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## **Technical analysis of the first biennial update report of Malawi submitted on 22 December 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 Malawi, 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 <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
EF	emission factor
FOLU	forestry and other land use
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>
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NAMA	nationally appropriate mitigation action
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NMVO	non-methane volatile organic compound
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
Revised 1996 IPCC Guidelines	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
SF <sub>6</sub>	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 Malawi, 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, Malawi submitted its first BUR on 22 December 2021 as a summary of parts of its NC3. Malawi resubmitted its BUR on 22 June 2022.
6. During the technical analysis, the Party clarified that it did not receive funds for preparing its BUR until 2017. It also clarified that, as it submitted the first BUR as a summary of parts of its NC3, it could not submit the BUR until the NC3 was completed in February 2021. In addition, the Party clarified during the technical analysis that it encountered challenges related to the availability of data and experts.
7. A desk analysis of Malawi's BUR was conducted in Bonn from 20 to 24 June 2022 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: Ruleta Camacho Thomas (former member of the Consultative Group of Experts from Antigua and Barbuda), Aleksandar Jovic (Serbia), Nicolo Macaluso (Canada), Neranda Maurice-George (Saint Lucia), Jennifer Mutua (Kenya),<sup>1</sup> Sekai Ngarize (Zimbabwe), Eray Özdemir (Türkiye), Tran Ha Ninh (Viet Nam) and Midori Yanagawa (Japan). Ruleta Camacho Thomas and Nicolo Macaluso were the co-leads. The technical analysis was coordinated by Mirana Andriarisoa and Sohel Pasha (secretariat).
8. 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 Malawi engaged in consultation<sup>2</sup> on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of Malawi's first BUR, the TTE prepared and shared a draft summary report with Malawi on 23 February 2023 for its review and comment. Malawi, in turn, provided its feedback on the draft summary report on 21 April 2023.
9. The TTE responded to and incorporated Malawi's comments referred to in paragraph 8 above and finalized the summary report in consultation with the Party on 31 July 2023.

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<sup>1</sup> The expert participated remotely.

<sup>2</sup> The consultation was conducted via videoconferencing.

## **II. Technical analysis of the biennial update report**

### **A. Scope of the technical analysis**

10. 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).

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

### **B. Extent of the information reported**

12. The elements of information referred to in paragraph 10(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.

13. 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 12 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**

14. The technical analysis referred to in paragraph 10(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.

15. 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.

16. 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**

17. 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.

18. Malawi reported in its first BUR information on its national circumstances, including a description of national and regional development priorities, objectives and circumstances, including features of geography, climate, policy 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 and/or the impact of the implementation of response measures, as referred to in Article 4, paragraph 8, and, as appropriate, Article 4, paragraphs 9–10, of the Convention.

19. In addition, Malawi provided a summary of relevant information regarding its national circumstances in tabular and graphical format.

20. Malawi reported in its first BUR information on its existing institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description covers key aspects of the institutional arrangements, including the legal status and roles and responsibilities of the overall coordinating entity and the involvement and roles of other institutions and experts. Malawi's Environmental Affairs Department has the overall mandate for preparing and coordinating NCs and BURs and accounting for all related financial resources to the United Nations Environment Programme. The Department operates under the technical guidance of the National Technical Committee on Climate Change and Disaster Risk Management and has six thematic working groups, which are National circumstances, GHG inventory, Mitigation actions and effects, Vulnerability and adaptation assessments, Any other information and Constraints and gaps. Each working group comprises a pool of experts, including researchers, drawn from key relevant sectors from government ministries and departments, academic institutions, private sector organizations and non-governmental organizations. During the technical analysis, the Party provided the updated information that it currently has three thematic working groups, namely Adaptation, Mitigation and Finance, which provide technical direction for specific thematic areas and report to the National Technical Committee.

21. Information on the ministry under which the Environmental Affairs Department serves was not clearly reported in Malawi's BUR. The Party mentioned several different ministries with similar names. It was not clear to the TTE whether the names of the ministries had changed, or whether the responsibility is shared between different ministries. During the technical analysis, the Party clarified that there is one ministry responsible for climate change, but its name has changed several times over the years, clarifying that, since January 2023, the name is the Ministry of Natural Resources and Climate Change.

22. The TTE noted that the transparency of the information reported on institutional arrangements could be further enhanced by addressing the area noted in paragraph 21 above, which could facilitate a better understanding of the information reported on institutional arrangements.

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

23. As indicated in table I.1, Malawi 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.

24. Malawi submitted its first BUR in 2021 and the GHG inventory reported is for 2017. The Party also submitted a summary of the GHG inventories of 1994 and 2000. The GHG inventory is consistent with the requirements for the reporting time frame. However, the 2017 inventory contained some gaps, with data from 2010 instead of 2017 being used in many sections. During the technical analysis, the Party clarified that this was due to a lack of data for some sectors.

25. GHG emissions and removals for the BUR covering the 1994–2017 inventories were estimated using the tier 1 methodologies from the 2006 IPCC Guidelines. The TTE commends Malawi for using the 2006 IPCC Guidelines.

26. Information on AD and their sources for the energy and AFOLU sectors and on EFs was reported in the BUR. The Party used default EFs from the 2006 IPCC Guidelines for most sectors (see BUR table 2.39). For category 4.A forest land, Malawi used country-specific EFs from a publication by Walker, Brown and Makungwa (2015) for the growth rates of some tree species and forest types, which were given in tonnes of carbon per hectare for the various forest types planted or naturally regenerating.

27. Information on AD for the IPPU and waste sectors was not clearly reported in Malawi’s BUR, although the approaches used to collect those AD were reported and the institutions providing them were listed. During the technical analysis, the Party clarified that it experienced challenges in collecting AD for the IPPU and waste sectors, adding that this is an area where technical capacity needs to be developed. Malawi also indicated that confidentiality concerns made it difficult to collect IPPU data from private sector institutions.

