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## **Technical analysis of the first biennial update report of Botswana submitted on 6 November 2019**

### **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 Botswana, 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

AD	activity data
AFOLU	agriculture, forestry and other land use
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CGE	Consultative Group of Experts
CH <sub>4</sub>	methane
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
EF	emission factor
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
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>
MRV	measurement, reporting and verification
NA	not applicable
NC	national communication
NIR	national inventory report
non-Annex I Party	Party not included in Annex I to the Convention
NO <sub>x</sub>	nitrogen oxides
N <sub>2</sub> O	nitrous oxide
PFC	perfluorocarbon
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”
2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>

## **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 BURs 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 Botswana, 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, Botswana submitted its first BUR on 6 November 2019 as a stand-alone update report. The Party did not provide any clarification of the reason for not complying with the mandated submission timeline outlined in paragraph 2 above.
6. A desk analysis of Botswana's BUR was conducted from 9 to 13 March 2020<sup>1</sup> 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: Selam Kidane Abebe (former member of the CGE from Ethiopia), Thiago de Araújo Mendes (former member of the CGE from Brazil), Fernando Farias (former member of the CGE from Chile), Liviu Gheorghe (Romania), Eduardas Kayakevicius (Lithuania), Mwangi Kinyanjui (Kenya), Orlando Ernesto Rey Santos (Cuba), Hlobosile Sikhosana (Eswatini) and John Steller (United States of America). Mr. Kinyanjui and Mr. Steller were the co-leads. The technical analysis was coordinated by Marion Vieweg-Mersmann, Bhava Dhungana and Hiroaki Odawara (secretariat).
7. During the technical analysis, in addition to the written exchange, through the secretariat, to provide technical clarifications on the information reported in the BUR, the TTE and Botswana 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 Botswana's first BUR, the TTE prepared and shared a draft summary report with Botswana on 15 June 2020 for its review and comment. Botswana, in turn, provided its feedback on the draft summary report on 2 October 2020.
8. The TTE responded to and incorporated Botswana's comments referred to in paragraph 7 above and finalized the summary report in consultation with the Party on 10 November 2020.

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<sup>1</sup> Owing to the circumstances related to the coronavirus disease 2019, the technical analysis of the BUR submitted by Botswana had to be conducted remotely.

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

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

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

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

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

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

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

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

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

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

12. According to decision 20/CP.19, annex, paragraph 15(a), in undertaking the technical analysis of the submitted BUR, the TTE is to identify the extent to which the elements of information listed in paragraph 11 above have been included in the BUR of the Party concerned. The TTE considers that the reported information is mostly 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 annex I.

### **C. Technical analysis of the information reported**

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

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

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

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

16. As per the scope defined in paragraph 2 of the UNFCCC reporting guidelines on BURs, the BUR should provide an update to the information contained in the most recently submitted NCs, including information on national circumstances and institutional

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

17. Botswana reported in its first BUR the following information on its national circumstances: a description of national development priorities, objectives and circumstances, including information on features of geography, demographics, climate and economy that might affect the Party's ability to deal with mitigating and adapting to climate change, as well as information regarding national circumstances and constraints on the specific needs and concerns arising from the adverse effects of climate change 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.

18. Information on institutional arrangements for the preparation of its BURs was not clearly reported by Botswana. The BUR contains information on institutional arrangements for the preparation of inventories but not BURs or NCs. It states that the Ministry of Environment, Natural Resources Conservation and Tourism compiled the BUR, but does not mention which institutions are involved in preparing reports on a continuous basis. During the technical analysis, the Party clarified that the same institutional arrangements for inventories will remain in place and the Ministry of Environment, Natural Resources Conservation and Tourism would prepare subsequent submissions.

19. The TTE noted that the transparency of the information reported on institutional arrangements could be enhanced by addressing the area noted in paragraph 18 above, which could facilitate a better understanding of the information reported on institutional arrangements.

