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# Report on the technical assessment of the proposed forest reference level of the Philippines submitted in 2023

*Summary*

This report covers the technical assessment of the voluntary submission of the Philippines 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 Philippines covers the activities reducing emissions from deforestation and enhancement of forest carbon stocks, which are among the activities included in decision 1/CP.16, paragraph 70.

For its submission, the Philippines developed a national FRL. The FRL presented in the submission, for the reference period 2000–2018, corresponds to 13,507,350 tonnes of carbon dioxide equivalent per year.

The assessment team notes that the data and information used by the Philippines in constructing its FRL are mostly transparent, mostly complete and mostly in accordance with the guidelines contained in decision 12/CP.17, annex. 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 decision 13/CP.19, annex.

# Abbreviations and acronyms

| | |
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| 2006 IPCC Guidelines | *2006 IPCC Guidelines for National Greenhouse Gas Inventories* |
| 2019 Refinement to the 2006 IPCC Guidelines | *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* |
| AD | activity data |
| AT | assessment team |
| $CH_4$ | methane |
| $CO_2$ | carbon dioxide |
| $CO_2$ eq | carbon dioxide equivalent |
| COP | Conference of the Parties |
| EF | emission factor |
| FAO | Food and Agriculture Organization of the United Nations |
| FREL | forest reference emission level |
| FRL | forest reference level |
| GEZ | Global Ecological Zones |
| GHG | greenhouse gas |
| IPCC | Intergovernmental Panel on Climate Change |
| LULUCF | land use, land-use change and forestry |
| $N_2O$ | nitrous oxide |
| NAMRIA | National Mapping and Resource Information Authority of the Philippines |
| NC | national communication |
| REDD+ | reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70) |
| TA | technical assessment |

# I. Introduction and summary

## A. Overview

1. This report covers the TA of the voluntary submission of the Philippines on its proposed FRL,[1] submitted on 9 January 2023, in accordance with decisions 12/CP.17 and 13/CP.19. The TA took place from 20 to 24 March 2023 and was coordinated by the secretariat.[2] The TA was conducted by two LULUCF experts from the UNFCCC roster of experts[3] (hereinafter referred to as the AT): Kwame Agyei (Ghana) and Javier Garcia Perez (Gamarra) (Spain). In addition, Komlam Edou, an expert from the Consultative Group of Experts, participated as an observer[4] during the session. The TA was coordinated by Pierre Brender (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 Philippines submitted its proposed FRL on a voluntary basis. The proposed FRL is one of the elements[5] 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 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 the Philippines is in accordance with the guidelines for submissions of information on reference levels[6] 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 Philippines to construct and improve its FRL in the future, as appropriate.[7]

4. The TA of the FRL submitted by the Philippines 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 the Philippines. The facilitative exchange during the TA allowed the Philippines 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, the Philippines provided a modified version of its submission on 29 May 2023, 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.

## B. Proposed forest reference level

6. In decision 1/CP.16, paragraph 70, the COP encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking a number of activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances, in the context of providing adequate and predictable support. The FRL proposed by the Philippines, on a voluntary basis for a TA in the context of results-

[1] The submission of the Philippines is available at https://redd.unfccc.int/submissions.html?country=PHL.
[2] As per decision 13/CP.19, annex, para. 7.
[3] As per decision 13/CP.19, annex, paras. 7 and 9.
[4] As 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] As per decision 13/CP.19, annex, paras. 1(b), 13 and 14.

based payments, covers the activities reducing emissions from deforestation and enhancement of forest carbon stocks, which are two of the five activities referred to in that paragraph. Pursuant to paragraph 71(b) of the same decision, the Philippines developed a national FRL that covers its entire territory. For its submission, the Philippines 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 FREL or FRL by incorporating better data, improved methodologies and, where appropriate, additional pools.

7. The national FRL proposed by the Philippines for the historical reference period 2000–2018 is the annual average of the net emissions associated with deforestation, and of the gross removals from reforestation associated with the activity enhancement of forest carbon stocks, excluding areas subject to multiple land cover change events (deforestation and reforestation) during the reference period. The Philippines defines deforestation as the human-induced conversion of forest to another land use or the long-term reduction of canopy cover below the minimum 10 per cent threshold of the forest definition (see para. 40 below). For the estimation of the FRL, deforestation was deemed to have taken place in the reference period on the basis of the observation of a single change of forest to another land use. The Philippines defines reforestation as the re-establishment of forests through planting and/or deliberate seeding on land classified as forest. For the estimation of the FRL, reforestation was deemed to have occurred in the reference period on the basis of the observation of a single change of a non-forest to a forest area without an assessment of whether or not planting or seeding occurred (owing to the difficulties in determining whether reforestation was caused by planting or seeding during remote sensing analysis).