28. Information on the Party’s total GHG emissions by gas for 2017 is outlined in table 1 in Gg CO<sub>2</sub> eq. It shows a decrease in emissions of 71.4 per cent with land and HWP since 1994 (24,582.78 Gg CO<sub>2</sub> eq).

Table 1

**Greenhouse gas emissions by gas of Malawi for 2017**

<i>Gas</i>	<i>GHG emissions (Gg CO<sub>2</sub> eq) including land and HWP<sup>a</sup></i>	<i>% change 1994–2017</i>
CO <sub>2</sub>	3 271.65	–82.1
CH <sub>4</sub>	3 342.50	–15.3
N <sub>2</sub> O	428.58	–82.2
HFCs	NE	NA
PFCs	NE	NA
SF <sub>6</sub>	NE	NA
Other	NE	NA
<b>Total</b>	<b>7 042.73</b>	<b>–71.4</b>

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

29. Information on NMVOCs was not reported in the BUR and information on nitrogen oxides and carbon monoxide was reported only from biomass burning sources. During the technical analysis, the Party clarified that it does not have country-specific EFs for NMVOCs. The Party indicated that it lacks the technical expertise to estimate emissions of those gases.

30. Malawi applied notation keys (“NA”, “NE” and “NO”) in tables where numerical data were not provided. The use of notation keys was mostly consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties.

31. The TTE noted that, although notation keys were used extensively in the reporting tables, “0” was reported for some cells rather than notation keys, such as for IPPU and waste categories in BUR table 2.10. During the technical analysis, the Party clarified that there was some confusion and inconsistency in the use of the notation keys and that this is an area where additional capacity-building is needed.

32. Malawi reported comparable information addressing the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF. The Party reported aggregated data on land area and the associated emissions or removals for the main LULUCF categories at the aggregated land category level, using a combination of approaches 1 and 2 for land representation and reporting information on forest land remaining forest land, land converted to forest land, the annual average rate for reforestation (9,354 ha/year) and total deforestation area (5,556 ha/year). For forest land, the land area data were reported in graphical format for 1990–2017, but no quantified area data were presented.

33. Malawi did not report comparable information addressing the sectoral reporting tables annexed to the Revised 1996 IPCC Guidelines. The level of disaggregation by sector and categories in the table provided in the BUR is not comparable with and less detailed than the sectoral report tables annexed to the Revised 1996 IPCC Guidelines. During the technical analysis, the Party clarified that the tables are available in Malawi's NC3 and it assumed that it was not necessary to provide it in the BUR.

34. Information on carbon pools in the FOLU sector was not clearly reported in Malawi's BUR. Malawi reported information on carbon pools under category 3.B land, including national growth rates for the above-ground and below-ground biomass pools (BUR table 2.45) and the approach used (tier 1) for the deadwood carbon pool (the carbon stocks in deadwood do not significantly change over time if the land remains within the same land-use category), but did not report on the methodology used for estimating changes in carbon stocks in the soil organic matter pool. During the technical analysis, the Party clarified that it needs additional training on estimating changes in carbon stocks and collecting data for this pool.

35. The shares of emissions that different sectors contributed to the Party's total GHG emissions including land and HWP (category 3.B and, if reported, 3.D), as calculated by the TTE using information from the BUR, in 2017 are reflected in table 2.

Table 2

**Shares of greenhouse gas emissions by sector of Malawi for 2017**

<i>Sector</i>	<i>GHG emissions (Gg CO<sub>2</sub> eq)</i>	<i>% share<sup>a</sup></i>	<i>% change 1994–2017</i>
Energy	1 740.37	33.4	–53.2
IPPU	80.58	1.5	38.00
AFOLU	4 546.70	NA	–78.1
Livestock (category 3.A)	2 687.06	51.6	–16.1
Land (category 3.B)	1 964.00	NA	–88.8
Aggregate sources and non-CO <sub>2</sub> emissions sources on land (category 3.C)	25.64	0.5	628.5
HWP and other emissions (category 3.D)	–130.00	NA	48.2
Waste	675.07	13.0	649.3

<sup>a</sup> 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)).

36. Malawi 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.

37. For the energy sector, information was clearly reported on the main emissions sources for the 2010 and 2017 inventories. Malawi reported in graphical format the total energy sector emission in 2001–2017 and transport was the main source of emissions owing to increased use of oil products for air, rail and road transport. More detailed information on GHG emissions by subcategory, methodological tier level and sources of AD and EFs, and key categories was reported for 2010, instead of the last inventory year 2017. Malawi reported that total energy sector emissions in 2010 were 1,489.65 Gg CO<sub>2</sub> eq and were dominated by CO<sub>2</sub> emissions (63.0 per cent), mainly from fossil fuel combustion, followed by CH<sub>4</sub> and N<sub>2</sub>O emissions. The key categories identified include 1.A.3.b road transportation (CO<sub>2</sub>) contributing to 40.42 per cent of emissions in the sector, 1.A.4 other sectors – biomass (CH<sub>4</sub>) contributing to 26.93 per cent and 1.A.2 manufacturing industries and construction – solid fuels (CO<sub>2</sub>) contributing to 10.34 per cent. Data on fuel consumption used as AD for category 1.A fuel combustion were taken from different national organizations and sectoral reports.

