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National Communications from Parties not included in Annex I to the Convention

Compilation and synthesis of initial national communications

**Sixth compilation and synthesis of initial national communications from
Parties not included in Annex I to the Convention**

Note by the secretariat*

Addendum

**Inventories of anthropogenic emissions by sources and removals by sinks of
greenhouse gases**

Summary

This document compiles and summarizes information relating to national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs). It provides information on how Parties not included in Annex I to the Convention reported on their GHG inventories. In doing so, it addresses the methodological issues, as well as activity data, emission factors and reporting tables. The document also contains an overview of the GHG data submitted, including regional distribution of emissions and removals by gas by sector and per capita for 1994 or the closest year reported. The total amount of aggregate GHG emissions for that year of the 122 Parties that have reported is 11.7 billion tonnes CO₂ equivalent without land-use change and forestry (LUCF) and 11.9 billion tonnes CO₂ equivalent with LUCF. Finally, the document includes information about the financial and technical needs and constraints relating to GHG inventories identified by Parties in their initial national communications.

* This document is submitted after the due date because all the necessary information was not available on time.

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I. Introduction

1. In accordance with Article 4, paragraph 1 (a), and Article 12, paragraph 1 (a), of the Convention, Parties provided information on their national inventory of anthropogenic emissions by sources and removal by sinks of greenhouse gases (GHGs) not controlled by the Montreal Protocol. This section of the sixth compilation and synthesis report covers inventory information and related methodological issues identified by the 122¹ of 148 Parties not included in Annex I to the Convention (non-Annex I Parties) (82 per cent) which submitted their initial national communications by 1 April 2005.² This represents 83 per cent of the Africa region, 77 per cent of the Asia and the Pacific region, 94 per cent of the Latin America and the Caribbean region, and 70 per cent of the “Other” region.

II. Reporting

2. Most Parties followed the UNFCCC guidelines, as contained into the annex to decision 10/CP.2. They also took into account relevant conclusions of the Subsidiary Body for Scientific and Technological Advice (SBSTA), which encouraged Parties to apply the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (FCCC/SBSTA/1996/20, paras. 30 (b) and 31).

3. All Parties estimated, at least for one year, emissions of carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), with the exception of Maldives (which did not include N₂O emissions), Marshall Islands (which did not provide any data), Singapore (which did not report CH₄ emissions), and Solomon Islands (which reported only CO₂). Twelve Parties (10 per cent) reported for the year 1990, and 94 Parties (77 per cent) for the year 1994, and the remaining Parties (13 per cent) reported for various years. A total of 107 Parties (88 per cent) provided emission estimates for some or all GHG precursors.³ Fifteen Parties (12 per cent) did not provide estimates of these gases. Eighteen Parties (15 per cent) provided estimates of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and/or sulphur hexafluoride (SF₆). Sixty-four Parties (52 per cent) reported emission estimates of sulphur dioxide (SO₂).

4. Estimates of emissions from international aviation and/or marine bunker fuels were reported by 69 Parties (57 per cent). Fifty-six Parties (46 per cent) provided, when appropriate, a breakdown into marine and aviation bunkers. In conformity with the IPCC Guidelines,⁴ these emissions were not included in the national total but were reported separately.

A. Methodological issues

5. All Parties followed the IPCC Guidelines in compiling their national GHG inventories. Most Parties (89 per cent) used the Revised 1996 IPCC Guidelines; some Parties (11 per cent) used the 1995 IPCC Guidelines either as sole guidance or, in very few cases, in combination with the Revised 1996 IPCC Guidelines.

¹ The national communication of Marshall Islands contains a chapter on the national inventory of GHGs, but no inventory data were provided.

² Addenda to the initial national communication officially submitted to the UNFCCC secretariat are also considered. These documents might sometime be available on the web site of the UNFCCC, but not necessarily, as some documents were made available only in hard copy.

³ Precursors are atmospheric compounds which themselves are not GHGs or aerosols, but which have an effect on GHG or aerosol concentrations by taking part in physical or chemical processes regulating their production or destruction rates.

⁴ “IPCC Guidelines” refers to both the *1995 IPCC Guidelines for National Greenhouse Gas Inventories* and the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*.

6. Fifty Parties (41 per cent) identified limitations of the IPCC methodologies for estimating emissions in some sectors. The major concerns were the availability, quality, and lack of disaggregated data required to apply IPCC methodologies. Some country-specific problems were also encountered: the inappropriateness of most default emission factors; the difficulty of obtaining activity data in a suitable format; differences in statistical categories and definitions; an inappropriate forest classification; the need to adjust the methodology for rice cultivation; the need to develop a methodology for estimating methane from reservoirs; the need to identify other potential sinks of CO₂; difficulties in calculating emissions from waste combustion; the lack of default values for SO₂ emissions from the mining and metallurgy industry; and inappropriate classification of eco-climatic zones.

7. Most Parties applied both reference and sectoral approaches to estimate fuel combustion emissions from the energy sector. Few Parties used only the reference approach for estimating their fuel combustion emissions, and some applied only the sectoral approach. Most Parties performed the comparison between the two approaches, as recommended by the IPCC Guidelines, and some of them reported on observed differences. This comparison is a useful self-verification procedure, which greatly improves the transparency and indicates the level of confidence in the inventories by giving an indication of the level of uncertainty of the results. The usefulness of applying both approaches would be enhanced if the differences found when comparing results were also explained by all Parties.

8. The IPCC Guidelines request Parties to make efforts to report the estimated range of uncertainty in their emission estimates, where appropriate. Almost half of the Parties (55) reported uncertainties, 11 of them providing the information quantitatively, 33 qualitatively, and 11 both qualitatively and quantitatively. The sectors covered in estimating the range of uncertainty were more often energy, agriculture and land-use change and forestry (LUCF), and in some cases the waste and industrial sectors.

B. Activity data

9. About half of the Parties reported that some important activity data were either lacking, or, not accessible due to inadequate data collection and/or management systems. Most Parties reported generally on this issue, but some elaborated on their needs, relating mainly to the energy and forestry sectors. These needs were often identified as a lack of institutional capacity for the collection, archiving and management of data for preparing the inventory and systematization/standardization of activity data.

10. The source of the national activity data used for the emission estimates of the different sectors and source categories was referenced by many Parties with varying levels of detail, even though this information is not explicitly requested by the UNFCCC guidelines. Parties indicated that activity data were obtained from various national sources, such as national statistics provided by the respective ministries, municipalities and agencies, or from industrial facilities. In some instances, expert judgment was also used when data were not available.