8. The AD used in constructing the FRL were extracted from a historical time series of maps showing forest and non-forest cover for 2000–2018 generated using TerraPulse forest cover product with a tree canopy cover threshold of 30 per cent. The EFs were derived from the Forest Resources Assessment conducted from 2013 to 2019 by the Forest Management Bureau of the Department of Natural Resources of the Philippines. The FRL presented, with the aim of accessing results-based payments for REDD+ activities after 2018, corresponds to 13,507,350 t $CO_2$ eq/year.[10]

9. The proposed FRL includes the pools above-ground biomass and below-ground biomass. Deadwood, litter and soil organic matter were excluded. Regarding GHGs, the submission includes $CO_2$ only.

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

## How each element in decision 12/CP.17, annex, 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 Philippines used the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines to calculate its average historical emissions from deforestation and removals from reforestation for 2000–2018. Changes in above-ground and below-ground biomass carbon stocks due to land-use changes were calculated separately. For parameters such as biomass growth rate in non-forest land, root-to-shoot ratios and uncertainty parameters, the Party additionally drew on local literature, expert judgment and the 2019 Refinement to the 2006 IPCC Guidelines. FLINTpro software was used to combine at the pixel level the AD (before bias correction) with the emission/removal assumptions described in paragraph 15 below.

11. The AD used in constructing the FRL were derived from annual data on forest and non-forest cover generated on the basis of TerraPulse maps using a 30 per cent canopy cover threshold for 2000–2018. These data were post-processed in Google Earth Engine to include only pixels with at least a 99 per cent probability of being forest and gap-filling any

[10] The figure remained the same in both the original and the modified submission.

information missing due to cloud cover to create a time series of annual maps showing land-cover change, on the basis of which the Party produced a stratification map grouping areas subject to deforestation and reforestation as separate strata. Unbiased area estimates were then calculated by adjusting the areas included in those maps using the results of the land-use classification of 929 sample points generated from Collect Earth Online as reference data.

12. Forest land was stratified according to the four climate types recognized by the Philippine Atmospheric, Geophysical and Astronomical Services Administration, resulting in four forest types. The five IPCC land-use classes (cropland, grassland, wetlands, settlements and other land) were used to classify non-forest land. For estimating the FRL, deforestation was deemed to have occurred on land with only one observed instance of forest cover loss during the reference period, and reforestation to have occurred on land with only one observed instance of forest gain. Land subject to multiple land-cover changes was excluded from the calculation.

13. The EFs for above-ground biomass were derived from the Party's Forest Resources Assessment undertaken from 2013 to 2019. The sampling design adopted for this reporting was low-intensity, systematic and unstratified. This resulted in the selection of 395 tracts nationwide. From 2013 to 2018, regional forest inventory teams carried out field measurements of 302 tracts (each containing four plots, with each plot having three pairs of subplots or nested plots), of which 292 were evaluated and electronically encoded in 2019. Ten tracts were excluded because of missing field data. Owing to the absence of local allometric models, the above-ground biomass of individual trees in the plots was calculated using the allometric model for pantropical forests developed by Chave et al. (2014). Carbon stocks per hectare for each forest type were calculated using default values for root-to-shoot ratio from the 2019 Refinement to the 2006 IPCC Guidelines and carbon fraction of dry matter from the 2006 IPCC Guidelines. Growth rates for post-deforestation regrowth were also taken from the 2019 Refinement to the 2006 IPCC Guidelines. The Philippines decided to apply the maximum biomass and growth rates of shaded perennial crop systems from the 2019 Refinement to the 2006 IPCC Guidelines to represent carbon stocks in post-deforestation perennial crop following a review of the IPCC default values and local carbon stock literature.