38. Information on total GHG emissions and country-specific EFs for the energy sector was not clearly reported in Malawi's BUR. In BUR figure 2.1, the Party reported that total energy sector emissions increased from 669.61 Gg CO<sub>2</sub> eq in 2001 to 1,130.77 Gg CO<sub>2</sub> eq in 2017. However, in BUR table 2.14, Malawi reported significantly different energy sector emissions, of 1,683.83 Gg CO<sub>2</sub> eq in 2000 and 1,740.37 Gg CO<sub>2</sub> eq in 2017. The TTE noted that BUR figure 2.1 provides only the amount of CO<sub>2</sub> emissions and not total GHG emissions.

During the technical analysis, the Party clarified that these discrepancies will be rectified for the next submission.

39. For the IPPU sector, information was clearly reported on the main GHG emissions in Malawi, which are CO<sub>2</sub>. CO<sub>2</sub> emission trends were reported in graphical format for categories 2.A.1 cement production, 2.A.2 lime production, 2.A.4.a ceramics production, 2.F.6 paint industry and 2.H.2 ethanol production. The Party reported in BUR summary table 2.14 that total GHG emissions from the IPPU sector were 80.58 Gg CO<sub>2</sub> eq for the 2017 inventory. However, Malawi reported a complete GHG inventory for 2010 only and this was used by the TTE to assess the emissions for the sector. The IPPU sector contributed 0.78 per cent of the total national GHG emissions in 2010 and the Party reported that the cement industry continues to be a major contributor of CO<sub>2</sub> emissions in Malawi for the IPPU sector. Malawi also reported information on GHG emissions by subcategory, methodological tier level, AD and their sources, and EFs.

40. Information on N<sub>2</sub>O, CH<sub>4</sub>, HFC, PFC and SF<sub>6</sub> emissions and AD and methodologies used was not reported for some categories in the IPPU sector. For example, emissions from those gases were reported as “NE” for categories 2.E electronics industry and 2.F product uses as substitutes for ozone-depleting substances, and the reason for this was not clear to the TTE. Malawi explained that this is due to such data being unavailable, noting a need for support in this area and enhanced institutional capacity.

41. For 2006 IPCC Guidelines AFOLU categories 3.A and 3.C, 3.A.1 enteric fermentation (CH<sub>4</sub>) and 3.A.2 manure management (N<sub>2</sub>O) were identified as key categories and the most relevant emissions sources in the sector (accounting for 18.66 and 11.43 per cent of the total sectoral emissions respectively). Information was reported on the number of livestock (BUR table 2.38) and the amount of fertilizer used (BUR figure 2.12) for 2001–2017. Malawi also reported the trend of GHG emissions for categories 3.C.1 emissions from biomass burning, 3.C.3 urea application, 3.C.5 indirect N<sub>2</sub>O emissions from managed soils, 3.C.6 indirect N<sub>2</sub>O emissions from manure management and 3.C.7 rice cultivation for 2001–2017.

42. Malawi reported GHG emissions and removals for 2010 for the land category (3.B), including emissions from all the relevant subcategories, and for the HWP category (3.D) the Party reported the trend of total wood removals for 1990–2017. Overall, the emissions/removals from land and HWP categories 3.B and 3.D fluctuated between a net removal of 17,424.74 Gg CO<sub>2</sub> eq in 1994 and a net emission of 1,834 Gg CO<sub>2</sub> eq in 2017.

43. Information on the change in the net emissions/removals from land and HWP (categories 3.B and 3.D) and disaggregated information on estimating HWP subcategories between 1994 and 2017 was not clearly reported in Malawi’s BUR. In addition, Malawi did not provide clear justification that the country-specific EFs are developed in a manner consistent with the 2006 IPCC Guidelines and are considered to be more accurate than the defaults ones for forest land. Standard deviation values or ranges of these country-specific EFs are not clearly reported and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that disaggregated information on HWP could not be provided owing to limited resources and that it faced challenges reporting the use of country-specific EFs.

44. For the waste sector, information was clearly reported on total GHG emissions for the 2017 inventory (675.07 Gg CO<sub>2</sub> eq) in BUR summary table 2.14, but without any disaggregation on emissions per category. For 2010, Malawi reported total waste sector emissions of 1,004.06 Gg CO<sub>2</sub> eq, with 47.37 per cent coming from wastewater treatment and discharge (4.D), 42.17 per cent from solid waste disposal (4.A) and 10.46 per cent from incineration and open burning of waste (4.C). CH<sub>4</sub> emissions from wastewater treatment and discharge and from solid waste disposal are among the key categories. Malawi reported also CH<sub>4</sub> emissions from solid waste disposal sites for 2001–2017, which show an increasing trend; however, an explanation of the drivers was not provided in the BUR.

45. Information on the sources of AD, profiles of waste disposal and management, and estimation methods used for the solid waste disposal and domestic and commercial wastewater categories, including for open burning of waste, was not reported in Malawi’s BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party



clarified that it requires training on estimation methods and needs to build technical capacity to generate AD and profiles of waste disposal and management.

46. The BUR provides an update to some of the GHG inventories reported in the Party's previous NCs, although some gaps exist. A summary table on the sectoral totals of emissions from the previous GHG inventory was provided. The information reported provides an update of the Party's NC3, which addresses anthropogenic emissions and removals for 2001–2010. The update was carried out for various time series, using the methodologies contained in the 2006 IPCC Guidelines. The Party reported that it recalculated the CO<sub>2</sub> emissions from cement and lime from the NC1 and the NC2 from 1994 to 2000.

