



United Nations

FCCC/SBI/ICA/2021/TASR.3/IND



Framework Convention on
Climate Change

Distr.: General
30 August 2021

English only

Technical analysis of the third biennial update report of India submitted on 20 February 2021

Summary report by the team of technical experts

Summary

According to decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention, consistently with their capabilities and the level of support provided for reporting, were to submit their first biennial update report by December 2014. Further, paragraph 41(f) of that decision states that Parties not included in Annex I to the Convention shall submit a biennial update report every two years, either as a summary of parts of their national communication in the year in which the national communication is submitted or as a stand-alone update report. 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 third biennial update report of India, conducted by a team of technical experts in accordance with the modalities and procedures contained in the annex to decision 20/CP.19.



Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AD	activity data
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
COVID-19	coronavirus disease 2019
EF	emission factor
ETF	enhanced transparency framework under the Paris Agreement
GEF	Global Environment Facility
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>
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
N ₂ O	nitrous oxide
NA	not applicable
NAPCC	National Action Plan on Climate Change of India
NC	national communication
NMVOC	non-methane volatile organic compound
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
NO _x	nitrogen oxides
PFC	perfluorocarbon
Revised 1996 IPCC Guidelines	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
SDG	Sustainable Development Goal
SF ₆	sulfur hexafluoride
SO _x	sulfur oxides
TTE	team of technical experts
UNFCCC guidelines for the preparation of NCs from non-Annex I Parties	“Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention”
UNFCCC reporting guidelines on BURs	“UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention”

I. Introduction and process overview

A. Introduction

1. The process of ICA consists of two steps: a technical analysis of the submitted BUR and a facilitative sharing of views under the Subsidiary Body for Implementation, resulting in a summary report and a record, respectively.
2. According to decision 2/CP.17, paragraph 41(a), non-Annex I Parties, consistently with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014. In addition, paragraph 41(f) of that decision states that non-Annex I Parties shall submit a BUR every two years, either as a summary of parts of their NC in the year in which the NC is submitted or as a stand-alone update report.
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. India submitted its second BUR on 31 December 2018, which was analysed by a TTE in the thirteenth round of technical analysis of BURs from non-Annex I Parties, conducted from 27 to 31 May 2019. After the publication of its summary report, India participated in the eighth workshop for the facilitative sharing of views, convened in Madrid on 9 December 2019.
5. This summary report presents the results of the technical analysis of the third BUR of India, 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

6. In accordance with the mandate referred to in paragraph 2 above, India submitted its third BUR on 20 February 2021 as a stand-alone update report. The submission was made within two years and two months from the submission of the second BUR.
7. A desk analysis of India's BUR was conducted remotely from 28 June to 2 July 2021 and was undertaken by the following TTE, drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Dawa Chhoedron (Bhutan), Komlan Edou (Togo), Sandro Federici (San Marino), Karin Kindbom (Sweden), Bamikole Jacques Kouazounde (Benin), Nicolo Macaluso (Canada), Philippe Missi Missi (Cameroon), Takashi Morimoto (Japan), Sekai Ngarize (Zimbabwe), Guilhem Pouillevet (France) and Tatiana Tugui (Republic of Moldova). Ms. Kindbom and Mr. Kouazounde were the co-leads. The technical analysis was coordinated by Alma Jean, Ruta Bubniene, Sabin Guendehou and Mirana Andriarisoa (secretariat).
8. During the technical analysis, in addition to the written exchange, in the virtual team room, to provide technical clarifications on the information reported in the BUR, the TTE and India engaged in consultation¹ on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of India's third BUR, the TTE prepared and shared a draft summary report with India on 27 July 2021 for its review and comment. India, in turn, provided its feedback on the draft summary report on 9 August 2021.
9. The TTE responded to and incorporated India's comments referred to in paragraph 8 above and finalized the summary report in consultation with the Party on 27 August 2021.

¹ The consultation was conducted via videoconferencing.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

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

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

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

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

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

B. Extent of the information reported

12. The elements of information referred to in paragraph 10(a) above include the national GHG inventory report; information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and information on progress in their implementation; information on domestic MRV; and information on support needed and received.

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

14. The current TTE noted improvements in the reporting in India's third BUR compared with that in its second BUR. Information on notation keys, uncertainty assessment, nitrogen inputs to managed soils, progress indicators for each of the eight NAPCC missions and annual estimates of GHG emission reductions for 2015–2016 for major policies and programmes is reported in the Party's third BUR, demonstrating that it has taken into consideration the areas for enhancing the transparency of the extent of the information reported, as noted by the previous TTE in the summary report on the technical analysis of the Party's second BUR.

C. Technical analysis of the information reported

15. The technical analysis referred to in paragraph 10(b) above aims to increase the transparency of information reported by the Parties on mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the focus of the technical analysis was on the transparency of the information reported in the BUR.

16. 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.

17. 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

18. As per the scope defined in paragraph 2 of the UNFCCC reporting guidelines on BURs, the BUR should provide an update to the information contained in the most recently submitted NC, including information on national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis. In their NCs, non-Annex I Parties report on their national circumstances following the reporting guidance contained in decision 17/CP.8, annex, paragraphs 3–5, and they could report similar information in their BUR, which is an update of their most recently submitted NC.

19. In its third BUR, India provided an update on its national circumstances, including a description of national and regional development priorities and features of geography, climate and economy that might affect the Party's ability to deal with mitigating and adapting to climate change, as well as information regarding national circumstances and constraints on the specific needs and concerns arising from the adverse effects of climate change 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. The Party also identified its national sustainable development priorities associated with economic recovery after the COVID-19 pandemic.

20. In addition, India provided a summary of relevant information regarding its national circumstances using maps and in graphical and tabular format.

21. India transparently reported in its third BUR an update on its existing institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description covers key aspects of the institutional arrangements, including the 12 national institutions that carry out the inventory preparation in the areas of their respective sectoral expertise on a continuous basis. The National Communication Project Management Unit assists the National Project Director in compiling NCs. The National Steering Committee, chaired by the Secretary of the Ministry of Environment, Forest and Climate Change, oversees the preparation and implementation of the work programme for the BUR, involving various line ministries and government departments. A Technical Advisory Committee, with members from government, academia and civil society, provides technical guidance for the preparation of the BUR. In addition, the Party plans to establish a web-based system to coordinate national institutional stakeholders for climate reporting, as part of the upcoming CBIT project after funds are received and the project is operationalized.

