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Report on the technical expert review of the first biennial transparency report of Malawi*

Addendum

Summary

This addendum to the report on the technical expert review of the first biennial transparency report of Malawi, conducted by a technical expert review team in accordance with the modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement, contains the results of the review of the consistency of the information submitted by the Party with those modalities, procedures and guidelines, and presents capacity-building needs identified by the Party and by the technical expert review team in consultation with the Party during the review. The review took place from 11 to 15 May 2026 in Kigali.

* In the symbol for this document, 2025 refers to the year in which the biennial transparency report was submitted, not to the year of publication.



Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
2019 Refinement to the 2006 IPCC Guidelines	<i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AD	activity data
BTR	biennial transparency report
C	carbon
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRT	common reporting table
CTF	common tabular format
EF	emission factor
ETF	enhanced transparency framework under the Paris Agreement
FAOSTAT	statistical database of the Food and Agriculture Organization of the United Nations
FOD	first-order decay
GHG	greenhouse gas
HWP	harvested wood products
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
ITMO	internationally transferred mitigation outcome
k	methane generation rate
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MPGs	modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement
N	nitrogen
N ₂ O	nitrous oxide
NA	not applicable
NDC	nationally determined contribution
NE	not estimated
NID	national inventory document
NIR	national inventory report
NO	not occurring
PaMs	policies and measures
QA/QC	quality assurance/quality control
SOC	soil organic carbon
SWDS	solid waste disposal site(s)
TERT	technical expert review team

I. Areas of improvement¹ identified during the technical expert review of the Party's first biennial transparency report

1. Tables 1–14 present the results of the review of the consistency with the MPGs² of the information submitted by Malawi in its BTR1. All recommendations and encouragements contained in the tables are for the next BTR or NIR, unless otherwise specified.

A. General reporting provisions

Table 1

Areas of improvement relating to general reporting provisions

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
1.1	Specified in paragraph 2 of decision 5/CMA.3	Malawi reported the information required under the MPGs in its BTR1, but certain elements of the information required under the MPGs relating to the description of the NDC, progress tracking, mitigation actions and PaMs, the summary of GHG emissions and removals, and projections are dispersed across sections in chapter 3, and some information is presented under headings that do not correspond to those contained in the outline provided in annex IV to decision 5/CMA.3 (e.g. information on mitigation measures and their budgetary allocation under unconditional and conditional scenarios appears under the description of the NDC), making it more difficult to identify where specific reporting elements are reported. During the review, Malawi acknowledged that the information is dispersed and explained that this is due to capacity constraints. The Party stated that it will make efforts to reorganize the information in its next BTR. The TERT encourages Malawi to report information on the description of the NDC, progress tracking, mitigation actions and PaMs, the summary of GHG emissions and removals, and projections in the relevant section and subsections of BTR chapter 3, ensuring consistency with the outline provided in annex IV to decision 5/CMA.3.

B. Greenhouse gas emissions and removals

Table 2

Areas of improvement relating to general findings on greenhouse gas emissions and removals

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
2.G.1	Specified in paragraph 6 in conjunction with paragraphs 48 and 57 of the MPGs Flexibility	Malawi applied the flexibility provided in paragraph 48 of the MPGs for those developing country Parties that need it in the light of their capacities by only reporting CO₂, CH₄ and N₂O. In addition, the Party reported an annual time series with a starting year of 1994 for all sectors except LULUCF, for which the annual time series started from 2018, by applying the flexibility provided to those developing country Parties that need it in the light of their capacities with respect to the reporting of the time series to report data covering, at a minimum, the reference year/period for their NDCs and, in addition, a consistent annual time series from at least 2020 onward. However, while the Party provided information on capacity constraints related to the availability of AD in the context of applying flexibility in these areas, it did not provide its self-determined estimated time frame for improvements in relation to those capacity constraints. The TERT also noted that reporting an annual time series starting from 1994 for most sectors and from 2018 for the LULUCF sector resulted in a lack of time-series consistency since emissions and removals were not reported from the same starting year across all sectors.

¹ As referred to in paras. 7, 8, 146(d) and 162(d) of the MPGs, contained in the annex to decision 18/CMA.1.

² Decision 18/CMA.1, annex.

ID#	Reporting requirement	Description of area of improvement with recommendation or encouragement
		During the review, the Party explained that although it has no immediate plans to estimate AD for years before 1994, the base year used for its initial national communication, with suitable capacity-building, and financial and technical support, this could be achieved by undertaking specific studies. The Party clarified that it has considered extending the LULUCF time series back to 1990, but it was constrained by limited historical AD, remote sensing data sets and technical capacity. Malawi also informed the TERT about its plans to progressively improve time-series coverage and recognized this as an area requiring further capacity-building and technical support. Noting the flexibility applied in relation to the starting year of the time series, the TERT recommends that the Party report a consistent annual time series by reporting emissions and removals from the same inventory starting year for all sectors. The TERT also recommends that the Party provide self-determined estimated time frames for improvements in relation to the capacity constraints associated with reporting all seven gases (CO₂, CH₄, N₂O, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and nitrogen trifluoride) and a consistent annual time series starting from 1990.
2.G.2	Specified in paragraph 18 of the MPGs Institutional arrangements	Malawi documented in its NID (section 1.3) its national inventory arrangements, including institutional arrangements and the inventory compilation process. The Party mentioned in the NID that the Environmental Affairs Department is the lead institution coordinating the compilation of the national GHG inventory. However, the NID does not include information on the legal basis for establishing the Department as the inventory focal point and coordinator. During the review, Malawi explained that the Environmental Affairs Department is mandated as a coordinator for climate change management and serves as the secretariat for the climate change governance structures established under the 2016 National Climate Change Management Policy. Furthermore, Malawi is developing a climate change bill that will reaffirm the Department's role as the lead institution for climate change reporting. The TERT encourages the Party to document in the NID and the BTR the legal basis for establishing the Environmental Affairs Department as the GHG inventory focal point and coordinator.
2.G.3	Specified in paragraph 19(d) of the MPGs Inventory submission	The Party reported in the NID (section 1.3.4) on the established QA process for the GHG inventory before it is submitted to the UNFCCC secretariat. However, the Party did not clearly describe the official consideration and approval process that is carried out after the QA process is completed and before the NIR is submitted to the secretariat. During the review, the Party explained that after comments arising from the domestic sectoral technical reviews, stakeholder consultations and QA processes have been acted upon, the consolidated inventory report is reviewed and approved by the agencies responsible for national climate change coordination, namely the Joint National Technical Committee on Climate and Disaster Management, and the National Steering Committee on Climate Change. The NID is then submitted for institutional clearance using established administrative governmental procedures, which include review and endorsement by designated senior officials, including directors responsible for affairs related to climate change and the environment, and subsequent clearance by the Principal Secretary and the Minister of the Ministry of Natural Resources and Climate Change. The TERT recommends that the Party clearly report in the NID the processes in place for the official consideration and approval of the inventory, particularly with regard to institutional clearance and approval of the NIR.
2.G.4	Specified in paragraph 39 of the MPGs Methods	The TERT noted that, in some cases (e.g. for agriculture, LULUCF and waste), Malawi applied methodologies, parameters and EFs from the 2019 Refinement to the 2006 IPCC Guidelines for categories where methodologies, parameters and EFs are available from the 2006 IPCC Guidelines. In these cases, the Party explained in the NID that it did so to ensure time-series consistency; however, the rationale for the choice of methods, EFs and AD from the 2019 Refinement to the 2006 IPCC Guidelines was not provided in the NID.