## 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

14. During the TA, in response to a request, the Philippines shared with the AT a detailed spreadsheet showing its calculations and granted it read-only access to the FLINTpro tool, which enhanced the AT's understanding of the Party's approach to calculating the FRL. However, the AT noted that the read-only access to the tool prevented it from reconstructing the FRL, and therefore considers granting the AT full access to the tool as an area for future technical improvement.

15. In its FRL submission, the Philippines referred to differences between the data, methods and assumptions used for its 2018 GHG inventory and those used for its FRL submission. However, the AT noted that the 2018 GHG inventory has not been submitted to the UNFCCC and, as such, it is unable to assess the consistency of the data, methods and assumptions therein with those in the FRL submission. The Party's most recent national GHG inventory is therefore the one included in its NC2 submitted in 2014 for inventory year 2000. However, the inventory contains very limited information on the underlying data, methods and assumptions; it only specifies that the Philippines used the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* for preparing the inventory. During the TA, the Philippines explained that forest area was classified into more homogeneous strata, based on the four climate types, in the FRL submission compared with in the NC2, which distinguished between closed, open, mangrove and plantation forests. The AT determined that the data, methods and assumptions used to construct the FRL are not consistent with the Party's latest GHG inventory (i.e. the one included in the NC2); the Party reported during the TA that it would take action to ensure consistency in this regard in future GHG inventories.

The AT therefore noted using the same sources of AD to characterize forest areas and ensuring consistency between the GHG inventory and the FRL submission, including in the stratification of forests, as an area for future technical improvement.

16. In its FRL submission, the Party explained that in some cases cloud cover prevented the assessment of tree cover in TerraPulse maps, and that it filled these gaps by taking the average tree cover data from the surrounding four years, classifying areas as forests only if those data indicate such land cover with a probability of 99 per cent. During the TA, the AT noted that notwithstanding that procedure, some of the areas did not have land cover change strata assigned to them for the calculation in FLINTpro. The Party explained that, since the unbiased area (and emission) estimates were determined by adjusting the areas assumed (and emissions/removals calculated) in FLINTpro by a correction factor between area estimates obtained using a sample-based approach in Collect Earth Online and the area assumed in FLINTpro, the existence of areas without strata in the forest map does not introduce an underestimation or overestimation of emissions and removals. However, the AT noted that the mapped strata are critical in estimating the FRL as the strata were used in selecting the sample to be analysed in Collect Earth and that any incorrect classification of those data could indeed affect the accuracy of the estimation of emissions and removals. The AT therefore considers the extension of the data gap-filling procedures as an area for future technical improvement.

17. The Philippines adopted a binary approach to classifying forest and non-forest areas. In the absence of disaggregated non-forest data, it used the 2020 NAMRIA land-cover map to estimate the proportion of post-deforestation land use for each of the four forest types. The AT noted that this is not consistent with the Party's overall approach to estimating AD for deforestation and reforestation, namely taking forest areas derived from TerraPulse data in FLINTpro and adjusting them to calculate unbiased area estimates using Collect Earth Online sample points. This combination could lead to overestimated or underestimated emissions from deforestation. The AT therefore noted ensuring consistency in the approaches to determining post-deforestation land use and to estimating AD for deforestation and reforestation as an area for future technical improvement.

18. The AT noted significant differences between the mapped areas of deforestation and reforestation assumed in FLINTpro (referred to as "simulated" in the FRL submission) and the adjusted areas of deforestation and reforestation ultimately used as AD by the Party. In the original submission, the Party reported 396,670 ha as the mapped deforestation area and 1,197,127 ha as the adjusted area in table 10; and 1,223,076 ha as the mapped reforestation area and 671,713 ha as the adjusted area in table 11. During the TA, the Party reported that one of the main reasons for the large differences was that plantations had been incorrectly mapped as forests. The Party added that the TerraPulse maps only facilitated the spatial distribution of sample points using stratified random sampling, which were ultimately analysed with Collect Earth. The AT noted improving the accuracy of the land-cover map as an area for technical improvement that would enhance the accuracy of the area and emission/removal estimates given the stratified sample used.