22. India reported in its third BUR an update on its domestic MRV arrangements. The description covers key aspects of the institutional arrangements, including that they are decentralized and distributed across multiple levels of governance, with a three-tier system for the administration and monitoring of policy schemes and actions. The information reported on MRV includes an update on India's actions to enhance transparency and builds on the information reported in its previous two BURs. At the core of India's MRV framework are efforts to track the effectiveness of domestic sustainable development programmes and schemes and monitor energy efficiency and indicators of GHG emission reductions and climate-related co-benefits. The Party reported that MRV enables the assessment of the performance and effectiveness of the programmes being implemented and outlined its key scheme-specific MRV in its BUR (section 4.5).

23. The Party reported that it has made significant efforts to strengthen its existing MRV arrangements and that extensive work has been undertaken to update and create data repositories and technical dashboards and portals, and improve public access to them. Transparency and accountability have been enhanced by making information accessible through web portals and digital dashboards for the different sectors, particularly energy (see BUR table 4.1). This has led to effective tracking of the performance of the schemes highlighted in paragraph 22 above, across all States, via a single platform. Several mobile applications have been launched to extend the coverage of government initiatives within the

domestic MRV framework and monitor their implementation. These facilitate the provision of real-time updates and transparent information dissemination. The Party reported that building a robust national data repository system is essential for developing baselines and estimating accurate GHG emissions inventories, including identifying emissions sources, calculating baseline projections and forecasting trends.

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

24. As indicated in table I.1, India 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.

25. India submitted its third BUR in 2021 and the GHG inventory reported is for 2016. The latest reported inventory year is more than four years prior to the date of submission of the Party's BUR. During the technical analysis, India clarified that the delay of just 51 days was a consequence of the global COVID-19 pandemic.

26. GHG emissions and removals for the BUR covering the 2016 inventory were estimated using a mix of tier 1, 2 and 3 methodologies from the Revised 1996 IPCC Guidelines, the IPCC good practice guidance for LULUCF and the 2006 IPCC Guidelines, as reported in the BUR (table 2.1). For the agriculture and LULUCF sectors, methodologies from the 2006 IPCC Guidelines were used for some individual categories. For the other sectors, the 2006 IPCC Guidelines were used for estimating GHG emissions. India has developed and used country-specific EFs for the energy, industrial processes and product use, and waste sectors. The TTE commends the Party for using the 2006 IPCC Guidelines.

27. Information on methods used to estimate changes in the biomass, dead organic matter and soil organic matter carbon pools in forest land as well as in the biomass and soil organic matter carbon pools in cropland, grassland and settlements was not clearly reported in India's BUR. In BUR table 2.1 the methods were reported simply as tier 2 for those land categories. During the technical analysis, the Party referred to its second BUR and clarified that the changes in those pools are calculated on the basis of consecutive measurements using the stock-difference approach. The TTE notes that, for the soil organic matter pool, the stock-difference approach qualifies as IPCC tier 3.

28. Information on manure management systems; the share of manure allocated to each manure management system; associated CH₄ and N₂O EFs; dry matter intake of each livestock population; EFs applied for rice cultivation; and areas where crop residues are burned was not reported in India's BUR. During the technical analysis, the Party clarified that, for rice cultivation, the EFs reported in its second BUR still apply, and that the area of rice cultivation reported refers to harvested area, as per the IPCC good practice guidance. Regarding the information on the agriculture and LULUCF sectors, India noted that this information was not reported since it is not mandatory.

29. Information on the Party's total GHG emissions by gas for 2016 is outlined in table 1 in units of mass.

Table 1
Greenhouse gas emissions by gas of India for 2016

<i>Gas</i>	<i>GHG emissions (Gg) including LULUCF</i>	<i>GHG emissions (Gg) excluding LULUCF</i>
CO ₂	1 921 590.94	2 231 067.52
CH ₄	19 556.79	19 501.77
N ₂ O	470.87	469.25
HFCs	1.65	1.65
PFCs	4.73	4.73
SF ₆	0.004	0.004
Total (Gg CO₂ eq)	2 531 069.02	2 838 888.58

30. Information on CO, NO_x, NMVOCs and SO_x was not reported in India’s BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that reporting this information is not mandatory and its capacity to do so is determined by the level of support received.

31. India applied notation keys in tables where numerical data were not provided. The use of notation keys was mostly consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties. The TTE noted that in the BUR (table 2.36) India reported CO, NO_x, NMVOCs and SO_x as “X”. During the technical analysis, India clarified that “X” was used because reporting this information is not mandatory.

32. India reported mostly 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 or corresponding reporting tables in the 2006 IPCC Guidelines. The Party reported aggregated land area and the associated emissions or removals for the main LULUCF categories at the aggregated land category level, except for forest land, for which aggregated GHG emission estimates and area for land converted to forest land were reported.

33. The shares of emissions that different sectors contributed to the Party’s total GHG emissions excluding LULUCF, as calculated by the TTE using information from the BUR, in 2016 are reflected in table 2.

Table 2
Shares of greenhouse gas emissions by sector of India for 2016

<i>Sector</i>	<i>GHG emissions (Gg CO₂ eq)</i>	<i>% share^a</i>
Energy	2 129 428.48	75.01
Industrial processes and product use	226 406.78	7.98
Agriculture	407 820.88	14.36
LULUCF	-307 819.56	NA
Waste	75 232.44	2.65

^a Share of total emissions without LULUCF.

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

35. For the energy sector, information was clearly reported on the main emissions sources in the sector: CO₂ emissions for category 1.A.1.a electricity production, which contributes around 40 per cent of the total sectoral emissions, followed by CO₂ emissions for category 1.A.3.b road transportation. Information was reported on GHG emissions by subcategory, methodological tier levels, the sources of AD and EFs. India has developed and used country-specific CO₂ EFs for solid fuels for energy industries and manufacturing industries and construction, and a country-specific CH₄ EF for fugitive emissions from coal mining activities under the energy sector.

36. The data on fuel consumption used as AD for category 1.A fuel combustion are taken from different organizations and sectoral reports. While the AD cover most of the fuel consumption in India, some emissions sources under fuel combustion were not estimated because of a lack of disaggregated data. Moreover, CO₂ emissions from flaring activities and CH₄ emissions from abandoned coal mines were not included. During the previous technical analysis, India clarified that these emissions were not estimated owing to data unavailability.

37. The main emissions source in the industrial processes and product use sector is CO₂ emissions for category 2.A.1 cement production, followed by PFCs for category 2.C.3 aluminium production. Information was reported on GHG emissions by subcategory, methodological tier levels, AD and their sources, and EFs. India also reported that it used country-specific CO₂ EFs for cement and soda ash production, company-specific N₂O EFs for nitric acid production, and country-specific EFs for aluminium production and

fluorochemical production (by-product emissions). However, the summary information on methodologies and EFs in the BUR (table 2.1) did not cover fluorinated gas emissions.

