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Technical analysis of the first biennial update report of Liberia submitted on 2 April 2021

Summary report by the team of technical experts

Summary

According to decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention, consistently with their capabilities and the level of support provided for reporting, were to submit their first biennial update report by December 2014. As mandated, the least developed country Parties and small island developing States may submit biennial update reports at their discretion. This summary report presents the results of the technical analysis of the first biennial update report of Liberia, conducted by a team of technical experts in accordance with the modalities and procedures contained in the annex to decision 20/CP.19.



Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AD	activity data
AFOLU	agriculture, forestry and other land use
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
EEA	European Environment Agency
EF	emission factor
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
EPA	Environmental Protection Agency of Liberia
F-gas	fluorinated gas
FAO	Food and Agriculture Organization of the United Nations
FOLU	forestry and other land use
GEF	Global Environment Facility
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
HWP	harvested wood products
ICA	international consultation and analysis
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	<i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i>
IPCC good practice guidance for LULUCF	<i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>
LEAP	Low Emissions Analysis Platform
MEA Unit	Multilateral Environment Agreements Unit
MRV	measurement, reporting and verification
N ₂ O	nitrous oxide
NA	not applicable
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NIR	national inventory report
NMVO	non-methane volatile organic compound
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
NO _x	nitrogen oxides
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
Revised 1996 IPCC Guidelines	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
SF ₆	sulfur hexafluoride
TTE	team of technical experts

UNFCCC guidelines for the preparation of NCs from non-Annex I Parties

“Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention”

UNFCCC reporting guidelines on BURs

“UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention”

I. Introduction and process overview

A. Introduction

1. The process of ICA consists of two steps: a technical analysis of the submitted BUR and a facilitative sharing of views under the Subsidiary Body for Implementation, resulting in a summary report and a record, respectively.
2. According to decision 2/CP.17, paragraph 41(a), non-Annex I Parties, consistently with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014. The least developed countries and small island developing States may submit at their discretion.
3. Further, according to paragraph 58(a) of the same decision, the first round of ICA is to commence for non-Annex I Parties within six months of the submission of the Parties' first BUR. The frequency of developing country Parties' participation in subsequent rounds of ICA, depending on their respective capabilities and national circumstances, and the special flexibility for small island developing States and the least developed country Parties, will be determined by the frequency of the submission of BURs.
4. This summary report presents the results of the technical analysis of the first BUR of Liberia, undertaken by a TTE in accordance with the provisions on the composition, modalities and procedures of the TTE under ICA contained in the annex to decision 20/CP.19.

B. Process overview

5. In accordance with the mandate referred to in paragraph 2 above, Liberia submitted its first BUR on 2 April 2021 as a stand-alone update report.
6. A desk analysis of Liberia's BUR was conducted remotely from 29 November to 3 December 2021 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: Ahmad Wafiq Aboelnasr (Egypt), Ana-Maria Danila (former member of the Consultative Group of Experts from the European Union), Andres B. Espejo (Spain), Reza Fallah (Islamic Republic of Iran), Domenico Gaudio (Italy), Olga Gavrilova (Estonia), Agustín José Inthamoussu (Uruguay), Traute Koether (Austria), Stanford Mwakasonda (member of the Consultative Group of Experts from the United Republic of Tanzania), Juan Luis Martín Ortega (El Salvador), Diana Camila Rodríguez Vargas (Colombia), Raúl Salas Reyes (Mexico), Caroline Tagwireyi (Zimbabwe) and Alexander Zahar (Australia). Ms. Gavrilova and Mr. Salas Reyes were the co-leads. The technical analysis was coordinated by Nashib Kafle, Nalin Srivastava and Pedro Torres (secretariat).
7. During the technical analysis, in addition to the written exchange, in the virtual team room, to provide technical clarifications on the information reported in the BUR, the TTE and Liberia engaged in consultation¹ on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of Liberia's first BUR, the TTE prepared and shared a draft summary report with Liberia on 1 March 2022 for its review and comment. Liberia, in turn, provided its feedback on the draft summary report on 2 May 2022.
8. The TTE responded to and incorporated Liberia's comments referred to in paragraph 7 above and finalized the summary report in consultation with the Party on 27 May 2022.

¹ The consultation was conducted via videoconferencing.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

9. The scope of the technical analysis is outlined in decision 20/CP.19, annex, paragraph 15, according to which the technical analysis aims to, without engaging in a discussion on the appropriateness of the actions, increase the transparency of mitigation actions and their effects and shall entail the following:

(a) The identification of the extent to which the elements of information listed in paragraph 3(a) of the ICA modalities and guidelines (decision 2/CP.17, annex IV) have been included in the BUR of the Party concerned (see chap. II.B below);

(b) A technical analysis of the information reported in the BUR, specified in the UNFCCC reporting guidelines on BURs (decision 2/CP.17, annex III), and any additional technical information provided by the Party concerned (see chap. II.C below);

(c) The identification, in consultation with the Party concerned, of capacity-building needs related to the facilitation of reporting in accordance with the UNFCCC reporting guidelines on BURs and to participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention (see chap. II.D below).

10. The remainder of this chapter presents the results of each of the three parts of the technical analysis of Liberia's BUR outlined in paragraph 9 above.

B. Extent of the information reported

11. The elements of information referred to in paragraph 9(a) above include the national GHG inventory report; information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and information on progress in their implementation; information on domestic MRV; and information on support needed and received.

12. According to decision 20/CP.19, annex, paragraph 15(a), in undertaking the technical analysis of the submitted BUR, the TTE is to identify the extent to which the elements of information listed in paragraph 11 above have been included in the BUR of the Party concerned. The TTE considers that the reported information is partially consistent with the UNFCCC reporting guidelines on BURs. Specific details on the extent of the information reported for each of the required elements are provided in the tables included in annex I.

C. Technical analysis of the information reported

13. The technical analysis referred to in paragraph 9(b) above aims to increase the transparency of information reported by the Parties on mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the focus of the technical analysis was on the transparency of the information reported in the BUR.

14. For information reported on national GHG inventories, the technical analysis also focused on the consistency of the methods used for preparing those inventories with the appropriate methods developed by the IPCC and referred to in the UNFCCC reporting guidelines on BURs.

15. The results of the technical analysis are presented in the remainder of this chapter.

1. Information on national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis

16. As per the scope defined in paragraph 2 of the UNFCCC reporting guidelines on BURs, the BUR should provide an update to the information contained in the most recently

submitted NC, including information on national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis. In their NCs, non-Annex I Parties report on their national circumstances following the reporting guidance contained in decision 17/CP.8, annex, paragraphs 3–5, and they could report similar information in their BUR, which is an update of their most recently submitted NC.

17. Liberia reported in its first BUR information on its national circumstances, including population size and growth rate, and features of geography, climate and economy that might affect the Party's ability to deal with mitigating and adapting to climate change, as well as information regarding national circumstances and constraints on the specific needs and concerns arising from the adverse effects of climate change.