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
		During the review, Malawi explained that it used the 2019 Refinement to the 2006 IPCC Guidelines for selected categories with a view to ensuring that the methods used best reflect its national circumstances. Malawi also indicated that it will include in future BTRs information on the rationale for using the 2019 Refinement to the 2006 IPCC Guidelines for the agriculture, LULUCF and waste sectors. The TERT recommends that the Party report methodologies, parameters and EFs used, including the rationale for the choice of methods, in accordance with good practice elaborated in the IPCC guidelines referred to in paragraph 20 of the MPGs.
2.G.5	Specified in paragraphs 25 and 42 of the MPGs Key category analysis	The Party reported in the NID on the key category analysis and listed the key categories in NID table 1-6. However, the Party only reported the individual percentage contributions of key categories and did not report their cumulative contributions including and excluding LULUCF in accordance with the MPGs (para. 42) and the 2006 IPCC Guidelines (vol. 1, chap. 4, tables 4.2 and 4.3). Furthermore, Malawi did not identify significant subcategories and carbon pools within key categories, which are to be identified in accordance with the 2006 IPCC Guidelines (e.g. vol. 1, chap. 4.2, and vol. 4, chap. 1, figures 1.2 and 1.3). During the review, the Party explained that it did not report cumulative key category contributions or identify significant subcategories and carbon pools within key categories in accordance with the 2006 IPCC Guidelines owing to technical capacity limitations, including in relation to using analytical tools. The Party acknowledged this as a capacity-building need and explained that improvements will be made for future BTR submissions in order to align its reporting with IPCC guidance. The TERT recommends that the Party report the individual and cumulative percentage contributions of key categories, for both level and trend, consistently with the IPCC guidelines and the MPGs, and identify significant subcategories and carbon pools within key categories as part of the key category analysis.
2.G.6	Specified in paragraphs 29 and 44 of the MPGs Uncertainty analysis	Malawi explained in the BTR1 (section 2.7.3) that a full uncertainty analysis was provided in an annex to the NID. However, the NID and its annexes do not include a full uncertainty analysis, which should comprise uncertainties for the base year and most recent year and a trend assessment between the starting year and the latest reporting year of the inventory time series for all source and sink categories, including inventory totals. During the review, the Party acknowledged that the annex containing a full uncertainty analysis was not attached to or clearly referenced in the NID, which may have limited its accessibility during the review. The Party also explained that the uncertainty analysis was undertaken as per the 2006 IPCC Guidelines and included an assessment of uncertainties associated with AD, EFs and GHG emission and removal estimates for all source and sink categories, including totals, for the starting year and the most recent inventory year, as well as estimates of the trend uncertainty for GHG emission and removal estimates for all source and sink categories, including totals, between the two years. Malawi also provided detailed information on the uncertainty analysis included in the annex as supporting documentation. The TERT recommends that the Party include quantitative uncertainty estimates for the emission and removal estimates for all source and sink categories, including for AD, EFs and inventory totals, for at least the starting year and the latest reporting year of the inventory time series, as well as estimates of the trend uncertainty of emission and removal estimates for all source and sink categories, including totals, between the starting year and the latest reporting year of the inventory time series.
2.G.7	Specified in paragraph 32 of the MPGs Completeness	The Party reported in the NID (section 1.8.3) information on categories considered insignificant on the basis of the likely level of emissions for individual categories and the total national aggregate of estimated emissions. However, while the Party reported the likely level of emissions for individual categories considered insignificant, it is not clear how the Party derived the category-specific AD used to undertake the assessment. Furthermore, the Party did not report the total national aggregate of estimated emissions for all gases for categories considered

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		insignificant or specify whether this total remains below 0.1 per cent of national total GHG emissions, excluding LULUCF. During the review, the Party explained that approximated AD were used to assess whether certain categories were insignificant. The approximated values were derived using available national information and expert judgment where direct measurements were not available, and Malawi will ensure that this is explicitly stated in future submissions. The TERT recommends that the Party report the total national aggregate of estimated emissions for all gases for categories considered insignificant and ensure that this total is below 0.1 per cent of national total GHG emissions, excluding LULUCF. The TERT encourages the Party to report in the NID the category-specific AD used to assess the likely level of emissions for individual categories.
2.G.8	Specified in paragraphs 34 and 46 of the MPGs QA/QC and verification	The Party reported in the NID (section 1.6) a brief general description of the QA/QC plan, but the information provided is not consistent with the guidance in the 2006 IPCC Guidelines (vol. 1, chap. 6.5) as it does not include detailed information on QA/QC and verification activities or institutional arrangements and responsibilities for implementing those activities. The TERT noted that although a QA/QC plan is referenced in the NID (p.18), the hyperlink to the plan does not work. In addition, the Party reported in the NID (section 1.3.4) information on the three-step process for official consideration and approval of the NIR, which includes some information on review processes followed at different review stages to ensure the accuracy and consistency of the reported information. During the review, the Party clarified that at the time of preparation of the BTR1 and the NID, it had developed operational QA/QC practices and checklists for guiding inventory compilation and review processes, but QA procedures had not yet been fully consolidated into a formally approved stand-alone standard operating procedure or comprehensive national QA plan covering all inventory sectors and institutional arrangements. Instead, the QA activities were implemented through the use of sectoral coordination mechanisms, inventory compilation templates and technical review processes, and through guidance provided to sectoral experts and institutions involved in inventory preparation. The Party provided a detailed QA/QC plan as supporting material during the review. The TERT recommends that the Party report information on its QA/QC plan and procedures, both implemented and planned, in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 6.5) in the NID, including detailed information on QA/QC and verification activities and institutional arrangements and responsibilities for implementing those activities.
2.G.9	Specified in paragraph 38 of the MPGs CRTs	Malawi submitted a stand-alone NID. However, the Party did not submit CRTs, which are part of the NIR. During the review, the Party explained that it experienced challenges in generating the CRTs using the IPCC inventory software and the ETF reporting tools. The Party also explained that it requires capacity-building support to enable it to submit CRTs for its BTR2. The TERT recommends that the Party submit an NIR consisting of an NID and the CRTs.

Table 3

Areas of improvement of the reporting on greenhouse gas emissions and removals – energy sector

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
3.E.1	Specified in paragraph 36 of the MPGs Fuel combustion – reference approach – liquid, solid and gaseous fuels – CO₂	Malawi provided the results of the comparison of the emission estimates from the reference and sectoral approaches in the NID (table 3-4 and figure 3-6). However, information was only reported at an aggregated level for CO₂ emissions, which is not consistent with the level of disaggregation required by CRTs 1.A(b) and 1.A(c), such as by fuel type and fuel consumption. During the review, the Party explained that it reported the comparison of the emission estimates from the reference and sectoral approaches at an aggregated level owing to challenges related to the availability, consistency and completeness of disaggregated fuel consumption data across the national energy