38. Information on HFC, PFC and SF₆ emissions from electronics industry, production of substitutes for ozone-depleting substances and other product manufacture and use was not reported. During the technical analysis, India explained that this is due to unavailability of data and the dispersed nature of emissions sources, and that such reporting depends on the level of support received, data availability and available institutional capacity.

39. For the agriculture sector, enteric fermentation (CH₄), agricultural soils (N₂O), rice cultivation (CH₄) and manure management (N₂O) were identified as key categories and the most relevant emissions sources in the sector. Prescribed burning of savannahs was reported as not occurring. India used a mix of country-specific EFs and EFs from the 2006 IPCC Guidelines and the IPCC good practice guidance. Information on the number of livestock was reported in graphical instead of tabular format. Further, the categories for agriculture from the Revised 1996 IPCC Guidelines and the LULUCF categories from the IPCC good practice guidance for LULUCF were applied for the reporting in summary tables 1 and 2 (BUR table 2.36), while the uncertainty and key category analyses were prepared and reported on the basis of the agriculture, forestry and other land use categories from the 2006 IPCC Guidelines. India reported information on livestock populations, nitrogen inputs to agricultural soils, country-specific EFs for enteric fermentation and N₂O emissions from agricultural soils, and the country-specific parameters used to derive the amount of main crop residues burned per ha.

40. Information on N₂O emissions from cultivation of histosols was not reported in India's BUR. During the technical analysis, India noted that the meaning of organic soils is different from organic agriculture, and clarified that there are generally no cultivated soils in India that strictly meet the 2006 IPCC Guidelines definition of organic soils, and hence N₂O emissions were not estimated.

41. For the LULUCF sector, India reported annual GHG emissions and removals for 2011–2016 in BUR table 2.35. Overall, the net removals for the LULUCF sector ranged between a minimum of –210,913 Gg CO₂ eq in 2011 and a maximum of –364,569 Gg CO₂ eq in 2013. Information on areas for land categories and the aggregated area of land converted, which was limited to forest land, was reported.

42. The total area, total carbon stocks and the per ha rate of change across the country were reported in India's BUR for cropland, grassland and settlements. However, information was not provided on the per ha carbon stocks applied to calculate the stock difference for each carbon pool and for each land category across consecutive inventories, or on areas of land conversion. During the technical analysis, the Party clarified that, since reporting this information is not mandatory, it does not consider it to be an efficient use of available resources. However, the TTE notes that reporting information on per ha carbon stock for each carbon pool in each land category for which the stock-difference approach is applied for estimating GHG emissions and removals could be considered for future BURs.

43. For the waste sector, India reported CH₄ emissions for category 6.A solid waste disposal on land and CH₄ and N₂O emissions for category 6.B wastewater handling. Information was mostly reported on GHG emissions by subcategory, methodological tier levels, AD and their sources, and EFs. During the technical analysis, India provided additional information on the parameters used for estimating CH₄ emissions from solid waste disposal on land.

44. Information on emissions from waste incineration or biological treatment of solid waste was not provided in the BUR. During the technical analysis, India clarified that such emissions were not estimated because of their insignificance as well as data constraints.

45. The BUR provides an update to all GHG inventories reported in the Party's previous NCs and BURs. The information reported provides an update of India's second BUR, which addressed anthropogenic emissions and removals for 2014, and presented sectoral totals for 1994, 2000, 2007 and 2010 as reported in its NC1, NC2 and first BUR. The update was carried out for 2016 and a time series of 2011–2016 using the methodologies contained in the 2006 IPCC Guidelines, the IPCC good practice guidance for LULUCF and the Revised

1996 IPCC Guidelines, thus generating a consistent six-year time series, which shows an increase in emissions of 22.5 per cent without LULUCF since 2011 (521,601 Gg CO₂ eq).

46. India described in its BUR the institutional framework for the preparation of its 2016 GHG inventory. The Party reported that the Ministry of Environment, Forest and Climate Change is the nodal agency that coordinates the preparation of the inventory, including convening the expert institutions that collate sectoral information and conduct studies to obtain country-specific EFs. Twelve national institutions, many of which have been involved since India's initial NC, carried out the inventory preparation in the areas of their respective sectoral expertise. In addition, various other ministries, government departments and public sector entities provided inputs to the BUR preparation.

47. India clearly reported that a key category analysis was performed for both the level of emissions in 2016 and the trend in emissions for 2011–2016, with and without LULUCF. The Party reported that the top five key categories remained the same during 2014–2016. For the level assessment using approach 1 without LULUCF, the top five key categories and main gases were identified as CO₂ emissions from electricity production (39.5 per cent of total emissions occurring in the country), CO₂ emissions from road transport (8.6 per cent), CH₄ emissions enteric fermentation (7.8 per cent), CO₂ emissions from non-specific industries (6.4 per cent) and CO₂ emissions from iron and steel (4.8 per cent).

48. The BUR provides information on QA/QC measures for all sectors. The information reported includes QA/QC procedures and plans, including a time frame for the different stages of the inventory from initial development to final reporting. General tier 1 QC measures from the 2006 IPCC Guidelines include checking whether the assumptions and criteria used for selecting AD, EFs and other estimation parameters are documented. In addition, the reference and sectoral approaches are compared, trend checks are conducted, and internal documentation and archiving are reviewed. India reported that the Ministry of Environment, Forest and Climate Change is responsible for reviewing the inventory with regard to quality and areas for improvement, and the final validation is done by an expert group and the National Steering Committee through the Ministry of Environment, Forest and Climate Change. The TTE commends India for providing information in accordance with the IPCC good practice guidance.

49. India reported information on CO₂ fuel combustion using both the sectoral and the reference approach. The difference in estimated CO₂ emissions between the two approaches for 2015 and 2016 was reported as 7.4 and 6.3 per cent, respectively. India reported in the BUR that work is proposed to refine the GHG emission estimates in order to reduce the difference between the two approaches for future reports.

50. The difference between the estimated CO₂ emissions from fuel combustion calculated using the sectoral and the reference approach was not explained in the BUR. During the technical analysis, the Party clarified that, considering the uncertainties, challenges and constraints in the country, the difference is acceptable and rational. Nevertheless, India proposes to take steps towards refining the estimates in order to decrease the difference in the estimated emissions between the two approaches.