18. Liberia transparently reported information on its existing and planned institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description covers key aspects of the existing institutional arrangements, whereby the EPA is responsible for the implementation of international environmental treaties and is the designated national authority for the UNFCCC. The EPA is overseen by the National Environmental Policy Council and the Board of Directors. Within the EPA, the Department of Multilateral Environment Agreements, which coordinates climate change related activities, is responsible for the preparation of NCs, BURs and NIRs. Liberia reported that its institutional arrangements for the preparation of its first BUR involved various government ministries and agencies that provided data, although data-sharing agreements between national institutions and other inventory stakeholders are not yet in place. The description of planned institutional arrangements includes the roles and responsibilities of the overall coordinating entity, the involvement and roles of other institutions and experts, and provisions for public consultation and other forms of stakeholder engagement.

19. Liberia reported information on its domestic MRV arrangements. The Party reported in the BUR (section 6.2) that it has an undocumented and unstructured MRV system. Capacity-building is required to facilitate effective, efficient and continuous MRV arrangements. The institutional arrangements for measuring and estimating emissions include the MEA Unit, technical working groups and consultants. Information on AD and measurement or estimation of emissions and mitigation actions is reported to the MEA Unit but there is no internal verification mechanism for the reported data. Liberia reported on its proposed domestic MRV system and institutional arrangements in the BUR (section 6.5.2), whereby the MEA Unit will be responsible for the preparation of NCs, BURs and NDCs, and the manager of the Department and the office of the UNFCCC national focal point will be responsible for the final validation of and signing off the reports. During the technical analysis, Liberia indicated that its domestic MRV system will be developed under the Capacity-building Initiative for Transparency project, with funding from the GEF, and technical support from the West Africa MRV project supported by Environment and Climate Change Canada.

2. National greenhouse gas emissions by sources and removals by sinks

20. As indicated in table I.1, Liberia reported information on its GHG inventory in its BUR partially in accordance with paragraphs 3–10 of the UNFCCC reporting guidelines on BURs and paragraphs 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8.

21. Liberia submitted its first BUR in 2021 and the GHG inventory reported is for 2015–2017. The GHG inventory is consistent with the requirements for the reporting time frame.

22. GHG emissions and removals for the BUR covering 2015–2017 were estimated using tier 1 methodology from the 2006 IPCC Guidelines. The IPCC inventory software was used. In addition, an EMEP/EEA air pollutant emission inventory guidebook was used for compiling estimates for NO_x, CO, NMVOCs and sulfur dioxide. The TTE commends the Party for using the 2006 IPCC Guidelines.

23. Information was provided on the applied tier 1 approach from the 2006 IPCC Guidelines. An overview of the AD used and their sources was also provided in the BUR (table 8). AD were reported for the energy sector and for some parts of AFOLU (livestock, animal waste management systems, rice cultivation and land representation) for 2015–2017.

24. Liberia used default EFs from the 2006 IPCC Guidelines, but reported only the EFs used for the energy sector in the BUR (table 21) and referred to the relevant tables and chapters in the 2006 IPCC Guidelines for the IPPU, AFOLU and waste sectors in the BUR, in tables 25, 30 and 36, respectively.

25. Information on GHG emissions by sector and by gas was provided in the BUR in tables generated using the IPCC inventory software (tables 24, 27, 34 and 36) and using simple spreadsheet calculations (tables 23, 26, 33 and 35).

26. However, the information given in the summary tables (tables 9–11) is not always consistent with that in the sectoral tables and/or sectoral summaries. During the technical analysis, Liberia clarified that the inconsistencies are due to limited resources and technical capacity of the experts to use the IPCC inventory software.

27. Information on the Party's total GHG emissions by gas for 2015–2017, as calculated by the TTE using information from the BUR (tables 23–24, 26–27 and 33–36) and GWP values from the AR2, is outlined in table 1 in Gg CO₂ eq. The total emissions and percentage figures calculated by the TTE are different from those included in the BUR by the Party.

Table 1
Greenhouse gas emissions by gas of Liberia for 2017

<i>Gas</i>	<i>GHG emissions (Gg CO₂ eq) including land and HWP^a</i>	<i>% change 2015–2017</i>	<i>GHG emissions (Gg CO₂ eq) excluding land and HWP^a</i>	<i>% change 2015–2017</i>
CO ₂	4 859.93	8.0	1 054.23	–35.2
CH ₄	823.82	–11.0	823.83	–11.0
N ₂ O	269.70	–0.3	269.70	–0.3
HFCs	2.93	193.0	2.93	150.4
PFCs	NE	–	NE	–
SF ₆	NE	–	NE	–
Other	NE	–	NE	–
Total	5 956.38	4.6	2 150.69	–23.8

^a 2006 IPCC Guidelines AFOLU category 3.B (land) and, if reported, 3.D (HWP (3.D.1) and other emissions (3.D.2)).

28. Information on SF₆ and PFC emissions was not reported in the BUR. During the technical analysis, the Party clarified that this is due to the unavailability of data and the limited technical capacity of the experts.

29. Information on other emissions was clearly reported, including 3.06 Gg NO_x, 1,140.99 Gg CO and 356.87 Gg NMVOCs, but only for the energy sector. Information on sulfur oxides could not be seen in the BUR (summary tables 10–11) owing to the page layout. During the technical analysis, the Party clarified that it encountered difficulties in providing tables that depicted the required information fully. Information on total GHG emissions including and excluding FOLU was clearly reported in the BUR (figure 13) but not in the summary tables.

30. Liberia partially applied notation keys in tables where numerical data were not provided. The use of notation keys was not consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties. “NO” and “NE” were used interchangeably in some cases and incorrectly in others. The TTE noted that quantitative information on emission estimates was not reported for a number of categories in the short summary table (table 10) and dashes were used instead. During the technical analysis, Liberia explained that the partial application of notation keys is due mainly to limited capacity for compiling the inventory and in part to typographical errors, and that the dashes, which were used to mean “NA”, “NE” or “NO”, will be updated to the appropriate notation key in future submissions.

31. Liberia reported comparable information addressing the sectoral reporting tables annexed to the Revised 1996 IPCC Guidelines using the IPCC inventory software.

32. Liberia did not report comparable information addressing the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF. During the technical analysis, the Party clarified that it has limited technical capacity for using the IPCC inventory software.

33. The shares of emissions that different sectors contributed to the Party's total GHG emissions excluding land and HWP (category 3.B and, if reported, 3.D), as calculated by the TTE using information from the BUR (tables 23–24, 26–27 and 33–36) and GWP values from the AR2, in 2017 are reflected in table 2.

