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Technical report on the technical analysis of the technical annex to the third biennial update report of Argentina submitted in accordance with decision 14/CP.19, paragraph 7, on 2 December 2019

Summary

This technical report covers the technical analysis of the technical annex submitted on a voluntary basis, in the context of results-based payments, by Argentina on 2 December 2019 through its third biennial update report in accordance with decision 14/CP.19. The technical annex provides data and information on the activity reducing emissions from deforestation, which is an activity included in decision 1/CP.16, paragraph 70, and covers the same subnational territorial forest area as the assessed forest reference emission level (FREL) proposed by Argentina in its modified FREL submission of October 2019.

Argentina reported the results of the implementation of this activity for 2014–2016, which amount to 165,172,705.42 tonnes of carbon dioxide equivalent and were measured against the assessed FREL of 101,141,848 tonnes of carbon dioxide equivalent per year for 2002–2013.

The data and information provided in the technical annex are in overall accordance with the guidelines contained in the annex to decision 14/CP.19. The technical analysis concluded that the data and information provided by Argentina in the technical annex are transparent and overall consistent with the assessed FREL established in accordance with decision 1/CP.16, paragraph 71(b), and decision 12/CP.17, section II. This report contains the findings from the technical analysis and a few areas identified for capacity-building and future technical improvement in accordance with decision 14/CP.19, paragraph 14.

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Abbreviations and acronyms

AD	activity data
BUR	biennial update report
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
FREL	forest reference emission level
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
NFI	national forest inventory
OTF	other forest land
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)
SNMBN	National Monitoring System for Native Forests of Argentina
TA	technical analysis
TF	forest land
TTE	team of technical experts
2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*

I. Introduction

A. Introduction

1. This technical report covers the TA of the technical annex provided by Argentina on 2 December 2019 in accordance with decision 14/CP.19, paragraph 7, included in its third BUR, which was submitted in accordance with decision 2/CP.17, paragraph 41(a), and annex III, paragraph 19. In the technical annex, Argentina provided the data and information used for estimating its anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest carbon stock and forest area changes resulting from the implementation of REDD+ activities in four forest regions in the country. The submission of the technical annex is voluntary and in the context of results-based payments in accordance with decision 14/CP.19, paragraph 8. The TA was coordinated by Jenny Wong (secretariat).

2. The TA of the technical annex is part of the international consultation and analysis of BURs referred to in decision 2/CP.17, annex IV, paragraph 4, the objective of which is to increase the transparency of mitigation actions and their effects through analysis by the TTE in consultation with Argentina and through a facilitative sharing of views, resulting in a separate summary report.[1]

3. Argentina made its FREL submission, in accordance with decision 12/CP.17, on 8 January 2019, which was subject to a technical assessment following the guidance provided in decision 13/CP.19 and its annex. As a result of the facilitative interactions with the assessment team during the TA, Argentina provided a modified FREL submission on 9 October 2019.[2] The assessed FREL was included as one of the elements of the technical annex to its third BUR in accordance with the guidelines contained in the annex to decision 14/CP.19. The findings from the technical assessment of the FREL are included in a separate report.[3]

B. Process overview

4. The TA of the third BUR of Argentina was conducted from 9 to 13 March 2020 as a desk analysis[4] and was undertaken by the following TTE drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Kwame Agyei (Ghana), Laura Aranguren (Colombia), Kenel Delusca (Haiti), Jenny Mager (Chile), Jorge Eduardo Morfín Ríos (Mexico), Elisabeth Pagnac-Farbiaz (France), Lilian Portillo (Paraguay), Atsushi Sato (Japan), Inês Sousa Mourão (Cabo Verde), Marcelo Theoto Rocha (Brazil) and Silke Christina (Sina) Wartmann (Germany). Mr. Morfín Ríos and Ms. Pagnac-Farbiaz were the LULUCF experts who undertook the TA of the technical annex in accordance with decision 14/CP.19, paragraphs 10–13.

5. The TA of the technical annex provided by Argentina was undertaken in accordance with the procedures contained in decisions 2/CP.17, 14/CP.19 and 20/CP.19. This technical report on the TA was prepared by the LULUCF experts in the TTE in accordance with decision 14/CP.19, paragraph 14.

6. During the TA and subsequent exchanges, the LULUCF experts and Argentina engaged in technical discussions, and Argentina provided clarifications in response to the questions raised by the LULUCF experts, in order to reach a common understanding on the identification of the capacity-building needs of the Party and areas for technical improvement.

[1] FCCC/SBI/ICA/2020/TASR.3/ARG. At the time of publication of this report, the summary report was under preparation.

[2] Available at https://redd.unfccc.int/submissions.html?country=arg, where links to all relevant submissions and reports referenced in this document are also provided.

[3] FCCC/TAR/2019/ARG, published on 25 November 2019.

