and forest degradation below the FRL so as to qualify for results-based payments.

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

27. According to decision 12/CP.17, annex, subparagraph (c), reasons for omitting a pool and/or activity from the construction of the FRL should be provided, noting that significant pools and/or activities should not be excluded.

28. The pools included in the Party's FRL are above-ground biomass and below-ground biomass. Deadwood, litter and SOC were not included owing to the lack of data. Following the technical exchange with the AT, Solomon Islands mentioned in its modified FRL submission that data from the NFI planned to be implemented in 2020–2023 will be used to improve the accuracy of the next FRL submission (in 2022). The missing pools will be included, with priority given to deadwood.

29. With regard to emissions from deadwood, Solomon Islands explained in the FRL (section 3.2) that although it could be a significant pool, especially in disturbed forests, it was not included in the FRL because of the lack of country-specific data and default data from the 2006 IPCC Guidelines. The AT considers the treatment of emissions from the deadwood pool (i.e. the inclusion of the pool or the provision of more information justifying its omissions) to be an area for future technical improvement.

30. With regard to emissions from litter, Solomon Islands explained in the FRL submission (section 3.2) that, although the 2006 IPCC Guidelines do not provide a default value for the litter carbon stocks in tropical evergreen broadleaf forest occurring in the country, the litter pool is not a highly significant pool based on the default value of litter carbon stocks for broadleaf deciduous forest in the tropical region provided in the 2006 IPCC Guidelines (2.1 t C/ha), which is 1.2 per cent of the average carbon stocks of total biomass in primary forests in Solomon Islands (nearly 181 t C/ha). The AT noted that on the basis of this assessment, it may be reasonable to conclude that the contribution to the EF for deforestation is probably not significant. However, the AT noted that assessment of the significance of the changes in litter as a result of forest degradation is not possible without country-specific data corresponding to various types of disturbances. The AT, therefore, considers the treatment of emissions from the litter pool (i.e. the inclusion of the pool or the provision of more information justifying its omission) to be an area for future technical improvement.

31. With regard to emissions from the SOC pool, Solomon Islands mentioned in the FRL submission (section 3.2) that they are expected to be significant in the case of deforestation. The Party, however, noted that it cannot use the tier 1 methodology from the 2006 IPCC Guidelines together with the default data therein because soils in the country have not been classified according to the soil types in the 2006 IPCC Guidelines. In its modified submission, Solomon Islands explained that it has yet to evaluate whether the existing soil data from the mapping and analysis carried out in all provinces as part of the Solomon Islands land resources study (Hansell and Wall, 1976) could be used to improve the accuracy of the FRL or whether new data need to be collected during the NFI. The AT noted that, according to the Ministry of Forests, Environment and Conservation of Solomon Islands (1995), those soil maps were produced following the United States Department of Agriculture soil taxonomy, whose mapping with the IPCC soil classification is provided in the 2006 IPCC Guidelines.

The AT considers the treatment of emissions from the SOC pool (i.e. the inclusion of the pool or the provision of more information justifying its omission) to be an area for future technical improvement. Given that the existing soil maps are old, the AT noted that the integration of the SOC study into the upcoming NFI could provide updated data on SOC stocks in a timely and cost-effective manner. In the near future, pending the availability of such data, the Party may consider classifying its soils into the IPCC soil categories using the mapping between the IPCC soil classification and the United States Department of Agriculture soil taxonomy provided in the 2006 IPCC Guidelines (vol. 4, table 2.3) in order to use the tier 1 methodology therein.

32. Solomon Islands included only CO₂ in the FRL. The Party mentioned in the FRL submission (section 3.3) that, although emissions of non-CO₂ gases (CH₄ and N₂O) related to fires and the drainage of organic soils are likely to be significant, currently it cannot include them in the FRL submission because of the unavailability of reliable data. During the TA, in response to a question from the AT, the Party explained that it is looking for a suitable method for estimating non-CO₂ emissions from fires associated with temporary gardening, the second most important driver of forest disturbance, using the AD for gardening. The Party noted that CH₄ emissions from drainage occur only in organic soils under mangrove forests, which cover less than 1 per cent of the forest area, and, based on land-use change assessment, the overall deforestation rate between 2000 and 2017 was limited (annual deforested area of 0.3 per cent). The amount of these emissions can, therefore, be expected to be very small. Noting the explanation provided by Solomon Islands, the AT considers the inclusion of non-CO₂ emissions from fires associated with temporary gardening to be an area for future technical improvement.