Table 2

Shares of greenhouse gas emissions by sector of Liberia for 2017

<i>Sector</i>	<i>GHG emissions (Gg CO₂ eq)</i>	<i>% share^a</i>	<i>% change 2015–2017</i>
Energy	957.67	44.5	–17.6
Industrial processes and product use	555.36	25.8	–48.0
AFOLU	3 979.87	NA	29.6
Livestock (category 3.A)	172.51	8.0	–8.5
Land (category 3.B)	3 805.69	NA	32.5
Aggregate sources and non-CO ₂ emissions sources on land (category 3.C)	1.68	0.1	–6.7
HWP and other emissions (category 3.D)	NE	NA	NA
Waste	463.47	21.6	17.0

^a Share of total without 2006 IPCC Guidelines AFOLU category 3.B (land) and, if reported, 3.D (HWP (3.D.1) and other emissions (3.D.2)).

34. Liberia reported information on its use of GWP values consistent with those provided by the IPCC in its AR2 based on the effects over a 100-year time-horizon of GHGs.

35. For the energy sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs, key categories, notation keys used and other information specific to the sector. The key data source for the emission estimation for the energy sector is the national energy balance compiled by the Ministry of Mines and Energy and the key sources of emissions in the energy sector are categories 1.A.1.a.i electricity generation, 1.A.2.i mining and quarrying and 1.A.3.b road transportation. The energy sector emissions show a declining trend over 2015–2017, associated with the increased renewable hydropower share in the national grid.

36. Information on emissions for category 1.A.3.a.ii domestic aviation and 1.A.3.c rail operations was not reported in Liberia's BUR. During the technical analysis, the Party clarified that emissions from domestic aviation in Liberia are negligible because it does not have a domestic airline and, while the United Nations Mission in Liberia did operate domestic aircraft, it did so on a small-scale and non-commercial basis. The Party further clarified that, at the time of preparation of the BUR, its railways were still being rehabilitated post the civil war and, as the railways were not in use, there is limited information on fuel consumption. Data may be available for future reports.

37. Liberia reported in its BUR (section 1.1.2.5.3, table 8) that oil exploration and well-drilling activities are occurring in the country, but did not report associated emissions. During the technical analysis, the Party clarified that it initiated operations with national and international companies in the hope of exploring its oil potential, but no progress has been made. Data availability is thus a challenge since the wells have not yet been explored.

38. For the industrial processes sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, key categories, notation keys used and other information specific to the sector for categories 2.C.1 iron and steel production, 2.D.1 lubricant use and 2.F.1.a refrigeration and stationary air-conditioning. The key data sources for the emission estimation for industrial processes are the Central Bank of Liberia's annual reports and HFC consumption data prepared by the Ozone Unit of the EPA. The key source of emissions in the industrial processes sector is category 2.D non-energy

products from fuels and solvent use. The industrial processes sector emissions show a declining trend over 2015–2017.

39. Liberia reported in its BUR (pp.76–77) that emissions were not estimated for categories 2.A.2 lime production, 2.B.1 ammonia production, 2.B.2 nitric acid production, 2.C.2 ferroalloys production, 2.C.3 aluminium production, 2.C.5 lead production, 2.C.6 zinc production or 2.D.2 paraffin wax use. Emissions of F-gases for category 2.G other product manufacture and use were reported as “NO”. During the technical analysis, the Party clarified that emissions were not estimated for certain categories owing to a lack of data and the incorrect notation key was used owing to either limited capacity or a typographical error.

40. For the solvent and other product use sector, information was not reported in the BUR, with the clarification that emissions from the sector were not estimated owing to lack of data.

41. For categories 3.A livestock and 3.C aggregate sources and non-CO₂ emissions sources on land under the AFOLU sector from the 2006 IPCC Guidelines no category was identified as key. Information was reported on number of livestock and on rice cultivation and management for 2015–2017.

42. Liberia used AD from the Central Bank of Liberia’s annual reports and from the Central Agricultural Research Institute and FAO to estimate CH₄ and N₂O emissions for the livestock categories cattle, sheep, goats, swine and chicken. Liberia did not estimate CH₄ and N₂O emissions from ducks, horses or mules and asses owing to lack of data. During the technical analysis, Liberia clarified that it will make further efforts to obtain complete AD for all livestock categories.

43. Liberia reported in its BUR (table 29) that emissions from dairy and non-dairy cattle were estimated using the EF for the livestock category other cattle. During the technical analysis, Liberia clarified that, according to the definition in the 2006 IPCC Guidelines, which corresponds to that of FAO, dairy cattle are “mature cows producing milk in commercial quantities for human consumption”. Therefore, Liberia classified all of its cattle as other cattle (under categories 3.A.1.a.ii and 3.A.2.a.ii) since they are primarily reared for meat, which is in line with the definition provided in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.1). Liberia also clarified that, for the GHG inventory, national data are used over data from FAO.

44. Liberia estimated CH₄ emissions from swine for category 3.A.2 manure management applying the tier 1 approach and the default EF on the basis of an assumed annual average temperature of 28 °C or above. However, the Party reported in its BUR (table 1) an annual average temperature of 25.8 °C. During the technical analysis, Liberia clarified that experts from the Ministry of Agriculture agreed to use the EF for the assumption of 28 °C because of the increase in rainfall over the last 10 years.

45. Liberia did not report emissions for categories 3.C.1 emissions from biomass burning, 3.C.2 liming, 3.C.3 urea application, 3.C.4 direct N₂O emissions from managed soils, 3.C.5 indirect N₂O emissions from managed soils or 3.C.6 indirect N₂O emissions from manure management. During the technical analysis, Liberia clarified that this is due to lack of AD and capacity to use the IPCC inventory software.

46. For category 3.B land, Liberia reported annual GHG emissions and removals for 2015–2017. It reported net emissions and removals from changes under categories 3.B.1.a forest land remaining forest land and 3.B.3.b.i forest land converted to grassland, which are key categories. Liberia also reported net removals from changes under category 3.B.2.a cropland remaining cropland. The Party applied the tier 1 gain–loss method for carbon pools from the 2006 IPCC Guidelines, which is based on estimates of annual change in biomass from estimates of biomass gain and loss. Liberia provided area estimates for three land-use types (forest land, cropland and grassland) for 2015–2017.

47. Liberia did not report emissions and removals for categories 3.B.1.b land converted to forest land, 3.B.2.b land converted to cropland, 3.B.3.a grassland remaining grassland, 3.B.3.b land converted to grassland (except for 3.B.3.b.i forest land converted to grassland), 3.B.4 wetlands, 3.B.5 settlements or 3.D.1 HWP. During the technical analysis, Liberia clarified that this is due to lack of AD, resources and capacity to use the IPCC inventory software.

48. For the waste sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, key categories, notation keys used and other information specific to the sector for solid waste disposal sites, open burning of waste, and industrial wastewater treatment and discharge. The key sources of emissions in the waste sector are categories 4.A solid waste disposal and 4.D wastewater treatment and discharge. The waste sector emissions show a declining trend over 2015–2017.