C. Emission factors

11. Sixty-eight Parties reported that the default emission factors provided by the IPCC Guidelines often did not reflect national circumstances well, so their use in inventory calculations led to uncertainties in the national GHG inventory estimates. The inappropriateness of the IPCC emission factors was reported more often for the industrial processes and waste sectors, and to a lesser extent for agriculture and LUCF. Parties sometimes mentioned large uncertainties in the emission estimates as a result of the unavailability of emission factors specific to national circumstances, for example, in small island developing States (SIDS).

12. The IPCC Guidelines encourage the development and use of local emission factors that suit national circumstances. However, most Parties used only IPCC default methods. It is only in the recently submitted national communications (over the past two years) that one can notice an increase in the

number of Parties who have developed their own emission factors for one or more sectors of their national GHG inventory. These mostly relate to the energy and agriculture sectors, that is, to the most important emitting sectors.

D. Reporting tables

13. Sixty-three Parties (52 per cent) used the IPCC summary tables⁵ and 32 Parties (26 per cent) provided information using tables with a similar format. Three Parties (2 per cent) did not use either format.

14. Nine of the reporting Parties (7 per cent) used strictly table II of the UNFCCC guidelines. Fourteen Parties (11 per cent) adopted a modified format of that table. All but four Parties included sectors or source categories of the IPCC other than those explicitly required by UNFCCC table II. In some cases it was not clear whether certain source categories were not reported because they were not relevant for the country or had not been estimated for other reasons. By comparison, more Parties used the IPCC summary table format than used the UNFCCC table II format.

15. Thirty-three Parties (27 per cent) provided all the necessary IPCC worksheets, which give detailed calculations of the estimation of GHG emissions as well as numerical information on aggregate emission factors and activity data for inventories using the IPCC default methods. The provision of these worksheets contributes substantially to the transparency of the inventories. Six Parties (9 per cent) provided some of the IPCC worksheets and the rest did not provide any worksheet.

16. The degree of completeness of reporting on IPCC sectors and subsectors was high. For example, only 25 Parties (20 per cent) did not report on emissions from agricultural soils. All but eight Parties reported on CO₂ emissions from the LUCF sector.

17. Some Parties used the notation keys indicated in the IPCC Guidelines, which help report on completeness such as where a category is not applicable versus data are not available.

18. Although the UNFCCC guidelines request inventory data for either 1990 or 1994, 24 Parties (20 per cent) provided a national GHG inventory for both years. This allowed a preliminary analysis to be made of the trends of GHG emissions in these countries. Two Parties (Azerbaijan, Indonesia) provided detailed annual GHG inventories for the period 1990 to 1994; three (Republic of Moldova, Tajikistan, The former Yugoslav Republic of Macedonia) for the period 1990 to 1998; and two (Kyrgyzstan, Malta) for the period 1990 to 2000.

19. Other reporting issues were also noted during the process of compiling the inventory information. For example, different emission estimates for the same sector or source categories were indicated in different places or tables in the communication. Also, some Parties changed the format of the IPCC summary tables, or used erroneous global warming potentials (GWPs).

III. Overview of the greenhouse gas data submitted

A. General overview

20. As 1994 is the year for which national GHG inventory data are most commonly reported on by Parties, table 2 summarizes inventory data in terms of aggregate emissions and removals provided for the

⁵ The summary tables and worksheets are automatically generated when using the IPCC inventory software. See *Greenhouse Gas Inventory Software for the Workbook of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories – Instruction Manual*.

year 1994 or the closest year reported.⁶ In accordance with these guidelines, the analysis provided in this section is based on 1994 inventory data, whenever possible. When needed, estimates provided by Parties have been converted into CO₂ equivalent estimates using 1995 IPCC GWPs in order to facilitate comparison of inventory results (see figure 1). Such a presentation shows the relative contribution of the different GHGs and the different sectors to a Party's total GHG emissions. It should be noted that 87 Parties (71 per cent) used the GWPs to estimate the relative contribution of each individual GHG or sector to their aggregate GHG emissions, although this is not required by the UNFCCC guidelines.

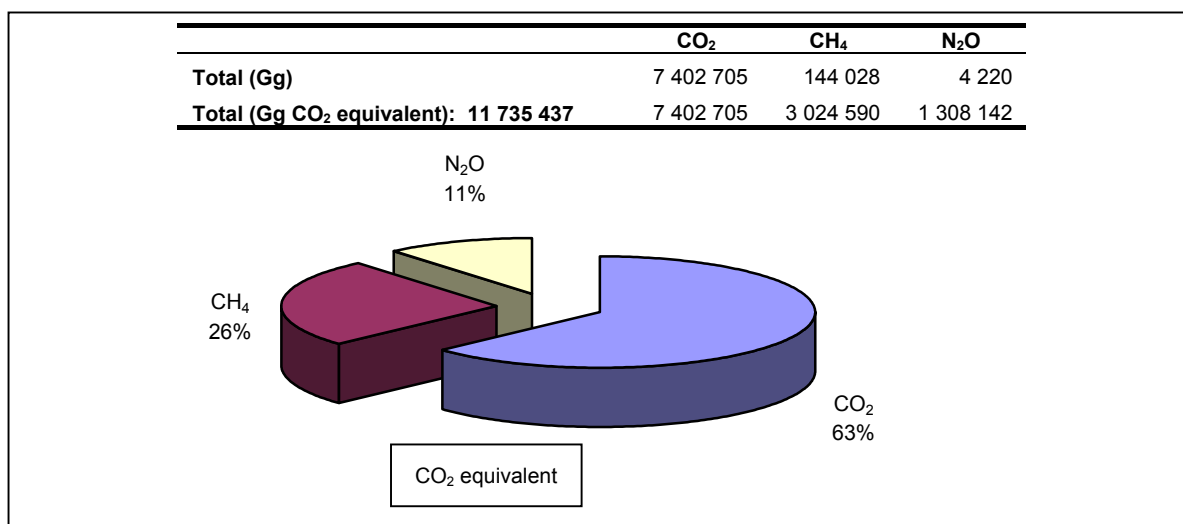
1. Emissions by sources and removals by sinks⁷

21. Most reporting Parties are a net source of GHG emissions (see table 2). However, 29 Parties (24 per cent) report net GHG sinks due to the relatively large CO₂ removals in the LUCF sector when compared to emissions from all the other sectors. Thirty-six Parties (30 per cent) showed that removals of CO₂ by sinks in LUCF exceeded total CO₂ emissions.⁸

2. Aggregate greenhouse gas emissions expressed in terms of CO₂ equivalent⁹

22. In terms of aggregate total GHG emissions, expressed as CO₂ equivalent, excluding the LUCF sector, CO₂ was the primary GHG for more than half of the Parties (55 per cent). For one third of them CH₄ was the most important contributor, and for 14 Parties (12 per cent) N₂O was the highest contributor.