19. The Party mentioned in the calculation spreadsheet it shared with the AT that the confusion matrices between map areas and sample plots analysed with Collect Earth Online cannot be used to assess the accuracy of the TerraPulse maps since the land-use categories estimated with Collect Earth Online do not align with the mapped strata. For instance, whereas plantations had been categorized as non-forest in the creation of reference land-use data with Collect Earth Online, the Party explained during the TA that there had been no attempt to distinguish between perennial crops and forest in the process of creating TerraPulse forest maps. The AT noted aligning the label used in the Collect Earth analysis and the mapped data used in FLINTpro as an area for future technical improvement that would enhance the accuracy of the FRL. The AT also noted that, alternatively, the Party may wish to consider using a random sample (instead of a stratified sample using mapped AD) and increasing the number of sample points in Collect Earth Online to estimate AD for deforestation and reforestation.

20. The Party temporarily divided the reference period underlying its FRL into different "epochs" (2000–2005, 2006–2012 and 2013–2018) with a view to determining whether changes in tree/forest cover were consistent over time. However, the AT noted that many

pixels in the underlying maps, as well as in the reference Collect Earth Online data, show multiple changes in tree cover (labelled as "multiple events"), which may have pointed to either deforestation and reforestation events or changing land cover within areas of stable land use. The Party explained that it did not take into account areas containing multiple events in constructing its FRL so as to provide conservative estimates. The AT noted that this may result in an inaccurate representation of the country's forest areas and noted the assessment of forest-cover changes in areas subject to multiple changes in tree cover as an area for future technical improvement, while noting the difficulties involved in such interpretation, particularly when long reference periods are involved. The AT also notes that the 2006 IPCC Guidelines highlight as good practice the development of accurate rather than conservative estimates.

21. In response to a question regarding discrepancies in estimates for forest and reforestation areas between the FRL submission and those provided by the Party as part of its reporting to FAO for the Global Forest Resources Assessment (for 2015 and 2020), the Party reported that this was due to the use of different methodologies to estimate forest and reforestation areas in the FRL and in the reporting to FAO, noting that clarification would be included in the modified submission. The AT noted that such clarification was not included in the modified submission. The AT noted that providing a more detailed explanation in future FRL submissions for the discrepancies in the estimates would increase transparency, noting this as an area for future technical improvement.

22. In estimating its FRL, the Party applied a correction factor (the ratio of Collect Earth Online to FLINTpro estimates) to estimate unbiased areas of deforestation and reforestation. During the TA, in response to a question from the AT on whether the application of different correction factors for different forest types was considered, the Party reported that, although it acknowledges that there can be different biases in TerraPulse mapped areas for the different forest types, it did not apply different correction factors owing to limited resources and the judgment that the national-level estimates using national correction factors allow the production of unbiased estimates of deforestation and reforestation and that increasing the sampling intensity would not have yielded a significant improvement. The AT noted, however, that using a national correction factor may affect the accuracy of the area estimates. The AT therefore considers applying separate correction factors for each forest type as an area for future technical improvement.

23. The AT noted that the Party did not undertake a quantitative assessment of the accuracy of the TerraPulse forest maps with canopy cover thresholds of 10 and 30 per cent respectively. However, the Party determined a classification accuracy of 93.92 per cent for the NAMRIA maps and qualitatively assessed the accuracy of both the TerraPulse and the NAMRIA maps, on the basis of which it decided that the TerraPulse maps applying a threshold of 30 per cent, to be subject to subsequent post-processing in Collect Earth Online, provided a more accurate indication of known forest areas, even though a threshold of 10 per cent canopy cover is used in the forest definition (see para. 40 below). The AT noted that quantitatively assessing the different TerraPulse maps would have been a better measure of reliability and thus considers this as an area for future technical improvement.

24. The AT noted some inconsistencies in the mapped area of deforestation in the original submission (tables 6, 8 and 10). During the TA, the Party reported that this was due to having to estimate the areas of each pixel as well as rounding associated with the use of the officially accepted size of the country. The AT noted that the correction factor (the ratio of unbiased to mapped areas of deforestation and reforestation) was an important part of the estimation of emissions, acknowledging the Party's efforts to ensure consistency in this regard in the modified submission, with consistent figures provided for the first two tables (tables 7 and 9 in the modified submission). However, it noted that there are still discrepancies between the mapped areas of deforestation reported in the first and third tables (tables 7 and 11 in the modified submission), and thus considers ensuring consistency in such reporting as an area for future technical improvement.