51. Information was reported on international aviation and marine bunker fuels. The emissions from international aviation and marine bunker fuels were reported as memo items in the summary tables.

52. India reported information on the uncertainty assessment (level and trend) of its national GHG inventory. The uncertainty assessment was based on approach 1 and covers all key categories (level) without LULUCF. The results obtained, as reported in the BUR, reveal that the level uncertainty is approximately ± 7 per cent (excluding LULUCF) and the trend uncertainty is approximately ± 8 per cent (excluding LULUCF) for the national total emissions. The Party reported that the uncertainties associated with the AD were derived from the data sources, from the researchers involved or from the 2006 IPCC Guidelines.

53. The TTE noted that the further information noted in paragraphs 30, 31, 36, 38, 40, 42, 43, 44 and 50 above could facilitate a better understanding of the information reported on GHG inventories.²

54. In paragraphs 25–27 and 30–37 of the summary report on the technical analysis of India’s second BUR, the previous TTE noted areas where the transparency of the reporting on GHG inventories could be further enhanced. The current TTE noted the improvements referred to in paragraphs 26, 27, 32, 39, 45, 47 and 48 above and commends the Party for enhancing the transparency of its reporting.

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

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

56. The information reported provides a clear and comprehensive overview of the Party’s mitigation actions and their effects. India frames its national mitigation planning and actions in the context of the NAPCC, which was launched in 2008. The NAPCC is an overarching framework for addressing climate change and promoting sustainable development and includes objectives, targets and key achievements for eight national missions. In its BUR (table 3.1), India reported updated information since its initial BUR on progress indicators for each of the NAPCC missions. The Party reported that States are actively contributing to the NAPCC by preparing their own action plans, which encourage a focused and structured approach to strengthening climate action in the priority sectors of forest, biodiversity, agriculture, water, energy, urban development and transport. Since 2012, 33 State action plans have been completed and endorsed by the National Steering Committee. The TTE commends India for the updated information, which provides clarity on its progress in reporting climate change information. The mitigation actions reported in the BUR are in the energy, industry, forestry, agriculture, buildings, transport and waste sectors.

57. According to India, its contribution to reducing global GHG emissions is outlined in its 2010 voluntary pledge to reduce the emission intensity of its gross domestic product by 20–25 per cent from the 2005 level by 2020 (excluding emissions from agriculture) and an emission intensity reduction of 24 per cent was achieved between 2005 and 2016. This demonstrates that India has progressively continued to decouple economic growth from GHG emissions. The Party attributes its progress to its effective measures to increase the share of cleaner and renewable energy in the total energy mix. The successful implementation of its current policies, without compromising its development priorities, is also a key factor in achieving its target. India reported that in 2015, in its nationally determined contribution under the Paris Agreement, it voluntarily increased its target for reducing the emission intensity of its gross domestic product to 33–35 per cent from the 2005 level by 2030. In addition, the Party stated a target of achieving about 40 per cent of its cumulative electrical power installed capacity from non-fossil fuel energy resources by 2030.

58. India reported that it will achieve its nationally determined contribution target with currently planned and implemented policies, stating that in November 2020 non-fossil sources accounted for 38.2 per cent of its installed capacity for electricity generation. Generation of electricity from renewable energy sources doubled between 2014–2015 and 2018–2019, while generation from non-renewable sources increased by just 19 per cent.

59. The Party reported a summary of its mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11, for four groups of sectoral mitigation actions under the energy, agriculture, forestry and transport sectors (sectoral tables 3.40–3.43) and voluntarily reported on major annually quantified policies and programmes for 2015–2016 (table 3.44). The Party reported that the information reported in the aforementioned sectoral tables is indicative and non-exhaustive.

² The Party is of the view that it has followed the guidelines regarding the “shall”, “should” and “encouraged” provisions and complied transparently with these reporting requirements.

60. Information on some mitigation actions, including for the waste sector, was reported in narrative rather than tabular format and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that information in tabular format was provided for most of the mitigation actions as far as institutional capacity and data availability allowed. For several actions, data were not collected at the time of their initiation and therefore data gaps exist and will continue to exist in future reporting.

61. Consistently with decision 2/CP.17, annex III, paragraph 12(a), India clearly reported the names of mitigation actions for the sectoral actions referred to in paragraph 59 above. A description of and information on coverage, the nature of the action, progress indicators and quantitative goals were provided for all actions in the BUR. The sectoral mitigation actions cover energy, forestry, agriculture and transport, with most actions in the energy sector, and cumulative mitigation estimates were reported. The Party voluntarily reported a second group of mitigation actions, with a focus on energy efficiency, as major policies and programmes, including annual estimates of GHG emission reductions for 2015–2016 (see para. 73 below).

62. Information on GHGs covered by mitigation actions was reported differently in two sets of tables of India's BUR. Sectoral mitigation actions reported in the sectoral tables (tables 3.40–3.43) were reported to cover CO₂ only, while some of the same actions were also reported as major annually quantified policies and programmes for 2015–2016 in table 3.44, where they were reported to cover CH₄ and N₂O too. During the technical analysis, the Party clarified that sectoral tables 3.40–3.43 provide mandatory information on the gases reduced and quantified, while table 3.44 provides voluntarily information on all the gases reduced, regardless of being quantified or not, and is an illustrative list of actions for which further detailed information is available.

63. India clearly reported information on methodologies and assumptions, the objectives of the actions and steps taken or envisaged to achieve the actions for all mitigation actions in the energy, transport, agriculture, forestry and waste sectors. The TTE noted an improvement since the second BUR in the Party's reporting on methodologies and assumptions for major policies and programmes. Estimated outcomes and estimated emission reductions, as well as co-benefits, such as the employment generated, were also reported for most of the mitigation actions.

64. India reported 18 mitigation actions for the energy sector, which focus on promoting renewable energy and improving energy efficiency in the power sector, which contributes 43 per cent of India's total GHG emissions. The priorities for India's power sector are outlined in the BUR, which indicates that the power sector has been transformed over the years, with an increasing focus on clean and sustainable power generation sources. In 2015–2016, the Indian Government set a target of achieving 175 GW renewable energy capacity by 2022 (100 GW from photovoltaic, 60 GW from wind power, 10 GW from bioenergy and 5 GW from small hydropower), with a further increase of up to 450 GW proposed by 2030. India reported on the results achieved as estimated outcomes, GHG emission reductions and co-benefits.