ID#	Reporting requirement	Description of area of improvement with recommendation or encouragement
3.E.2	Specified in paragraphs 31, 32 and 53 of the MPGs International bunker fuels – liquid fuels – CO ₂ , CH ₄ and N ₂ O	balance system at the time of reporting. In particular, Malawi faced constraints related to insufficient sector-level fuel use statistics, incomplete disaggregation of imported and domestically consumed fuels, limited historical time-series data for certain fuel types, and differences in the reporting formats used between institutions that provided data. While aggregate energy data were available through national energy statistics and sectoral estimates, these were not consistently broken down to the level of detail required by CRTs 1.A(b) and 1.A(c). Malawi confirmed that this is an area that requires further capacity-building, including with regard to strengthening national energy data systems, improving the collection and disaggregation of fuel consumption statistics and enhancing coordination among institutions that provide data. The Party provided the national energy balance table during the review. The TERT encourages the Party to report a comparison of the CO₂ emission estimates from the reference and sectoral approaches, disaggregated by fuel type and including information on both fuel consumption and CO₂ emissions, drawing on the information available in the national energy balance. Malawi reported emissions from international aviation in BTR1 figure 2-9, where emissions from international aviation were added to the total emissions for the energy sector. However, the TERT noted that emissions associated with international aviation and bunker fuels should be reported separately and not included in national totals. It was also not clear whether emissions from international bunker fuels were included in the national total amount. In addition, CO₂ emissions from international aviation were reported as 257.49 Gg CO₂ eq for 2022 in BTR table 2-10, whereas the area of the bar graph representing CO₂ emissions from international aviation (yellow) in BTR figure 2-9 is very small and does not correspond to that amount. In addition, Malawi reported GHG emissions for subcategory 1.A.3.d domestic waterborne navigation in the NID (table 3-11) but did not report GHG emissions from international navigation in the NID, and no explanation was provided. During the review, the Party acknowledged that international aviation and international navigation fuel emissions should be reported separately as memo items and excluded from national totals. The Party explained that the value reported in BTR1 table 2-10 is correct and the corresponding chart (figure 2-9) will be corrected to ensure that the graphical presentation is consistent with the table. The Party also explained that domestic waterborne navigation is the activity currently reported for Lake Malawi. The inventory does not identify significant international navigation activity between Malawi and Mozambique or the United Republic of Tanzania for this category, and the reported emissions therefore reflect domestic activity only. The Party further explained that although there is transportation to Mozambique from Likoma Island, emissions from this activity are negligible. The TERT encourages the Party to report emissions associated with international aviation and international navigation as separate entries (e.g. in the corresponding table and chart) and to not include such emissions in national totals if disaggregated data are available, making every effort to both apply and report according to the method contained in the IPCC guidelines. If international navigation in Malawi does not occur or if the associated emissions are considered insignificant (e.g. if there is transportation to Mozambique from Likoma Island), the TERT recommends that the Party use the appropriate notation keys (“NO” and “NE” respectively) and, if considered insignificant, the TERT encourages the Party to use approximated AD and default IPCC EFs to derive a likely level of emissions for the respective category and report it in the NID.
3.E.3	Specified in paragraphs 45 and 47 of the MPGs 1.A.1.a Public electricity and heat production – liquid fuels – CO ₂ , CH ₄ and N ₂ O	Malawi provided information on CO₂ emissions from diesel oil use for subcategory 1.A.1.a public electricity and heat production in the NID. However, there is no information about any other fuels used in energy industries. During the review, the Party explained that the reported estimates of CO₂ emissions for energy industries relate mainly to diesel oil, while the available data on other fuels are not yet sufficiently disaggregated to enable the estimation of CO₂ emissions. The Party also explained that it will improve the national energy balance and fuel use reporting in future submissions.

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
		The TERT recommends that the Party ensure completeness of the inventory and report emission estimates for fuels other than diesel oil and provide disaggregated information in the NID on CO₂ emissions from fuels other than diesel oil used in energy industries (category 1.A.1). The TERT further recommends that the Party report information in the NID on the reasons for lack of completeness in reporting estimates of CO₂ emissions for fuels other than diesel oil in energy industries, as relevant.
3.E.4	Specified in paragraph 47 of the MPGs 1.A.1 Energy industries – liquid fuels – CO₂, CH₄ and N₂O	The TERT noted that electricity generation using diesel oil increased from 14.2 to 170.5 GWh in 2017–2018, an increase of 1,100.1 per cent (NID table 3-1). However, total GHG emissions for category 1.A.1 energy industries only increased from 1.50 to 3.81 kt CO₂ eq in the same period, an increase of 154.0 per cent (NID table 3-2). At the same time, while electricity generation using diesel oil increased from 170.5 to 207.3 GWh (an increase of 21.6 per cent) in 2018–2019, total GHG emissions for category 1.A.1 increased from 3.81 to 55.47 CO₂ eq in that period (an increase of 1,355.9 per cent). The Party did not explain the trend for total GHG emissions for the category in the NID. During the review, the Party explained that NID table 3-1 merely shows the available generation capacity and fuel type, while NID table 3-2 is based on consumption data. The Party also explained that a major diesel oil electric power generator was installed in 2018, which led to the consumption of diesel suddenly increasing in 2019. The TERT recommends that the Party include in the NID a descriptive summary and figures related to the underlying emission trend for total GHG emissions for category 1.A.1, including information on the significant inter-annual changes in emissions, such as an explanation of the drivers (e.g. the reasons for the difference in the size of the increase between electricity generated using diesel oil and associated GHG emissions in 2017–2019).
3.E.5	Specified in paragraphs 31, 40 and 47 of the MPGs 1.A.2 Manufacturing industries and construction – CO₂, CH₄ and N₂O	The Party reported GHG emissions for subcategory 1.A.2.e food processing, beverages and tobacco in the NID but did not report GHG emissions for other subcategories under category 1.A.2 manufacturing industries and construction. Furthermore, the Party did not provide information on the disaggregation of fuel consumption per fuel for subcategory 1.A.2.e. Malawi reported CO₂ and CH₄ emissions for subcategory 1.A.2.e but did not report N₂O emissions. During the review, the Party explained that other industrial subcategories under category 1.A.2, including mining, construction and off-road machinery, have not yet been estimated because of limited disaggregated AD for fuel combustion by sector and subsector and a lack of information on combustion technologies, fuel characteristics and operational conditions, which is needed for estimating N₂O emissions. Malawi will continue to improve coverage of subcategories under category 1.A.2 by strengthening data-collection systems and improving institutional coordination with energy suppliers, industrial operators and national statistical agencies. The Party explained that the GHG emission estimates for subcategory 1.A.2.e were derived using aggregated industrial fuel consumption data obtained from national energy statistics and based on sectoral information reported in the energy balance and that it aims to provide more detailed AD tables and improve documentation for fuel consumption in future inventory submissions in line with reporting requirements under the ETF and the 2006 IPCC Guidelines. The TERT recommends that the Party report, to the extent possible, transparent information in the NID on the coverage of emissions for industrial subcategories under category 1.A.2. The TERT also recommends that the Party report GHG emissions for category 1.A.2 at the most disaggregated level, including N₂O emissions, covering all subcategories, including by using appropriate notation keys, as necessary, and reporting the AD on fuel consumption for each fuel for all subcategories.
3.E.6	Specified in paragraphs 21 and 23 of the MPGs	The Party applied a tier 1 method to estimate CO₂ emissions for subcategory 1.A.3.b road transportation even though it is a key category. The TERT noted that the Party's reporting is not consistent with good practice as per the 2006 IPCC Guidelines (vol. 2, chap. 3, figure 3.2.2). The Party explained in the NID that, given that the transport sector relies on national fuel use information, to