Figure 1. Total greenhouse gas emissions, excluding LUCF, for the year 1994 or the closest year reported



⁶ Not all Parties reported for the year 1994 or alternatively 1990 as stated in decision 10/CP.2 but, due to their national circumstances, some Parties reported only for 1993, 1995, 1996 or 1998.

⁷ For more detailed information see document "Key GHG Data - 2005" published by the UNFCCC secretariat, <http://unfccc.int/essential_background/background_publications_htmlpdf/items/2625.php>.

⁸ The term "total CO₂ emissions" in this document denotes the sum of CO₂ emissions from all sectors except CO₂ emissions and removals in the LUCF sector. This provides for the presentation of the data in a consistent and comparable manner for all reporting Parties.

⁹ Aggregate GHG emission estimates given in this document represent the sum of total CO₂, CH₄ and N₂O emissions expressed in CO₂ equivalent, using IPCC 1995 GWP values.

23. The aggregate GHG emissions, excluding the LUCF sector, reported by 122 non-Annex I Parties for the year 1994 or the closest year reported, total 11.7 billion tonnes¹⁰ CO₂ equivalent (see figure 1 above). CO₂ is the primary gas emitted, with a total of 7.4 billion tonnes (63 per cent), followed by CH₄, with 3 billion tonnes CO₂ equivalent (26 per cent), and N₂O with 1.3 billion tonnes CO₂ equivalent (11 per cent).

24. The level of emissions varied widely among reporting Parties. Aggregate GHG emissions, excluding LUCF, range from 4.7 to 4,057,306 CO₂ equivalent, as can be seen from table 2. This represents a scale from 1 to 863,257. Nineteen Parties reported emissions lower than 1 million tonne CO₂ equivalent; in contrast, for 22 Parties the emissions were higher than 100 million tonnes CO₂ equivalent (see table 1).

Table 1. Total aggregate emissions and removals of CO₂, CH₄ and N₂O in CO₂ equivalent excluding and including land-use change and forestry (Gg)

Party	Total (without LUCF)	Total (with LUCF)	Party	Total (without LUCF)	Total (with LUCF)
AFRICA			ASIA AND THE PACIFIC		
Algeria	91 607.24	100 194.24	Tunisia	25 140.99	23 368.29
Benin	39 347.62	-8 175.79	Uganda	42 604.27	50 856.97
Botswana	9 291.74	-29 441.86	United Republic of Tanzania	39 235.89	952 798.83
Burkina Faso	5 968.26	6 060.07	Zambia	32 769.33	36 327.29
Burundi	1 995.43	-1 003.00	Zimbabwe	27 594.14	-34 645.30
Cameroon	165 725.02	187 911.39	Total Africa	1 612 904.22	1 201 794.07
Cape Verde	292.89	329.41	ASIA AND THE PACIFIC		
Central African Republic	38 343.90	-102 513.64	Bangladesh	45 926.16	53 764.13
Chad	8 021.06	-38 177.06	Bhutan	1 292.38	-2 257.14
Comoros	518.94	-376.18	Cambodia	12 762.38	-5 145.31
Congo	1 374.88	-68 485.80	China	4 057 306.00	3 649 827.00
Côte d'Ivoire	24 725.27	4 877.86	Cook Islands	80.29	-74.14
Democratic Republic of the Congo	44 532.51	-132 307.70	Democratic People's Republic of Korea	201 930.35	187 308.89
Djibouti	511.44	-88.06	India	1 214 248.00	1 228 540.14
Egypt	117 266.11	107 366.11	Indonesia	323 262.22	487 380.54
Eritrea	4 135.21	5 811.51	Iran (Islamic Republic of)	385 433.81	417 012.03
Ethiopia	47 414.90	33 008.20	Israel	63 075.15	62 701.15
Gabon	6 524.33	-494 351.36	Jordan	21 943.34	20 034.06
Gambia	4 242.48	-45 740.60	Kazakhstan	219 238.90	212 611.90
Ghana	12 578.39	-6 894.28	Kiribati	27.97	27.97
Guinea	5 057.70	-12 538.95	Kyrgyzstan	18 185.30	17 306.93
Kenya	21 466.23	-6 533.99	Lao People's Democratic Republic	6 866.55	-97 437.28
Lesotho	1 820.30	3 080.87	Lebanon	15 702.33	15 908.58
Madagascar	21 933.66	-217 037.34	Malaysia	136 362.77	75 284.81
Malawi	7 070.34	24 585.88	Maldives	483.02	483.02
Mali	8 666.20	-1 081.94	Marshall Islands	-	-
Mauritania	4 329.86	3 689.88	Micronesia (Federated States of)	246.01	246.01
Mauritius	2 058.85	1 837.49	Mongolia	15 159.40	15 559.40
Morocco	44 373.00	39 862.00	Nauru	35.90	26.85
Namibia	5 602.16	-34.18	Nepal	31 188.87	39 305.63
Niger	4 856.31	10 962.55	Niue	4 422.16	4 507.51
Nigeria	242 626.40	347 636.38	Pakistan	160 599.70	167 126.80
Senegal	9 317.90	3 320.94	Palau	124.81	-292.38
Seychelles	256.41	-576.36	Papua New Guinea	5 012.24	4 599.24
South Africa	379 837.38	361 221.42	Philippines	100 866.61	100 740.12
Sudan	54 237.00	72 014.00	Republic of Korea	289 458.00	263 223.00
Swaziland	2 635.98	-617.08			
Togo	4 996.32	25 292.98			

¹⁰ One billion tonnes equal 10⁹ tonnes or 10³ Tg (Teragrams) or 10⁶ Gg (Gigagrams).