65. The share of renewables (excluding large hydropower and nuclear) in installed electricity generation capacity increased from 5 per cent in 2006 to 24 per cent in 2020. As at 30 November 2020, installed renewable power capacity (excluding hydropower above 25 MW) had reached 90.39 GW, contributing approximately 24 per cent of the country's installed capacity for electricity generation. The highest GHG emission reduction reported stemmed from the national programme for light-emitting diode home and street lighting: 366.85 million lights distributed up to November 2020 led to a cumulative emission reduction of 178.36 Mt CO₂ from 2014–2015 to 2020. Under the Street Lighting National Programme, more than 11.25 million light-emitting diode streetlights were installed up to September 2020, leading to a cumulative energy saving of 18.071 billion units and an emission reduction of 14.82 Mt CO₂ from 2015–2016 to 2019–2020. The Perform, Achieve and Trade scheme for energy efficiency in industry and other energy-intensive sectors launched in 2012, covering 478 designated consumers, achieved GHG emission reductions of 31 Mt CO₂ in cycle I (2012–2013 to 2014–2015), while cycle II (2016–2017 to 2018–2019) resulted in total energy savings of approximately 13.28 Mtoe and 61.34 Mt CO₂ avoided emissions. Energy efficiency initiatives in the micro, small and medium-sized enterprises sector led to total energy savings of 0.022 Mtoe and avoided emissions of 0.124 Mt CO₂ in 2018–2019.

66. India reported the introduction of coal-to-gas technology but the results achieved were not estimated. During the technical analysis, India clarified that it is using coal responsibly and has decommissioned old plants and increased the supercritical fleet of coal units. The Party also clarified that its effort to gasify coal is limited by the lack of availability of technologies for gasifying high-ash Indian coal. It underscored the need to develop efficient low-cost gasification technology and support from technology providers to transfer technologies at reasonable cost.

67. Information was reported on nine mitigation actions in the forestry sector, most of which relate to plantations, afforestation, reforestation and programmes for conserving and enhancing the carbon sink, all of which are underpinned by various legal instruments, in particular the 1980 Forest (Conservation) Act, which laid the foundation for the protection and conservation of the country's natural forests. The Compensatory Afforestation Fund Act 2016 made compensatory afforestation mandatory where forest land is converted to non-forest uses. The Party reported that its forest and tree cover increased from 802,088 to 807,276 km² in 2017–2019. The net increase in forest carbon stock was 42.6 Mt, or 156.2 Mt CO₂ eq, between the assessments in 2017 and 2019. In 2019, a report on the state of India's forest showed that forest and tree cover had reached 80.73 million ha, equating to 24.56 per cent of the geographical area of the country. The annual increase in carbon stock is estimated at 21.3 Mt, or 78.1 Mt CO₂ eq. The Party reported a reduction in GHG emissions of approximately 330.76 Mt CO₂ through the LULUCF sector, which is about 15 per cent of India's total CO₂ emissions in 2016.

68. For the agriculture sector, the Party reported information in its BUR on 10 mitigation actions in three groups: the National Mission for Sustainable Agriculture, the Pradhan Mantri Krishi Sinchayee Yojana scheme and a crop diversification programme. The aims are, respectively, to transform agriculture into an ecologically sustainable, climate-resilient production system by devising appropriate adaptation and mitigation strategies; increase investment in irrigation at the field level; and promote alternatives to water-intensive paddy cultivation. Agriculture contributes 14.37 per cent of the Party's total GHG emissions and 17.1 per cent of its gross value added (at constant 2011–2012 prices).

69. The Party reported that agriculture is not included in its voluntary pledge under the nationally appropriate mitigation actions to be implemented by non-Annex I Parties. The aim of India's solarization scheme is to achieve 30.8 GW solar capacity through the installation of small solar power plants with a capacity of up to 2 MW. The area covered under microirrigation under one component of the scheme referred to in paragraph 68 above between 2017–2018 and 2019–2020 was 3.38 million ha. That scheme overall resulted in emission reductions of 11.979 Mt CO₂ between 2017–2018 and 2018–2019.

70. In the transport sector, including road transport, railways, aviation and shipping, the mitigation actions focus mainly on improving fuel efficiency, increasing the share of biofuels and promoting electrification, and most were reported as implemented or ongoing. The transport sector in India is growing rapidly and accounts for 12.1 per cent (excluding LULUCF) of the national CO₂ emissions. India presented several policy and legislative instruments in narrative format, such as emission standards and fuel economy norms for different types of vehicle. The Party reported the results of implementing the mitigation actions as estimated outcomes and emission reductions. Under the ongoing Ethanol Blended Petrol Programme, in 2019–2020 1,703 million litres of ethanol were blended into petrol, which resulted in an estimated emission reduction of 3.39 Mt CO₂. Under the National E-Mobility Programme, electric vehicles have been procured for government use, and support for infrastructure to sustain the transition to electric vehicles is being provided. Replacing 500,000 cars over a period of three to four years is expected to lead to annual fuel savings of 832 million litres and a reduction in emissions of 2.23 Mt CO₂.

71. In the waste sector, the ongoing mitigation actions focus mainly on the expansion and modernization of sanitation facilities and waste management infrastructure in general. Information reported on legislation promoting efficient waste management indicates that several instruments were amended in 2016. The Party reported results achieved as estimated outcomes and environmental co-benefits. It also reported that these actions are indispensable for future mitigation in the waste sector, which in 2016 contributed 2.65 per cent of India's GHG emissions (excluding LULUCF). India recognizes that efficient waste disposal can lead

to enhanced environmental benefits as well as initiatives promoting conversion of waste to energy. The Swachh Bharat Mission includes setting up municipal wet-waste processing facilities and dry-waste recycling and recovery facilities with central government support covering 35 per cent of project costs. There is estimated potential to generate about 500 MW power from municipal solid waste. Under its Programme on energy from urban, industrial and agricultural waste and residue, 216 waste-to-energy plants have been set up, with an aggregate capacity of 370 MW.

72. Information on the results achieved as GHG emission reductions for the waste sector was not reported in India's BUR. During the technical analysis, the Party clarified that it encountered capacity constraints, and challenges and constraints regarding the availability of the detailed data required for estimating GHG emission reductions resulting from the measures taken in the waste sector.

73. The mitigation actions reported as major policies and programmes in the BUR (table 3.44) relate to renewable energy, the power sector, energy efficiency, agriculture and transport. Information was reported on the status of implementation, objective of the action, year of implementation and implementing entity. India reported results achieved as estimated emission reductions in 2015 and 2016. The largest emission reductions were achieved for actions in the renewable energy, energy efficiency and transport sectors. The National Wind Energy Programme contributed to emission reductions of 26.98 and 35.63 Mt CO₂ eq in 2015 and 2016, respectively, and use of other renewables to emission reductions of 21.02 and 19.14 Mt CO₂ eq in 2015 and 2016, respectively, while the lighting replacement scheme helped to avoid 19.35 Mt CO₂ eq emissions in 2016. The biodiesel policy contributed to emission reductions of 11.57 and 12.22 Mt CO₂ eq in 2015 and 2016, respectively.