20. Botswana reported in its first BUR information on its domestic MRV arrangements. In chapter 4 of its BUR, the Party outlined a monitoring plan and templates for monitoring, reporting and verifying emissions, mitigation actions and international assistance. It provided information on the sectors and parameters to be monitored, data collection by sector, institutional arrangements and responsibilities by sector, methods of monitoring and verification, and monitoring framework templates. However, the BUR does not specify whether implementation of the MRV system is complete, ongoing or planned. During the technical analysis, Botswana clarified that implementation of the MRV system and use of the associated templates are planned, and that no tracking is being conducted at present.

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

21. As indicated in table I.1, Botswana reported information on its GHG inventory in its BUR mostly 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.

22. Botswana submitted its first BUR in 2019 and the GHG inventory reported is for 2015. The GHG inventory is consistent with the requirements for the reporting time frame.

23. Botswana submitted an NIR as an additional document during the technical analysis but did not include the relevant references in the BUR. During the technical analysis, the Party clarified that information relating to some of the reporting provisions for the GHG inventory, such as information on a comparison between the sectoral and reference approach (see para. 47 below) and on an uncertainty assessment (see para. 49 below), is contained in the NIR. The Party also indicated that it may submit the NIR to the secretariat following revision. The TTE noted that the Party submitting the national inventory before the technical analysis and including relevant references in the BUR could facilitate a better understanding of the information reported.

24. GHG emissions and removals for the BUR covering the 2015 inventory were estimated using the tier 1 methodology from the 2006 IPCC Guidelines. Botswana also applied the IPCC good practice guidance. The TTE commends the Party for its efforts to use updated methodologies. Botswana reported using the IPCC inventory software (version 2.54) for data entry, calculations and analysis, and the UNFCCC inventory software for non-Annex

I Parties for trend analysis. During the technical analysis, the Party submitted estimates of GHG emissions and removals for the time series 2000–2015, which is included in its NIR.

25. Information on sources of EFs was clearly reported in the BUR, including the use of tier 1 default EFs from the 2006 IPCC Guidelines. Table 2 of the BUR provides a transparent assessment of the methodologies and EFs used for each inventory sector.

26. Information on sources of AD was not clearly reported in Botswana’s BUR. During the technical analysis, the Party clarified that this information is included in its NIR.

27. Information on the Party’s total GHG emissions by gas for 2015 is outlined in table 1 in unit of mass. The TTE encountered challenges in identifying the total GHG emissions including and excluding land owing to differences between the information provided in the first paragraph of section 2.2.5 and the data in sectoral tables 6–9 and 11, as well as inconsistencies within table 5, of the BUR. The TTE compiled information excluding land from information reported in tables 1 and 11 of the BUR, while information including land was taken from the information reported only in table 1. Total GHG emissions in Gg CO<sub>2</sub> eq (including land) are as reported in section 2.2.5 of the BUR. Table 1 shows an increase in total emissions (excluding land) of 71.9 per cent from 2000 to 2015 (9,917.68 Gg CO<sub>2</sub> eq), on the basis of information provided for 2000 in the NIR.

Table 1  
**Greenhouse gas emissions by gas of Botswana for 2015**

<i>Gas</i>	<i>GHG emissions (Gg) including land<sup>a, b</sup></i>	<i>GHG emissions (Gg) excluding land<sup>a</sup></i>	<i>% change 2000–2015<sup>b</sup></i>
CO <sub>2</sub>	6 714.08	9 507.25	103.9
CH <sub>4</sub>	147.86	147.86	14.4
N <sub>2</sub> O	1.45	1.43	47.9
HFCs	0.55	0.55	NA
PFCs	NA	NA	NA
SF <sub>6</sub>	NA	NA	NA
CO	253.89	253.89	NA
NO <sub>x</sub>	15.23	15.23	NA
<b>Total (Gg CO<sub>2</sub> eq)</b>	<b>7 131.07</b>	<b>9 917.68</b>	<b>71.9</b>

<sup>a</sup> 2006 IPCC Guidelines AFOLU category 3.B.

<sup>b</sup> GHG emissions including land were not reported for 2000.