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
	1.A.3 Transport – liquid fuels – CO ₂	enable the application of higher-tier methods for the category, its main needs relate to developing country-specific EFs, collecting more disaggregated vehicle data and strengthening technical capacity to develop inventory estimates. During the review, the Party explained that subcategory 1.A.3.b was estimated using a tier 1 approach for this submission and elaborated on the explanation provided in the NID. The TERT recommends that the Party use a recommended method (tier level) for estimating CO₂ emissions for subcategory 1.A.3.b road transportation in accordance with the IPCC guidelines or document in the NID the reasons for not following the relevant decision tree from the IPCC guidelines.
3.E.7	Specified in paragraph 47 of the MPGs 1.A.4.b Residential – liquid fuels – CO ₂ , CH ₄ and N ₂ O	The TERT noted that the amounts reported in the NID (table 3-12) for kerosene and LPG consumption were more than 50 times higher for 1994 (28.47 and 24.80 Gg respectively) compared with 2000 (0.42 and 0.45 Gg respectively). The Party did not explain the trends in emissions related to kerosene and LPG consumption in the trend analysis provided in the NID (p.73). During the review, the Party explained that kerosene was used for cooking in urban households and for lighting in both rural and urban areas. Over time, it has been phased out of the market. The Party also explained that LPG is currently being promoted as the new urban household fuel with the aim of replacing charcoal in urban areas. The Party further explained that the value of LPG consumption reported for 1994 is an outlier. The TERT recommends that the Party assess the value reported for LPG consumption in households for 1994, revise the emission estimates, as necessary, and explain in the NID the trend of kerosene consumption across the time series.

Table 4

Areas of improvement of the reporting on greenhouse gas emissions and removals – industrial processes and product use sector

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
4.I.1	Specified in paragraph 21 of the MPGs 2.A.2 Lime production – CO ₂	The Party estimated CO₂ emissions for category 2.A.2 lime production using a weighted tier 1 default EF of 0.75 t CO₂/t lime from the 2006 IPCC Guidelines (vol. 3, chap. 2, table 2.4). However, the implied emission factor value derived on the basis of emissions for 2022 of 47.38 Gg CO₂ and AD on lime production for the same year of 80,296.82 t lime (NID table 4-3, p.91) is approximately 0.59 t CO₂/t lime, which is significantly lower than the tier 1 default EF from the 2006 IPCC Guidelines. The TERT noted that this indicates that the estimation was not correctly performed. During the review, the Party confirmed that the tier 1 weighted default EF of 0.75 t CO₂/t lime (NID section 4.2.4.1.3, p.92, equation 4-2) is the correct EF used for category 2.A.2 and acknowledged that the reported CO₂ emission estimates are not consistent with this EF owing to an estimation error. The Party explained that it intends to prioritize identifying the source of the error and providing corrected emission estimates for category 2.A.2 for the next inventory submission. The TERT recommends that the Party estimate and report the CO₂ emission estimates for category 2.A.2 for the entire time series (1994–2022) by correctly applying the tier 1 weighted default EF of 0.75 t CO₂/t lime based on the EFs and method provided in the 2006 IPCC Guidelines (vol. 3, chap. 2, table 2.4 and equation 2.8).

Table 5

Areas of improvement of the reporting on greenhouse gas emissions and removals – agriculture sector

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
5.A.1	Specified in paragraphs 40 and 47 of the MPGs	The TERT noted that the reported CH₄ emissions from enteric fermentation from swine for 2018–2022, manure management for swine for 1994–2018 and manure management for broilers for 1994–2010 were different from those calculated by the TERT using the EFs used throughout the time series.

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
	3. General (agriculture) – CH ₄	During the review, the Party explained that the inconsistencies in the time series of CH₄ emissions from enteric fermentation from swine and from manure management for swine and broilers were due to typographical errors in the NID and confirmed that the estimates were made correctly in the IPCC inventory software. The TERT recommends that the Party, to the extent possible, ensure that information and detailed data for the estimates of CH₄ emissions from enteric fermentation from swine for 2018–2022, manure management for swine for 1994–2018 and manure management for broilers for 1994–2010 are correctly reported in the NID and CRTs.
5.A.2	Specified in paragraphs 21 and 23 of the MPGs 3.A Enteric fermentation – CH ₄	The Party reported in its NID CH₄ emissions from enteric fermentation for non-dairy cattle and goats as key categories. However, the Party applied tier 1 methods from the 2006 IPCC Guidelines, which is not consistent with the method (tier level) recommended for key categories in the 2006 IPCC Guidelines (vol. 1, chap. 4). The TERT noted that, given the government initiatives to intensify dairy production in the country, a tier 2 method would better reflect the differences in livestock productivity over the time series. During the review, the Party confirmed that emissions from enteric fermentation for the livestock categories covered in the inventory, including other cattle and goats, were estimated using tier 1 default EF values from the 2006 IPCC Guidelines (vol. 4, chap. 10.3.2). Malawi noted that the use of tier 1 EFs for these key categories stems from constraints in developing country-specific values for animal productivity and feed intake and country-specific EFs. However, efforts are under way to develop tier 2 EFs for these categories, which will strengthen reporting in future NIDs. The TERT recommends that the Party clearly document in the NID why the methodological choice for estimating CH₄ emissions from enteric fermentation for non-dairy cattle and goats is not in line with the corresponding decision tree of the IPCC guidelines. The TERT encourages the Party to make every effort to use a higher-tier method, in line with IPCC good practice, and to report information on how it is addressing or intends to address the issue.
5.A.3	Specified in paragraphs 39–40 of the MPGs 3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O	The Party did not report AD or transparent information on the methodology used for calculating the different inputs contributing to direct and indirect N₂O emissions from agricultural soils. Malawi only described the methodology used for the category urine and dung deposited by grazing animals. During the review, the Party explained that the total N input applied to agricultural soils used in the calculations comprises inorganic fertilizers, organic manure, crop residue returns and biological N fixation, with underlying AD obtained from the Ministry of Agriculture, the Malawi Revenue Authority, FAOSTAT and the National Statistical Office of Malawi. The Party acknowledged that it did not fully disaggregate each N input source in the tabular summary and stated that it will report the underlying AD more clearly in future submissions. The TERT recommends that the Party provide, to the extent possible, the disaggregated AD for the different N inputs contributing to direct and indirect N₂O emissions from agricultural soils and report transparent information on the methodology used for estimating them.
5.A.4	Specified in paragraph 47 of the MPGs 3.D.1.f Cultivation of organic soils (i.e. histosols) – N ₂ O	Malawi did not report direct N₂O emissions from cultivation of organic soils in the NID. During the review, the Party explained that cultivation of organic soils occurs in a small area of the country. The Party noted that it will be able to collect the AD necessary to enable estimation of N₂O emissions from cultivation of organic soils. The TERT recommends that Malawi report direct N₂O emissions from cultivation of organic soils.