Party	Total (without LUCF)	Total (with LUCF)	Party	Total (without LUCF)	Total (with LUCF)
Samoa	560.83	478.85	Guatemala	14 742.18	-24 803.64
Singapore	26 859.08	26 859.08	Guyana	2 706.05	-23 779.75
Solomon Islands	294.38	294.38	Haiti	5 131.76	6 087.25
Sri Lanka	29 428.85	57 313.40	Honduras	10 825.92	15 455.20
Tajikistan	8 508.50	6 460.50	Jamaica	116 225.10	116 058.10
Thailand	223 977.48	285 831.30	Mexico	383 076.88	524 615.22
Turkmenistan	52 309.54	52 690.14	Nicaragua	7 651.84	-5 404.82
Tuvalu	4.66	4.66	Panama	10 692.28	34 402.99
Uzbekistan	153 888.00	153 489.00	Paraguay	140 456.13	159 960.39
Vanuatu	299.39	297.85	Peru	57 582.89	98 800.86
Viet Nam	84 449.80	103 834.58	Saint Kitts and Nevis	164.47	74.71
Yemen	17 868.55	8 198.37	Saint Lucia	886.45	541.22
Total Asia and the Pacific	7 929 689.69	7 614 071.57	Saint Vincent and the Grenadines	379.50	247.41
LATIN AMERICA AND THE CARIBBEAN			Trinidad and Tobago	16 389.79	14 918.27
Antigua and Barbuda	387.95	291.12	Uruguay	29 815.20	28 949.98
Argentina	263 879.10	229 700.40	Total Latin America and the Caribbean	2 058 599.43	2 986 460.11
Bahamas	2 197.20	2 197.20	OTHER		
Barbados	3 750.50	3 739.50	Albania	5 533.87	7 059.35
Belize	6 335.01	2 310.32	Armenia	25 312.21	24 695.21
Bolivia	20 685.06	47 529.62	Azerbaijan	60 786.52	57 277.52
Brazil	658 976.00	1 477 056.00	Georgia	10 689.90	11 728.10
Chile	54 659.19	27 526.55	Malta	2 670.24	2 430.26
Colombia	137 485.14	152 087.98	Republic of Moldova	15 356.94	13 821.37
Costa Rica	10 504.32	9 779.51	The former Yugoslav Republic of Macedonia	13 893.87	12 158.29
Cuba	38 122.39	11 652.81	Total Other	134 243.56	129 170.10
Dominica	152.17	-219.68	Total 122 non-Annex I Parties		
Dominican Republic	20 441.05	13 936.83		11 735 436.90	11 931 495.85
Ecuador	30 774.48	45 374.45			
El Salvador	11 916.98	15 859.66			
Grenada	1 606.47	1 514.47			

B. Regional greenhouse gas profiles

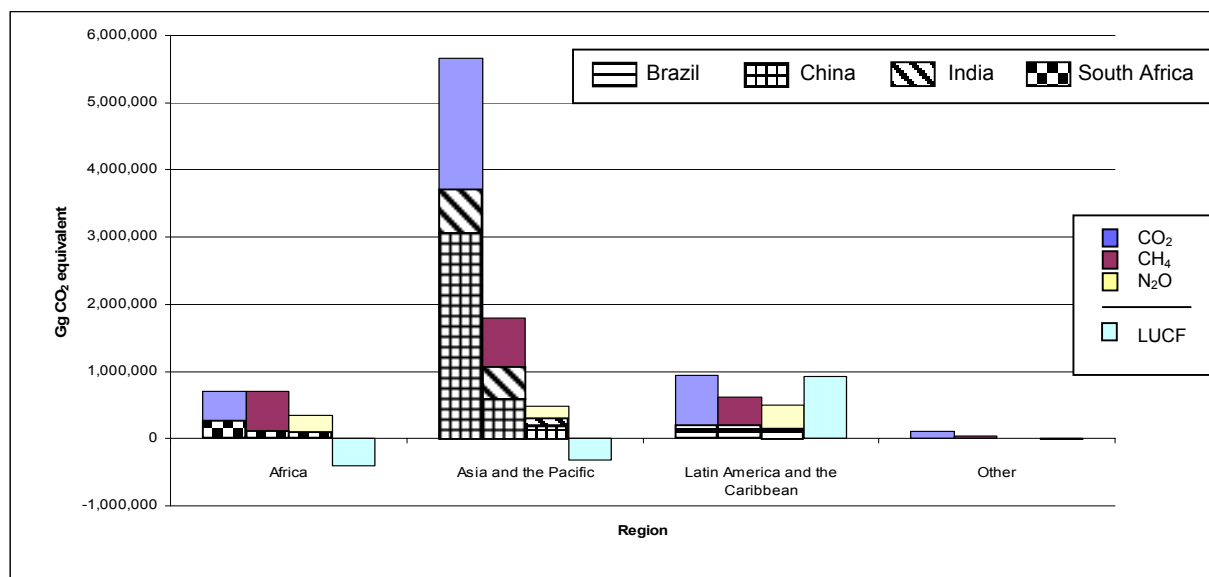
25. There are differences in the regional distribution of the aggregate GHG emissions resulting mainly from the national circumstances prevailing within each the region. For the Africa region, the majority of Parties (56 per cent) reported CH₄ as being the highest contributor; for the three remaining regions,¹¹ CO₂ is the major contributor. The Asia and the Pacific region has the highest aggregate GHG emissions (7.9 billion tonnes CO₂ equivalent), followed by Latin America and the Caribbean (2 billion tonnes CO₂ equivalent), Africa (1.6 billion tonnes CO₂ equivalent), and Other (0.1 billion tonnes CO₂ equivalent) (see figure 2 and table 2).

26. In the Asia and the Pacific region, the three largest emitters are China (51 per cent), India (15 per cent) and the Islamic Republic of Iran (5 per cent). In the Latin America and the Caribbean region, they are Brazil (32 per cent), Mexico (19 per cent) and Argentina (13 per cent). In the Africa region, they are South Africa (24 per cent), Nigeria (15 per cent) and Cameroon (10 per cent). For the "Other" region, Azerbaijan is the largest emitter (45 per cent). For the Latin America and the Caribbean region, as outlined in figure 2, Brazil's share of emissions appears relatively small because the emissions from the LUCF sector are not accounted for. Brazil accounts for 88 per cent of the total aggregate emissions from the region for the LUCF sector.

27. The energy sector was the largest source of GHG emissions for 70 Parties, whereas for 45 Parties the agriculture sector was largest and for six the waste sector was largest. Agriculture was the second largest emitter for most Parties, followed by the industrial processes sector, and then the waste sector. Removals by LUCF in most Parties offset GHG emissions from this same sector (see table 2).