74. Information on methods and assumptions for most mitigation actions was provided in the chapter on mitigation actions. However, it was not clear to the TTE whether the methodology and assumptions for three actions in the transport sector (biodiesel policy, bus-based public transport and metro) presented in table 3.44 were actually included in the BUR. During the technical analysis, the Party clarified that the information for those mitigation actions was provided elsewhere in the BUR or in its previous BUR.

75. India provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol in BUR table 5.4. The Party reported this information as part of the information on its mitigation actions in the sectors of energy efficiency, fuel switching, industrial processes, municipal solid waste, renewable energy and forestry, including the number of actions and the results achieved as estimated emission reductions. Of these actions, 1,672 have been registered by the Executive Board of the clean development mechanism. As at May 2020, certified emission reductions issued to Indian projects amounted to 252 million (or 12.49 per cent of the total certified emission reductions issued). India reported on the domestic market-based mechanism for the Perform, Achieve and Trade scheme for energy efficiency, which was reported as a mitigation action in BUR chapter 3.

76. India reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that India has in place a domestic MRV system for mitigation actions, which is implemented in a bottom-up decentralized manner and includes many sectors, with measurement and evaluation schemes across a number of sectors, responsible agencies and institutions. India has developed technical data repositories, scheme-specific monitoring and dashboards and portals for tracking schemes' performance, with improved accessibility to the public. India presented in BUR table 4.1 online dashboards and portals, the responsible agency or institution and the relevant indicators for the energy, transport, agriculture, forestry and waste sectors. A number of non-governmental stakeholders are involved in India's efforts to develop guidelines and reporting formats, in collecting climate-relevant data and in the technical assessment of programmes and policies.

77. The TTE noted that the further information noted in paragraphs 66, 72 and 74 above could facilitate a better understanding of the information reported on mitigation actions.³

³ The Party is of the view that it has followed the guidelines regarding the "shall", "should" and "encouraged" provisions and complied transparently with these reporting requirements.

78. In paragraph 61 of the summary report on the technical analysis of India's second BUR, the previous TTE noted areas where the transparency of the reporting on mitigation actions in the waste sector and on a few actions in the energy and forestry sectors could be further enhanced. The current TTE noted the improvements referred to in paragraphs 56, 61, 63 and 67 above and commends the Party for enhancing the transparency of its reporting.

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

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

80. India 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, India identified limited financial resources and technical and capacity-building needs related to applying a higher-tier method or using plant-specific EFs in line with the 2006 IPCC Guidelines as constraints. India reported related capacity needs with regard to developing a streamlined mechanism for data collection for various subsectors and an incentive mechanism for industrial units to improve productivity. In addition, India identified constraints related to strengthening scientific research, applying technology and proactive planning to ensure the health and security of people in the face of natural disasters and climate-induced extreme events. The Party reported that the financial, technical and capacity-building needs specified in its second BUR remain.

81. India 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 (table 5.1), India provided complete and disaggregated information on climate finance received through various channels, particularly the GEF, the Green Climate Fund, the Adaptation Fund, the Clean Technology Fund, the International Bank for Reconstruction and Development, the International Development Association, the Asian Development Bank and the New Development Bank. India reported that the GEF and the Green Climate Fund provided grants of USD 165.25 million, while domestic mobilization amounting to USD 1.374 billion supported the implementation of 22 projects in mitigation, adaptation and cross-cutting areas. India is to receive USD 8.216 million from the GEF for establishing an integrated and enhanced transparency framework for climate action and support measures, preparing its NC4, fourth BUR and first biennial transparency report and strengthening institutional and analytical capacity in relation to climate change.

82. India reported in its BUR (p.362) that it has not received technology transfer. The Party also reported that most technologies for adaptation in agriculture, forestry, water and health are available in India to a very limited extent. They need to be locally adapted and scaled up to ensure the climate resilience of the country's ecosystems and local population, which requires substantial financial support.

83. India reported information on nationally determined technology needs with regard to the development and transfer of technology in accordance with decision 2/CP.17, annex III, paragraph 16. In its BUR, India reported that its major technology needs were nationally determined in the areas of photovoltaics, offshore wind power, advanced ultra-supercritical coal technology, biofuels and cost-effective energy storage in order to pursue import substitution, cut high costs and dependence on international supply chains and pursue early development and deployment of future technologies and practices.

84. In paragraph 67 of the summary report on the technical analysis of the India's second BUR, the previous TTE noted areas where the transparency of the reporting on constraints, gaps, needs and support needed and received could be enhanced, clarifying that India received no technology transfer. The current TTE noted the improvements referred to in paragraphs 82 and 84 above and commends the Party for enhancing the transparency of its reporting.

85. India reported that its cooperation initiatives have a long history and in recent years they have been expanded both geographically and sectorally. India carries out various international technical cooperation programmes for neighbouring countries and those in

Africa and is expanding its assistance to South-East Asia, Latin America and the Caribbean, Mongolia, the Russian Federation and Pacific Island countries. Further, India reported that, despite being a vast developing country severely impacted by the COVID-19 pandemic and climate change, it kept supply chains open during the pandemic and supplied medicines and medical equipment to more than 150 countries. The TTE commends India for its reporting.

86. India reported in its BUR (section 4.7) information on its current initiatives for enhancing its existing MRV system for compliance with requirements under the ETF. The initiatives relate to enhancing institutions' capacity to report accurate data in a timely manner, adopt standardized methodologies and templates for reporting across institutions and establish robust management systems that can enable the development of strong reporting and verification systems. For developing an integrated MRV system India stressed the importance of streamlined data management, improved technical skills and analytical capacity and, most importantly, coordination among stakeholders. India also reported on a proposal that has been approved by the GEF for a project entitled "Capacity-building for establishing an Integrated and Enhanced Transparency Framework for Climate Actions and Support Measures". The aim of the project is to create an environment for domestic planners to follow the ETF guidelines through a coordinated mechanism. One important outcome would be creating a web-based national institutional coordination system for stakeholders' climate reporting. The TTE commends the Party for the clear and comprehensive reporting on its proactive approach to preparing for ETF implementation.