28. Information on other emissions was reported, but the TTE encountered challenges in identifying which of the reported values to include in this report because of inconsistencies across tables 1, 3, 4 and 11 of the BUR. Emissions for NO<sub>x</sub> and CO reported in table 4 were 15.23 Gg and 253.89 Gg, respectively.

29. Information on PFCs, SF<sub>6</sub> and non-methane volatile organic compounds was not reported in Botswana’s BUR. The Party clarified in the BUR that relevant publicly available AD were lacking.

30. Botswana applied notation keys in table 2 of the BUR where numerical data were not provided. The use of notation keys was consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties. The TTE noted that the sectoral tables do not include notation keys where numerical data were not provided. During the technical analysis, the Party clarified that notation keys would be used in the sectoral tables in future reporting.

31. Botswana reported comparable information addressing the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF and the sectoral reporting tables annexed to the Revised 1996 IPCC Guidelines. It used the 2006 IPCC Guidelines and reported comparable information in table 4 and annex tables 35–38 of its BUR.

32. The TTE encountered challenges in identifying the correct sectoral emissions owing to inconsistencies in sectoral tables 6–9 and 11, summary tables 3–5 and information in section 2.2.5 of the BUR. The total GHG emissions reported in section 2.2.5 (7,131.07 Gg CO<sub>2</sub> eq) and the sum of the GHG emissions in the sectoral tables (10,270.43 Gg CO<sub>2</sub> eq)

differ by 44 per cent. The emissions that different sectors contributed to the total GHG emissions, excluding AFOLU category 3.B (land) and 3.D (other emissions), as reported by the Party for 2015 in the sectoral tables of the BUR, are reflected in table 2. The shares of emissions that sectors contributed are calculated by the TTE on the basis of the emissions reported in the sectoral tables of the BUR as the share of total emissions without 2006 IPCC Guidelines AFOLU category 3.B (land) and other emissions (3.D).

Table 2

**Shares of greenhouse gas emissions by sector of Botswana for 2015**

<i>Sector</i>	<i>GHG emissions (Gg CO<sub>2</sub> eq)</i>	<i>% share</i>
Energy	9 310.72	71.2
Industrial processes and product use	1 221.69	9.4
AFOLU	-947.94	NA
Livestock (category 3.A)	1 403.78	10.7
Land (category 3.B)	-2 786.61	NA
Aggregate sources and non-CO <sub>2</sub> emissions sources on land (category 3.C)	445.98	3.4
Other (category 3.D)	-11.09	NA
Waste	685.92	5.3

33. Botswana 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.

34. For the energy sector, information was clearly reported on the use of tier 1 methods from the 2006 IPCC Guidelines for estimating GHG emissions and key categories. Energy industries (solid fuels) and road transport are the key categories in the sector, and CO<sub>2</sub> is the main gas.

35. Information on key categories and sources of AD for fuel consumption activities and fugitive emissions was not clearly reported in Botswana's BUR. During the technical analysis, the Party clarified that relevant information was included in the NIR, namely that AD were sourced from Statistics Botswana, government ministries and other relevant national stakeholders, as well as the International Energy Agency.

36. For the industrial processes and product use sector, information was clearly reported on the use of tier 1 methods from the 2006 IPCC Guidelines for estimating GHG emissions. Botswana reported on HFCs from refrigeration and stationary air conditioning. The key category in this sector is (CO<sub>2</sub>) emissions from soda ash production.

37. Information on the sources of AD for the industrial processes and other product use sector was not reported, but this information was included in the NIR. AD were sourced from the International Merchandise Trade Statistics unit of Statistics Botswana and the Botswana Ash company.

38. For categories 3.A and 3.C under the AFOLU sector from the 2006 IPCC Guidelines, enteric fermentation was identified as a key category and the main source of (CH<sub>4</sub>) emissions in the sector.

39. For land (category 3.B), Botswana reported annual GHG emissions and removals for 2015. The TTE encountered challenges in identifying which of the reported values are correct because of inconsistencies in tables 3, 4 and 11 of the BUR. Overall, the removals from land reported in sectoral table 11 were 2,786.61 Gg CO<sub>2</sub> eq and total net emissions from AFOLU were -947.94 Gg CO<sub>2</sub> eq in 2015.