33. Solomon Islands reported that “enhancement of forest carbon stocks” was included in the FRL (section 3.1). However, in response to a question from the AT during the TA, the Party explained in the modified FRL submission (section 4.2.8) that, owing to the changes from this activity occurring gradually and over longer timescales than those from deforestation and forest degradation, no pixels or plots were identified as being subject to the activity in the Collect Earth analysis and, therefore, no data from the activity were used in the construction of the FRL. During the TA, Solomon Islands explained that this activity was included because its emissions and removals are expected to be significant. The Party also explained that, while the FRL includes post-deforestation regrowth removals, it has been making efforts to improve the Collect Earth methodology to better account for forest regrowth in natural forests and plantations. In the modified submission, the Party revised the definition of carbon stock enhancement to be “the emissions and removals that occur in areas where non-forest grows into forest and in areas where forest remains forest”. The AT considers the accurate identification of the areas subject to the enhancement of forest carbon stocks in the reference period to be an area for future technical improvement. Further, the AT notes that until Solomon Islands can accurately identify the areas subject to the enhancement of forest carbon stocks, the transparency of the reporting would be improved by clearly mentioning in the FRL submission that this activity is not included in the FRL.

34. The AT noted that in its NC2 Solomon Islands reported emissions and removals from the LULUCF sector as “NE” owing to the lack of data. Therefore, the AT could not assess the consistency of the information reported on the LULUCF sector between the FRL and the GHG inventories. However, during the TA, in response to a question from the AT, Solomon Islands indicated that it would use the data used for the construction of the FRL for preparing the GHG inventories for future NCs and biennial update reports.

35. The AT acknowledges that Solomon Islands included the most significant activity, “reducing emissions from forest degradation”, of the five activities identified in decision 1/CP.16, paragraph 70, in accordance with its national capabilities and circumstances. The AT noted that Solomon Islands also included “reducing emissions from deforestation” and “enhancement of forest carbon stocks” in the FRL. As acknowledged by the Party, emissions and removals from and enhancement of forest carbon stocks are likely to be significant, but the Party did not include emissions or removals from this activity because of its inability to identify the areas subject to the activity (see para. 33 above).

36. On the basis of the information provided by the Party, the AT noted that the removals from “conservation of forest carbon stocks” and “sustainable management of forests” are

likely not to be significant. The AT noted the intention of Solomon Islands to include emissions and removals from “enhancement of forest carbon stocks” by accurately identifying areas subject to the activity in future submissions (see para. 33 above).

4. Definition of forest

37. Solomon Islands provided in its submission the definition of forest used in the construction of its FRL. The definition in the modified submission (i.e. land spanning more than 1 ha with trees higher than 5 m (for most forest types) and a canopy cover of more than 10 per cent, or trees able to reach these thresholds in situ and excluding land predominantly under agricultural or urban use) is consistent with the one the Party uses for its reporting to FAO for the Global Forest Resources Assessment (FAO, 2012) except regarding the minimum area threshold applied. As opposed to the minimum area threshold of 0.5 ha applied for reporting to FAO, the Party applied a minimum area of 1 ha in the FRL submission, consistent with the remote sensing approach used. Because emissions and removals from the LULUCF sector were reported in the NC2 of Solomon Islands as “NE” (see para. 34 above), the AT was unable to assess the consistency of the forest definition used in the construction of the FRL with the one applied in the national GHG inventory.

38. The AT noted that Solomon Islands did not include in its FRL submission transparent information as to whether certain land-use categories (i.e. mangroves, high-altitude forests, young tree stands and agroforestry ecosystems) that may fall below the forest height threshold (5 m) are included in its forest definition. In response to a question from the AT during the TA, Solomon Islands explained in its modified submission that mangroves and high-altitude forests were included in the definition of forest, and provided the AT with the criteria applied during the land identification using Collect Earth to classify plots of agroforestry systems and young tree stands as forests (over 10 per cent tree coverage, below 20 per cent settlements and below 30 per cent cropland). The AT considers the provision of transparent information, including relevant thresholds, on all land-use categories considered as forest in the construction of the FRL to be an area for future technical improvement.

III. Conclusions

39. The information used by Solomon Islands in constructing its FRL for “reducing emissions from deforestation” and “reducing emissions from forest degradation” is mostly transparent, complete and in overall accordance with the guidelines for submissions of information on reference levels.

40. The FRL presented in the most recent modified submission, for the reference period 2018–2021, corresponds to 15,335,717 t CO₂ eq for 2018, 16,181,627 t CO₂ eq for 2019, 17,027,538 t CO₂ eq for 2020 and 17,873,448 t CO₂ eq for 2021.