25. In the original submission, the Party mentioned that country-specific data from its Forest Resources Assessment conducted between 2013 and 2019 were used to estimate above-ground biomass. Following the 2006 IPCC Guidelines, which encourage homogeneity within forest land strata in order to reduce variance within each forest type and thus improve

accuracy and reduce uncertainty, the Party divided its forest into four strata based on the climate types to calculate above-ground biomass, which were found by the AT to be significantly different from those computed using the FAO GEZ classification. Following the technical exchange with the AT, the Party included a presentation of the GEZ-based above-ground biomass in its modified submission. The AT commends the Party for this addition, which increases the transparency of the submission.

26. The AT noted that some elements underlying the EFs used for forest areas (such as root-to-shoot ratios) were based on IPCC default values by GEZ rather than values developed specifically for the forest strata used by the Philippines for the construction of the FREL. In its modified submission, the Party clarified that the GEZ-based above-ground biomass default values that could have been used for the different GEZ of the Philippines are all very similar. Nevertheless, the AT considers developing values for EFs that are fully aligned with the spatial stratification in the country as an area for future technical improvement.

27. The AT noted that the Party used the maximum rather than the mean biomass value for non-forest classes. During the TA, the Party explained that using the mean, and thus lower, value would result in underestimation of the biomass growth rate for non-forest classes, adding that the values used were based on tier 1 methodology from the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines and were selected following a review of local carbon stock literature. The AT commends the Party for its explanation, noting the adoption of a higher-tier methodology for estimating biomass in non-forest classes as an area for future technical improvement.

28. The AT noted that the Party reported inconsistent root-to-shoot ratios in tables 1 and 2 in the original submission (37 and less than 33 per cent respectively); however, this inconsistency was corrected in the modified submission. The AT commends the Party for providing consistent ratios in the modified submission.

29. In the original submission, the Party explained that it used an allometric model for pantropical forests from Chave et al. (2014) to estimate above-ground biomass in trees, using tree diameter at breast height and wood density as key parameters, since no local allometric models were available. The AT noted that the formula in the original submission showed that the equation used also included total tree height in metres as a parameter and commends the Party for the clarification on this included in the modified submission. Noting that Chave et al. (2014) mentioned that its allometric model for pantropical forests can result in biases when applied to local circumstances, the AT considers developing country-specific allometric models for estimating above-ground biomass in trees as an area for future technical improvement.

30. The AT noted that in table 15 in the original submission the uncertainties for reforestation removals were reported to be percentages, but the values reported seemed to be extremely low. During the TA, the Party reported that the values need to be multiplied by 100 to be read as percentages. The AT commends the Party for correcting the percentages in the modified submission in most cases, but noted that related errors remain in the presentation of the uncertainties for deforestation in the last column of table 15 of the modified submission, noting the correction of this issue as an area for future technical improvement.

31. The AT noted that the Philippines reported lower uncertainty values for total biomass than for above-ground biomass in table 17 in the original submission, despite the estimate of the former being derived from the latter, but that this issue could be resolved by changing the order of calculation steps used to estimate the uncertainty for total biomass using equations 3.1 and 3.2 from the 2006 IPCC Guidelines (vol. 1, chap. 3). The AT commends the Party for the adjustment introduced in table 18 of the modified submission, but considers that the same correction could have been applied in the estimation of the uncertainty values in relation to removals from reforestation for below-ground biomass and total biomass in table 20 in the modified submission and thus notes correcting the uncertainty estimates for reforestation as an area for future technical improvement.

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

32. The Party provided a brief description of its national forest management framework, including details of relevant laws, policies and REDD+ frameworks, as well as laws and regulations governing land tenure, carbon rights and forest rights. For example, the Philippine Master Plan for Climate Resilient Forestry Development for 2016–2028 is the national framework for the forestry sector, aimed at ensuring the climate resilience and sustainable management of watersheds and forestry ecosystems, developed in response to the changing climatic conditions, expanded role of forests as the provider of ecosystem services and institutional challenges in managing forest resources prevalent in the country.

33. Furthermore, the Party reported that the Climate Change Act of 2009 ensures that national and subnational policies, plans, programmes and projects related to climate change are founded upon sound environmental considerations and the principle of sustainable development. The Party also explained that the Philippine National REDD-plus Strategy was developed in 2010, and updated in June 2017 to facilitate the Party's participation in REDD+ initiatives and updated again in 2021 to facilitate the implementation of activities under the Warsaw Framework for REDD+.