40. Information on sources of AD for AFOLU was not clearly reported in Botswana's BUR. During the technical analysis, the Party clarified that relevant information was provided in the NIR, namely that AD were sourced from the Agricultural Statistics and International Merchandise Trade Statistics units of Statistics Botswana, and Google Earth.

41. For the waste sector, information was clearly reported on the use of tier 1 methods from the 2006 IPCC Guidelines for estimating GHG emissions. The main source of (CH<sub>4</sub>) emissions in the sector is solid waste disposal.
42. The Party did not include information in its BUR on the sources of AD used, but this information was provided in the NIR, namely that AD were sourced from Statistics Botswana and gross domestic product figures from the World Bank.
43. Information on updates to the GHG inventories reported in previous NCs was not reported in Botswana's BUR. The TTE notes that Botswana's NC3 was submitted at the same time as its first BUR in 2019. During the technical analysis, the Party clarified that information on updates to the GHG inventories, especially on recalculations, was provided in the NIR. Recalculations were conducted for the full time series 2000–2013 using the 2006 IPCC Guidelines, and estimates were presented by sector and by gas. GHG emissions increased by 52.0 per cent over the period. The NIR also presents inventories for 2014 and 2015. The Party also clarified that the inventory for 1994–1999 could not be recalculated owing to the lack of AD, but indicated that it plans to extend the time series as well as include summary information on previous inventories in its next BUR.
44. Botswana described in its BUR the institutional framework for the preparation of its 2015 GHG inventory. The Party reported that the Department of Meteorological Services is the governmental body designated as the climate change focal point and that this Department has delegated responsibility for GHG inventory preparation to other institutions, as noted in section 2.1.2 of its BUR. Other institutions involved include the Ministry of Environment, Natural Resources Conservation and Tourism (GHG system lead, as shown in figure 9 of the BUR); the University of Botswana; the Botswana Power Corporation; the Department of Waste Management and Pollution Control; the Botswana Institute for Technology, Research and Innovation; Statistics Botswana; and the Department of Forestry and Range Resources. During the technical analysis, the Party clarified that the institutional arrangements for the preparation of GHG inventories are set up for continuous reporting.
45. Botswana clearly reported that a key category analysis was performed for the level of and trend in emissions. The main sources of (CO<sub>2</sub>) emissions by level and trend are land converted to forest land, land converted to grassland, and energy industries (solid fuels).
46. The BUR provides information on quality assurance/quality control measures for all sectors, including on the methodological guidance and specific checks used for quality assurance/quality control. Information on the internal and external inventory review processes, which involve inputs from the National Climate Change Committee and its secretariat and the United Nations Development Programme, was also reported. The TTE commends Botswana for providing information in accordance with the IPCC good practice guidance.
47. Botswana reported information in the BUR on CO<sub>2</sub> fuel combustion using only the sectoral approach. During the technical analysis, the Party indicated that both the sectoral and reference approach were used and reported in its NIR, and that there was a difference of 4.1 per cent between the two approaches in 2015. Neither the BUR nor the NIR include an explanation for this difference. The Party clarified that it plans to include both approaches in its next BUR.
48. Information was clearly reported on international aviation and marine bunker fuels.
49. Information on the level of uncertainty associated with inventory data and underlying assumptions was not reported in Botswana's BUR, although the BUR does indicate that uncertainty ranges were identified for the GHG inventory. During the technical analysis, the Party clarified that information on the uncertainty of AD and EFs and the resulting combined uncertainty is included in its NIR.
50. The TTE noted that the transparency of the information reported on GHG inventories could be enhanced by addressing the areas noted in paragraphs 23, 26, 29, 35, 37, 40, 42, 43, 47 and 49 above, and that the consistency of information reported throughout the BUR, as noted in paragraphs 27 and 32 above, could be improved, which could facilitate a better understanding of the information reported on GHG inventories.