49. Information on domestic wastewater treatment and discharge, waste incineration and biological treatment of solid waste was not provided in Liberia's BUR. During the technical analysis, the Party clarified that this is due to unavailability of data.

50. Information on data sources for the waste sector was not reported in the BUR. During the technical analysis, the Party clarified that this was an accidental omission resulting from a typographical error and the data source(s) for the waste sector will be included in future submissions. The Party also clarified that waste sector data were collected from municipal governments, such as the Monrovia City Corporation and Paynesville City Corporation.

51. Information on the GHG inventory time series included in the Party's previous NCs was not reported in the BUR. As the Party reported emissions and removals for 2000 and 2014 in its NC1 and NC2, respectively, the reason for excluding this information from the BUR was not clear to the TTE. During the technical analysis, the Party clarified that it did not consider compiling data for the time series back to 2000 when preparing its BUR.

52. Liberia described in its BUR the institutional framework for the preparation of its 2017 GHG inventory. The Party reported that the EPA is the governmental body responsible for its climate change policy and, within the EPA, the Climate Change Enabling Unit is responsible for the GHG inventory, which was prepared with the support of the GEF through the United Nations Environment Programme.

53. Liberia clearly reported that a key category analysis was performed for the level of and trend in emissions for 2017. The key category analysis was prepared using the 2006 IPCC inventory software. Nine key categories and main gases were identified on the basis of the level assessment: 3.B.3.b land converted to grassland (CO₂), 3.B.1.a forest land remaining forest land (CO₂), 2.D non-energy products from fuels and solvent use (CO₂), 4.A solid waste disposal (CH₄), 1.A.3.b road transportation (CO₂), 4.D wastewater treatment and discharge (CH₄), 1.A.1 energy industries – biomass (N₂O), 1.A.1 energy industries – liquid fuels (CO₂) and 1.A.4 other sectors – biomass (CH₄).

54. The BUR provides information on QA/QC measures for data collection, including QC procedures in case of inconsistencies in the AD and parameters collected from different institutions. The EPA conducts the final QA before archiving the data in national databases. The TTE commends Liberia for providing information on QA/QC in accordance with the IPCC good practice guidance. However, during the technical analysis, the Party clarified that it plans to improve its QA/QC procedures.

55. Liberia reported information on CO₂ fuel combustion using both the sectoral and the reference approach. The information reported indicates that the combustion emissions estimated under the sectoral and the reference approach are 501.74 Gg CO₂ and 1,469.57 Gg CO₂, respectively. The difference between the estimates calculated using the two approaches was reported as 192.9 per cent. The Party identified the reasons for differences, such as the lack of energy balance for 2015–2017; inconsistent application of expert judgment on fuel consumption allocation to end-use sectors; inconsistent reporting of total fuel consumption; lack of data on fuel used for non-energy activities or as feedstock; lack of data on diesel fuel consumption for international and domestic waterborne navigation; and lack of data on domestic aviation turbine kerosene consumption in the domestic aviation industry.

56. For international bunker fuels, information was clearly reported on aviation fuels, but not on marine bunker fuels. The Party clarified in its BUR that this is due to unavailability of data on diesel consumption for international and domestic waterborne navigation. During the technical analysis, the Party further clarified that it was difficult to obtain aggregated data on fuel consumption by sector.

57. Liberia reported information on the uncertainty assessment (level) of its national GHG inventory. The uncertainty analysis was based on the tier 1 approach and covers all source

categories and all direct GHGs. The results obtained, as reported in the BUR, reveal that the level uncertainty for emissions is 7.1 per cent excluding FOLU and 62.5 per cent including FOLU.

58. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the areas noted in paragraphs 24, 26, 29, 30, 32, 42, 45 and 47 above, which could facilitate a better understanding of the information reported on GHG inventories.

59. Liberia identified areas for improvement in its GHG emission reporting, such as (1) collecting and generating AD for all sources, in particular for key sources; (2) manipulating data into the format required for the GHG inventory; (3) developing country-specific EFs in order to represent national circumstances and improve accuracy; (4) planning an inventory cycle with time allocations; (5) improving institutional resources, including human resource capacity; and (6) training experts to use the IPCC inventory software.

3. Mitigation actions and their effects, including associated methodologies and assumptions

60. As indicated in table I.2, Liberia reported in its BUR, mostly in accordance with paragraphs 11–13 of the UNFCCC reporting guidelines on BURs, information on mitigation actions and their effects, to the extent possible.

61. The information reported provides a clear overview of the Party's mitigation actions and their effects. In its BUR, Liberia reported information on its national context: most of its climate change mitigation actions are set out in national laws and policies, action plans and projects, and relate to the energy and forestry sectors.

62. Liberia reported information on its intended NDC submitted to the UNFCCC in 2015, which provides a platform for integrating the Party's low-carbon development strategy into its long-term sustainable development vision by 2030. During the technical analysis, Liberia specified that, in 2021, it submitted a revised NDC with the target of reducing emissions by 64 per cent below 'business as usual'. The TTE acknowledged the information, which is presented in this summary report as contextual without assessing the completeness and transparency of the information.

63. Liberia reported a summary of its mitigation actions in narrative and tabular format in accordance with decision 2/CP.17, annex III, paragraph 11.

64. Potential mitigation actions for the agriculture and waste sectors were included in Liberia's BUR but information on mitigation actions for the transport and industry sectors was not reported. The Party clarified in its BUR that it was a challenge to identify mitigation actions, especially for the transport sector, owing to lack of access to data. During the technical analysis, the Party further clarified that in 2021 it submitted a revised NDC, which includes numerous mitigation actions for the agriculture, waste, transport and industry sectors.

65. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Liberia reported the names of mitigation actions or groups of actions, coverage (sector and gases) and progress indicators in the BUR (table 41). A description of mitigation actions, as well as information on quantitative goals, was provided.

66. In the BUR (section 3.2), Liberia described the methodology used for estimating the emission reductions resulting from mitigation actions, which involves data-collection forms, the LEAP software used in conjunction with Microsoft Excel, and a simple Microsoft Excel model developed by the Stockholm Environment Institute to determine the baseline and project scenario impacts of mitigation actions. For some mitigation actions, information on methodologies, assumptions and GHG emission reduction was reported as "NA". During the technical analysis, Liberia clarified that methodologies and assumptions were either not applicable to those mitigation actions or not developed and there was lack of data or lack of methodology for estimating emission reductions resulting from mitigation actions. The TTE noted that clarifying the use of "NA" would enhance the transparency, clarity and understanding of the information reported in the BUR.

67. Liberia clearly reported information on the objectives of the mitigation actions and steps taken or envisaged to achieve those actions, gases covered, status of implementation, implementing entity and progress indicators for all mitigation actions reported for the cross-cutting, energy and forestry sectors.