47. Information on time series and recalculations for energy, AFOLU, waste and some IPPU categories, as well as disaggregated data on emissions from previous GHG inventories, was not clearly reported in Malawi's BUR. The TTE noted that the Party reported limited information on the national GHG inventory for 2017, which is the latest year reported. More information is provided for 2010 but some inconsistent time series were reported in some subsectoral emissions for energy, IPPU, waste and agriculture. For example, for the energy sector, the Party reported the time series 2001–2012 for GHG emissions from 1.A.4.b residential subcategory and 2001–2017 for coal production data used in fugitive emissions from fuels for 1.B.1 solid fuels. For the IPPU sector, the Party reported CO<sub>2</sub> emissions for 1994–2014. For the AFOLU sector, Malawi reported GHG emissions for 2001–2017 for categories 3.C.3 urea application, 3.C.5 indirect N<sub>2</sub>O from manure, 3.C.6 indirect N<sub>2</sub>O from livestock and 3.C.7 rice cultivation, and 1990–2017 for emissions from biomass burning and HWP removals. The Party used also the time series 2001–2017 for emissions from solid waste disposal. During the technical analysis, the Party clarified that the absence of disaggregated data on emissions from previous GHG inventories and some of the differences in time series reporting were an oversight when updating the BUR.

48. Malawi described in its BUR the institutional framework for the preparation of its 2017 GHG inventory. The Party reported that the Environmental Affairs Department of the Ministry of Natural Resources and Climate Change is the governmental body responsible for the GHG inventory. A number of relevant agencies and organizations are involved in providing data, including appointed focal points in key institutions and companies (see BUR table 2.8), which include the National Statistical Office, the Department of Mines, the Department of Economic Planning and Development, the Ministry of Commerce, Trade and Industry and Shayona Cement Limited.

49. Malawi reported that a key category analysis was performed for both the level of and the trend in emissions. In the level assessment, Malawi reported in BUR table 2.5 a list of 53 categories ranked from highest to lowest emissions, and categories 3.B.1.a forest land remaining forest land – CO<sub>2</sub> and 3.B.2.b land converted to cropland – CO<sub>2</sub> are the two main sources of emissions. In the trend assessment, a similar list containing 15 key categories was identified, with 3.C aggregate sources and non-CO<sub>2</sub> emissions sources on land and 1.A.1 energy industries being the main sources.

50. Information on the key category analysis was reported for different time series in Malawi's BUR. The level assessment was reported for 2010 and the trend assessment for 2000 and 2017, and the reason for this inconsistency was not clear to the TTE. During the technical analysis, the Party clarified that the inconsistency was owing to lack of data.

51. The BUR provides information on QA/QC measures for all sectors. The information reported includes a comparison of estimates under the reference and sectoral approaches, checks of the trends and a review of internal documentation. However, the information reported does not include QA/QC procedures and plans, including a time frame for the different stages of the inventory from initial development to final reporting. There are still some errors in the reporting of GHG emission estimates and inconsistencies in the time series. This means that the QA/QC measures are not fully consistent with the IPCC good practice guidance.

52. Malawi reported information on CO<sub>2</sub> fuel combustion emissions using both the sectoral and the reference approach for 2010 only. The difference between the estimates calculated using the two approaches was reported as 4.76 per cent for aviation gasoline, –4.64 per cent for kerosene and –4.50 per cent for gas/diesel oil.

53. Information on international aviation and marine bunker fuels was not reported in Malawi's BUR. During the technical analysis, the Party clarified that consumption of diesel for marine purposes is due to waterborne navigation on Lake Malawi. Since Lake Malawi is an inland lake and is therefore not used by international ships, the Party estimated emissions from domestic waterborne navigation only. In addition, Malawi reported that estimated emissions from fuel consumption for international flights are very low compared with those for domestic flights, noting that most international flights fuel outside Malawi.

54. Malawi reported information on the uncertainty assessment (level) of its national GHG inventory for category 1.A fuel combustion activities in the energy sector only (see BUR table 2.7). The uncertainty analysis was based on the tier 1 approach for 2010 only and conducted using the IPCC Inventory Software. The results obtained, as reported in the BUR, reveal that the highest uncertainties in the energy sector are largely driven by the use of solid and liquid fuels in that sector.

55. Information on the assumptions underlying the uncertainty assessment as well as the level of uncertainty for some categories in the energy sector and for the IPPU, AFOLU and waste sectors was not reported in Malawi's BUR. During the technical analysis, the Party clarified that it accidentally omitted information on the underlying assumptions, clarifying that it used the error propagation method, including equation 3.1, from the 2006 IPCC Guidelines (vol. 1, chap. 3, p.27). The Party also clarified that the uncertainty analysis for the IPPU, AFOLU and waste sectors was not conducted because the consultants in charge of reporting on those sectors did not receive a clear definition of the deliverables in their terms of reference. Malawi indicated that it plans to address this issue in its future reporting.

56. The TTE noted that the transparency of the information reported on GHG inventories could be enhanced by addressing the areas noted in paragraphs 27, 29, 31, 33, 34, 38, 40, 43, 45, 47, 50 and 55 above, which could facilitate a better understanding of the information reported on GHG inventories.

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

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

58. The information reported in the BUR provides an overview of the Party's mitigation actions and their effects. In its BUR, Malawi reported information on its national context and framed its national mitigation planning and actions in the context of its NAMAs, which, it reported, will provide a platform for achieving the mitigation goals outlined in its National Climate Change Management Policy. These goals are to reduce GHG emissions, enhance the capacity of carbon sinks and facilitate sustainable development. The NAMAs were chosen on the basis of emission reduction potential, synergy with government plans and potential to secure funding and co-benefits. The National Climate Change Response Framework was developed to strengthen and focus these mitigation efforts.

59. Climate change management is also among the priorities of the Malawi Growth and Development Strategy, which was being updated at the time of preparation of the BUR. Instruments, policies and regulations are in place to create enabling environments for the implementation of mitigation actions in the energy, IPPU, AFOLU and waste sectors (see BUR table 3.2). Most of the mitigation actions reported (BUR table 3.3) are in the energy sector (nine actions), followed by the FOLU sector (five actions) and the agriculture, waste and IPPU sectors (two actions each).