[4] Owing to the circumstances related to the coronavirus disease 2019, the TA of the BUR submitted by Argentina had to be conducted remotely.

7. Following the TA of the technical annex, the LULUCF experts prepared and shared the draft technical report with Argentina for its review and comments. The LULUCF experts responded to the Party's comments and incorporated them into and finalized this technical report in consultation with Argentina.

C. Summary of results

8. In decision 1/CP.16, paragraph 70, the Conference of the Parties 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 in accordance with its respective capabilities and national circumstances. In the context of results-based payments and in line with decision 12/CP.17, Argentina, on a voluntary basis, proposed a subnational FREL covering the activity reducing emissions from deforestation for the purpose of a technical assessment in accordance with decision 13/CP.19 and its annex. The activity is being implemented in four of the country's seven native forest regions (Parque Chaqueño, Selva Tucumano Boliviana (Yungas), Selva Misionera (Selva Paranaense) and Espinal (Caldenal and Ñandubay districts)), which together cover an area of 49,241,852 ha (estimated in 2002), comprising approximately 65 per cent of the area of all forest regions and approximately 90 per cent of the country's total forest land. The assessed FREL of Argentina is 101,141,848 t CO_2 eq/year for the reference period 2002–2013.

9. The Party's FREL is based on its annual average historical CO_2 emissions associated with gross deforestation for the historical reference period of 2002–2013. Forest is divided into two land classes: TF and OTF. TF is defined as land with tree cover of at least 20 per cent native species, with trees that reach a minimum height of 7 m. OTF is defined as land with tree cover of between 5 and 20 per cent native species, with trees that can reach a minimum height of 7 m; or with tree cover of at least 20 per cent native species, where the trees reach a height of less than 7 m; or that has at least 20 per cent of shrubland cover of native species (including palms and reed bed formations), where the bushes have a minimum height of 0.5 m.

10. Argentina reported the results of the implementation of the activity reducing emissions from deforestation for 2014–2016, calculated against the FREL, which amount to emission reductions of 44,409,046 t CO_2 eq for 2014, 59,006,338 t CO_2 eq for 2015 and 61,757,321 t CO_2 eq for 2016, with a total emission reduction of 165,172,705 t CO_2 eq and an associated uncertainty of 3 per cent. This is equivalent to an approximate 56 per cent reduction in the historical emissions from deforestation during 2014–2016.

II. Technical analysis of the information reported in the technical annex to the third biennial update report

A. Technical annex

11. For the technical annex to the third BUR submitted by Argentina, see annex I.[5]

B. Technical analysis

12. The scope of the TA is outlined in decision 14/CP.19, paragraph 11, according to which the TTE shall analyse the extent to which:

(a) There is consistency in the methodologies, definitions, comprehensiveness and information provided between the assessed FREL and the results of the implementation of REDD+ activities;

(b) The data and information provided in the technical annex are transparent, consistent, complete and accurate;

[5] In accordance with decision 14/CP.19, para. 14(a).

(c) The data and information provided in the technical annex are consistent with the guidelines referred to in decision 14/CP.19, paragraph 9;

(d) The results are accurate, to the extent possible.

13. The remainder of this chapter presents the results of the TA of the technical annex to the BUR according to the scope outlined in paragraph 12 above.

1. Consistency in the methodologies, definitions, comprehensiveness and information provided between the assessed reference level and the results in the technical annex

14. In accordance with decision 14/CP.19, paragraph 3, the data and information used by Parties for estimating anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest carbon stock and forest area changes related to REDD+ activities undertaken by them should be transparent and consistent over time and with their established FREL in accordance with decision 1/CP.16, paragraph 71(b–c), and decision 12/CP.17, section II.

15. The LULUCF experts noted that Argentina ensured overall consistency between its FREL and its estimation of the results of the implementation of the activity reducing emissions from deforestation in 2014–2016 by:

(a) Using consistent methodologies and data to generate AD on gross deforestation based on data from the SNMBN, in particular using the same approach for assessing deforestation areas for each year in the reference and results periods, which was based on the same minimum mapping unit of 4–10 ha;

(b) Using consistent methodologies and data to generate EFs, in particular the same above- and below-ground biomass pools, volumetric equations, biomass expansion factors, wood densities and carbon fractions; the same stratification of the four native forest regions for TF; and, for OTF, the same EFs derived from bibliographical reviews and expert knowledge for each of the forest regions;

(c) Including the same two carbon pools, namely above- and below-ground biomass, with the explanation that there is not sufficiently robust information for estimating the soil organic carbon, deadwood and litter pools;

(d) Including the same gases: CO_2 only;

(e) Covering the same subnational forest area: the four native forest regions of Parque Chaqueño, Selva Misionera (Selva Paranaense), Selva Tucumano Boliviana (Yungas) and Espinal (Caldenal and Ñandubay districts);

(f) Assuming that all carbon from both biomass pools is lost after the deforestation event, as detected by visual interpretation owing to the lack of spatially explicit information on carbon content in final land use, and that the forest types in each forest region are homogeneous for deriving EFs for TF and OTF. The FREL and the estimated results for REDD+ consider only native forests, and the conversion of native forest to forest plantation is considered to be deforestation;

(g) Using the same forest definition as that used in constructing its FREL.