41. The AT acknowledges that Solomon Islands included in its FRL the most significant activities and the most significant pools in terms of emissions from forests. The AT considers that, in doing so, Solomon Islands followed decision 1/CP.16, paragraph 70, on activities undertaken, and paragraph 71(b), on elaboration of a subnational FRL as an interim measure, and decision 12/CP.17, paragraph 10, on applying the stepwise approach. The AT commends Solomon Islands for providing information on its ongoing work to develop FRLs for other activities.

42. As a result of the facilitative interactions with the AT during the TA, Solomon Islands provided a modified submission that took into consideration the technical input of the AT. The AT noted 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 Solomon Islands on its efforts. The new information provided in the modified submission increased the reproducibility of the FRL calculations.

43. The AT noted that, because Solomon Islands did not report estimates of its emissions and removals from the LULUCF sector in the GHG inventory included in its NC2, the AT was unable to assess the consistency of its FRL with the GHG inventory included in its NC.¹⁴

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

(a) Considering, with regard to the sampling approach, ways of increasing the accuracy of the assessment of changes affecting land cover categories with potentially large contributions to overall net emissions (see para. 17 above);

(b) Making a quantitative assessment of bias associated with the analysis of plots not covered by high-resolution images in the assessment year and applying appropriate corrections to them (see para. 19 above);

(c) Developing the EF for forest degradation on the basis of measurements of reduction in carbon stocks in degraded forest in the country, including, if possible, developing different EFs for each type of forest disturbance and further stratifying forests degraded owing to logging into forests where logging occurred only once and those where re-entry into secondary forests also occurred (see para. 20 above);

(d) Considering the impact on the net emissions for 2001–2017 of the regrowth associated with the deforestation occurring before 2001, and using limited periods of regrowth of crops in deforested areas in line with the 2006 IPCC Guidelines (see para. 21 above);

(e) Including transparent information justifying that anthropogenic activities do not occur on lands affected by natural disturbances (see para. 22 above);

(f) Using independent data (e.g. for 2001–2012) to establish that a linear trend better reflects emissions over 2013–2017 than any average of emissions over different periods until 2013 (see para. 23 above);

(g) Including the correct regression equation used to calculate the FRL in future submissions (see para. 24 above);

(h) Accurately identifying the areas subject to the enhancement of forest carbon stocks in the reference period, and until that is possible, clearly mentioning in the FRL submission that this activity is not included in the FRL (see para. 33 above);

(i) Providing transparent information, including relevant thresholds, on all land-use categories considered as forest in the construction of the FRL (see para. 38 above).

45. 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 the deadwood, litter and SOC pools (i.e. the inclusion of the pools or the provision of more information justifying their omission) (see paras. 29–31 above);

(b) Treatment of non-CO₂ gases from fires, especially those associated with temporary gardening (see para. 32 above).

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

(a) Use disaggregated EFs for degradation according to the drivers of degradation (e.g. logging) based on the data obtained from the planned NFI;

(b) Use a more systematic way of identifying and delineating managed and unmanaged lands than manually separating them on the basis of interpreter knowledge;

(c) Produce emission and removal estimates at the provincial level through the use of more detailed AD and EFs;

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

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- (d) Improve the accounting for post-deforestation regrowth by collecting more reliable information on it;
 - (e) Broaden the scope of the FRL to include more activities, namely “sustainable management of forests” and “conservation of forest carbon stocks”;
 - (f) Generate more accurate data on forest degradation by implementing a real-time timber monitoring system for assessing the net annual harvested areas and by using harvested timber as a proxy for the extent of forest degradation;
 - (g) Use a combination of forest cover/type wall-to-wall mapping and stratified sampling to improve the accuracy of the FRL;
 - (h) Ensure complete coverage of the assessed area with high-resolution images to increase the accuracy of the FRL;
 - (i) Include non-CO₂ emissions from fires and drainage of mangrove soils in the FRL;
 - (j) Include carbon pools other than living biomass, namely deadwood, litter and SOC, building on the NFI planned to be implemented in 2020–2023 or preliminary (subnational) results that could already be available for a submission in 2022.

47. In conclusion, the AT commends Solomon Islands for showing strong commitment to the continuous improvement of its FRL estimates in line with the stepwise approach. A number of areas for the future technical improvement of Solomon Islands’ 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 support.¹⁵ The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with Solomon Islands.