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

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

52. The information reported provides a clear overview of the Party's mitigation actions and their effects. In its BUR, the Party reported information on feasible and cost-effective national mitigation plans and actions that would not impede the country's economic growth and development. Most of the mitigation actions are in the energy sector (stationary energy), but measures are also reported for the transport, waste and AFOLU sectors. Botswana noted that a desk review, including a review of the Party's NC1, NC2 and annual energy reports, was undertaken to identify suitable mitigation projects and methods for estimating their emission reduction potential against baseline emissions. The implemented mitigation actions are projected to contribute to emission reductions of 15 per cent by 2030 compared with the baseline emission level, with the energy sector being the main source of emission reductions. The base year for the development of the baseline was 2010.

53. The Party reported a summary of its mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11, and provided additional information in narrative format.

54. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Botswana reported the name, type and a description of each mitigation action and the related quantitative goals (reported as CO<sub>2</sub> eq or per cent GHG reduction) in table 13 of its BUR. Additional information on objectives, status, co-benefits, type of support and cost of implementation for each mitigation action was also provided in the same table.

55. Information on coverage (i.e. sectors and gases) and progress indicators for each mitigation action was not reported in Botswana's BUR. During the technical analysis, the Party clarified that gases covered by the reported mitigation actions include CO<sub>2</sub>, CH<sub>4</sub> and NO<sub>x</sub>.

56. The reported mitigation actions focus mainly on the energy sector. The Party clearly reported information on methodologies and assumptions, objectives, implementation status and recommended facilitative policies for each action, as well estimated emission reductions by 2030. The Party reported on six mitigation actions in the energy sector, of which five are ongoing and one is planned. Ongoing mitigation actions in the energy sector include switching to energy-efficient lighting; introducing efficient refrigeration, solar geysers and solar electrical appliances; and rolling out solar street lighting. Proposed facilitative policies to support these actions, as reported in table 14 of the BUR, include taxes on inefficient appliances and lighting and subsidies for solar equipment. Further, Botswana plans to develop solar power plants as a feasible mitigation action. The Government has set a target to increase the renewable energy share of total power consumption to 25 per cent by 2030. The objective is to produce 328.5 MWh electricity by 2030 from two 50 MW solar power plants, resulting in an estimated emission reduction of 761 Gg CO<sub>2</sub> eq (9 per cent below the baseline level).

57. Planned improvements in public transport are projected to account for approximately 1,350 Gg CO<sub>2</sub> eq emission reductions by 2030. Proposed facilitative policies to support these actions, as reported in table 14 of the BUR, include removing subsidies for coal power generation and introducing feed-in tariffs and taxes on petroleum products.

58. Botswana identified two potential mitigation actions in the waste sector: using waste-to-energy biogas, including using CH<sub>4</sub> from landfills as biogas for vehicles or cooking; and using CH<sub>4</sub> from sewage ponds for electricity generation. Using biogas from landfills is projected to achieve a 2 per cent emission reduction versus the baseline level, and using biogas from sewage is estimated to result in a reduction of 73 Gg CO<sub>2</sub> eq/year, on the assumption that 90 per cent of CH<sub>4</sub> from landfills and sewage ponds is captured by 2030. The co-benefits reported by the Party include electricity savings, increased energy security, reduced use of fossil fuels and imported fuels, revenue generation, reduced traffic congestion and increased ambient air quality.

59. Information on progress or results achieved, including the years of implementation of the mitigation actions in the energy, transport and waste sectors, was not reported and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that it did not have sufficient resources and expertise to analyse and report this information.

60. The ongoing mitigation action in the AFOLU sector focuses on improving land management, specifically improving fire management to reduce veldt fires, enhancing pasture management, and reducing deforestation and enhancing natural regeneration of degraded rangelands. Botswana reported that these measures are estimated to achieve an emission reduction of 16,000 Gg CO<sub>2</sub> eq by 2030 and will be facilitated by capacity quotas, as well as fines that discourage fires. The co-benefits reported by the Party include increased ecosystem functions and services, increased wildlife populations and reduced vulnerability of communities to climate variability.