Table 6

Areas of improvement of the reporting on greenhouse gas emissions and removals – land use, land-use change and forestry sector

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
6.L.1	Specified in paragraphs 39–40 of the MPGs 4. General (LULUCF) – CO ₂ , CH ₄ and N ₂ O	Malawi briefly discussed the methods applied and parameters used to estimate carbon stock changes and associated CO₂ and non-CO₂ emissions and removals in the LULUCF section of the NID (pp.148–172), mainly in section 6.4. The TERT noted that, while the application of the stock difference method in forest land was mentioned and an EF for miombo forests (13.66 t CO₂/ha/year) was reported, no detailed information was provided on the methods used (e.g. equations), specific parameters applied and reference documents (e.g. chapter, equation or table of 2006 IPCC Guidelines) at the level of land-use categories and subcategories, carbon pool (e.g. living biomass or SOC), source/sink category (e.g. biomass burning) or gas (CO₂, CH₄ and N₂O). In addition, the Party did not clarify which carbon pools were covered by the EF reported for miombo forests or how the EF was derived. During the review, Malawi provided more details on how the LULUCF inventory was developed, noting that it primarily used tier 1 methods with default parameter values from the 2006 IPCC Guidelines, together with country-specific AD, to calculate CO₂ emissions or removals and non-CO₂ emissions. Malawi clarified that the EF of 13.66 t CO₂/ha/year, which represents an estimated annual net carbon stock change primarily associated with living biomass carbon in miombo woodland ecosystems under Malawi's national conditions, was derived using national forestry studies and regional miombo woodland literature on above-ground biomass, together with default IPCC biomass conversion and expansion factors. Malawi also noted that it intends to provide more detailed methodological documentation in future submissions. The TERT recommends that Malawi report in the NID, to the extent possible, detailed information on the methods, assumptions, EFs and stock change factors, parameters and AD used, including references or sources of information, at the most disaggregated level, for each land-use category and for each source/sink category, including the methods, parameters and assumptions used to derive the stock change factor for miombo forests and the carbon pools covered. The TERT also recommends that, when tier 1 methods are applied, Malawi provide references for the 2006 IPCC Guidelines and equations used and explicitly report the EFs, parameters and AD applied, at the most disaggregated level, to the extent possible.
6.L.2	Specified in paragraphs 21 and 40 of the MPGs Land representation – CO ₂ , CH ₄ and N ₂ O	Malawi reported total areas for the six land-use categories in NID table 6-4 for 2018–2022 and annual areas for different types of land-use conversions in various sections of the NID (tables 6-9, 6-12, 6-15, 6-17 and 6-19). The TERT noted that it was not able to verify the areas of different land-use categories reported in NID table 6-4 for 2022 using the areas reported for 2021 and the land-use conversion data reported in the other tables. Moreover, although the other land category shows a steady decrease, the corresponding conversions from other land to other land-use categories were not reported. The TERT noted that the land representation was not consistent with good practice as per the 2006 IPCC Guidelines (vol. 4, chap. 3). During the review, Malawi acknowledged the inconsistencies identified between total land-use areas and reported conversion areas, which were due to the interpolation methods used and limitations associated with developing the land-use transition matrix. Malawi also identified this as an area requiring further capacity-building and technical support. The TERT recommends that Malawi develop and report a consistent land representation in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 3) by (1) ensuring consistency in the use of annual land-use conversion areas to derive cumulative 20-year land-use and land-use conversion areas (e.g. in year X, the land converted to forest land subcategory should comprise the sum of all annual land-use conversions to forest land in the period from X–19 to X, and the forest land remaining forest land area should equal the forest land remaining forest land area in year X–1 minus the sum of all conversions from forest land to other

ID#	Reporting requirement	Description of area of improvement with recommendation or encouragement
6.L.3	Specified in paragraphs 20–21 of the MPGs 4. General (LULUCF) – CO ₂	land-use categories in year X, plus the sum of all land-use conversions to forest land in year X–20); and (2) ensuring that any increase or decrease in the area reported for a land-use category is balanced by an equivalent decrease or increase in areas of other relevant land-use categories, such that the net change in area across all land-use categories in a given year equals zero. Malawi reported that SOC stocks were estimated using an equation from Pan et al. (2011) (equation 6.5). The TERT was unable to identify the cited equation in the study, which has a global scope. Moreover, the use of this equation resulted in SOC stock changes in forest land remaining forest land, although Malawi indicated in the NID (table 1-5, p.11) that it applied a tier 1 methodology under which SOC stock changes in forest land remaining forest land are assumed to be zero. The Party did not provide in the NID further information on the methodology applied, including any verification of the results derived from applying the equation. In addition, CO₂ emissions for forest land is a key category and the Party did not identify significant subcategories and carbon pools within the key category in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 4.2, and vol. 4, chap. 1, figures 1.2 and 1.3). During the review, Malawi clarified that Pan et al. (2011) was incorrectly cited in the NID and that SOC stock changes were based on a simplified, literature-informed expert judgment rather than on a published and peer-reviewed methodology. The Party explained that this approach was applied mainly for forest land remaining forest land and land converted to forest land to model SOC dynamics in the absence of country-specific data. Malawi also explained that there was no verification of the results obtained under this approach. The TERT concluded that, on the basis of the information provided during the review, the approach followed by Malawi is not consistent with the 2006 IPCC Guidelines owing to, inter alia, the lack of verification of the results and the basis for the expert judgment applied, which should, for example, be elicited on the basis of the protocol described in annex 2A.1 to the 2006 IPCC Guidelines (vol. 1, chap. 2). The TERT recommends that Malawi use a recommended method from the IPCC guidelines, including by applying a higher-tier method in line with IPCC good practice if the SOC pool is found to be significant within the key category and by developing country-specific stock change factors consistent with the IPCC guidelines, or clearly document the reasons for not following the relevant decision tree from the IPCC guidelines. If the SOC pool is found to be insignificant, the TERT recommends that Malawi use a tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 2, equation 2.25, together with default parameters) for all land-use categories, and clearly explain in the NID why a tier 1 method was used in the SOC pool.
6.L.4	Specified in paragraph 21 of the MPGs 4.A Forest land – CO ₂	Malawi reported that allometric equations from Kachamba, Eid and Gobakken (2016) were applied to estimate above- and below-ground biomass stocks in forest land (NID p.155). The TERT noted that these equations were developed for miombo woodlands in Malawi. However, the Party did not clarify whether the equations were also applied to other forest types, such as pine and eucalyptus plantations, or justify why they were considered representative of other forest types. During the review, Malawi confirmed that allometric equations from Kachamba, Eid and Gobakken (2016) were primarily developed for miombo woodlands and were applied as proxies for the other forest types found in the country (i.e. pine plantations and eucalyptus plantations) in the absence of similar equations. Malawi acknowledged the significant differences between these forest types in terms of species composition and management practices and the uncertainty associated with applying these equations to pine and eucalyptus plantations, and highlighted its plans to improve its estimation methodology in future inventories. The TERT noted that the approach applied by the Party is not consistent with good practice because pine and eucalyptus plantations are entirely different from miombo woodlands in terms of species composition and management systems, and therefore applying allometric equations developed specifically for miombo woodlands to plantations introduces a bias in the estimation of carbon stock changes.