60. Malawi reported that its revised NDC, which covers both adaptation and mitigation actions up to 2040, was prepared and submitted in 2021. In its BUR, the Party reported that the NDC includes emission reductions and estimated funding requirements and covers the energy, IPPU, agriculture, FOLU and waste sectors. The NDC also reports an increase in GHG emissions under a 'business as usual' scenario driven by growing demand for thermal power generation and transportation services and more limited agricultural outputs. The NDC includes GHG mitigation actions with the potential to reduce emissions by 17.7 Mt CO<sub>2</sub> eq by 2040 against the emissions under a 'business as usual' scenario in the same year of 34.6

Mt CO<sub>2</sub> eq. The TTE acknowledged the information, which is presented in this summary report as contextual, without assessing the completeness and transparency of the information.

61. The Party reported a summary of its mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11.

62. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Malawi reported the names of and sectors covered by all mitigation actions or groups of actions in the BUR (table 3.3). Information on mitigation actions was reported in the form of projects, including a description of each project.

63. Information on gases covered was not reported for some mitigation actions and information on progress indicators was only provided for one project in the energy sector (table 3.4). During the technical analysis, the Party clarified that, since this is its first BUR, there is room for improvement, including more comprehensive reporting on gases covered and progress indicators.

64. Malawi reported information on the objectives of all mitigation actions.

65. The nine mitigation actions in the energy sector focus mainly on promoting the use of renewable energy. One of the actions was reported as planned, five as ongoing and three as completed. The Party reported information on methodologies and assumptions, steps taken or envisaged to achieve the action and results achieved, as estimated emission reductions, for one ongoing mitigation action on promoting use of fuel grade ethanol in the transport subsector (BUR table 3.4). This project commenced in 2001 and Malawi reported that, from 2001 to 2017, it mitigated 220.97 Gg CO<sub>2</sub> eq. The Party also reported the estimated outcome for two completed mitigation actions in the energy sector: a project under the Millennium Challenge Corporation, which increased renewable power generation capacity by 12 MW, and a hydroelectric power project, which added 18 MW of renewable power generation capacity to the grid. Malawi also produces electricity and heat from bagasse through the Illovo Sugar factories in Dwangwa and Nchalo, which have increased renewable power generation capacity by 18 MW. In its BUR, Malawi reported that these projects have resulted in less reliance on diesel power generators. For the other actions in the energy sector, Malawi reported general information on expected outcomes and co-benefits, including reduced GHG emissions, increased electricity access, reduced use of charcoal firewood and rural economic growth.

66. Malawi reported two ongoing actions in the IPPU sector, focused on reducing the amount of cement used for construction. The actions focus mainly on promoting soil-cement stabilized blocks as well as cement blends with rice or coal ash and the Solvay process for lime production, as well as reducing CO<sub>2</sub> emissions, with the reduction proportional to the amount of cement that is saved.

67. The two ongoing actions in the agriculture sector are focused on improving agricultural practices. The action on improving conservation agriculture, which is being implemented by the Government in cooperation with non-governmental organizations, involves providing fertilizer and hybrid maize seeds to farmers with the aim of reducing N<sub>2</sub>O emissions, improving soil fertility and enhancing soil capacity to sequester carbon, and has some potential adaptation benefits. The action on promoting animal husbandry involves improving feed and manure management, resulting in reduction of CH<sub>4</sub> emissions from the agriculture sector.

68. The Party reported five mitigation actions (four ongoing and one completed) in the FOLU sector, focused on enhancing carbon sinks through afforestation, management and conservation of protected areas, establishing tree nurseries and seed research plots, and screening for disease and pest-resistant species. According to Malawi's NDC, its afforestation and forest regeneration activities result in an annual unconditional sequestration of approximately 1 Mt CO<sub>2</sub> eq, and more than 50 million trees have been planted each year in Malawi since 2011. The Party also reported that its programme for the management and conservation of protected areas has co-benefit in creating sustainable livelihoods.

69. Two ongoing actions were reported in the waste sector. The first is focused on promoting waste beneficiation, including producing biogas and promoting use of briquettes, and the second is focused on improving waste management and disposal in cities. The Party

reported that the actions limit CH<sub>4</sub> emissions and promote sustainable and improved livelihoods.

70. Information on methodologies and assumptions, the steps taken or envisaged to achieve the actions, and progress of implementation was not reported in Malawi's BUR for most of the actions (eight actions in energy, two in IPPU, two in agriculture, five in FOLU, and two in waste sectors). The Party reported on results achieved for most mitigation actions, noting that they will result in emission reductions, but did not quantify these reductions. However, the Party provided relevant clarification in its BUR, indicating that only general information was available owing to limited availability of data.

71. Malawi provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. In its BUR, it reported that it does not have any clean development mechanism projects, but during the technical analysis, it provided the updated information that it has 10 projects registered under the clean development mechanism, most of which are in the energy sector and aim to improve the efficiency of cookstoves across the country.

72. Malawi reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that the Party intends to use its National Monitoring and Evaluation Master Plan, which is already in place to assess progress achieved in the implementation of the Malawi Growth and Development Strategy, as its MRV system. To further enhance the system, Malawi reported that the monitoring and evaluation framework set out in its National Climate Change Investment Plan will aid in tracking progress towards implementing climate change action. Monitoring and evaluation activities, covering areas such as finance, progress of implementation, outcomes and impacts, will be undertaken at the ministry, committee and expert group level, as well as by other stakeholders. Further, Malawi reported consistently with the voluntary general guidelines for domestic MRV of domestically supported NAMAs contained in the annex to decision 21/CP.19. The NAMAs under the MRV system are reported in a diagram that shows the Environmental Affairs Department as the focal point of the National Climate Change Programme.