61. Information on the progress of implementation of reported mitigation actions in the AFOLU sector and underlying steps taken or envisaged to achieve them was not reported in Botswana's BUR, and information on the methodologies used and results achieved for ongoing actions was not transparently reported. During the technical analysis, the Party clarified that the IPCC inventory software was one component of the methodology used for estimating emission reduction potential for mitigation actions in the AFOLU sector. The Party also clarified that it did not have sufficient resources and expertise to analyse and report information on the steps taken and the progress of implementation towards achieving the mitigation actions, or on the results of ongoing actions.

62. Botswana did not provide information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. During the technical analysis, the Party clarified that it is not currently participating in international market mechanisms.

63. The TTE noted that the transparency of the information reported on mitigation actions could be enhanced by addressing the areas noted in paragraphs 55, 59, 61 and 62 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**

64. As indicated in table I.3, Botswana 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.

65. Botswana clearly 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, Botswana identified poor availability of data and lack of country-specific EFs as constraints. The Party reported that its financial, technical and capacity-building needs are primarily in the areas of tracking the progress of implementation of its mitigation actions and using the 2006 IPCC Guidelines for preparing its GHG inventory.

66. Botswana reported information on financial resources, capacity-building and technical support received in accordance with decision 2/CP.17, annex III, paragraph 15. In its BUR, the Party reported that it received support from the Global Environment Facility. The information reported indicates that Botswana received capacity-building and technical support from the United Nations Development Programme to facilitate use of the 2006 IPCC Guidelines for preparing its GHG inventory.

67. Information on the specific amount received for the preparation of its first BUR and the NC3 was not reported in the BUR and the reason for this was not clear to the TTE.

68. Information on nationally determined technology needs and support was not clearly reported in the Party's BUR. During the technical analysis, the Party clarified that technology needs are implied under the planned projects seeking support, which are reported in table 31 of its BUR.

69. 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 67–68 above, which

could facilitate a better understanding of the information reported on needs and support received.

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

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

- (a) In relation to the GHG inventory:
  - (i) Applying the 2006 IPCC Guidelines, including the IPCC inventory software;
  - (ii) Improving arrangements for data collection and management of AD;
  - (iii) Estimating uncertainty of both AD and EFs;
  - (iv) Enhancing the transparency of the BUR, including by identifying important information to summarize from the NIR;
- (b) In relation to mitigation actions:
  - (i) Identifying and training new experts to facilitate identification and reporting of additional mitigation actions;
  - (ii) Enhancing institutional arrangements for consultants and relevant institutions to better quantify and report results achieved to date for all ongoing mitigation actions;
  - (iii) Reporting on progress of implementation of mitigation actions and underlying steps taken or envisaged to achieve them at the project level;
  - (iv) Developing and defining progress indicators for mitigation actions, and using those indicators to track the progress of nationally determined contributions;
  - (v) Transparently describing facilitative policies, their status and how they support individual actions, including training relevant experts to better describe policies and actions;
- (c) In relation to institutional arrangements and needs and support:
  - (i) Strengthening institutional arrangements and support for institutions for the continuous provision of higher-quality data;
  - (ii) Reporting specific needs, such as technology needs and the capacity-building needs of local experts;
  - (iii) Providing specific information on technical, financial and technology needs.

71. The TTE noted that, in addition to the capacity-building needs identified during the technical analysis, Botswana reported in its BUR the need for training relevant institutions in data gathering, GHG inventory methodologies and data formats.

### **III. Conclusions**

72. The TTE conducted a technical analysis of the information reported in the first BUR of Botswana in accordance with the UNFCCC reporting guidelines on BURs and concludes that the information reported is mostly consistent. It provides an overview of national circumstances and institutional arrangements relevant to the preparation of the first BUR; the national inventory of anthropogenic emissions by sources and removal by sinks of all GHGs not controlled by the Montreal Protocol; mitigation actions and their effects, including associated objectives, methodologies, assumptions, estimated outcomes and co-benefits; constraints and gaps and related financial, technical and capacity-building needs, including a description of support needed and received; and domestic MRV. During the technical analysis, Botswana supplied additional information, including an NIR that supplemented

information included in the BUR, and details on mitigation actions and constraints in reporting on progress and steps in implementing actions. The TTE concluded that the information analysed is mostly transparent.