16. In view of the above, the LULUCF experts concluded that the results presented of the implementation of the activity reducing emissions from deforestation are consistent with the assessed FREL. The LULUCF experts commend Argentina for ensuring the consistency of the data and methodologies described in the FREL submission for the reference period 2002–2013 and in the technical annex with the results of the implementation of the activity reducing emissions from deforestation for 2014–2016.

2. Transparency, consistency, completeness and accuracy of the data and information provided in the technical annex

17. The LULUCF experts noted that, as part of the TA process, Argentina provided additional information, in particular on its forest definition, EFs applied and a list of documents and databases used for constructing the assessed FREL and estimating the results, including weblinks to where the data and information can be found (see table 9 of the

technical annex). The additional information includes reports on deforestation and monitoring of deforestation[6] by province and forest region for 2002–2004, 2002–2006, 2006–2011 and 2011–2013, which were used for constructing the FREL, and for 2014, 2015 and 2016, which were used for estimating the results. Argentina also provided data and information on the digital coverage of deforestation for the FREL reference periods 1998–2006 and 2006–2014 and for the results period 2015–2016 and the respective catalogues of these imagery data sets, including access to the map portal[7] of the SNMBN for the visualization of deforestation in the provinces and forest regions between 1998 and 2017. Other data shared with the LULUCF experts included tables containing deforestation estimates by province and forest region for 1998–2006 and 2006–2017; the Excel worksheets used for annualizing AD and estimating gross emissions from deforestation and the associated uncertainties of the FREL at the forest region level for 2002–2013; and a worksheet used for estimating emission reductions and the associated uncertainty of the results. The Party further provided a methodological report on the accuracy assessment of the deforestation maps from the SNMBN, including the error matrices and estimates of uncertainty by forest region for both the FREL and the results. In addition, Argentina clarified that all the information used for constructing the FREL and estimating the results in the REDD+ technical annex is publicly available upon request,[8] in accordance with the national Law on Free Access to Public Environmental Information (law 25.381).[9] The LULUCF experts commend Argentina for its efforts to increase transparency and ensure the completeness[10] of the data and information provided, allowing for the reconstruction of the results.

18. The AD used for estimating the results were based on the same four forest regions and the two forest classes (TF and OTF) reported for the assessed FREL. Deforestation estimates were obtained using the same methodology applied for constructing the FREL; that is, through visual interpretation of Landsat satellite imagery of forest lost between two different time periods. The AD for the REDD+ results period relating to the conversion of TF and OTF to other land uses were based on land-use changes for 2013–2014, 2014–2015 and 2015–2016. The LULUCF experts sought further clarification from Argentina on the use of these biennial periods for estimating results in relation to deforestation, indicating that the results were reported as annual values in the technical annex. Argentina clarified that the periods used for estimating the results do not correspond to biennial periods, but instead each period refers to a single year; that is, 2014, 2015 and 2016, respectively. The outputs of the deforestation analyses included digital maps of deforestation areas, annual deforestation tables for the four forest regions and official forest monitoring reports on deforestation for each year of the REDD+ results period.

19. The LULUCF experts noted that the data provided by Argentina on the digital coverage of deforestation for 2014, 2015 and 2016[11] and the data from the official monitoring of deforestation reports are not always consistent with the estimates reported for the total deforested areas, particularly with regard to the deforested areas in the regions of Parque Chaqueño and Espinal for 2014 and 2015. The LULUCF experts also noted that the digital maps and monitoring reports present lower estimates of deforestation areas. For Parque Chaqueño, the digital deforestation maps and the official deforestation monitoring report indicate a deforested area of 157,807 ha/year and 166,360 ha/year, respectively, for 2014. Both these sources present estimates that are different from the total deforested area of 171,211 ha/year for Parque Chaqueño given in table 4 of the technical annex. Similarly, the

[6] Available at https://www.argentina.gob.ar/ambiente/tierra/bosques-suelos/manejo-sustentable-bosques/umsef (in Spanish).

[7] http://snmb.ambiente.gob.ar (in Spanish).

[8] By contacting the National Directorate of Climate Change by email at cambioclimatico@ambiente.gob.ar or making requests online at https://www.argentina.gob.ar/ambiente/transparencia/pedirinformacion (web page in Spanish).