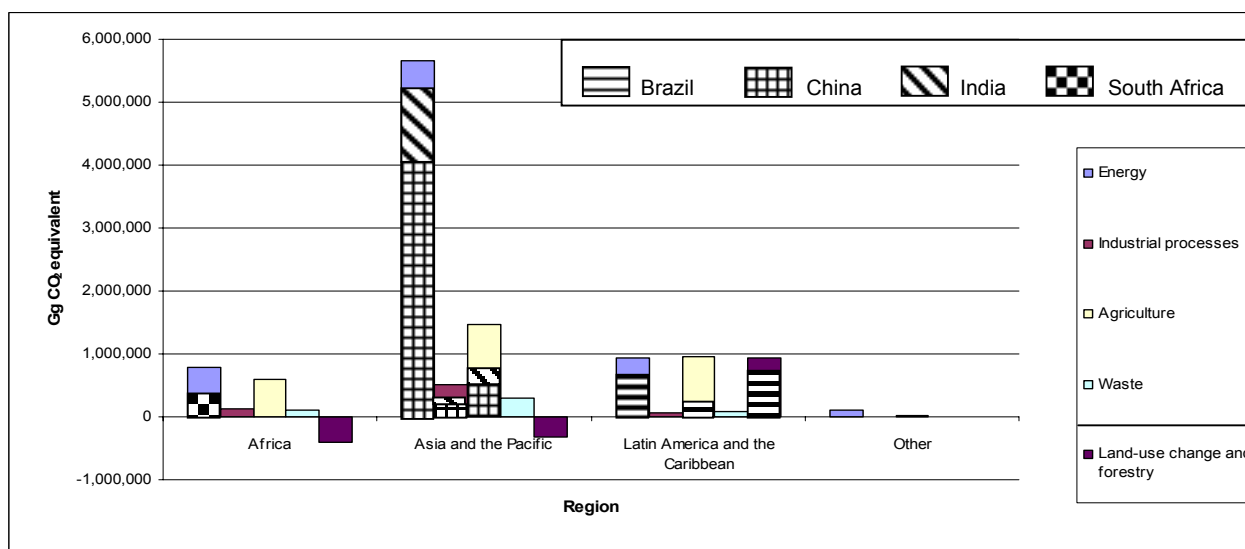
¹¹ Asia and the Pacific, Latin America and the Caribbean, and "Other".

Figure 2. Aggregate GHG emissions and removals by gas by region (Gg CO₂ equivalent) for the year 1994 or the closest year reported



28. The energy sector was the primary source of emissions for all regions, except for the Latin America and the Caribbean region, where the agriculture sector came first (see figure 3). The agriculture sector is the second largest source of emissions for all regions, with the exception of the Latin America and the Caribbean region, where the energy sector is second largest. The only region for which the industrial processes sector accounts for a large amount of emissions is the Asia and the Pacific (0.5 billion tonnes CO₂ equivalent), although in terms of relative share this sector represents only 6.4 per cent of the total emissions from the region, excluding the LUCF sector.

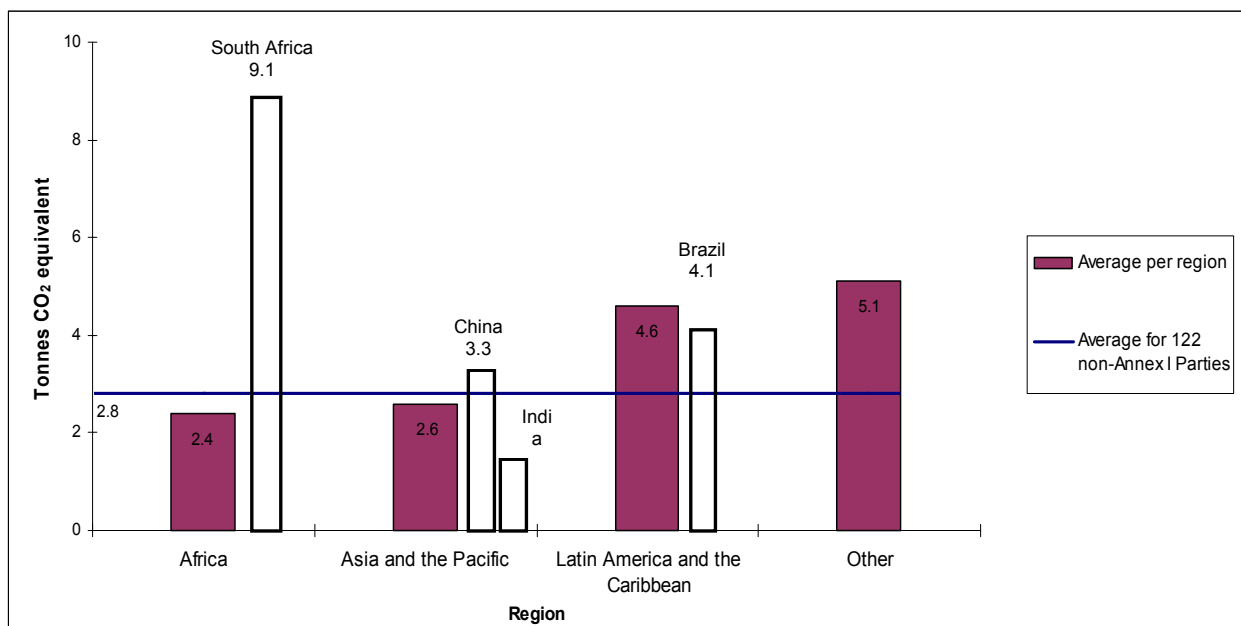
Figure 3. Aggregate GHG emissions and removals by sector by region (Gg CO₂ equivalent) for the year 1994 or the closest year reported



29. The LUCF sector is a net GHG sink for the Africa region (411 million tonnes CO₂ equivalent), the Asia and the Pacific region (316 million tonnes CO₂ equivalent), and the Other region (5 million

tonnes CO₂ equivalent). For the Latin America and the Caribbean region, LUCF is a net source of emissions (928 million tonnes CO₂ equivalent). Although Parties report high uncertainty in the LUCF sector data, in the cross-regional aggregate there appears to be only a small difference (1.7 per cent) between the total aggregated emissions without LUCF (11.7 billion tonnes CO₂ equivalent) and with LUCF (11.9 billion tonnes CO₂ equivalent).

Figure 4. Per capita GHG emissions (tonnes CO₂ equivalent (excluding LUCF)) for the year 1994 or the closest year reported



30. The per capita emissions (expressed in tonnes CO₂ equivalent, excluding LUCF) average 2.8 tonnes for 122 non-Annex I Parties. The Africa region has the lowest average per capita emission with 2.4 tonnes, while South Africa has 9.1 tonnes. The Asia and the Pacific region has an average per capita emission of 2.6 tonnes, with China at 3.3 and India at 1.3 tonnes. The Latin America and the Caribbean region has 4.6 tonnes average per capita emission. Brazil has 4.1 tonnes, which is lower than the average for the region, because the LUCF sector is not taken into account and most of Brazil's emissions come from that sector. The Other region has the highest average per capita emission, at 5.1 tonnes; however, this covers only seven Parties with relatively small populations.

IV. Financial and technical needs and constraints

31. Most Parties reported difficulties in preparing their GHG inventories, and indicated that their technical and institutional capacities were inadequate to meet their reporting obligations under the Convention for both the preparation and updating of national GHG inventories.