68. The mitigation actions reported for the energy sector include the National Energy Policy, aimed at ensuring universal access to modern energy services. The National Renewable Energy Action Plan includes policies, targets and projections for 2030, including an aim to provide access to electricity to the entire population by 2030 and to ensure that renewable energy makes up 95 per cent of the total mix by 2030. The Rural Energy Strategy and Master Plan for 2030, adopted in 2016, identifies 92 projects and investments for providing electricity to 265,000 homes and 1.34 million people outside Monrovia, with 75 per cent of the electricity generated using renewable energy sources (with 19 per cent from hydropower, solar and biomass).

69. Several policies promoting renewable energy sources were reported as implemented or ongoing. Implemented projects include the Mount Coffee Hydropower Project (88 MW, operational since 2015) and the Firestone hydroelectric power station (4.8 MW). The aim of Liberia's rural renewable energy sector projects (15.8 MW) is to provide affordable renewable electricity to rural populations in several counties, while the West African Power Pool interconnection project is aimed at ensuring access to renewable electricity from neighbouring countries. In the energy sector, increasing hydropower and solar power generation has saved around 772.48 Gg CO₂ eq per year. Liberia identified co-benefits for the energy sector, such as provision of affordable electricity, security of energy supply and gender mainstreaming in the energy sector.

70. For the forestry sector, Liberia reported three mitigation actions as implemented or ongoing: the National Forest Reform Law of 2006 is aimed at sustainable management of Liberia's forest land and conservation of its forest resources (30 per cent of the total forest land); the Liberia Forest Sector Project, since 2017, focuses on forest management, but also addresses some elements of agriculture and land-use planning; and the Foya Afforestation Project, since 2006, has the aim of afforesting over 100 ha, with 40.5 ha already afforested. Liberia reported annual carbon sequestration in the forestry sector amounting to 12,305.45 Gg CO₂ eq per year. It was not clear whether the estimated emission reductions included for mitigation actions in the energy and forestry sectors as GHG emission reductions per year relate to achieved mitigation results or expected outcomes. During the technical analysis, the Party clarified that the GHG emission reductions reported were estimated avoided emissions in a scenario where the mitigation actions were implemented successfully; they were not results.

71. Liberia identified potential mitigation actions for the agriculture and waste sectors. For the agriculture sector, these relate to climate-change-smart activities, aimed at a shift from highland to lowland farming and use of biofertilizer. For the waste sector, waste-to-energy and biogas generation were identified as potential mitigation actions. Liberia noted that the leading mitigation option in the waste sector is recycling, mostly in cities.

72. Liberia did not provide any information on its involvement in international market mechanisms. During the technical analysis, it clarified that there are data constraints on reporting the use of market mechanisms and there was no clean development mechanism activity in the country.

73. Liberia reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that Liberia is in the process of designing and developing a domestic MRV system, including for mitigation actions (see para. 21 above). Liberia outlined in its BUR (chap. 6) the steps to be taken in establishing its domestic MRV system, including establishing institutional arrangements and defining reporting obligations and monitoring and verification approaches and roles.

74. The TTE noted that the transparency of the information reported on mitigation actions could be enhanced by addressing the areas noted in paragraphs 64, 66 and 72 above, which could facilitate a better understanding of the information reported on mitigation actions.

4. Constraints and gaps, and related technology, financial, technical and capacity-building needs, including a description of support needed and received

75. As indicated in table I.3, Liberia reported in its BUR, partially in accordance with paragraphs 14–16 of the UNFCCC reporting guidelines on BURs, information on finance, technology and capacity-building needs and support received.

76. Liberia reported information on constraints and gaps, and related financial, technical and capacity-building needs in accordance with decision 2/CP.17, annex III, paragraph 14. In its BUR, Liberia identified the following constraints and gaps: gaps in data and information for preparing its GHG inventory and reporting on mitigation actions and support needed and received; lack of country- and region-specific EFs in order to reduce uncertainties in GHG emission estimates; lack of expertise for adequately and appropriately analysing, developing and costing mitigation and adaptation options; a weak institutional framework and limited technical expertise for developing a comprehensive and integrated vulnerability assessment; lack of accurate hydrometeorological data owing to the deteriorated systematic observation network; lack of sustained access to a reliable body of scientific and technical information on climate change; inadequate access to financial resources for climate change programmes; a weak domestic MRV system; and weak institutional arrangements for climate change reporting. Liberia reported its capacity-building needs in its BUR (table 42) as equivalent to USD 290,000 per year.

77. Information on financial and other needs was not clearly reported in Liberia's BUR (table 42 and section 4.3). It was not clear to the TTE how each reported capacity constraint at various levels relates to the Party's financial, technical or capacity-building needs. During the technical analysis, Liberia clarified that there was technical limitation on the preparation of section 4.3 of the BUR. The Party also clarified that the capacity-building needs reported in table 42 of the BUR correspond to the financial needs for strengthening its institutional arrangements.

78. Liberia reported information on financial resources in accordance with decision 2/CP.17, annex III, paragraph 15. In its BUR, Liberia reported that it received USD 233,333 from the GEF of the approved USD 352,000 for preparing its first BUR. The Party reported that it faced challenges in reporting on support owing to lack of data, relevant information and guidelines for MRV of support.

79. Information on capacity-building and technical support received from Parties included in Annex II to the Convention, other developed country Parties and multilateral institutions was not clearly reported in Liberia's BUR. Liberia reported in the BUR on some support received, such as training on using the 2006 IPCC inventory software (section 2.11, p.63) and training on data collection and climate change mitigation assessment using the LEAP software and Microsoft Excel (section 3.2, p.89). During the technical analysis, the Party clarified that reporting information on support received, such as financial, technology transfer, capacity-building and technical support, was difficult owing to the many different forms of support scattered across ministries and agencies, the different sources of funding, and the fact that some of the support is related to sustainable development programmes and climate change.

80. Liberia did not report information on nationally determined technology needs with regard to the development and transfer of technology in accordance with decision 2/CP.17, annex III, paragraph 16. Information on updated technology needs that are nationally determined was not reported in Liberia's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that the lack of update on the technology needs assessment is due partly to capacity limitation and delay in the reporting on the progress of the technology needs assessment. Information on technology support received was not reported in Liberia's BUR, although some mitigation projects reported in the BUR (table 41) were classified as technology projects. During the technical analysis, Liberia clarified that those projects cannot be classified as technology support because of the projects' sources of funding and ownership. However, the Party indicated that there are technology projects that were not reported owing to lack of capacity for tracking and reporting technology received.

81. The TTE noted that the transparency of the information reported on needs and support received could be enhanced by addressing the areas noted in paragraphs 77, 79 and 80 above, which could facilitate a better understanding of the information reported on needs and support received.