[9] The full text of law 25.831 is available at http://servicios.infoleg.gob.ar/infolegInternet/anexos/90000-94999/91548/norma.htm (in Spanish).

[10] "Complete" here means the provision of the information necessary for the reconstruction of the results.

[11] These data are available at http://snmb.ambiente.gob.ar/develop/ (in Spanish) or can be requested through the National Directorate of Climate Change.

digital maps and official monitoring reports for 2014 for the forest region of Espinal indicate total deforested areas of 21,685 ha/year and 19,174 ha/year, respectively. Once again, the estimates provided by these two sources for Espinal differ from the estimate of 42,049 ha/year noted in table 4 of the technical annex. The LULUCF experts further noted that, likewise, for these two forest regions, Parque Chaqueño and Espinal, the deforested area estimates reported in the official deforestation monitoring report for 2015 are not consistent with the estimates for 2015 provided in the technical annex. For the forest regions of Selva Misionera and Selva Tucumano Boliviana, the estimates of deforested areas derived from digital deforestation maps and the official deforestation monitoring reports are consistent with the estimates of deforested areas in the technical annex.

20. As the majority of deforestation has occurred in the Parque Chaqueño and Espinal regions, the LULUCF experts asked Argentina about the steps it is taking to improve the consistency of the data used in reporting for these two regions. Argentina informed the LULUCF experts that it is currently taking steps to improve the consistency of the data source archive system with the aim of enhancing the transparency, consistency and accuracy of the AD used for estimating emission reductions for future submissions. In addition, in response to a question from the LULUCF experts relating to the differences in estimates between the other sources of information (e.g. official deforestation reports) and the estimates reported in the technical annex, Argentina clarified that the monitoring of deforestation in these regions involves an ongoing review of the forest maps and results as part of a continuous improvement process. The maps are continuously reviewed and revised as more up-to-date information becomes available. On the basis of this updated information, the respective reports are also updated and used for the national GHG inventory. The LULUCF experts also noted that Argentina may wish to consider providing online access to the final digital deforestation coverage maps in order to allow estimation of the REDD+ results for the chosen results period. This would enhance the transparency of the data and information provided in the submission of Argentina. In response to this observation by the LULUCF experts, Argentina clarified that all data (images and annual maps) are publicly available, enabling relevant stakeholders to reconstruct annual increments of forest carbon stock.[12]

21. The LULUCF experts noted that when estimating results, Argentina applied the same EFs as those used for constructing the FREL for each of the four forest regions considered. According to the technical annex, the EFs used for constructing the FREL and for estimating reductions in emissions due to deforestation were estimated on the basis of the carbon content in above- and below-ground biomass by forest region and forest class (TF and OTF). For the TF class, the carbon content values were estimated using field information obtained from 343 sampling units of the NFI (1998–2006), whereas for the OTF class, they were estimated from bibliographical reviews and consultation with experts. During the TA, Argentina explained that the second NFI[13] will provide updated information on biomass values and this would enable it to update the EFs for TF and estimate the specific EFs for OTF. The updated data and information derived from the NFI will enhance the accuracy of the estimations for the REDD+ reporting. Overall, the LULUCF experts conclude that Argentina has maintained consistency in the data and information (i.e. AD and EFs) used as the basis for constructing its FREL and in estimating the results presented in the technical annex.

22. According to decision 12/CP.17, paragraph 8, the FREL shall be established taking into account decision 4/CP.15, paragraph 7, and maintaining consistency with the anthropogenic forest-related GHG emissions by sources and removals by sinks reported in the Party's GHG inventory. The team assessing Argentina's FREL noted that the Party did not include non-CO_2 emissions from fires, although those emissions were included in the second and third BURs of Argentina.[14] At the time of the technical assessment of its FREL, Argentina clarified that non-CO_2 emissions from fires were not included because the available national data on fires were not sufficiently robust to allow for estimation of such

[12] See https://www.argentina.gob.ar/ambiente/tierra/bosques-suelos/manejo-sustentable-bosques/umsef and http://snmb.ambiente.gob.ar (both in Spanish). See also footnotes 8 and 11 above.

[13] Information on the second national inventory of native forests is available on the web portal of the National Directorate of Forests at https://www.argentina.gob.ar/ambiente/tierra/bosques-suelos/segundo-inventario-nacional-bosques-nativos (in Spanish).