48. The table contained in annex I summarizes the main features of Solomon Islands’ proposed FRL.

¹⁵ Per decision I3/CP.19, annex, para. 1(b), and decision I2/CP.17, para. 10.

Annex I

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

	<i>Main features of the FRL</i>	<i>Remarks</i>
Proposed FRL	15 335 717 t CO ₂ eq for 2018; 16 181 627 t CO ₂ eq for 2019; 17 027 538 t CO ₂ eq for 2020; 17 873 448 t CO ₂ eq for 2021	The projections were based on the linear regression model: annual emissions (t CO ₂ eq/year) = 845 910 × year – 1 691 711 671 (see paras. 10 and 23 of this document)
Type and reference period of FRL	FRL = based on projections of historical emissions and removals for the reference period 2001–2017	As above
Application of adjustment for national circumstances	No	
National/subnational	National	See paragraph 6 of this document
Activities included	Reducing emissions from deforestation Reducing emissions from forest degradation Enhancement of forest carbon stocks	While acknowledging they are likely to be significant, Solomon Islands reported emissions and removals from the enhancement of forest carbon stocks as zero during the reference period owing to the difficulty in assessing the areas subject to the activity (see para. 33 of this document)
Pools included	Above-ground biomass Below-ground biomass	Solomon Islands did not include the deadwood, litter or SOC pools owing to the lack of reliable data. The Party provided a justification for the insignificance of litter (see paras. 29–31 of this document)
Gas included	CO ₂	Solomon Islands did not include non-CO ₂ emissions from fires and drainage of organic soils owing to the lack of reliable data (see para. 32 of this document)
Forest definition	Included	Land spanning more than 1 ha with trees higher than 5 m (for most forest types) and a canopy cover of more than 10 per cent, or trees able to reach these thresholds in situ. The forest definition does not include land that is predominantly under agricultural or urban use. The forest definition is consistent with the definition that the Party used in the past to report to FAO for the Global Forest Resources Assessment except with regard to the minimal area threshold (0.5 ha in the latter) (see para. 37 of this document)
Consistency with latest GHG inventory		The AT could not assess the consistency of the information reported on the

<i>Main features of the FRL</i>		<i>Remarks</i>
		LULUCF sector between the FRL and the GHG inventories because Solomon Islands reported emissions and removals from the LULUCF sector as “NE” in its NC2 (see para. 34 of this document)
Description of relevant policies and plans	Included	Solomon Islands reported a number of policies and plans in its submission, in particular the National Development Strategy 2016–2035 and the Medium-Term Development Plan 2016–2020 (see paras. 25–26 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	This is Solomon Islands’ first FRL submission
Identification of future technical improvements	Included	Several areas for future technical improvements were identified (see paras. 17, 19–24, 29–33 and 38 of this document)

Annex II

Documents and information used during the technical assessment

A. Reference documents

First FRL submission of Solomon Islands. Available at <https://redd.unfccc.int/submissions.html?country=slb>.

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

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl>.

IPCC. 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 <http://www.ipcc-nggip.iges.or.jp/public/wetlands/>.

NC2 of Solomon Islands. Available at <https://unfccc.int/documents/81629>.

B. Additional information provided by the Party

The following documents¹ were provided by the Party in response to requests for clarification or additional information during the TA:

FAO. 2012. *FRA 2015; Terms and Definitions*. Available at <http://www.fao.org/3/ap862e/ap862e00.pdf>.

Fox JC, Yosi CK, Nimiago P, et al. 2010. Assessment of aboveground carbon in primary and selectively harvested tropical forest in Papua New Guinea. *Biotropica*. 424: pp.410–419.

Hansell JRF and Wall JRD. 1976. *Land Resources of the Solomon Islands Volumes 1-8*. Surrey, England: Land Resources Division, Ministry of Overseas Development.

Land Resources Division, Ministry of Overseas Development. 1976. *Land Resources of the Solomon Islands*.

Ministry of Forests, Environment & Conservation (Solomon Islands). 1995. *Solomon Islands National Forest Resources Inventory. Volume One: National Overview and Methods*. Available at <https://archive.org/details/SINFRI1995V1NationalOverview>.

Solomon Islands Government. 2003. *National Forest Resources Assessment, Solomon Islands Forestry Management (SIFM) Project Report*.

Solomon Islands Government. 2006. *National Forest Resource Assessment Update, Solomon Islands Forestry Management Project (SIFMP) II*.

Solomon Islands Government. 2011. *Solomon Islands National Forest Resource Assessment Update, RAMSI Economic Governance Pillar*.

¹ Reproduced as received from the Party.