5. Any other information

82. Liberia reported information on its national adaptation programme of action, which accounts for synergies between adaptation and national development plans and multilateral initiatives. Through the process, the needs to enhance the adaptive capacity of the national hydrometeorological monitoring system and to reduce the vulnerability of coastal urban areas to erosion, floods, siltation and degraded landscapes were identified. The Party included information in the BUR on its National Policy and Response Strategy on Climate Change, which covers adaptation and mitigation interventions in key sectors of its economy. Cross-cutting issues in the strategy include promoting communication, education and public awareness programmes on adaptation and mitigation to climate change; capacity development and training; research and development aimed at addressing climate change at the national, regional and international level; transferring technology that is locally adaptable; and mainstreaming gender and other issues in all climate change mitigation and adaptation interventions.

D. Identification of capacity-building needs

83. In consultation with Liberia, the TTE identified the following needs for capacity-building that could facilitate the preparation of subsequent BURs and participation in ICA:

(a) Strengthening Liberia's institutional arrangements by developing legal arrangements and procedures that inform organizational and institutional mandates, enhancing institutional technical capacity and facilitating data flows, including by developing systems and tools for climate change reporting;

(b) Building capacity (including institutional) to prepare the national GHG inventory in line with the principles of transparency, accuracy, completeness, consistency and comparability through training on:

(i) Preparing sectoral methodological descriptions and emission estimate reports; developing a QA/QC plan for GHG inventory preparation; key category analysis (level and trend) and using it in planning GHG inventory preparation; and preparing tables and graphs for GHG inventory reporting, including on trends by sector and by gas and time-series data;

(ii) The IPCC inventory software; key category analysis; estimating emissions from domestic wastewater using proxy data; estimating fugitive emissions from oil exploration activities; estimating F-gas emissions using expert judgment; and extracting tables from the IPCC inventory software to report the GHG emissions inventory;

(iii) Estimating bunker fuel emissions, including extracting energy sector data from the national energy balance through close collaboration with experts on energy statistics; identifying sources of data on international bunker fuel consumption; soliciting expert judgment on international bunker fuel consumption; and exploiting other data sources when data are not available in the national energy balance;

(iv) Estimating emissions from agricultural soils, livestock and manure management, including identifying livestock subcategories; analysing manure management practices for each livestock subcategory; developing country-specific EFs for estimating emissions from livestock and manure management; estimating direct and indirect N₂O emissions from managed soils; and estimating non-CO₂ emissions from enteric fermentation, manure management and managed soils;

(v) Estimating emissions from rice cultivation, including mapping out rice cultivation characteristics (e.g. regional differences, multiple crops, water regime,

organic amendments to soils); developing country-specific EFs for estimating emissions from rice cultivation; and estimating and reporting CH₄ emissions from rice cultivation;

(vi) Estimating emissions from land use, including preparing a land-use matrix and land cover; estimating emissions and removals for all land categories with limited data available; and developing country-specific EFs for forest land subcategories;

(vii) Appropriate use of notation keys, including the implications of using specific notation keys and dashes in reporting tables;

(c) Building capacity (including institutional) to collect data on ongoing mitigation actions, including by identifying and tracking specific progress indicators;

(d) Training on methodologies for measuring the progress of mitigation actions, including on building mitigation scenarios;

(e) Enhancing national capacity to systematically identify, track and report financial, technical and capacity-building support received for mitigation, adaptation and reporting;

(f) Enhancing national capacity to systematically track and report technology support received.

84. The TTE noted that, in addition to those identified during the technical analysis, Liberia reported the following capacity-building needs in its BUR, which include capacity-building needs for future BURs and transitioning to implementing the enhanced transparency framework under the Paris Agreement:

(a) Strengthening institutional and human capacity to fulfil obligations under the Convention, the Kyoto Protocol and the Paris Agreement;

(b) Institutionalizing a dedicated technical national climate change committee;

(c) Improving the capacity of the EPA and among members of the technical national climate change committee of developments in the science, economics and politics of climate change;

(d) Improving the capacity of members of the technical national climate change committee for developing country-specific methodologies and EFs in order to reduce inventory uncertainties;

(e) Developing a climate change policy, a comprehensive low-carbon development strategy and a climate change adaptation plan, with an integrated implementation strategy;

(f) Enhancing national technical capacity to conduct sectoral vulnerability assessment;

(g) Promoting and institutionalizing networking and collaboration between leading global climate modelling groups and the technical national climate change committee, including efforts to transfer biophysical model technology to Liberia;

(h) Upgrading the Party's systematic observation networks to improve data and information availability by acquiring automatic weather stations, and repairing meteorological stations and equipping them with the required instruments and automatic recorders;

(i) Enhancing the capacity of instrument and electronics technicians to maintain those observation networks;

(j) Enhancing national capacity to revise education curricula and training programmes and public awareness on climate change;

(k) Strengthening scientific and technical higher-education institutions with the necessary equipment and scientific information for climate change programmes.

III. Conclusions

85. The TTE conducted a technical analysis of the information reported in the first BUR of Liberia in accordance with the UNFCCC reporting guidelines on BURs and concludes that the information reported is partially consistent. It provides an overview of national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis; the national inventory of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol; mitigation actions and their effects, including associated methodologies and assumptions; constraints and gaps, and related financial, technical and capacity-building needs, including a description of support needed and received; the level of support received to enable the preparation and submission of BURs; domestic MRV; and any other information relevant to the achievement of the objective of the Convention. The TTE concluded that the information analysed is partially transparent.

86. Liberia reported information on the institutional arrangements relevant to the preparation of its BURs. The Climate Change Enabling Unit within the EPA is responsible for the preparation of NCs, BURs and NIRs. A project management team within the EPA and technical expert groups in consultation with other government ministries, agencies and civil society organizations are involved in the preparation of BURs. Liberia reported on its existing MRV system and a planned system to be developed under the Capacity-building Initiative for Transparency and the West Africa MRV project supported by Environment and Climate Change Canada, which is supporting development of MRV in West African countries, including Liberia. The enhanced domestic MRV system will enable sustainable preparation of Liberia's BURs.

87. In its first BUR, submitted in 2021, Liberia reported information on its national GHG inventory for 2015–2017. This included GHG emissions and removals of CO₂, CH₄ and N₂O for all relevant sources and sinks, as well as emissions of HFCs for some categories and the precursor gases. The inventory was developed on the basis of the 2006 IPCC Guidelines, supplemented by an EMEP/EEA air pollutant emission inventory guidebook for estimating NO_x, CO, NMVOC and sulfur dioxide emissions. Default EFs from the 2006 IPCC Guidelines were applied for all key categories. The total GHG emissions for 2017 were calculated by the TTE as 2,150.7 Gg CO₂ eq (excluding FOLU) and 5,956.4 Gg CO₂ eq (including FOLU). F-gas emissions for category 2.G other product manufacture and use were reported as “NO” owing to difficulties in obtaining the necessary data, as clarified by the Party during the technical analysis. Emissions for several categories were not estimated owing to lack of AD, resources and/or technical capacity, including 3.A.2.i poultry, 3.B.1.b land converted to forest land, 3.B.2.b land converted to cropland, 3.B.3.a grassland remaining grassland, 3.B.4 wetlands, 3.B.5 settlements, 3.B.6 other land, 3.C.1 emissions from biomass burning, 3.C.4 direct N₂O emissions from managed soils, 3.C.5 indirect N₂O emissions from managed soils and 3.C.6 indirect N₂O emissions from manure management.