[14] Argentina's second and third BURs are available at https://unfccc.int/BURs.

emissions that were a direct result of deforestation. Emissions from the dead organic matter pools (litter and deadwood) were not included in the national GHG inventories reported in the second and third BURs. In order to ensure consistency with the national GHG inventory, these pools were also not considered when constructing the FREL and estimating the results for the REDD+ technical annex. The LULUCF experts noted that these emissions were also not considered for the estimation of the results of the implementation of the activity reducing emissions from deforestation for 2014–2016. Argentina noted in the technical annex that the aim of the national system for its national GHG inventory is to improve the process of preparing international reports for the UNFCCC. The system allows for the evaluation of consistency between the national GHG inventory and the different reports to the UNFCCC, including the information used for preparing the REDD+ technical annex. Argentina also noted that the emissions and removals reported for its agriculture, livestock, forestry and other land-use sector in the national GHG inventory and the emissions from deforestation used in the REDD+ submissions are based on information generated from the SNMBN. The LULUCF experts commend Argentina for its continuing efforts to ensure consistency in the data and information used in its national GHG inventory and submissions on REDD+.

23. During the TA, Argentina explained that it is currently developing a second NFI,[15] which is expected to provide data that will help to improve the accuracy of its estimates. The LULUCF experts commend Argentina for providing transparent information and continuing to improve the accuracy of its estimates as part of the stepwise approach (see also para. 21 above).

24. The LULUCF experts concluded that Argentina provided the necessary information to allow for the reconstruction of the results of the implementation of the activity reducing emissions from deforestation. The data and information provided in the technical annex are considered to be transparent, consistent, complete and accurate to the extent possible.

3. Consistency with the guidelines on elements to be included in the technical annex

25. Argentina provided data and information on all the required elements in accordance with the guidelines contained in the annex to decision 14/CP.19, namely summary information from the final report containing the assessed FREL; results in t CO_2 eq/year, consistent with the assessed FREL; a demonstration that the methodologies used to produce the results are consistent with those used to establish the assessed FREL (as outlined in chap. II.B.1 above); a description of forest monitoring systems and the institutional roles and responsibilities in the MRV of the results; the information necessary for the reconstruction of the results (as outlined in chap. II.B.2 above); and a description of how the elements contained in decision 4/CP.15, paragraph 1(c–d), have been taken into account.

26. In its submission, Argentina provided a summary table with the results of the implementation of the activity reducing emissions from deforestation for 2014–2016, consistent with the assessed FREL and allowing for the reconstruction of the results. The emission reductions achieved are presented in table 3 of the technical annex and amount to 44,409,046 t CO_2 eq for 2014, 59,006,338 t CO_2 eq for 2015 and 61,757,321 t CO_2 eq for 2016. The total emission reduction achieved for 2014–2016 is 165,172,705 t CO_2 eq.

27. The LULUCF experts noted that Argentina provided a description of the SNMBN and a summary of the institutional roles and responsibilities for the MRV of the results in the technical annex, together with illustrations of how MRV for REDD+ is linked with the national GHG inventory system and monitoring of GHG emissions, as well as weblinks for accessing further information. The roles and responsibilities of the agencies and institutions involved in MRV were transparently explained.

28. The SNMBN is under the authority of the National Directorate of Forests and has two main components: satellite monitoring of native forests, which provides annual data and information on forest loss in TF and OTF (AD); and the NFI, which provides data and information for the derivation of EFs for estimating above- and below-ground biomass. Argentina uses geographical information systems to monitor native forests in each forest region and province, facilitating the detailed mapping by forest region and province and the

[15] As footnote 13 above.

generation of detailed disaggregated data sets that enhance the detection of deforestation in these monitored areas. The combination of field data and remote sensing data also enables the Party to generate information for use in the national GHG inventory system, in particular for the forest sector. In addition, Argentina explained that, since 2018, the SNMBN has extended the monitoring of native forest loss to the Monte and Bosque Andino Patagónico regions. Moreover, Argentina clarified that it is striving to make data more accessible on the SNMBN web portal.

29. During the TA, Argentina explained that the second NFI, which is currently under development, will include the collection of field data on native forests. These data will enable Argentina to update the biomass values and revise the associated parameters, such as allometric equations and EFs, thus enabling more accurate estimation of above-ground biomass. Argentina also explained that it is conducting pilot studies on measuring soil organic carbon, litter and deadwood and these studies could be extended across the forest regions of the country with the aim of including these carbon pools in future reporting and submissions. These measurements from the second NFI and the pilot studies will also be included in the improvement of the estimates on AD and EF to be applied in future submissions.

30. During the TA, Argentina also explained that the design of the second NFI was informed by experience from the first NFI. The design of the second inventory, which is based on systematic sampling, uses an orthogonal square grid of 10 by 10 km and each point of intersection that consists of native forest is surveyed, reaching a total of 4,158 sampling units. In addition to dasometric information, information on other variables such as forest biological diversity, state of conservation and non-wood forest products is also collected. The LULUCF experts acknowledge the information shared by Argentina on the SNMBN and the activities being carried out under its second NFI with the aim of improving data collection and the data collected. The experts commend Argentina for these efforts as part of the stepwise approach.