A. Activity data

32. Most of the reporting Parties identified the lack of activity data as a major constraint for the estimation of emissions of some source categories in at least one sector, which was usually energy or LUCF, and to a lesser extent agriculture, industrial processes and waste.

33. Regarding energy use, most Parties reported broadly or specifically on the lack of activity data. The most common fields specified were household biomass consumption, vehicles and equipment efficiency in the transport and industrial subsectors, and international bunker fuels.

34. Some Parties reported difficulties in obtaining activity data in the time series needed for the LUCF sector, as requested by the IPCC methodology. Data on land use and forest cover were often outdated or not in a suitable format.

35. In the industrial processes sector, some Parties faced problems in collecting national activity data, particularly from the private sector. Some Parties reported that the needed data were sometimes considered to be confidential, whereas others indicated problems relating to the harmonization of the IPCC source categories with those used locally.

B. Emission factors

36. Most Parties found the IPCC default emission factors for several source categories to be inappropriate, and they expressed a need for the development of appropriate emission factors for the respective sectors with a view to improving estimates of national GHG emissions. Parties emphasized, for example, limitations relating to the applicability of the IPCC non-CO₂ emission factors and the need to study the composition of local fuel types, the development of specific emission factors for fugitive gases from oil fields, agricultural soils, and processes relating to the production of cement.

C. Supporting continuity in the inventory preparation process

37. Most Parties expressed their financial and technological needs in order to ensure the continuous collection and archiving of data with a view to improving future inventories. This warranted the establishment and maintenance of stable national institutions and inventory teams. The improvement of infrastructure coupled with more efficient equipment and better facilities would permit the creation and/or strengthening of statistical systems for managing basic information relating to GHG emissions on an ongoing basis. Parties also expressed the need to establish a reliable and effective GHG inventory database system.

38. Financial and technical assistance is also needed for improving data quality (availability, accuracy and reliability) in various key socio-economic sectors, particularly in the LUCF sector. For many Parties, data are either lacking or highly uncertain. Specific technical needs relate to establishing systematic mechanisms to collect data, undertaking field studies and validation of emission factors, carrying out further surveys in order to reduce uncertainties in activity data, improving the use of methodologies to determine forest area, improving institutional capacity to collect forest data, and improving and expanding carbon sequestration studies.

39. Parties also expressed the need to improve the availability and reliability of data through active cooperation with relevant government departments and agencies, industry, non-governmental organizations and other institutions that provide, collect and maintain relevant data. Access to adequate training was also considered to be an important element in enhancing local technical capacity and expertise in data collection, management and dissemination.

D. Institutional requirements, research needs and the implementation capacity

40. Parties also referred to the need to strengthen the capacity of institutions involved in the preparation of the GHG inventory, including the training of personnel.

41. Some Parties requested assistance to expand the scope of their original inventories by including other gases.

42. Some Parties stressed the need to develop a comprehensive energy balance to help compute GHG emissions in the energy sector on a continuous basis, and a few pointed out the need to link the energy balance with GHG emissions methodologies such that data changes in the energy balance are automatically reflected in the GHG emissions values.
43. Some Parties stressed the lack of data on household consumption of biomass fuels, and requested funds to conduct and update, on a more sustainable basis, studies to gather consumption data for conventional and non-conventional fuels.
44. Some Parties outlined technological and financial difficulties encountered in collecting data in the transport sector for accurate estimates of vehicular emissions and in measuring and applying default values for data sets.
45. Several Parties indicated the need to undertake research studies on savannah burning, as well as the need to generate data on crop residues to help estimate emissions from burning of agricultural residues.
46. Several Parties expressed a need for the training of personnel in the compilation and analysis of GHG inventories as well as in order to keep abreast of refinements to the IPCC methodologies.
47. More generally, some Parties expressed the need for support for research on emission factors and for obtaining relevant activity data, and the need for GHG inventory workshops to help improve the expertise of national experts was also mentioned.

V. Summary

48. Parties have complied with Article 4, paragraph 1 (a), and Article 12, paragraph 1 (a), of the Convention, followed the UNFCCC guidelines on national communications (decision 10/CP.2), and sometimes provided more information than required.
49. All but four Parties estimated, at least for one year, emissions of CO₂, CH₄ and N₂O. A total of 107 Parties (88 per cent) provided emission estimates for some or all GHG precursors. Eighteen Parties (15 per cent) provided estimates of HFCs, PFCs and/or SF₆. Sixty-four Parties (52 per cent) reported emission estimates of SO₂.
50. In terms of aggregate total GHG emissions, expressed as CO₂ equivalent, excluding the LUCF sector, CO₂ was the primary GHG for more than half of the Parties (55 per cent). For one third of them CH₄ was the most important contributor, and for 14 Parties (12 per cent) N₂O was the highest contributor.
51. The aggregate total GHG emissions, excluding the LUCF sector, reported by 122 non-Annex I Parties for the year 1994 or the closest year reported, are 11.7 billion tonnes of CO₂ equivalent. CO₂ is the primary gas emitted, with a total of 7.4 billion tonnes (63 per cent), followed by CH₄, with 3 billion tonnes CO₂ equivalent (26 per cent), and N₂O with 1.3 billion tonnes CO₂ equivalent (11 per cent).
52. The level of emissions varied widely among reporting Parties. Aggregate GHG emissions expressed in CO₂ equivalent, excluding LUCF, range from 4.7 to 4,057,306 Gg, this represents a scale from 1 to 863,257. Nineteen Parties reported emissions lower than 1 million tonne CO₂ equivalent; in contrast, for 22 Parties the emissions were higher than 100 million tonnes CO₂ equivalent.
53. There are differences in the regional distribution of the aggregate GHG emissions resulting mainly from the national circumstances prevailing within each the region. For the Africa region, the majority of Parties (56 per cent) reported CH₄ as being the highest contributor; for the three remaining regions, CO₂ is the major contributor. The Asia and the Pacific region has the highest aggregate GHG emissions (7.9 billion tonnes CO₂ equivalent), followed by Latin America and the Caribbean region

(2 billion tonnes CO₂ equivalent), Africa (1.6 billion tonnes CO₂ equivalent), and Other (0.1 billion tonnes CO₂ equivalent).

54. The energy sector was the largest source of GHG emissions for 70 Parties, whereas for 45 Parties it was the agriculture sector, and for six the waste sector. Agriculture was the second largest emitter for most Parties, followed by the industrial processes sector, and then the waste sector. Removals by LUCF in most Parties offset GHG emissions from this same sector.