88. Liberia reported information on mitigation actions and their effects in tabular format. It reported implemented and ongoing actions in the cross-cutting, energy and forestry sectors. Additionally, the Party identified some potential mitigation actions for the agriculture and waste sectors. Several policies promoting renewable energy sources and mitigation action in the forestry sector were reported as implemented or ongoing. The mitigation actions reported focus on promotion of and access to renewable energy and sustainable forestry practices. The Party reported the progress of implementation of its mitigation actions (such as the 88 MW and 4.8MW hydropower projects), including estimated avoided GHG emissions for several mitigation actions. It also reported specific co-benefits of its mitigation actions, including in relation to sustainable growth, access to affordable electricity and employment for local communities. The Party noted that the mitigation actions in the energy and forestry sectors have contributed 20,075.96 Gg CO₂ eq emission reductions per year. The Party reported information on MRV arrangements, but not on its involvement in international market mechanisms. Moreover, estimates of emission reductions were not provided for all mitigation actions, and information on methodologies and assumptions was not provided owing to difficulties in obtaining the necessary data, as clarified by the Party during the technical analysis. Information on mitigation actions for the transport, agriculture and industry sectors

was not included in the BUR, but the Party stated during the technical analysis that several such mitigation actions were subsequently identified in the NDC update process.

89. Liberia reported information on key constraints, gaps and related needs, including weak institutional arrangements, inadequate financial funding for climate change programmes, gaps in tracking capacity and technical assistance, limited technical expertise, lack of regional and country-specific EFs in order to reduce inventory uncertainty, and an obsolete systematic observation network. Information on technical, technology transfer and capacity-building support received was not reported. During the technical analysis, Liberia acknowledged that support was provided but explained that no system is in place for tracking support received. The Party reported that the GEF committed financial support of USD 352,000 for Liberia to prepare its first BUR and USD 233,333 was received. The Party did not report information on technology received. During the technical analysis, Liberia clarified that it lacks capacity for tracking and reporting technology received. Information on technology needs was not reported. During the technical analysis, Liberia clarified that a technology needs assessment is ongoing and the lack of reporting thereon in the BUR is due mainly to delay in the reporting on the progress thereof.

90. The TTE, in consultation with Liberia, identified the 12 capacity-building needs listed in chapter II.D above and needs for capacity-building that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs and participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention. Liberia identified the following as priority capacity-building needs:

(a) Strengthening its institutional arrangements by developing legal arrangements and procedures that inform organizational and institutional mandates, enhancing institutional technical capacity and facilitating data flows, including by developing systems and tools for climate change reporting;

(b) Preparing sectoral methodological descriptions and emission estimate reports; developing a QA/QC plan for GHG inventory preparation; key category analysis (level and trend) and using it in planning GHG inventory preparation; and preparing tables and graphs for GHG inventory reporting, including on trends by sector and by gas and time-series data;

(c) Training on IPCC inventory software; key category analysis; estimating emissions from domestic wastewater using proxy data; estimating fugitive emissions from oil exploration activities; estimating F-gas emissions using expert judgment; and extracting tables from the IPCC inventory software to report the GHG emissions inventory;

(d) Training on estimating bunker fuel emissions, including extracting energy sector data from the national energy balance through close collaboration with experts on energy statistics; identifying sources of data on international bunker fuel consumption; soliciting expert judgment on international bunker fuel consumption; and exploiting other data sources when data are not available in the national energy balance;

(e) Training on estimating emissions from agricultural soils, livestock and manure management, including identifying livestock subcategories; analysing manure management practices for each livestock subcategory; developing country-specific EFs for estimating emissions from livestock and manure management; estimating direct and indirect N₂O emissions from managed soils; and estimating non-CO₂ emissions from enteric fermentation, manure management and managed soils;

(f) Building capacity (including institutional) to collect data on ongoing mitigation actions, including by identifying and tracking specific progress indicators;

(g) Training on methodologies for measuring the progress of mitigation actions, including on building mitigation scenarios;

(h) Enhancing national capacity to systematically identify, track and report financial, technical and capacity-building support received for mitigation, adaptation and reporting;

(i) Enhancing national capacity to systematically track and report technology support received.

Annex I

Extent of the information reported by Liberia in its first biennial update report

Table I.1

Identification of the extent to which the elements of information on greenhouse gases are included in the first biennial update report of Liberia