31. According to decision 1/CP.16, paragraph 71(c) and its footnote 7, subnational monitoring and reporting should include monitoring and reporting emission displacement at the national level, if appropriate, and reporting on how the displacement of emissions is being addressed and on the means of integrating subnational monitoring systems into a national monitoring system. During the TA, Argentina provided information clarifying that there is no risk of displacement of emissions from the four forest regions considered in the FREL and results period to the other forest regions in the country. On the basis of the available information, the LULUCF experts noted that, so far, there is no evidence of displacement of emissions. The LULUCF experts commend Argentina for its efforts to monitor emission displacement at the national level as part of the SNMBN.

32. Argentina provided a description of how IPCC guidance and guidelines were taken into account in accordance with decision 4/CP.15, paragraph 1(c). For the estimation of emission reductions in the four forest regions of the country reported in the technical annex, Argentina used the methodology provided in the 2006 IPCC Guidelines for estimating carbon stocks in forest land converted to other land uses. Accordingly, the gross emissions from deforestation were estimated for 2014, 2015 and 2016 by combining AD (i.e. areas of annual deforestation) with the appropriate EF and associated uncertainty (i.e. emissions associated with the corresponding forest type).

33. Argentina included in its FREL and estimation of results the most significant pools. It maintained consistency between the results and the FREL by including the most significant pools (above- and below-ground biomass) and estimating CO_2 emissions only. Overall, the exclusion of the litter, deadwood and soil organic carbon pools and non-CO_2 gases was adequately justified. As had been the conclusion of the assessment team of Argentina's FREL,[16] the LULUCF experts consider the treatment of non-CO_2 gases as an area for future technical improvement so as to maintain consistency with the GHG inventories included in the second and third BURs. The LULUCF experts commend Argentina for expressing its intention to obtain better information on the litter, deadwood and soil organic carbon pools

[16] See document FCCC/TAR/2019/ARG, para. 33.

with the aim of including them in future FREL submissions and estimates of results as part of the stepwise approach.

4. Accuracy of the results proposed in the technical annex

34. The LULUCF experts noted that the Party's estimation of the results of the implementation of the activity reducing emissions from deforestation in four of the forest regions of the country (see para. 8 above) was undertaken using a transparent and consistent approach. The LULUCF experts commend Argentina for its significant long-term efforts to build up the SNMBN and a national GHG inventory system and ensure that both systems are robust and capable of providing transparent and accurate estimates of emissions from deforestation and estimates that are consistent over time, in accordance with decision 11/CP.19.

35. Both the established FREL and the results for 2014–2016 of the implementation of the activity reducing emissions from deforestation are based on the assumption that net emissions from deforestation are the difference between the gross emissions reported in the FREL and annual gross emissions from deforestation for the results period. In addition, the LULUCF experts agree with the finding of the team that undertook the technical assessment of Argentina's FREL regarding the significance of the activity reducing emissions from forest degradation.[17] The experts commend Argentina for its ongoing efforts to collect new and better data and information on forest degradation and to improve related methodologies in order to accurately quantify the emissions and removals relating to the regeneration and degradation of forests.

36. As mentioned in paragraph 17 above, Argentina provided information related to the uncertainties associated with the estimates of gross emissions from deforestation at the forest region level for 2002–2013 for the FREL, and a worksheet used for calculating the associated uncertainty of the estimated emission reductions for 2014–2016. The Party also provided a methodological report on the accuracy assessment of the deforestation maps from the SNMBN, including the error matrices and estimates of uncertainty by forest region for both the FREL and the results. Argentina mentioned in the technical annex that the good practice guidelines for estimating area and assessing accuracy of land-use changes by Olofsson et al. (2014) were used to guide the sampling and response design for evaluating the accuracy of forest maps and the land-use changes in the four forest regions. For estimating the total uncertainty of emissions from gross deforestation, Argentina applied equations from the 2006 IPCC Guidelines (vol. 1, section 3.2.3.1, equations 3.1–3.2 of approach 1 for propagation of errors).

37. Estimations of EF uncertainty for all four forest regions were made separately for above- and below-ground biomass per ha, and included the error estimates in the parameters used, such as volume estimation (for above-ground biomass), root-to-shoot ratio (for below-ground biomass) and default values for wood density and carbon content from the 2006 IPCC Guidelines. The EF uncertainty for the forest class TF is associated with the sampling error from the first NFI and calculated at a 95 per cent confidence interval. For the forest class OTF, the EFs applied are assumed to have the same error as those for TF in each forest region, as there is insufficient information for each of the parameters considered. The total uncertainty, based on the combined EF (for above- and below-ground biomass) and AD (annual estimates of deforested areas by forest region and forest class), is estimated to be approximately 3 per cent.