55. The LUCF sector is a net GHG sink for the Africa, Asia and the Pacific and Other regions. For the Latin America and the Caribbean region, LUCF is a net source of emissions. Although Parties report high uncertainty in the LUCF sector data, in the cross-regional aggregate there appears to be only a small difference (1.7 per cent) between the total aggregated emissions without LUCF (11.7 billion tonnes CO₂ equivalent) and with LUCF (11.9 billion tonnes CO₂ equivalent).

56. The per capita emissions (expressed in tonnes CO₂ equivalent, excluding LUCF) are an average of 2.8 tonnes for 122 non-Annex I Parties. The Africa region has the lowest average per capita emission with 2.4 tonnes. The Asia and the Pacific region has an average per capita emission of 2.6 tonnes, the Latin America and the Caribbean region has 4.6 tonnes, and the Other region has the highest average per capita emission, with 5.1 tonnes.

57. The above-mentioned 122 initial national communications have been submitted in accordance with the UNFCCC guidelines as contained in decision 10/CP.2, but new guidelines were adopted at COP 8 (decision 17/CP.8). This represents another challenge for non-Annex I Parties. To help Parties meet this challenge, the secretariat has issued a “user manual”¹² to provide for an effective and efficient use of the UNFCCC guidelines as contained in the annex to decision 17/CP.8.

¹² See <http://unfccc.int/national_reports/non-annex_i_natcom/guidelines_and_user_manual/items/2607.php>.

Table 2. Aggregate emissions and removals of CO₂, CH₄ and N₂O in CO₂ equivalent by major source/sink category, including and excluding land-use change and forestry (Gg and percentages of total by Party)

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUFC	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
AFRICA													
Algeria	1994	70 081.74	76.5	4 768.00	5.2	12 037.50	13.1	4 720.00	5.2	91 607.24	8 587.00	100 194.24	9.4
Benin	1995	997.85	2.5	96.43	0.2	37 957.53	96.5	295.81	0.8	39 347.62	-47 523.41	-8 175.79	-120.8
Botswana	1994	3 842.53	41.4	210.80	2.3	5 066.61	54.5	171.80	1.8	9 291.74	-38 733.60	-29 441.86	-416.9
Burkina Faso	1994	908.25	15.2	-	-	4 708.42	78.9	351.59	5.9	5 968.26	91.82	6 060.07	1.5
Burundi	1998	799.74	40.1	0.13	0.0	1 091.60	54.7	103.96	5.2	1 995.43	-2 998.43	-1 003.00	-150.3
Cameroon	1994	3 239.59	2.0	58 523.45	35.3	102 231.80	61.7	1 730.19	1.0	165 725.02	22 186.37	187 911.39	13.4
Cape Verde	1995	219.78	75.0	-	-	39.40	13.5	33.71	11.5	292.89	36.52	329.41	12.5
Central African Republic	1994	18 928.00	49.4	-	-	16 850.64	43.9	2 565.26	6.7	38 343.90	-140 857.54	-102 513.64	-367.4
Chad	1993	309.65	3.9	-	-	7 298.98	91.0	412.43	5.1	8 021.06	-46 198.12	-38 177.06	-576.0
Comoros	1994	70.53	13.6	-	-	438.44	84.5	9.96	1.9	518.94	-895.11	-376.18	-172.5
Congo	1994	846.13	61.5	43.37	3.2	338.00	24.6	147.38	10.7	1 374.88	-69 860.68	-68 485.80	-5 081.2
Côte d'Ivoire	1994	12 438.07	50.3	0.77	0.0	3 448.85	13.9	8 837.58	35.7	24 725.27	-19 847.41	4 877.86	-80.3
Democratic Republic of the Congo	1994	3 599.43	8.1	21.94	0.0	34 854.50	78.3	6 056.64	13.6	44 532.51	-176 840.21	-132 307.70	-397.1
Djibouti	1994	275.58	53.9	-	-	206.29	40.3	29.57	5.8	511.44	-599.50	-88.06	-117.2
Egypt	1990	83 289.75	71.0	10 276.00	8.8	18 012.30	15.4	5 688.06	4.9	117 266.11	-9 900.00	107 366.11	-8.4
Eritrea	1994	2 677.70	64.8	32.34	0.8	1 371.20	33.2	53.97	1.3	4 135.21	1 676.30	5 811.51	40.5
Ethiopia	1994	7 229.00	15.2	310.00	0.7	38 447.00	81.1	1 428.90	3.0	47 414.90	-14 406.70	33 008.20	-30.4
Gabon	1994	6 364.54	97.6	65.20	1.0	-	-	94.59	1.4	6 524.33	-500 875.69	-494 351.36	-7 677.0
Gambia	1993	254.57	6.0	-	-	893.25	21.1	3 094.66	72.9	4 242.48	-49 983.08	-45 740.60	-1 178.2
Ghana	1994	6 567.80	52.2	281.80	2.2	5 255.70	41.8	473.09	3.8	12 578.39	-19 472.67	-6 894.28	-154.8
Guinea	1994	2 043.19	40.4	143.42	2.8	2 529.71	50.0	341.38	6.7	5 057.70	-17 596.65	-12 538.95	-347.9
Kenya	1994	8 058.16	37.5	989.51	4.6	12 099.66	56.4	318.89	1.5	21 466.23	-28 000.22	-6 533.99	-130.4
Lesotho	1994	827.22	45.4	-	-	938.51	51.6	54.57	3.0	1 820.30	1 260.57	3 080.87	69.3
Madagascar	1994	1 923.92	8.8	5.00	0.0	19 794.74	90.2	210.00	1.0	21 933.66	-238 971.00	-217 037.34	-1 089.5
Malawi	1994	3 717.87	52.6	58.38	0.8	3 204.00	45.3	90.09	1.3	7 070.34	17 515.54	24 585.88	247.7
Mali	1995	968.41	11.2	9.58	0.1	7 572.67	87.4	115.53	1.3	8 666.20	-9 748.14	-1 081.94	-112.5
Mauritania	1995	1 153.69	26.6	2.43	0.1	2 944.38	68.0	229.35	5.3	4 329.86	-639.98	3 689.88	-14.8
Mauritius	1995	1 759.98	85.5	88.07	4.3	139.27	6.8	71.53	3.5	2 058.85	-221.36	1 837.49	-10.8
Morocco	1994	26 839.00	60.5	3 158.00	7.1	12 092.00	27.3	2 284.00	5.1	44 373.00	-4 511.00	39 862.00	-10.2
Namibia	1994	1 917.68	34.2	5.46	0.1	3 607.41	64.4	71.61	1.3	5 602.16	-5 636.34	-34.18	-100.6
Niger	1990	928.47	19.1	9.56	0.2	3 890.21	80.1	28.07	0.6	4 856.31	6 106.23	10 962.55	125.7
Nigeria	1994	146 361.61	60.3	1 761.87	0.7	50 498.55	20.8	44 004.37	18.1	242 626.40	105 009.98	347 636.38	43.3
Senegal	1994	3 788.57	40.7	345.50	3.7	2 957.62	31.7	2 226.21	23.9	9 317.90	-5 996.96	3 320.94	-64.4
Seychelles	1995	179.56	70.0	-	-	27.49	10.7	49.35	19.2	256.41	-832.77	-576.36	-324.8
South Africa	1994	297 566.57	78.3	30 386.22	8.0	35 455.52	9.3	16 429.07	4.3	379 837.38	-18 615.96	361 221.42	-4.9
Sudan	1995	7 788.00	14.4	173.00	0.3	45 273.00	83.5	1 003.00	1.8	54 237.00	17 777.00	72 014.00	32.8
Swaziland	1994	1 055.95	40.1	-	-	1 233.49	46.8	346.54	13.1	2 635.98	-3 253.06	-617.08	-123.4
Togo	1995	1 307.17	26.2	403.53	8.1	3 278.87	65.6	6.75	0.1	4 996.32	20 296.66	25 292.98	406.2