5. Any other information

87. India reported in its BUR (chap. 6) additional information on programmes and plans and success stories in relation to renewable energy, sustainable transportation, international cooperation and initiatives, and private sector engagement. The Party reported that the indirect mitigation co-benefits of these initiatives and the resulting GHG emission reductions were not estimated as the chief purpose of the chapter was to illustrate the breadth of India's mitigation initiatives and other elements of climate action.

88. In relation to renewable energy, solar energy is promoted, for example, by the Indian Renewable Energy Development Agency, which in 2019 launched the State Rooftop Solar Attractiveness Index to incentivize rooftop solar development through competition among the States. Recent developments include the installation of a large solar rooftop at the Brabourne Stadium in Mumbai, a large solar park at Bhadla, the solarization of the Sun temple towns of Konarak and Modhera, and the fully solar-powered Cochin International Airport. India Railways has started installing solar and wind capacity of 103 and 104 MW, to be increased to 1,000 and 200 MW, respectively, by 2022.

89. On sustainable transport, India reported on the expansion of urban rail, strengthening electric mobility, the pilot use of biofuels in aircraft and the pilot operation of hydrogen-fuelled buses and cars. India also reported on international initiatives, such as the International Solar Alliance, headquartered in India, for scaling up solar energy, which has been signed by 88 countries and ratified by 70. The private sector is engaged in various climate-friendly initiatives and major Indian companies have announced individual mitigation plans. In addition, India reported on other actions and activities, including those relating to water resources and weather and climate services, including climate research. Lastly, India presented its National Disaster Management Plan, which includes risk prediction and disaster management training, as well as the Vulnerability Atlas of India.

D. Identification of capacity-building needs

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

- (a) Enhancing capacity to estimate and report CO₂, NO_x and NMVOC emissions;
- (b) Enhancing the technical capacity to calculate consistent time series, especially for the LULUCF sector;

(c) Estimating and reporting HFC, PFC and SF₆ emissions from, for example, air conditioning and refrigeration and the electronics industry and electrical equipment;

(d) Enhancing capacity to develop mitigation actions in the waste sector and assessing and quantifying their impacts;

(e) Establishing a long-term institutional and operational system for periodic, continuous and enhanced GHG emission estimation for national reporting under UNFCCC reporting requirements.

91. The TTE noted that, in addition to those identified during the technical analysis, India reported that the capacity-building needs identified in its second BUR remain unfulfilled, but still relevant. The Party also outlined ongoing capacity-building needs and identified the following as additional needs (see BUR sections 5.4–5.5):

(a) GHG inventories: enhancing use of the 2006 IPCC Guidelines to facilitate use of new methodologies and collection of more detailed data for the energy, industrial processes and product use, agriculture, LULUCF and waste sectors;

(b) Mitigation actions: enhancing capacity for data collection to estimate the coverage and results achieved related to the co-benefits of mitigation actions in the agriculture sector;

(c) Adaptation actions: enhancing the capacity to minimize loss and damage due to weather-related disasters through weather and climate forecasting and services and energy management systems.

III. Conclusions

92. The TTE conducted a technical analysis of the information reported in the third BUR of India 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 NCs on a continuous basis; the national inventory of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol; mitigation actions and their effects, including associated methodologies and assumptions; constraints and gaps, and related unmet financial, technical and capacity-building needs, including a description of support needed and received; the level of support received to enable the preparation and submission of BURs; domestic MRV; and any other information relevant to the achievement of the objective of the Convention. The TTE concluded that the information analysed is mostly transparent.

93. India reported an update on the institutional arrangements relevant to the preparation of its BURs. It has taken significant steps to establish institutional arrangements that allow for the sustainable preparation of its BURs. It has striven to continuously improve existing institutional arrangements and stakeholder participation in various tasks and activities. This includes establishing the National Steering Committee under the Secretary of the Ministry of Environment, Forest and Climate Change, involving various line ministries and government departments, which oversees the preparation and implementation of the work programme for the BUR; while the Technical Advisory Committee, with members from government, academia and civil society, provides technical guidance for the preparation of the BUR. India reported that dedicated decentralized domestic MRV arrangements have been established.

94. In its third BUR, submitted in 2021, India reported information on its national GHG inventory for 2016. This included GHG emissions and removals of CO₂, CH₄ and N₂O for most of the relevant sources and sinks. However, India did not report on the precursor gases. The inventory was developed on the basis of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines. The total GHG emissions for 2016 were reported as 2,838,889 Gg CO₂ eq (excluding LULUCF) and 2,531,069 Gg CO₂ eq (including LULUCF). A total of 23 key categories excluding LULUCF and 25 key categories including LULUCF were identified through a level assessment using approach 1. A trend assessment was also carried out for 2011–2016, which identified 25 key categories excluding LULUCF and 26 key categories

including LULUCF. The key categories were mostly in the energy sector and associated with CO₂ emissions. Estimates of fluorinated gases were provided for limited emissions sources owing to difficulties in obtaining the necessary data, as clarified by the Party during the technical analysis.

95. India reported information on mitigation actions and their effects in both tabular and narrative format. It reported on its mitigation actions that are planned, ongoing and already implemented in the energy, industry, buildings, forestry, agriculture, transport and waste sectors. The Party reported on three groups of mitigation actions: sectoral, major policies and programmes, and initiatives with indirect mitigation co-benefits. The methodologies and assumptions for the mitigation actions and their objectives were clearly reported. The Party reported the progress of implementation of its mitigation actions and the results achieved in reaching its 2020 target, including a GHG emission intensity reduction of 24 per cent between 2005 and 2016 (excluding agriculture). The results of implemented mitigation actions achieved include co-benefits (such as the generation of employment) and estimated emission reductions of individual mitigation actions. Of the measures whose impacts were quantified, those with the greatest impact were implemented in the LULUCF sector. India reported the sequestration of 330.76 Mt CO₂, which is about 15 per cent of India's total CO₂ emissions in 2016. The Perform, Achieve and Trade scheme for energy efficiency in the industry and other energy-intensive sectors led to avoided emissions of 31 Mt CO₂ in cycle I (2012–2013 to 2014–2015), while cycle II (2016–2017 to 2018–2019) resulted in total energy savings of approximately 13.28 Mtoe and 61.34 Mt CO₂ avoided emissions.

96. India reported information on key constraints, gaps and related needs, clearly identifying limited financial resources and constraints, including those related to strengthening scientific research, applying technology and proactive planning to ensure the health and security of people in the face of natural disasters and climate-induced extreme events. India reported information on financial resources, capacity-building and technical support received. The Party also reported that it received financial support from the GEF, the Green Climate Fund and the Climate Investment Fund, and through bilateral funding.