38. The LULUCF experts noted that, according to the information provided by Argentina, the uncertainty propagated for each forest region is the combined sum of errors in AD and EFs for each individual deforested area in each forest class (TF or OTF) of each forest region on an annual basis, whereas it should be the combined error for the entire deforested area of each forest region and based on the annual AD and EFs for the respective forest class (TF or OTF). The LULUCF experts noted that the Party's calculation could result in a low overall uncertainty, and this is reflected in the uncertainty estimates of 2 per cent for the FREL and 3 per cent for the emission reductions during the results period. During the TA, Argentina clarified that, in order to maintain consistency, the level of disaggregation applied for the

[17] See document FCCC/TAR/2019/ARG, para. 35.

uncertainty calculation corresponds to the level of disaggregation used for calculating the uncertainty in the national GHG inventory. In addition, Argentina shared with the experts a complementary analysis of the difference in uncertainty estimates due to the level of disaggregation or stratification of the parameters applied. In this analysis, the level of disaggregation was forest region and forest class (TF and OTF) and the minimum unit applied in the uncertainty calculation was the total area deforested in each stratum per year. In the case of the FREL (for 2002–2013), the estimated uncertainty was 8 per cent, and for the results period (2014–2016) the uncertainty was 15 per cent. Nevertheless, the LULUCF experts commend Argentina for providing detailed information on uncertainty and accuracy assessment and for the ongoing efforts to enhance the accuracy of the estimates from gross deforestation, noting this as an area for technical improvement for future submissions. Given the assumptions and approach used, the LULUCF experts conclude that the results are accurate to the extent possible.

C. Areas identified for technical improvement

39. The LULUCF experts concluded that the following areas for technical improvement identified in the report on the technical assessment of Argentina's FREL[18] also apply to the provision of information on the results of the implementation of the activity reducing emissions from deforestation:

(a) Using available species-specific wood densities for deriving the biomass values used to obtain the EFs to increase the accuracy of the estimates;

(b) Establishing additional sampling units in the forest regions of concern to enhance the accuracy of estimates;

(c) Using ground data to derive estimates for OTF instead of using bibliographical reviews and expert judgment;

(d) Enhancing the data acquisition process for the OTF class with new methods that allow for unequivocal identification of forest cover loss;

(e) Including non-CO_2 gases (in order to maintain consistency with the GHG inventory included in the Party's national communication or BUR) and considering the incorporation of additional carbon pools in future FREL submissions and REDD+ technical annexes to the BUR.

40. Furthermore, the LULUCF experts noted that, in the context of the technical annex, Argentina could also consider the following:

(a) Moving from subnational to national coverage of its REDD+ implementation and covering all forest regions and forest types of the country, in accordance with the stepwise approach (see para. 8 above);

(b) Strengthening the quality assurance and quality control of the data and information used for estimating the results of REDD+ implementation (see para. 20 above);

(c) Optimizing EFs in the light of new data provided by the second NFI, and AD gathered as a result of technical improvements that would enable forest types to be distinguished (see paras. 28–29 above);

(d) Further refining the stratification of the forest regions (phytogeographical provinces) and forest classes in the second NFI to enable identification of land-use change at the level of forest type (see paras. 29–30 above);

(e) Monitoring and reporting displacement of emissions at the national level (see para. 31 above);

(f) Considering including estimates for the soil organic carbon, litter and deadwood pools using the data from the ongoing second NFI in future submissions (see para. 33 above);

[18] FCCC/TAR/2019/ARG, paras. 43–44.

(g) Considering expanding the coverage of REDD+ activities to include reducing emissions from forest degradation (see para. 35 above);

(h) Improving the data and data analysis (e.g. AD and EF in relation to each forest class and forest region) to reduce uncertainty in the estimation of forest carbon stocks (see para. 38 above).

D. Comments and responses of the Party

41. During the consultation process, Argentina noted a number of areas of capacity-building needs. Addressing those needs could potentially enable Argentina to improve its data and methodologies, move from subnational to national coverage, and include additional activities and gases in future FREL and/or forest reference level submissions. After exchanges with the LULUCF experts, Argentina identified the following capacity-building needs:

(a) Training personnel to collect available data and generate new data in a continuous and robust way and in line with the requirements of the UNFCCC reporting process;

(b) Training personnel to standardize and systematize data collection, which would facilitate updates to the data and their use in other mitigation measures at the subnational and national level;

(c) Developing institutional arrangements among national agencies that would facilitate the provision of data and information in a continuous and efficient manner;

(d) Developing methodologies and building capacity for quantifying regeneration and degradation of forests, implementing the new operational definition of forests and making the corresponding adjustments within the SNMBN;

(e) Strengthening capacity for improving the allometric models for biomass and including other carbon pools in future submissions;

(f) Facilitating and enhancing access to predictable financial resources that support capacity-building and the implementation of the technical improvements identified.