73. The BUR was compiled by the Ministry of Environment, Natural Resources Conservation and Tourism. It does not contain information on the institutions involved in preparing reports on a continuous basis. During the technical analysis, the Party clarified that the same institutional arrangements for inventories will remain in place and the Ministry of Environment, Natural Resources Conservation and Tourism would prepare subsequent submissions.

74. In its first BUR, submitted in 2019, Botswana reported information on its national GHG inventory for 2015. This included GHG emissions and removals of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O for all relevant sources and sinks as well as the precursor gases. The inventory was developed on the basis of the 2006 IPCC Guidelines using tier 1 methods and EFs. Information on GHG estimates is not consistent across the BUR. The TTE evaluated total GHG emissions for 2015 and determined them to be 9,917.68 CO<sub>2</sub> Gg eq (excluding land) and 7,131.07 Gg CO<sub>2</sub> eq (including land). The TTE compiled information excluding land from information reported in tables 1 and 11 of the BUR, while information including land was taken from information reported only in table 1. The key categories and main gases were identified as land converted to forest land (CO<sub>2</sub>), land converted to grassland (CO<sub>2</sub>), solid fuels (CO<sub>2</sub>), forest land remaining forest land (CO<sub>2</sub>), road transportation (CO<sub>2</sub>), enteric fermentation (CH<sub>4</sub>), soda ash production (CO<sub>2</sub>) and liquid fuels (CO<sub>2</sub>). Botswana reported on HFCs from refrigeration and stationary air conditioning, but estimates of other fluorinated gases (i.e. PFCs, SF<sub>6</sub>) were not provided owing to difficulties in obtaining the necessary data, as clarified by the Party in the BUR. The NIR provided by the Party during the technical analysis includes a consistent time series for 2000–2015 as well as information on uncertainty estimates and both the reference and the sectoral approach for the energy sector.

75. Botswana reported information on mitigation actions and their effects in both tabular and textual format, including the baseline and mitigation scenario projections for 2010–2030, and framed a number of mitigation actions in the context of its draft energy plan, as reported in the BUR. It reported mitigation actions that are ongoing, planned or proposed in the energy sector (including transport and waste-to-energy actions) and the AFOLU sector. The actions focus on the energy sector, including improving public transport and energy efficiency and using renewable energy in the form of solar power and biogas. Mitigation actions in the AFOLU sector focus on efforts to improve veldt fire management to reduce deforestation. The Party reported on the progress of implementation of its mitigation actions and the expected resulting emission reductions. The emission reduction resulting from all mitigation actions was estimated at 15 per cent by 2030 compared with the baseline level. Botswana reported the co-benefits of its mitigation actions, including electricity savings, increased energy security, reduced use of fossil fuels and imported fuels, revenue generation, reduced traffic congestion and increased ambient air quality. The Party also reported information on its domestic MRV arrangements. Information on methodologies used, steps taken or envisaged to achieve actions, and progress of implementation of mitigation actions, as well as information on international market mechanisms, in which the Party stated it is not currently participating, was not provided owing to lack of resources and expertise, as clarified by the Party during the technical analysis.

76. Botswana reported information on key constraints, gaps and related needs, noting that its primary needs are in the areas of tracking the progress of implementation of its mitigation actions and using the 2006 IPCC Guidelines for preparing its GHG inventory. The Party also reported poor availability of data and lack of country-specific EFs as constraints. Information was reported on financial, technical and capacity-building support received. Information on technology needs was not reported. The Party clarified during the technical analysis that technology needs are due to be assessed as part of a planned project.

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

- (a) Identifying and training new experts to facilitate identification and reporting of additional mitigation actions;
- (b) Developing and defining progress indicators for mitigation actions, and using those indicators to track the progress of nationally determined contributions;
- (c) Applying the 2006 IPCC Guidelines, including the IPCC inventory software;
- (d) Improving arrangements for data collection and management of AD.