ID#	Reporting requirement	Description of area of improvement with recommendation or encouragement
6.L.5	Specified in paragraphs 21 and 39 of the MPGs 4.A Forest land – CO ₂	The TERT recommends that Malawi estimate carbon stock changes in forest land by developing allometric equations for the other forest types found in the country, namely pine plantations and eucalyptus plantations, in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 4.2.1). The TERT also recommends that Malawi apply default values from the 2006 IPCC Guidelines, including root-to-shoot ratios (vol. 4, chap. 4, table 4.4) and biomass conversion and expansion factors (vol. 4, chap. 4, table 4.5), in combination with country-specific growing stock data, until allometric equations adapted to pine plantations and eucalyptus plantations in Malawi are available. Malawi applied the stock difference method to estimate carbon stock changes in living biomass in forest land. The TERT noted that forest inventory data collected under a Japan International Cooperation Agency project in 2011 were used as time t_1, while data collected from the Modern Cooking for Healthy Forests project in 2022, supplemented by an inventory conducted in Lilongwe urban forest, were used as time t_2 (NID p.154). The Party did not provide sufficient information to enable the TERT to assess the consistency and comparability of the data sets or the application of the stock difference method. In particular, the Party did not clarify (1) whether both forest inventories cover the entire forest area and the same forest types; (2) whether the area covered by the Lilongwe urban forest inventory was also included in the 2011 forest inventory; (3) whether consistent methodologies were applied for both inventories; or (4) how the stock difference method was applied, including whether total carbon stocks or stock densities were compared and whether the same areas were considered at times t_1 and t_2. During the review, Malawi explained that both inventories (i.e. the inventories prepared under the Japan International Cooperation Agency project in 2011 and the Modern Cooking for Healthy Forests project in 2022) cover major forest types in the country; however, they are not completely identical in terms of spatial coverage, sampling intensity and implementation approach (e.g. the 2022 inventory was supplemented with data from Lilongwe urban forest to cover urban and peri-urban forests, and some of these areas may not have been covered by the 2011 inventory). Malawi also clarified that, although both forest inventories generally applied forest inventory methodologies tailored to the country's national circumstances, there were some differences in sampling design, plot distribution and data-processing procedures owing to differing project objectives and implementation arrangements. The stock difference method was applied through a comparison of carbon stock densities (t C/ha) between the two inventory periods, with the results then combined with land-area estimates to determine overall carbon stock changes and associated CO₂ emissions/removals. The TERT noted that the stock difference method was not correctly applied owing to a lack of consistency in the forest area covered between the two inventories. Consistency can be ensured by, for example, separately estimating carbon stock changes for the 'common' forest area in the two inventories (i.e. the forest area excluding Lilongwe urban forest), on the one hand, and for Lilongwe urban forest, on the other. For Lilongwe urban forest, in the absence of forest inventory data at time t_1, Malawi may use auxiliary data, such as local inventories or literature, or apply the gain-loss method until two comparable inventories are available. The TERT recommends that, when applying the stock difference method to estimate carbon stock changes in living biomass, Malawi either ensure that the land areas considered at times t_1 and t_2 are identical in order to avoid stock change estimates being affected by changes in area or apply the gain-loss method until two comparable inventories are available. The TERT also recommends that Malawi provide transparent information in the NID demonstrating that the forest inventories are consistent in terms of total forest area, forest types covered and methodologies applied.
6.L.6	Specified in paragraph 47 of the MPGs 4.B Cropland – CO ₂	Malawi did not report CO ₂ emissions from drained organic soils under cultivation in the NID for either cropland remaining cropland or land converted to cropland.

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
		During the review, the Party confirmed that cultivation of organic soils occurs in small areas in the country. The Party noted that it will be able to collect the necessary AD for cultivated organic soils for future BTRs. The TERT recommends that Malawi report CO₂ emissions from cultivation of organic soils for both cropland remaining cropland and land converted to cropland.
6.L.7	Specified in paragraph 56 of the MPGs 4.G HWP – CO ₂	Malawi reported emissions and removals from HWP estimated using the stock change approach. The Party did not report supplementary information on emissions and removals from HWP estimated using the production approach. During the review, Malawi explained that it applied the stock change approach for HWP owing to limited data sets on national production and trade, which are required for the production approach, and noted that it intends to report supplementary information on the contribution of HWP based on the use of the production approach. The TERT recommends that Malawi report in the NID supplementary information on emissions and removals from HWP estimated using the production approach (e.g. by collecting the necessary AD or using data provided in FAOSTAT).

Table 7

Areas of improvement of the reporting on greenhouse gas emissions and removals – waste sector

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
7.W.1	Specified in paragraph 40 of the MPGs 5.A Solid waste disposal on land – CH ₄	The Party reported EFs used for the waste sector in the NID (table 7-4, p.181). However, the NID does not provide the value of the reaction constant (k) used in the FOD method used for estimating CH₄ emissions from solid waste disposal as per the 2006 IPCC Guidelines (vol. 5, chap. 3.2.1.1). In addition, although the Party provided information on the amount of solid waste generated per capita per year, it did not report the fraction of waste disposed of at SWDS (2006 IPCC Guidelines, vol. 5, chap. 3.2.2). During the review, Malawi explained that it applied the tier 1 approach from the 2006 IPCC Guidelines (vol. 5, chap. 3.2.1.1) for estimating CH₄ emissions from solid waste disposal using the FOD method owing to the limited availability of country-specific decay parameters. In this approach, the k value was selected on the basis of IPCC default values for the wet climate zone category (2006 IPCC Guidelines, vol. 5, chap. 3, table 3.3), which is considered most representative of Malawi's tropical climate, with relatively high rainfall and warm temperatures. Accordingly, a default k value of approximately 0.18/year (consistent with IPCC default ranges for readily degradable organic waste under wet tropical conditions) was used for mixed municipal solid waste where country-specific calibration data were not available. For waste streams with slower degradability (e.g. paper and wood), lower k values from the range of tier 1 EFs from the 2006 IPCC Guidelines (vol. 5, chap. 3, table 3.3) were applied depending on waste composition assumptions. Malawi reported total per capita solid waste generation on the basis of available national estimates; however, the fraction of waste directed to SWDS was not explicitly quantified and reported owing to limitations in underlying data systems in municipal solid waste management. The Party also explained that its waste sector data are characterized by an incomplete coverage of formal waste collection systems, limited reporting at the municipal level and a lack of harmonized national statistics on waste collection, transport, and treatment and final disposal pathways. As a result, while estimates of total waste generation were available, consistent and disaggregated data on waste flows, particularly the proportion of waste collected and ultimately disposed of at managed SWDS, were not sufficiently robust to be systematically included in the inventory tables. The TERT recommends that the Party provide, to the extent possible, transparent information on the k values used in the FOD equation (2006 IPCC Guidelines, vol. 5, chap. 3.2.1.1) and the fraction of solid waste disposed of at SWDS used for estimating CH₄ emissions from solid waste disposal.

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
7.W.2	Specified in paragraph 40 of the MPGs 5.D.1 Domestic wastewater – CH ₄	In its NID (p.194), Malawi reported that all wastewater sludge is collected by farmers. However, the Party did not report in the NID the amount of sludge removed or collected and explain how it is treated. During the review, Malawi explained that AD on wastewater sludge are not available. The Party also explained that this is an area that could be strengthened in future inventory submissions, especially as the management of wastewater treatment is transitioning from local government to water boards, which have greater capacity to collect such information. The TERT recommends that the Party provide, to the extent possible, AD on the amount of wastewater sludge being collected and explain how it is treated.