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

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

35. The pools included in the Party's FRL are above-ground biomass and below-ground biomass.

36. With regard to emissions from the deadwood and litter pools, the AT requested clarification of the reasons for omitting the pools. In response, the Party explained that the pools were not included because relevant country-specific data were unavailable and that the exclusion of those pools was conservative. However, the AT noted from the spreadsheet provided by the Party during the TA that country-specific data for these pools were available for all forest types for all years in the reference period. During the TA, the Party clarified that those data were estimated using a simplified approach based on tier 1 methods from the 2006 IPCC Guidelines and that the Party was unable to assess their accuracy in its national context. The Party reported that it plans to measure the deadwood and litter pools in its upcoming Forest Resources Assessment and to use to enhance the accuracy of its future FRL submissions. The AT notes that the 2006 IPCC Guidelines consider the development of accurate, rather than conservative, estimates to be good practice. The AT also commends the Party for its effort to measure those pools but considers the treatment of emissions from deadwood and litter (i.e. including the pools or providing more information justifying their omission) as an area for future technical improvement.

37. With regard to emissions from the soil organic carbon pool, the Philippines explained that this pool was also not included because of a lack of country-specific data and that the exclusion of the pool was conservative. The AT notes that the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* provides a method and corresponding default EF for estimating carbon stock changes in soil organic carbon. The AT considers the treatment of emissions from soil organic carbon (i.e. including the pool or providing more information justifying its omission) as an area for future technical improvement.

38. The only gas included in estimating the FRL is $CO_2$, which the Party considers the most significant GHG for the forestry sector. In the FRL submission, the Party noted that there are limited AD for forest fires in the country, preventing it from making the necessary calculations of associated $CH_4$ and $N_2O$ emissions. The AT considers the treatment of non-$CO_2$ gases as an area for future technical improvement so as to maintain consistency with the GHG inventory and commends the Philippines for its efforts to create a database of known and reported incidents of forest fires as a basis for estimating emissions of non-$CO_2$ gases from fires.

39. The AT acknowledges that the Philippines included in its FRL the most significant activities (reducing emissions from deforestation and enhancement of forest carbon stocks)

of the five activities identified in decision 1/CP.16, paragraph 70, in accordance with its national capabilities and circumstances. In its submission, the Party acknowledged that the activity reducing emissions from forest degradation could also be significant, noting the importance of developing methods for assessing emissions from forest degradation, which is made difficult by the quick recovery (within a year) of reduced canopy cover observed. According to the Party's modified submission, the activity conservation of forest carbon stocks was excluded because of lack of AD on the effectiveness of protected areas. The activity sustainable management of forests was excluded owing to the lack of uniformly available spatial data on established plantations and timber harvesting activities and because of reported cases of deforestation within areas subject to forest management plans. The AT considers the development of methods for estimating emissions and/or removals for the activities reducing emissions from forest degradation, sustainable management of forests and enhancement of forest carbon stocks as an area for future technical improvement.

#### 4. Definition of forest

40. The Philippines provided in its submission the definition of forest used in constructing its FRL as formalized in DENR (2005) and NSCB (2004). The definition is the same as that used by the Party for its reporting to FAO for the Global Forest Resources Assessment (i.e. minimum area of 0.5 ha, height of 5 m or more and at least 10 per cent canopy cover). The parameters in this definition are all identifiable using remote sensing technology. Beyond these parameters, the Philippines further qualified in the submission what it considers forest. The AT noted that this additional qualification introduced additional land-cover features, such as temporarily unstocked forest areas, forest roads, cleared tracts of forest and small forest clearings, that could be misclassified as non-forest areas in remote sensing analysis. In response to a question from the AT during the TA in relation to how the Party ensured that these features were classified as forests in line with its forest definition, the Party explained that temporarily unstocked forest areas were considered to result from degradation events and subsequently labelled as stable forests, while the other features were not considered since they could not be consistently defined under the land-cover classification system used. The AT considers mapping land use and not only land-cover features as an area for future technical improvement.

## III. Conclusions

41. The information used by the Philippines in constructing its FRL for reducing emissions from deforestation and enhancement of forest carbon stocks is mostly transparent (see para. 47(h) and (k) below), mostly complete (see para. 47(a) below) and mostly in accordance with the guidelines for submissions of information on reference levels (see paras. 46 and 47(b)–(g), (i)−(j) and (l)−(q) below).