73. The monitoring and evaluation framework assigns monitoring and evaluation roles but does not set out any reporting or verification processes. During the technical analysis, Malawi clarified that it is reviewing the use of its National Monitoring and Evaluation Master Plan as its MRV system through a project under the Capacity-building Initiative for Transparency. The Party provided no information on mitigation accounting standards, monitoring data collection responsibilities, defining reporting obligations and defining verification approaches and roles. During the technical analysis, the Party outlined that the steps on a proposed pathway to establishing an enhanced MRV system are included in the Capacity-building Initiative for Transparency project on refining the MRV system.

74. The TTE noted that the transparency of the information reported on mitigation actions could be enhanced by addressing the areas noted in paragraphs 63, 70 and 73 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, Malawi reported in its BUR, mostly 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. Malawi 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, Malawi identified inadequate financial resources, insufficient human capacity and lack of access to the latest technologies as constraints. Malawi reported that it needs financial, technical and capacity-building support in order to address its low uptake of modern information and communication technologies; inadequate financial resources in institutions mandated to implement information and networking initiatives such as information and communication technologies; inadequate human capacity to implement effective information and networking initiatives; inadequate and outdated information and

communication technology equipment and infrastructure; absence of a legally binding information-sharing agreement between data/information producers or holders and users; lack of a centralized coordination unit for climate change research programmes; and lack of capacity to enforce biosafety regulatory frameworks, including relevant training thereon. In developing its BUR, the key challenges encountered were an insufficient number of personnel and the fact that Malawi's climate change monitoring and evaluation system had not been fully operationalized, resulting in data relating to mitigation actions and support received largely being collected manually.

77. It was not clear to the TTE how the Party identified the gaps, constraints and needs reported in BUR tables 5.1–5.2 how it distinguished between financial and technical support needed and why the United States Agency for International Development was particularly identified under financial support needs. During the technical analysis, the Party clarified that the gaps and needs were identified during a stocktaking exercise related to its NC2, with financial support needed expressed in monetary terms and technical gaps relating to lack of technical expertise in the application of some models. Malawi stated that the United States Agency for International Development supported it, and continues to support it, in developing local and country-specific EFs for livestock.

78. Malawi reported information on financial resources and technical support received in accordance with decision 2/CP.17, annex III, paragraph 15. Malawi reported that it received USD 352,000 from the Global Environment Facility, as well as technical support from in-country, regional and global workshops and training sessions, for preparing its NC3 and first BUR.

79. Information on capacity-building support received for preparing its BUR, as well as information on financial resources, technology transfer, capacity-building and technical support received for climate change activities from Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions, was not reported in Malawi's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that in order to report such information it requires support in improving its data-collection system.

80. Malawi reported 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. In its BUR, Malawi reported that its Environmental Affairs Department is implementing the technology needs assessment project funded by the Global Environment Facility and supported by the United Nations Environment Programme and the Technical University of Denmark. This technology needs assessment project was developed using Malawi's 2003 technology transfer and needs assessment report with technical guidance provided by the United States Climate Technology Initiative.

81. In its BUR, Malawi presented a list of prioritized climate technologies for adaptation purposes, but not for mitigation purposes. In addition, information on technology support received was not clearly reported in Malawi's BUR. During the technical analysis, the Party clarified that it has not yet drawn up a full list of technologies for mitigation purposes and that it assumed information on technology support would fall under the technical support section.

82. 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 81 above, which could facilitate a better understanding of the information reported on needs and support received.

#### **D. Identification of capacity-building needs**

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

(a) Enhancing key components of the institutional arrangements to facilitate sustainable GHG inventory planning, preparation and management, including legally binding

or formal agreements between relevant government ministries and agencies for data-sharing, and defining roles and responsibilities and timelines as part of the GHG inventory cycle;

(b) Enhancing technical capacity of national experts to recalculate GHG emission estimates across the time series and to collect historical data and apply the methods in the 2006 IPCC Guidelines to fill data gaps, perform recalculations to ensure time-series consistency and report more recent GHG inventories;

(c) Enhancing technical capacity in the FOLU sector to develop a land representation framework and disaggregated land-use subcategories for land area data in accordance with the 2006 IPCC Guidelines and to report on all carbon pools in accordance with the IPCC good practice guidance on land use;

(d) Enhancing technical capacity to document the AD, EFs and methods used for estimating GHGs and using the 2006 IPCC Guidelines for GHG estimation in the AFOLU, IPPU and waste sectors;

(e) Training national experts involved in the development of GHG inventories on the application of the 2006 IPCC Guidelines, particularly the reporting guidance (vol. 1, chap. 8), which describes the disaggregation, classification and definition of categories of emissions and removals;

(f) Enhancing the capacity to report on HWP subcategories, such as sawnwood, panel wood, and paper and paperboard, at a disaggregated level and providing training on methodologies and reporting requirements related to estimating changes in carbon stocks and emissions and removals from the HWP pool;

(g) Building the capacity to collect data on NMVOC emissions, developing country-specific EFs for NMVOCs and providing training on methodologies and reporting requirements related to estimating NMVOC emissions;

(h) Enhancing national capacity to estimate and report HFC, PFC and SF<sub>6</sub> emissions as well as emissions from product uses as substitutes for ozone-depleting substances;

(i) Enhancing technical capacity to undertake QA/QC checks on sector-specific GHG emission reporting;

(j) Training national experts on the use of tools for generating GHG inventory information (e.g. information for reporting or summary tables), including the IPCC Inventory Software;

(k) Training national experts on the development of country-specific EFs for key categories in all sectors, and building their capacity in this regard;