C. Information necessary to track progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

Table 8

Areas of improvement of the reporting on national circumstances and institutional arrangements

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
NA	NA	No areas of improvement identified

Table 9

Areas of improvement of the description of the nationally determined contribution under Article 4 of the Paris Agreement, including updates

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
NA	NA	No areas of improvement identified

Table 10

Areas of improvement of the reporting of the information necessary to track progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
10.1	Specified in paragraph 67 of the MPGs	Malawi's indicator for tracking progress in implementing and achieving its NDC is described as the absolute reduction in GHG emissions expressed as the difference between the 'business as usual' scenario presented in the NDC (baseline) and actual emissions as per the latest GHG inventory reported for each reporting year. The baseline was constructed by extrapolating data reported in the updated NDC submitted in 2021. The TERT noted that the values of the selected indicator for the baseline reported in the BTR1 (table 3-6) and CTF table 4 were based on the GHG inventory used for the updated NDC submitted in 2021 and were not updated in accordance with the recalculation of the GHG inventory for the BTR1, as required by the MPGs. During the review, Malawi informed the TERT that it did not update the 'business as usual' scenario following the recalculation of data for the national GHG inventory because it wanted to ensure consistency with the NDC. The TERT recommends that Malawi update the information for the indicator for the baseline in accordance with any recalculation of the GHG inventory.
10.2	Specified in paragraphs 74(b) and 75 of the MPGs	Malawi reported in the BTR1 (section 3.3.1) that the emission estimates used for the baseline were calculated by extrapolating data reported in the updated NDC submitted in 2021. However, the Party did not provide in the BTR1 a description of the methodology used for the construction of the baseline, including the key parameters, assumptions, definitions, data sources and models used. During the review, Malawi confirmed that the detailed assumptions and modelling metrics supporting the development of its projection scenarios were primarily documented in the updated NDC and were only partially reflected in the BTR1 and CTF tables. Malawi also explained that projections were developed using sector-

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
		specific analytical approaches informed by the 2006 IPCC Guidelines, historical GHG inventory data, national development projections, energy demand trends, population growth assumptions and sectoral policy scenarios. For the energy sector, projections were based on historical fuel consumption trends, projected economic growth, energy demand forecasts, population growth, electrification targets, technology penetration assumptions, and information on the implementation of mitigation measures, such as renewable energy deployment, energy efficiency improvements and clean cooking interventions. Data sources included national energy balance reports, GHG inventories, sectoral studies, demographic projections and national development planning documents. In other sectors, projections and mitigation estimates were informed by available AD, sectoral studies, land-use assessments, agricultural production trends, waste generation estimates and assumptions regarding adoption rates for mitigation interventions. However, methodological approaches in these sectors were less advanced and relied on IPCC default assumptions and limited country-specific parameters owing to constraints related to collecting data. The TERT recommends that Malawi provide in the BTR a description of the methodology used for the construction of the baseline, including the key parameters, assumptions, definitions, data sources and models used.
10.3	Specified in paragraph 77(d) of the MPGs	Malawi reported in the BTR1 (section 3.3.4.1, p.219) that it took part in activities related to ITMOs by issuing and trading carbon credits in 2021–2024 and that these ITMOs were not used to track progress in meeting its NDC goals. Malawi also reported in the BTR1 (executive summary, p.xxxviii) that it traded in ITMOs during the NDC reporting period (2021–2024). The Party also reported in CTF table 4 information on ITMOs, including annual quantities. However, the Party reported in CTF table 3 in the rows relating to participation in cooperative approaches that involve the use of ITMOs towards the NDC or the authorization of the use of mitigation outcomes for international mitigation purposes other than the achievement of the NDC that it does not participate in cooperative approaches. During the review, Malawi confirmed that it has used ITMOs towards tracking progress in achieving its NDCs by authorizing mitigation outcomes as ITMOs for use for other international mitigation purposes and has thus applied corresponding adjustments, but it does not intend to use ITMOs for the achievement of its NDC. The TERT recommends that Malawi clarify in the BTR and CTF tables its participation in cooperative approaches that involve the use of ITMOs towards the achievement of its NDC.

Table 11

Areas of improvement of the reporting on mitigation policies and measures, actions and plans, including those with mitigation co-benefits resulting from adaptation actions and economic diversification plans, related to implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
11.1	Specified in paragraph 81 of the MPGs	In BTR1 section 3.4, which is dedicated to mitigation actions and PaMs, Malawi reported actions and PaMs organized by project type only, contrary to the MPGs, which require Parties, to the extent possible, to organize the reporting of actions by sector (energy, transport, IPPU, agriculture, LULUCF, waste management and other). The TERT noted that sectors are included in CTF table 5 and the description of the NDC in the BTR1 (table 3-3-4), which presents the actions and PaMs included in the NDC. During the review, Malawi explained that reporting was provided in the narrative part of the BTR1 (table 3-3-4) mostly as energy sector projects, with information only reported on the description of Malawi's mitigation measures under the NDC. The TERT recommends that Malawi organize, to the extent possible, the reporting of actions and PaMs by sector (energy, transport, IPPU, agriculture, LULUCF, waste management and other) in the BTR.
11.2	Specified in paragraph 82 of the MPGs	Malawi did not provide the information specified in paragraph 82(c–f) and (h–i) of the MPGs on objectives; type of instrument; status; sector(s) affected; start year of implementation; or implementing entity or entities for all its actions and PaMs that

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
		support the implementation and achievement of its NDC reported in CTF table 5. In addition, for some actions and PaMs, the Party reported the type of instrument as “project”, reported the status as “not yet implemented” or provided a detailed description of the action, policy and measure, and instead provided detailed text for the start year of implementation. The TERT noted that the MPGs define the type of instrument as “regulatory”, “economic instrument” or “other” and the status as “planned”, “adopted” or “implemented”. During the review, Malawi acknowledged that insufficient information on the above-mentioned reporting elements was provided in its reporting and noted that this information will be included in future BTRs. The TERT recommends that the Party, to the extent possible, provide the missing information in CTF table 5 on objectives; type of instrument; status; sector(s) affected; start year of implementation; and implementing entity or entities, using the categories defined in the MPGs, for all its actions and PaMs that support the implementation and achievement of its NDC.
11.3	Specified in paragraph 83 of the MPGs	Malawi did not provide information in its BTR1 for each action, policy and measure reported on (1) costs, (2) non-GHG mitigation benefits and (3) how the mitigation actions interact with each other. During the review, Malawi explained that it recognizes that many mitigation actions generate important non-GHG benefits and while it reported key mitigation actions under the NDC implementation section, comprehensive detailed information on implementation costs and policy interactions was not provided. However, the Party noted that the cost for implementing each NDC is provided in the updated NDC submitted in 2021. The TERT encourages Malawi to include information, to the extent possible, for each action, policy and measure reported on (1) costs, (2) non-GHG mitigation benefits and (3) how the mitigation actions as identified in paragraph 80 of the MPGs interact with each other, as appropriate.
11.4	Specified in paragraph 85 of the MPGs	The Party did not provide in the BTR1 and in CTF table 5 estimates of expected and achieved GHG emission reductions for all its actions and PaMs. The TERT noted that the Party reported estimates of expected and achieved GHG emission reductions for only a few actions and PaMs in the energy sector. During the review, the Party explained that expected and achieved GHG emission reductions were not estimated or reported in the BTR1 for all actions and PaMs, apart from those in the energy sector, owing to data and capacity limitations. The TERT recommends that Malawi include, to the extent possible, estimates of expected and achieved GHG emission reductions for all actions and PaMs in the tabular format referred to in paragraph 82 of the MPGs.

Table 12

Areas of improvement of the summary of greenhouse gas emissions and removals

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
NA	NA	No areas of improvement identified

Table 13

Areas of improvement of the projections of greenhouse gas emissions and removals

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
13.1	Specified in paragraph 6 in conjunction with paragraph 102 of the MPGs	Malawi reported information on projections pursuant to paragraphs 96 and 98–101 of the MPGs using a less detailed methodology and coverage than those specified in the MPGs. For example, the Party did not report complete information on models and/or approaches used or key underlying assumptions and parameters used for projections (para. 96(a) of the MPGs); the sensitivity analysis (para. 96(d) of the MPGs); projections by sector and gas (para. 98 of the MPGs); projections relative to actual inventory data for the preceding years (para. 99 of the MPGs); projections with LULUCF (para. 100 of the MPGs); and projections in graphical and tabular formats (para. 101 of the MPGs). During the review, Malawi explained that it intended to apply the flexibility provided to those developing country Parties that need it in the light of their capacities with respect to paragraphs 96 and 98–101 of the MPGs in cases where it did not report the information required by the MPGs or where it reported a less detailed methodology and coverage. However, the Party acknowledged that it did not specify in the BTR1 to which provisions of the MPGs under paragraphs 93–101 it intended to apply this flexibility. The Party also explained that it lacked capacity in modelling projections, using analytical tools and conducting a sensitivity analysis, which could be addressed in 2026–2028. The TERT recommends that the Party clearly indicate whether it applied the flexibility provided for in paragraph 102 of the MPGs, including by specifying the provisions of paragraphs 93–101 of the MPGs that it intends to apply this flexibility to, concisely clarify its capacity constraints, and indicate a self-determined estimated time frame for improvements in relation to those capacity constraints.