42. The FRL presented in the modified submission, for the reference period 2000–2018, corresponds to 13,507,350 t $CO_2$ eq/year.

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

44. As a result of the facilitative interactions with the AT during the TA, the Philippines provided a modified submission that took into consideration the technical input of the AT. The AT notes that the transparency and completeness of the information provided were significantly improved in the modified FRL submission, without having to alter the approach or values used to construct the FRL, and commends the Philippines on its efforts. The new information provided in the modified submission increased the reproducibility of the FRL calculations.

45. The AT notes that, overall, the Philippines did not maintain consistency, in terms of sources of AD and EFs used for its FRL, with those used for the GHG inventory included in its NC2.[11]

46. Pursuant to decision 13/CP.19, annex, paragraph 3, the AT identified the following additional areas for future technical improvement regarding pools and gases excluded from the FRL:

(a) Treatment of emissions from deadwood, litter and soil organic carbon (see paras. 36–37 above);

(b) Treatment of non-$CO_2$ gases (see para. 38 above);

(c) Development of methods for estimating emissions and/or removals for the activities reducing emissions from forest degradation, sustainable management of forests and enhancement of forest carbon stocks (see para. 39 above).

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

(a) Ensuring full access to the FLINTpro tool to enable reconstruction of the FRL calculations by the AT (see para. 14 above);

(b) Using the same sources of AD to characterize forest areas and ensuring consistency in the forest strata applied between the GHG inventory and the FRL submission (see para. 15 above);

(c) Extending the data gap-filling procedures applied to the land-cover map (see para. 16 above);

(d) Ensuring consistency in the approaches to determining post-deforestation land use and estimating AD for deforestation and reforestation (see para. 17 above);

(e) Improving the accuracy of the land-cover maps used (see para. 18 above);

(f) Aligning the label used in the Collect Earth analysis and the mapped data used in FLINTpro (see para. 19 above);

(g) Improving the interpretation of forest-cover changes in areas subject to multiple changes in tree cover (see para. 20 above);

(h) Providing a more detailed explanation for discrepancies in estimates for forest and reforestation areas between the FRL submission and those provided by the Party as part of its reporting to FAO for the Global Forest Resources Assessment (for 2015 and 2020) (see para. 21 above);

(i) Applying separate correction factors for each forest type (see para. 22 above);

(j) Quantitatively assessing the different TerraPulse forest maps considered for use for spatial AD (see para. 23 above);

(k) Ensuring consistency in the mapped areas of deforestation reported (see para. 24 above);

(l) Developing values for EFs that are fully aligned with the spatial stratification in the country (see para. 26 above);

(m) Adopting a higher-tier methodology for estimating biomass in non-forest classes (see para. 27 above);

(n) Developing country-specific allometric models for estimating above-ground biomass in trees (see para. 29 above);

(o) Correcting the uncertainty estimates for deforestation and the presentation of relative uncertainties using the unit shown in the table header (see para. 30 above);

(p) Correcting the uncertainty estimates for reforestation (see para. 31 above);

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

(q) Mapping land use and not only land-cover features to ensure the consistent classification of land area in line with the Party's national forest definition (see para. 40 above).

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

(a) Produce annual forest-cover maps using the national canopy model under development by the Forestry Management Bureau with a view to improving the AD for estimating future FRLs;

(b) Improve spatial data management within the Forest Management Bureau to increase the availability of quality-controlled AD;

(c) Use the database under development by the Forest Management Bureau of known and reported incidents of forest fires as a basis for estimating emissions of $CH_4$ and $N_2O$ from fires;

(d) Develop more country-specific EFs by revising procedures in the conduct of the national Forest Resources Assessment (tripling tracts number along both the latitude and longitude dimensions, including in the deadwood and litter pools);

(e) Develop methods for estimating emissions from forest degradation in the country.

49. In conclusion, the AT commends the Philippines 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 Philippines' 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.[12] The AT also acknowledges that the TA was an opportunity for a rich, open, facilitative and constructive technical exchange of information with the Philippines.