(l) Strengthening the capacity of national experts to report on the objectives of mitigation actions and steps taken or envisaged to achieve them, underlying methodologies and assumptions, and gases covered, and improving the quality of AD to facilitate the quantification of the effects of those mitigation actions by:

(i) Improving data collection and archiving;

(ii) Improving reporting on linkages between mitigation policies and specific mitigation actions;

(m) Strengthening the capacity to adapt the existing MRV system to support enhanced data collection and reporting on mitigation actions;

(n) Providing capacity-building to national experts to analyse and identify technical, financial and capacity-building solutions to overcome gaps and constraints related to mitigation actions and BUR preparation;

(o) Improving the collection of data on capacity-building and technical support received;

(p) Improving the collection of data and reporting on technology transfer support received;

(q) Enhancing the capacity of staff from the Environmental Affairs Department to collect and report information related to support received.

84. The TTE noted that, in addition to those identified during the technical analysis, Malawi reported several capacity-building needs covering the following areas:

- (a) GHG inventory preparation:
  - (i) Establishing a system for estimating GHG emissions from municipal solid waste and domestic and industrial wastewater using country-specific AD;
  - (ii) Identifying entities responsible for waste management that can support disaggregated data collection by waste type, and developing templates for entities collecting waste sector AD;
  - (iii) Establishing a formalized data-collection system to mandate companies to release data required for GHG inventories;
  - (iv) Developing country-specific EFs and parameters for calculating emissions for the energy, IPPU, AFOLU, and waste sectors;
  - (v) Refining energy sector data for the reference and sectoral approaches;
  - (vi) Collecting and mapping data on individual industrial processes and product uses for missing years, to enhance completeness, and enhancing data-sharing arrangements from industrial companies to reporting institutions such as memorandums of understanding and data agreements;
  - (vii) Developing a systematic way of classifying crop types as perennial or annual cropland and determining their distribution in the country;
  - (viii) Disaggregating data on forest land and cropland by soil type (high-activity and low-activity soil) and determining their distribution on the basis of Malawi's climate;
  - (ix) Enhancing the capacity to document the uncertainties of estimates by sector and for the GHG inventory as a whole;
- (b) Cross-cutting technical support:
  - (i) Training scientists on conducting research, systems analysis and computer simulation modelling;
  - (ii) Building the capacity of academic institutions to develop country-specific EFs;
  - (iii) Collecting historical data for hazard analysis purposes with a view to identifying recurring disasters, and developing a multi-hazard approach to disaster risk and climate change management;
  - (iv) Carrying out comprehensive nationwide risk assessments to better address the root causes of disasters;
  - (v) Developing country-specific EFs for livestock.

### III. Conclusions

85. The TTE conducted a technical analysis of the information reported in the first BUR of Malawi 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, in general terms; 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. During the technical analysis, additional information was provided by Malawi on the national GHG inventory, mitigation actions and their effects, constraints and gaps, and related financial,

technical and capacity-building needs, including information on support needed and received. The TTE concluded that the information analysed is partially transparent.

86. Malawi reported information on the institutional arrangements relevant to the preparation of its BURs. The Environmental Affairs Department under the Ministry of Natural Resources and Climate Change serves as a core entity for developing and coordinating climate change policies as well as its domestic MRV system for mitigation actions. It has taken significant steps to establish institutional arrangements that enable sustainable preparation of its BURs, such as making organizational improvements and establishing knowledge-sharing procedures to facilitate sectoral information transfer.

87. In its first BUR, submitted in 2021, Malawi reported information on its national GHG inventory for 2017 and for 2010 for some areas owing to lack of data. This included GHG emissions and removals of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O for most relevant sources and sinks. The Party did not report on the precursor gases. The inventory was developed on the basis of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines. The total GHG emissions for 2017 were reported as 7,042.73 Gg CO<sub>2</sub> eq (including LULUCF). Emission estimates excluding LULUCF were not provided. A total of 53 categories and main gases were ranked in a level assessment using approach 1 for 2010 only. A trend assessment was carried out for 2000–2017, which identified 15 key categories. The key categories were mostly in the energy and AFOLU sectors and were associated with CO<sub>2</sub> emissions. Estimates of fluorinated gases were not provided owing to difficulties in obtaining the necessary data, as clarified by the Party in its BUR.

88. Malawi reported information on mitigation actions and their effects in tabular format and framed its national mitigation planning and actions in the context of its National Climate Change Management Policy; this is being implemented through Malawi's NAMAs, from which priority mitigation actions were identified in 2015. Malawi reported planned, ongoing and completed actions in the energy, IPPU, agriculture, FOLU and waste sectors. The mitigation actions focus on increasing energy efficiency, reducing reliance on fossil fuels, increasing carbon sinks and reducing GHG emissions from animal husbandry, crop production and industrial processes. The Party reported on the progress of implementation and the results achieved for the action on reduced reliance on diesel-powered generators by adding 48 MW in renewable power generation capacity. It also reported a reduction in emissions resulting from an energy sector project of 220.97 Gg CO<sub>2</sub> eq between 2001 and 2017. The Party also indicated during the technical analysis that it has 10 projects under the clean development mechanism. Malawi intends to use its National Monitoring and Evaluation Master Plan, which is already in place to assess progress achieved in the implementation of the Malawi Growth and Development Strategy, as its MRV system. In addition, the monitoring and evaluation framework set out in its National Climate Change Investment Plan will aid in tracking progress towards implementing climate change action. Estimates of emission reductions and information on methodologies, assumptions, goals and progress indicators was not provided for most of the mitigation actions owing to difficulties in obtaining the necessary data, as clarified by the Party in its BUR.