III. Conclusions

42. The LULUCF experts conclude that Argentina reported the results of the implementation of the activity reducing emissions from deforestation for 2014–2016 on the basis of the assessed FREL for the same activity for 2002–2013. Argentina's subnational FREL and results associated with gross deforestation in native forests covered the same four forest regions in the country, namely Parque Chaqueño, Selva Tucumano Boliviana (Yungas), Selva Misionera (Selva Paranaense) and Espinal (Caldenal and Ñandubay districts). The results include estimates of emissions of CO_2 from the two main carbon pools: above- and below-ground biomass. The results of the activity were reported using consistent methodologies, AD and EFs, definitions, assumptions and information with those used for the assessed FREL.

43. The LULUCF experts consider the data and information provided in the technical annex to be transparent, consistent, complete and accurate.

44. The LULUCF experts found that the data and information provided in the technical annex are consistent with the guidelines referred to in decision 14/CP.19, paragraph 9.

45. The results are accurate to the extent possible and uncertainties have been reduced, based on the assumptions used. Argentina provided detailed information on how gross deforestation areas were identified, which facilitated estimation of the results achieved.

46. The LULUCF experts noted that Argentina is implementing the SNMBN so that it can be used for assessing possible displacement of emissions.

47. In conclusion, the LULUCF experts commend Argentina for showing a strong commitment to the continuous improvement of the data and information used for calculating the results, in line with the stepwise approach, which are consistent with those used to establish its assessed FREL. Some areas for future technical improvement and capacity-building needs identified by Argentina have been identified in this report. At the same time, the LULUCF experts acknowledge that such improvements are subject to national capabilities and circumstances, and note the importance of adequate and predictable support.[19] The LULUCF experts also acknowledge that the TA process was an opportunity for a facilitative and constructive technical exchange of views and information with Argentina.[20]

[19] In accordance with decision 2/CP.17, para. 57.

[20] In accordance with decision 14/CP.19, paras. 12–13.

Annex I

Technical annex to the biennial update report

Owing to the complexity and length of the submitted technical annex to the BUR, and in order to maintain the original formatting, the technical annex is not reproduced here. It is available on the UNFCCC website at https://unfccc.int/BURs.

Annex II

Summary of the main features of the proposed results of the implementation of the activities referred to in decision 1/CP.16, paragraph 70, based on information provided by Argentina

Key elements		*Remarks*
Results reported	Total emission reductions of 165 172 705 t CO_2 eq/year	See paragraph 10 of this document
Results period	2014–2016	See paragraph 10 of this document
Assessed FREL	101 141 848 t CO_2 eq/year	The subnational FREL includes CO_2 emissions from the activity reducing emissions from deforestation. The technical assessment report (FCCC/TAR/2019/ARG) is available at https://redd.unfccc.int/submissions.html?country=arg (see para. 8 of this document)
Reference period	2002–2013	See paragraph 8 of this document
National/subnational	Subnational	Four of the country's seven native forest regions are included, namely Parque Chaqueño, Selva Misionera (Selva Paranaense), Selva Tucumano Boliviana (Yungas) and Espinal (Caldenal and Ñandubay districts), covering 90 per cent of the country's forest land (see para. 8 of this document)
Activity included	Reducing emissions from deforestation	Deforestation is defined as the conversion from native forests to non-forest land, including the conversion of native forests to plantations. The submission considers emissions from gross deforestation (see para. 9 of this document)
Pools included	Above-ground biomass Below-ground biomass	Deadwood, litter and soil organic carbon were not included owing to lack of reliable information (see para. 33 of this document)
Gas included	CO_2	Treatment of non-CO_2 gases was identified as an area for future technical improvement to maintain consistency with the GHG inventory (see para. 33 of this document)
Consistency between assessed FREL and the results	Methods, definitions and information used for the assessed FREL are consistent with the results	See paragraphs 15–16 of this document
Description of national forest monitoring system and institutional roles	Included	See paragraphs 27–28 and 31 of this document
Identification of future technical improvements	Included	Several areas for future technical improvement were identified (see paras. 39–40 of this document)

Annex III

Documents and information used during the technical analysis

Reference documents

"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/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/resource/docs/2011/cop17/eng/09a02.pdf#page=19.

"Guidelines for elements to be included in the technical annex referred to in decision 14/CP.19, paragraph 7". Annex to decision 14/CP.19. Available at https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf.

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.

Olofsson P, Foody GM, Herold M, et al. 2014. Good practices for estimating area and assessing accuracy of land change. *Remote Sensing of Environment*. 148: pp.42–57. Available at http://dx.doi.org/10.1016/j.rse.2014.02.015.

Original and modified FREL submissions of Argentina. Available at https://redd.unfccc.int/submissions.html?country=arg.

Report on the technical assessment of the proposed FREL of Argentina submitted in 2019. FCCC/TAR/2019/ARG. Available at https://redd.unfccc.int/submissions.html?country=arg.