50. The table contained in annex I summarizes the main features of the Philippines' proposed FRL.

[12] 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 Philippines

| *Main features of the FRL* | | *Remarks* |
|---|---|---|
| Proposed FRL | 13 507 350 t $CO_2$ eq/year | The FRL includes net emissions from deforestation and removals from reforestation, excluding land areas subject to multiple deforestation and reforestation events (see para. 7 of this document) |
| Type and reference period of FRL | FRL = average of historical emissions and removals in 2000–2018 | See paragraph 7 of this document |
| Application of adjustment for national circumstances | No | – |
| National/subnational | National | The FRL covers the entire national territory (see para. 6 of this document) |
| Activities included | Reducing emissions from deforestation<br>Enhancement of forest carbon stocks | The Philippines acknowledged reducing emissions from forest degradation as another significant activity to be considered in future FRLs and highlighted the importance of developing methods to assess such emissions (see para. **Error! Reference source not found.** o f this document) |
| Pools included | Above-ground biomass<br>Below-ground biomass | The deadwood, litter and soil organic carbon pools were excluded owing to a lack of country-specific data (see paras. 36–37 of this document) |
| Gas included | $CO_2$ | The Party noted that it has insufficient information to calculate $CH_4$ and $N_2O$ emissions from fires (see para. 38 of this document) |
| Forest definition | Included | The definition is the same as that used by the Party for its reporting to FAO for the Global Forest Resources Assessment, but the additional land-cover features taken into account in the submission may result in some forest areas not being classified in line with the forest definition (see para. 40 of this document) |
| Consistency with latest GHG inventory | Methods used for estimating the FRL are not consistent with those used for the latest GHG inventory | See paragraphs 15 and 38 of this document |
| Description of relevant policies and plans | Included | The Philippines included a brief description of its national forest management framework, including details of relevant laws, policies and REDD+ frameworks, as well as regulations governing land tenure, carbon rights and forest rights (see paras. 32−33 of this document) |

| *Main features of the FRL* | | *Remarks* |
|---|---|---|
| Description of assumptions on future changes to domestic policy, if included in constructing the FRL | Not applicable | – |
| Description of changes to previous FRL | Not applicable | – |
| Identification of future technical improvements | Included | Several areas for future technical improvement have been identified (see paras. 46−47 of this document) |

# Annex II

## Reference documents

### A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 1997. Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. JL Houghton, LG Meira Filho, B Lim, et al. (eds.). Paris: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency. Available at https://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html.

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 https://www.ipcc.ch/publication/good-practice-guidance-for-land-use-land-use-change-and-forestry/.

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

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

### B. UNFCCC documents

First modified FRL submission of the Philippines. Available at https://redd.unfccc.int/submissions.html?country=PHL.

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

“Guidelines for submissions of information on reference levels”. Decision 12/CP.17, annex. Available at https://unfccc.int/sites/default/files/resource/docs/2011/cop17/eng/09a02.pdf#page=19.

### C. Other documents

The following references may not conform to UNFCCC editorial style as some have been reproduced as received or as cited in the submission:

Chave J, Réjou-Méchain M, Búrquez A et al. 2014. *Improved allometric models to estimate the aboveground biomass of tropical trees.* Global Change Biology (2014) 20, 3177–3190.

DENR Memorandum Circular 2005-005. Adopting Forestry Definitions Concerning Forest Cover/Land Use. Available at: https://forestry.denr.gov.ph/images/policies/2005/dmc/dmc2005-005.pdf.

DENR–FMB. 2017. Update of the Philippine National REDD-plus Strategy. June 2017. Manila, Philippines: Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH. Available at https://forestry.denr.gov.ph/redd-plus-philippines/updates/pnrps.pdf.

FAO. 2015. *Global Forest Resources Assessment 2015*. Rome: FAO. Available at http://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/en/.

FAO. 2020. *Global Forest Resources Assessment 2020*. Rome: FAO. Available at http://www.fao.org/forest-resources-assessment/2020.

NSCB Resolution No. 12 Series of 2004 Approving and Adopting the Official Concepts and Definitions for Statistical Purposes of the Selected Sectors: Agriculture, Fishery and Forestry, Foreign Direct Investments, and Tourism.

Republic of the Philippines. 2009. Republic Act No. 9729. Climate Change Act of 2009. Available at https://www.officialgazette.gov.ph/2009/10/23/republic-act-no-9729/.