## Annex I

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

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</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	Botswana submitted its first BUR in November 2019; the GHG inventory reported is for 2015.
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	Botswana 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.	Yes	Botswana used the 2006 IPCC Guidelines and the IPCC good practice guidance.
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;	Yes	Comparable information was reported in annex table 37.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Yes	Comparable information was reported in annex tables 35–38.
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in its previous NCs.	No	The time series reported in the BUR did not include 1994, which was reported in Botswana's NC1.
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their NCs are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000).	No	This information was not reported for 1994, 2000 or 2014, although it was reported for 2014 in Botswana's NC3, which was submitted at the same time as its first BUR.
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of an NIR as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by	Yes	Comparable information was reported in table 3 of the BUR.

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</i>	<i>Comments on the extent of the information provided</i>
	the Montreal Protocol and greenhouse gas precursors);		
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF <sub>6</sub> ).	No	Comparable information was reported in table 4 of the BUR. While HFCs for refrigeration and air conditioning were reported, the Party reported insufficient AD for PFC and SF <sub>6</sub> emissions.
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, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	Yes	Information on arrangements was reported on page 26 of Botswana's BUR.
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> ;	Yes	
	(c) N <sub>2</sub> O.	Yes	
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of:		
	(a) HFCs;	Yes	
	(b) PFCs;	No	The BUR states that there are insufficient AD for reporting these emissions.
	(c) SF <sub>6</sub> .	No	The BUR states that there are insufficient AD for reporting these emissions.
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emissions by sources of other GHGs, such as:		
	(a) CO;	Yes	
	(b) NO <sub>x</sub> ;	Yes	
	(c) Non-methane volatile organic compounds.	Yes	The Party reported these emissions as not estimated, owing to the lack of AD.
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as sulphur oxides, and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	No	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</i>	<i>Comments on the extent of the information provided</i>
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.	No	The information was reported only for the sectoral approach.
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:		
	(a) International aviation;	Yes	
	(b) Marine bunker fuels.	Yes	
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	The Party 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 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	Botswana used the 2006 IPCC Guidelines. Tier 1 methodology was used for all sectors.
	(b) Explanation of the sources of EFs;	Yes	Botswana used default EFs from the 2006 IPCC Guidelines.
	(c) Explanation of the sources of AD;	Partly	Information on sources of AD was reported at an aggregate level; however, information on sources of AD by sector was not reported.
	(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	



<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</i>	<i>Comments on the extent of the information provided</i>
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1 and 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 table 2 of the BUR for reporting methods and EFs; however, the sectoral tables do not include notation keys where numerical data were not provided.
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;	No	Botswana did not report information on uncertainty in its BUR.
	(b) Underlying assumptions;	No	
	(c) Methodologies used, if any, for estimating these uncertainties.	No	

*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 Botswana**

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no</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 on coverage and progress indicators for the mitigation actions was not reported.
	(b) Information on:		
	(i) Methodologies;	Partly	Information on methodologies used for the mitigation action in the AFOLU sector was not reported.
	(ii) Assumptions;	Yes	
	(c) Information on:		

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no</i>	<i>Comments on the extent of the information provided</i>
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	No	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	No	
	(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	Information on results achieved to date for the implemented mitigation actions was not reported.
	(e) Information on international market mechanisms.	No	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	

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

Table I.3

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

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Yes/partly/no</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	
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	Information on technology transfer was not reported.
	(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	The specific amount received for preparing the first BUR and the NC3 was not reported.
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on:		
	(a) Nationally determined technology needs;	No	
	(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 Botswana. Available at <https://unfccc.int/BURs>.

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

#### C. Information provided by the Party

The following documents<sup>1</sup> were provided by the Party in response to requests for technical clarification during the technical analysis:

Botswana National Greenhouse Gas (GHG) Inventories Report for 2014 and 2015

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<sup>1</sup> Reproduced as received from the Party.