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, paragraph 41(g)	The first BUR shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available, and subsequent BURs shall cover a calendar year that does not precede the submission date by more than four years.	Yes	Liberia submitted its first BUR in April 2021; the GHG inventory reported is for 2015–2017.
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established in the latest UNFCCC guidelines for the preparation of NCs from non-Annex I Parties approved by the Conference of the Parties or those determined by any future decision of the Conference of the Parties on this matter.	Yes	Liberia used the 2006 IPCC Guidelines.
Decision 2/CP.17, annex III, paragraph 5	The updates of the section on national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; any change to the EF may be made in the subsequent full NC.	Partly	Liberia provided AD for the energy sector and partly for AFOLU (livestock, rice cultivation and land representation) and reported the EFs used for the energy sector only.
Decision 2/CP.17, annex III, paragraph 6	Non-Annex I Parties are encouraged to include, as appropriate and to the extent that capacities permit, in the inventory section of the BUR:		
	(a) The tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF;	No	Comparable information in accordance with the 2006 IPCC Guidelines was not reported.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Yes	Liberia did not report information on the basis of those tables, but did report comparable information.
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in its previous NCs.	No	The time series reported in the BUR includes 2015–2017, but it does not include 2000, the inventory year for the previous (initial) NC.
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their NCs are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000).	No	This information was not reported for 2000.
	The inventory section of the BUR should consist of an NIR as a summary or as an update of the information contained in decision 17/CP.8, annex,	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 9	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors);	Partly	Information for CO ₂ , CH ₄ and N ₂ O was provided for all sectors but information on GHG precursors was provided only for the energy sector.
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF ₆).	Partly	Information on HFCs was provided for category 2.F.1.a only; information on PFCs and SF ₆ was not provided.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	NA	No additional or supporting information was provided in an annex.
Decision 17/CP.8, annex, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	Yes	
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of:		
	(a) CO ₂ ;	Partly	Liberia reported CO ₂ emissions as “NE” for some categories for which IPCC methodologies are available: 1.A.3.a.ii, 1.A.3.c, 1.A.3.d.ii, 1.A.3.e, 1.A.4.c.i, 1.A.4.c.ii, 1.A.5, 2.A.1, 2.D.2, 3.B.1.b, 3.B.2.b, 3.B.3.a, 3.B.4, 3.B.5, 3.B.6, 3.C.3, 3.D and 4.C.
	(b) CH ₄ ;	Partly	Liberia reported CH ₄ emissions as “NE” for some categories for which IPCC methodologies are available: 1.A.3.a.ii, 1.A.3.c, 1.A.3.d.ii, 1.A.3.e, 1.A.4.c.i, 1.A.4.c.ii, 1.A.5, 1.B, 3.A.1.f, 3.A.1.g, 3.A.2.f, 3.A.2.g, 3.B, 3.C.1 and 4.B–4.D.
(c) N ₂ O.	Partly	Liberia reported N ₂ O emissions as “NE” for some categories for which IPCC methodologies are available: 1.A.3.a.ii, 1.A.3.c, 1.A.3.d.ii, 1.A.3.e, 1.A.4.c.i, 1.A.4.c.ii, 1.A.5, 1.B, 2, 3.A.2, 3.A.2.g, 3.B, 3.C.1, 3.C.4, 3.C.5, 3.C.6 and 4.B–4.D.	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of:		
	(a) HFCs;	Yes	Liberia reported HFC emissions as “NE” for some categories for which IPCC methodologies are available: 2.F.1.b, 2.F.2, 2.F.3, 2.F.4, 2.F.5 and 2.F.6.
	(b) PFCs;	No	Liberia reported PFC emissions as “-”.
	(c) SF ₆ .	No	Liberia reported SF ₆ emissions as “-”.
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emissions by sources of other GHGs, such as:		
	(a) CO;	Partly	Liberia reported CO emissions as “NE” for some categories for which IPCC methodologies are available: 1.A.3.a.ii, 1.A.3.c, 1.A.3.d.ii, 1.A.3.e, 1.A.4.c.i, 1.A.4.c.ii, 4.A and 4.C.
	(b) NO _x ;	Partly	Liberia reported NO _x emissions as “NE” for some categories for which IPCC methodologies are available: 1.A.3.a.ii, 1.A.3.c, 1.A.3.d.ii, 1.A.3.e, 1.A.4.c.i, 1.A.4.c.ii, 2.A–2.H.1, 2.C.2, 2.D.3, 3.A, 3.D, 3.C.1 and 4.
	(c) NMVOCs.	Partly	Liberia reported NMVOC emissions as “NE” for some categories for which IPCC methodologies are available: 1.A.3.a.ii, 1.A.3.c, 1.A.3.d.ii, 1.A.3.e, 1.A.4.c.i, 1.A.4.c.ii, 1.B, 2.A–2.H, 3.B, 3.D, 3.C.1 and 4.A–4.D.
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as sulfur oxides, and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	No	
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO ₂ fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Yes	
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:		
	(a) International aviation;	Yes	
	(b) Marine bunker fuels.	No	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO ₂ eq should use the GWP provided by the IPCC in its AR2 based on the effects of GHGs over a 100-year time-horizon.	Yes	
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of EFs and AD. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, EFs and AD used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol;	Partly	Liberia used 2006 IPCC Guidelines tier 1 methodology for all sources for which it reported information on GHGs.
	(b) Explanation of the sources of EFs;	Yes	Liberia used default EFs from the 2006 IPCC Guidelines.
	(c) Explanation of the sources of AD;	Yes	
	(d) If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	NA	
	(i) Source and/or sink categories;		
	(ii) Methodologies;		
	(iii) EFs;		
	(iv) AD;		
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Partly	Liberia identified areas for improvement in its BUR (section 2.11) but did not specify for which areas capacity-building would be needed.
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1–2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated. Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying	Partly	“NO” and “NE” were partly used.

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 17/CP.8, annex, paragraph 24	assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:		
	(a) Level of uncertainty associated with inventory data;	Partly	Uncertainties associated with the AD and EFs for each source were not provided.
	(b) Underlying assumptions;	No	
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	Tier 1 approach was used.

Note: The parts of the UNFCCC reporting guidelines on BURs on reporting information on GHG emissions by sources and removals by sinks in BURs are contained in decision 2/CP.17, paras. 3–10 and 41(g). Further, as per para. 3 of those guidelines, non-Annex I Parties are to submit updates of their national GHG inventories in accordance with paras. 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8. The scope of such updates should be consistent with the non-Annex I Party’s capacity and time constraints and the availability of its data, as well as the level of support provided by developed country Parties for biennial update reporting.

Table I.2

Identification of the extent to which the elements of information on mitigation actions are included in the first biennial update report of Liberia

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 11	Non-Annex I Parties should provide information, in tabular format, on actions to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.	Yes	
Decision 2/CP.17, annex III, paragraph 12	For each mitigation action or group of mitigation actions, including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information, to the extent possible:		
	(a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators;	Yes	
	(b) Information on:		
	(i) Methodologies;	Yes	The LEAP model was used for assessing some mitigation actions and effects. For the rest, “NA” was reported.
	(ii) Assumptions;	No	
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	Yes	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Yes	
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Yes	
	(e) Information on international market mechanisms.	No	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	

Note: The parts of the UNFCCC reporting guidelines on BURs on the reporting of information on mitigation actions in BURs are contained in decision 2/CP.17, annex III, paras. 11–13.

Table I.3

Identification of the extent to which the elements of information on finance, technology and capacity-building needs and support received are included in the first biennial update report of Liberia

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on: (a) Constraints and gaps; (b) Related financial, technical and capacity-building needs.	Yes Partly	Information on financial, technical and capacity-building needs was not classified.
Decision 2/CP.17, annex III, paragraph 15	Non-Annex I Parties should provide: (a) Information on financial resources received, technology transfer and capacity-building received; (b) Information on technical support received from the GEF, Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions for activities relating to climate change, including for the preparation of the current BUR.	Partly Partly	Financial resources provided for preparing the first BUR were reported. Information on other financial resources, technology transfer and capacity-building received was not reported. Information on technical support received for activities relating to climate change was not reported and information only on financial support received from the GEF for preparing the first BUR was reported.
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on: (a) Nationally determined technology needs; (b) Technology support received.	No No	

Note: The parts of the UNFCCC reporting guidelines on BURs on the reporting of information on finance, technology and capacity-building needs and support received in BURs are contained in decision 2/CP.17, annex III, paras. 14–16.

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. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, et al. (eds.). Hayama, Japan: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

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

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

B. UNFCCC documents

First BUR of Liberia. Available at <https://unfccc.int/BURs>.

NC1 and NC2 of Liberia. Available at <https://unfccc.int/non-annex-I-NCs>.