97. The current TTE noted improvements in the reporting in the Party's third BUR compared with that in its second BUR. The information reported demonstrates that the Party has taken into consideration the areas for enhancing the transparency of the information reported, as noted by the TTE in the summary report on the technical analysis of the second BUR. However, improvements are ongoing and the Party has taken note of outstanding areas for future improvement.

98. The TTE, in consultation with India, identified the five capacity-building needs listed in paragraph 90 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. India prioritized all the capacity-building needs.

Annex I

Extent of the information reported by India in its third biennial update report

Table I.1

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

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported^a</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.	No	India submitted its third BUR in February 2021; the GHG inventory reported is for 2016. The unavoidable delay of 51 days was a consequence of the global COVID-19 pandemic.
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established by 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 decisions of the Conference of the Parties on this matter	Yes	The Party used a combination of Revised 1996 IPCC Guidelines and 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	
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;	Partly	Comparable information was partially reported.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Partly	Comparable information was partially reported.
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in its previous NCs.	Partly	The time series reported in the BUR covers 1994, 2000, 2007 and 2010 by sector and 2011–2016 by category. Consistent time-series information was provided for 2000–2016 in graphical format. A consistent time series back to 1994 was not reported owing to inconsistencies between GHG inventories.
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	Partly	Although the sectoral totals of inventories of previous submission years were provided, summary information tables with

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported^a</i>	<i>Comments on the extent of the information provided</i>
	inventories for previous submission years (e.g. for 1994 and 2000).		disaggregated data were not provided.
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors);	Yes	Comparable information was reported in BUR table 2.36 for all GHGs not controlled by the Montreal Protocol but emissions for GHG precursors were not reported.
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF ₆).	Yes	Comparable information was reported in BUR table 2.36.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	NA	
Decision 17/CP.8, annex, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	Yes	
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of:		
	(a) CO ₂ ;	Partly	Emissions from sources in some categories were not reported.
	(b) CH ₄ ;	Partly	Emissions from sources in some categories were not reported.
	(c) N ₂ O.	Partly	Emissions from sources in some categories were not reported.
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	Information on HFC-23 and HFC-134 from production of halocarbons and SF ₆ was reported.
	(b) PFCs;	Yes	Information on carbon tetrafluoride (CF ₄) and

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported^a</i>	<i>Comments on the extent of the information provided</i>
	(c) SF ₆ .	Yes	hexafluoroethane (C ₂ F ₆) from metal production was reported. Information on SF ₆ from metal production was reported.
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;	No	Information on CO was not reported.
	(b) NO _x ;	No	Information on NO _x was not reported.
	(c) NMVOCs.	No	Information on NMVOCs was not reported.
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as SO _x , and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	No	Information on SO _x was not reported.
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO ₂ fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Partly	The information was reported for both the sectoral and the reference approach. The difference between the estimates calculated using the two approaches was not provided in the BUR. ^b
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 ₂ eq should use the GWP provided by the IPCC in its AR2 based on the effects of GHGs over a 100-year time-horizon.	Yes	The Party used the GWP values 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:		

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported^a</i>	<i>Comments on the extent of the information provided</i>
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol;	Partly	Certain information on methodologies was not reported and a reference to the previous BURs and NCs, where the information is contained, was not provided in the BUR.
	(b) Explanation of the sources of EFs;	Yes	India used both IPCC default and country-specific EFs as presented in BUR table 2.1. The sources of country-specific EFs were provided in the BUR.
	(c) Explanation of the sources of AD;	Yes	
	(d) If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	Yes	
	(i) Source and/or sink categories;	Yes	All land-use categories of the Revised 1996 IPCC Guidelines.
	(ii) Methodologies;	Yes	The stock-difference approach was applied for all land categories.
	(iii) EFs;	Yes	For land categories country-specific stock factors were reported.
	(iv) AD;	Yes	For land categories a land representation (approach 1) was prepared.
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Yes	
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1–2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.	Yes	
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;	Yes	Information was limited to key categories.
	(b) Underlying assumptions;	Yes	
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	

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

^a This table does not take into account the legal nature of each reporting provision when it presents the results of the identification of the extent to which the elements of information on GHGs are included in the third BUR of the Party concerned, as contained in 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. The Party maintained that all the reporting provisions that are encouraged are non-mandatory and its capacity to report such information is determined by the support received, data availability and available institutional capacity. The TTE has recognized the extra effort made by India in paragraphs 26, 48, 54, 56, 78, 84, 85 and 86 of this document.

^b The Party notes that the difference in estimated CO₂ emissions between the two approaches was 6.3 per cent. The Party also notes that, for a vast developing country like India, this difference cannot be considered large. Further, it notes that context for these guidelines is to explain the difference based on the mass balance of carbon. As a non-Annex I Party, this has not been undertaken.

Table I.2

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

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 11	Non-Annex I Parties should provide information, in tabular format, on actions to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.	Yes	India reported information in tabular format for energy, agriculture, forestry and transport. Information on waste was not reported in tabular format. In BUR table 3.44 India reported mitigation quantification for some major policies and programmes for 2015–2016.
Decision 2/CP.17, annex III, paragraph 12	For each mitigation action or group of mitigation actions, including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information, to the extent possible:		
	(a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators;	Yes	India reported for the first time an update on the progress indicators for each of the NAPCC missions (BUR table 3.1). Information was reported, to the extent possible, on quantitative goals and progress indicators for most of the mitigation actions in the energy, transport, agriculture, forestry and waste sectors.
	(b) Information on:		
	(i) Methodologies;	Yes	
	(ii) Assumptions;	Yes	
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	Yes	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Yes	
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Yes	The Party reported emission reductions, to the extent possible, for most of the mitigation actions in the energy, transport, agriculture and forestry sectors.
	(e) Information on international market mechanisms.	Yes	
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 third biennial update report of India

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on:		
	(a) Constraints and gaps;	Yes	
	(b) Related financial, technical and capacity-building needs.	Yes	
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;	Yes	
	(b) Information on technical support received from the GEF, Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions for activities relating to climate change, including for the preparation of the current BUR.	Yes	
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on:		
	(a) Nationally determined technology needs;	Yes	
	(b) Technology support received.	Yes	India reported that it has not received technology transfer.

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, second and third BURs of India. Available at <https://unfccc.int/BURs>.

NC1 and 2 of India. Available at <https://unfccc.int/non-annex-I-NCs>.

Summary report on the technical analysis of the second BUR of India, contained in document FCCC/SBI/ICA/2019/TASR.2/IND. Available at <https://unfccc.int/ICA-reports>.