89. Malawi reported information on key constraints, gaps and related needs, including technical gaps and constraints related to inadequate financial resources and human capacity for implementing information and networking initiatives as well as low uptake of modern information and communication technologies. Malawi stated that its key challenges for preparing BURs were an insufficient number of personnel and the fact that its climate change monitoring and evaluation system had not yet been fully operationalized. Information was reported on the financial and technical support received for preparing its NC3 and first BUR, including USD 352,000 from the Global Environment Facility, as well as technical support from in-country, regional and global workshops and training sessions. The Party further reported information on nationally determined technology needs. However, information on technology transfer, technical, financial and capacity-building support received for activities relating to climate change was not reported in the BUR, but rather a list of prioritized climate technologies for adaptation purposes.

90. The TTE, in consultation with Malawi, identified the 21 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. Malawi prioritized the capacity-building needs referred to in paragraph 81(a–c), (e–j), (l), (o) and (q) above.

## Annex I

### Extent of the information reported by Malawi 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 Malawi**

<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	Malawi submitted its first BUR in November 2021. The GHG inventory reported is for 2017, and for 2010 for some areas due to lack of data.
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	Malawi 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	Malawi did not report updated AD in some cases; for example, waste generation rates were not included and there are no updated AD for the AFOLU and IPPU sectors.
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 was reported.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	No	
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.	Partly	The Party reported many different time series depending on each sector or category. There is no historical time series covering 1990–1994; consistent time-series information was provided for 2001–2017 in graphical format only for some areas but a consistent time series back to 1994 was not reported owing to inconsistent use of IPCC guidelines between GHG inventories.

<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 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).	Partly	This information was reported for 1994, 2000, 2010 and 2017 but not for the intervening years and summary information tables with disaggregated data were not provided.
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:	Yes	
	(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);	Yes	Comparable information was reported in BUR table 2.2.
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF <sub>6</sub> ).	No	Comparable information was not reported.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	NA	
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.	Partly	Information was reported on a key category analysis for the level of emissions for 2010 only; and on a key category analysis for the trend in emissions for 2000–2017.
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	Information was reported on institutional arrangements relevant to the preparation of the national GHG inventory and on data provider institutions by sector.
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 <sub>2</sub> ;	Yes	
	(b) CH <sub>4</sub> ;	Partly	Malawi did not provide estimates of CH <sub>4</sub> emissions for category 2.A mineral industry of the IPPU sector.
	(c) N <sub>2</sub> O.	Partly	Malawi did not provide estimates of N <sub>2</sub> O emissions for any categories of the IPPU sector.
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;	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>
	(b) PFCs;	No	
	(c) SF <sub>6</sub> .	No	
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) Carbon monoxide;	Yes	Malawi reported carbon monoxide emissions from biomass burning for 1990–2017.
	(b) Nitrogen oxides;	Yes	Malawi reported nitrogen oxide emissions from biomass burning for 1990–2017.
	(c) NMVOCs.	No	Malawi did not report NMVOC emissions because it does not have country-specific EFs for NMVOCs.
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 <sub>2</sub> fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Yes	The information was reported for both approaches.
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;	No	
	(b) Marine bunker fuels.	No	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO <sub>2</sub> 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	Malawi used the GWP provided in the AR2.
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		

<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>
	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;	Yes	Malawi used the tier 1 methodology from the 2006 IPCC Guidelines for all sectors.
	(b) Explanation of the sources of EFs;	Yes	
	(c) Explanation of the sources of AD;	Partly	An explanation of the sources of AD was provided for certain categories in the LULUCF and IPPU sectors.
	(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.	Yes	
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.	Partly	Notation keys were used in the general tables but not in the sectoral tables.
Decision 17/CP.8, annex, paragraph 24	Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:		
	(a) Level of uncertainty associated with inventory data;	Partly	Malawi conducted uncertainty analyses for category 1.A only. Party did not conduct uncertainty analyses for the IPPU, AFOLU or waste sectors.
	(b) Underlying assumptions;	No	
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	

*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 Malawi**

<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;	Partly	Information was reported on quantitative goals and progress indicators for one mitigation action in the energy sector.
	(b) Information on:		
	(i) Methodologies;	Partly	Information on methodologies was provided for only one action in the energy sector.
	(ii) Assumptions;	Partly	Information on assumptions was provided for only one action in the energy sector.
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	Partly	Information on steps taken or envisaged was reported only for one action in the energy sector.
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Partly	Information on progress of implementation was reported only for one action in the energy sector.
	(ii) Progress of implementation of the underlying steps taken or envisaged;	No	
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Partly	The Party reported on emission reductions in quantitative terms for one mitigation action in the energy sector. Some general qualitative information was provided for the other actions.
	(e) Information on international market mechanisms.	Yes	The Party reported that it does not participate in the international carbon market.
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 Malawi**

<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;	Yes	
	(b) Related financial, technical and capacity-building needs.	Yes	The Party provided information on support received for the preparation of its BUR, but information on the support received relating to climate change activities was not provided.
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;	Partly	The Party provided information on support received for the preparation of its BUR, but information on the support received relating to climate change activities was not provided.
	(b) Information on technical support received from the Global Environment Facility, 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	Information on support received for activities relating to climate change from Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions was not provided.
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;	Yes	
	(b) Technology support received.	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 Malawi. Available at <https://unfccc.int/BURs>.

NC3 of Malawi. Available at <https://unfccc.int/non-annex-I-NCs>.

#### C. Other documents

The following reference may not conform to UNFCCC editorial style as it has been reproduced as received:

Walker, S.M; Brown, K.R., and Makungwa S. (2015). Inputs from the PERFORM project to the draft INDC report developed by Climate Analytics. Focus: Deforestation, Afforestation, and Degradation. USAID, Malawi.

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