Table 14

Areas of improvement of other information relevant to tracking progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

<i>ID#</i>	<i>Reporting requirement</i>	<i>Description of area of improvement with recommendation or encouragement</i>
NA	NA	No areas of improvement identified

II. Capacity-building needs³ identified by the Party and by the technical expert review team in consultation with the Party during the technical expert review of its first biennial transparency report

2. Table 15 presents capacity-building needs identified by the Party and by the TERT in consultation with the Party during the technical expert review of its BTR1.

Table 15

Capacity-building needs identified in consultation with the Party

<i>ID#</i>	<i>Reporting requirement</i>	<i>Area in which capacity-building is needed</i>
General reporting		
1_CBN.1	Specified in paragraph 10 of the MPGs	Strengthening technical capacity to understand and apply the reporting requirements of the MPGs (high priority)
1_CBN.2	Specified in paragraph 10 of the MPGs	Strengthening technical capacity to use the ETF reporting tools to report information in CRTs and CTF tables (high priority)
NIR – general		

³ As referred to in paras. 7, 8 and 162(d) of the MPGs.

<i>ID#</i>	<i>Reporting requirement</i>	<i>Area in which capacity-building is needed</i>
2.G_CBN.1	Specified in paragraphs 18, 34 and 46 of the MPGs	Developing procedural arrangements for the sustainable compilation of the GHG inventory, including for elaborating a QA/QC plan (high priority)
2.G_CBN.2	Specified in paragraph 20 of the MPGs	Enhancing technical capacity to understand and apply the 2006 IPCC Guidelines (high priority)
2.G_CBN.3	Specified in paragraphs 25 and 42 of the MPGs	Enhancing technical capacity to conduct a quantitative and qualitative key category analysis, including the identification of significant subcategories and carbon pools within key categories (high priority)
2.G_CBN.4b	Specified in paragraph 38 of the MPGs	Enhancing technical capacity to use the IPCC inventory software to estimate emissions and removals for all GHG inventory sectors (high priority)
2.G_CBN.5b	Specified in paragraphs 29 and 44 of the MPGs	Strengthening technical capacity to collect and derive uncertainty data for AD and EFs (high priority)
2.G_CBN.6a	Specified in paragraphs 6 and 57 of the MPGs	Strengthening technical capacity to use splicing techniques for filling data gaps to enable the reporting of a complete GHG inventory time series, as required under the MPGs (high priority)
NIR – energy		
3.E_CBN.1	Specified in paragraphs 31, 36, 40 and 47 of the MPGs	Strengthening technical and institutional capacity for data collection to support the estimation of emissions using the reference and sectoral approaches for the energy sector and estimating CO ₂ emissions at a disaggregated level for stationary and mobile combustion (high priority)
3.E_CBN.2b	Specified in paragraphs 21 and 23 of the MPGs	Strengthening technical capacity to collect and prepare the data required for applying a higher-tier methodology for estimating CO ₂ emissions for the energy sector (high priority)
NIR – IPPU		
NA	NA	No capacity-building needs identified
NIR – agriculture		
5.A_CBN.1	Specified in paragraphs 39–40 of the MPGs	Strengthening technical capacity to acquire and develop disaggregated AD for all N input to soils (high priority)
NIR – LULUCF		
6.L_CBN.1	Specified in paragraphs 20, 21 and 23 of the MPGs	Strengthening technical capacity to collect data and apply higher-tier methods for estimating carbon stock changes in the SOC pool in accordance with the 2006 IPCC Guidelines (medium priority)
6.L_CBN.2	Specified in paragraph 20 of the MPGs	Strengthening technical capacity to collect data on annual land-use and land-use change areas and developing a consistent time series for land representation (high priority)
6.L_CBN.3	Specified in paragraphs 20, 39 and 57 of the MPGs	Strengthening technical capacity to apply methodologies for the stock difference method for estimating carbon stock changes in living biomass (high priority)
NIR – waste		
7.W_CBN.1	Specified in paragraph 40 of the MPGs	Establishing a data-collection and information management system for obtaining and managing data on waste streams (high priority)
Information necessary to track progress in implementing and achieving the NDC under Article 4 of the Paris Agreement		
11_CBN.1	Specified in paragraph 83 of the MPGs	Strengthening technical capacity to assess co-benefits of actions and PaMs (high priority)

<i>ID#</i>	<i>Reporting requirement</i>	<i>Area in which capacity-building is needed</i>
11_CBN.2a	Specified in paragraph 85 of the MPGs	Strengthening technical capacity to apply methodologies and models to assess estimates of expected and achieved GHG emission reductions associated with the Party's reported actions and PaMs (high priority)
13_CBN.3a	Specified in paragraphs 6 and 102 of the MPGs	Strengthening technical capacity to perform modelling and ensuring enhanced access to analytical tools and modelling expertise to develop future sector-level (including with LULUCF projections) and gas-level projections, specifically in relation to analysing the impacts of PaMs for the 'with measures' and 'with additional measures' scenarios (high priority)
13_CBN.4a	Specified in paragraph 96(c) of the MPGs	Strengthening technical capacity for conducting a sensitivity analysis of the projections (medium priority)

^a Capacity-building need identified by the TERT in consultation with the Party relating to the flexibilities applied by it as per the MPGs.

^b Capacity-building need identified by the Party in its BTR1.

Annex

Documents and information used during the review

A. Reference documents

BTR1 of Malawi. Available at <https://unfccc.int/first-biennial-transparency-reports>.

BTR1 CTF tables of Malawi.

Available at <https://unfccc.int/first-biennial-transparency-reports>.

“Guidance for operationalizing the modalities, procedures and guidelines for the enhanced transparency framework referred to in Article 13 of the Paris Agreement”. Decision 5/CMA.3. FCCC/PA/CMA/2021/10/Add.2. Available at <https://unfccc.int/documents/460951>.

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

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

“Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement”. Annex to decision 18/CMA.1. FCCC/PA/CMA/2018/3/Add.2. Available at <https://unfccc.int/documents/193408>.

NDC of Malawi. Available at <https://unfccc.int/NDCREG>.

NID of Malawi. Available at <https://unfccc.int/first-biennial-transparency-reports>.

B. Additional information provided by the Party

Responses to questions during the review were received from Yamikani Idriss (Ministry of Natural Resources of Malawi), including additional material. The following references were provided by Malawi and may not conform to UNFCCC editorial style as some have been reproduced as received:

Kachamba, D.J., Eid, T. and Gobakken, T. 2016. *Above- and Belowground Biomass Models for Trees in Miombo Woodlands of Malawi*. Forests, 7, Article No. 38. <https://doi.org/10.3390/f7020038>.