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUCF	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
Tunisia	1994	15 251.12	60.7	2 839.47	11.3	6 018.27	23.9	1 032.13	4.1	25 140.99	-1 772.70	23 368.29	-7.1
Uganda	1994	4 962.22	11.6	43.50	0.1	37 503.51	88.0	95.05	0.2	42 604.27	8 252.70	50 856.97	19.4
United Republic of Tanzania	1994	6 887.79	17.6	370.46	0.9	29 730.16	75.8	2 247.48	5.7	39 235.89	913 562.94	952 798.83	2 328.4
Zambia	1994	17 409.51	53.1	326.51	1.0	13 618.13	41.6	1 415.19	4.3	32 769.33	3 557.96	36 327.29	10.9
Zimbabwe	1994	16 758.92	60.7	4 592.53	16.6	5 714.54	20.7	528.15	1.9	27 594.14	-62 239.44	-34 645.30	-225.6
Total Africa		792 394.82	49.1	120 342.23	7.5	590 669.72	36.6	109 497.45	6.8	1 612 904.22	-411 110.16	1 201 794.07	-25.5

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUCF	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
ASIA AND THE PACIFIC													
Bangladesh	1994	15 210.01	33.1	1 281.48	2.8	28 122.39	61.2	1 312.29	2.9	45 926.16	7 837.97	53 764.13	17.1
Bhutan	1994	95.82	7.4	133.69	10.3	1 062.87	82.2	-	-	1 292.38	-3 549.52	-2 257.14	-274.6
Cambodia	1994	1 881.11	14.7	49.85	0.4	10 559.05	82.7	272.37	2.1	12 762.38	-17 907.69	-5 145.31	-140.3
China	1994	3 007 780.00	74.1	282 630.00	7.0	604 776.00	14.9	162 120.00	4.0	4 057 306.00	-407 479.00	3 649 827.00	-10.0
Cook Islands	1994	32.56	40.6	-	-	10.32	12.9	37.41	46.6	80.29	-154.44	-74.14	-192.3
Democratic People's Republic of Korea	1990	178 945.45	88.6	9 855.20	4.9	11 648.15	5.8	1 481.55	0.7	201 930.35	-14 621.46	187 308.89	-7.2
India	1994	743 820.00	61.3	102 710.00	8.5	344 485.00	28.4	23 233.00	1.9	1 214 248.00	14 292.14	1 228 540.14	1.2
Indonesia	1994	222 102.37	68.7	8 212.92	2.5	84 506.61	26.1	8 440.32	2.6	323 262.22	164 118.32	487 380.54	50.8
Iran (Islamic Republic of)	1994	321 355.86	83.4	25 474.85	6.6	30 303.79	7.9	8 299.31	2.2	385 433.81	31 578.22	417 012.03	8.2
Israel	1996	50 598.35	80.2	2 425.30	3.8	2 071.50	3.3	7 980.00	12.7	63 075.15	-374.00	62 701.15	-0.6
Jordan	1994	11 799.15	53.8	1 701.00	7.8	555.93	2.5	7 887.25	35.9	21 943.34	-1 909.28	20 034.06	-8.7
Kazakhstan	1994	196 025.80	89.4	1 014.00	0.5	17 388.00	7.9	4 811.10	2.2	219 238.90	-6 627.00	212 611.90	-3.0
Kiribati	1994	18.56	66.3	-	-	0.49	1.8	8.93	31.9	27.97	-	27.97	-
Kyrgyzstan	1994	14 484.50	79.6	228.00	1.3	2 360.80	13.0	1 112.00	6.1	18 185.30	-878.37	17 306.93	-4.8
Lao People's Democratic Republic	1990	929.85	13.5	-	-	5 696.67	83.0	240.03	3.5	6 866.55	-104 303.83	-97 437.28	-1 519.0
Lebanon	1994	11 777.23	75.0	1 924.06	12.3	1 102.15	7.0	898.88	5.7	15 702.33	206.25	15 908.58	1.3
Malaysia	1994	97 861.23	71.8	4 973.00	3.6	6 932.04	5.1	26 596.50	19.5	136 362.77	-61 077.96	75 284.81	-44.8
Maldives	1994	129.00	26.7	-	-	-	-	354.02	73.3	483.02	-	483.02	-
Marshall Islands		-	-	-	-	-	-	-	-	-	-	-	-
Micronesia (Federated States of)	1994	240.98	98.0	0.02	0.0	0.84	0.3	4.16	1.7	246.01	-	246.01	-
Mongolia	1994	9 791.30	64.6	95.00	0.6	5 184.90	34.2	88.20	0.6	15 159.40	400.00	15 559.40	2.6
Nauru	1994	28.32	78.9	-	-	4.91	13.7	2.67	7.4	35.90	-9.05	26.85	-25.2

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUCF	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
Nepal	1994	3 266.00	10.5	165.00	0.5	27 197.00	87.2	560.87	1.8	31 188.87	8 116.76	39 305.63	26.0
Niue	1994	4 419.65	99.9	0.00		1.09	0.0	1.42	0.0	4 422.16	85.35	4 507.51	1.9
Pakistan	1994	83 267.27	51.8	11 269.60	7.0	61 940.17	38.6	4 122.66	2.6	160 599.70	6 527.10	167 126.80	4.1
Palau	1994	82.11	65.8	-	-	30.60	24.5	12.11	9.7	124.81	-417.19	-292.38	-334.2
Papua New Guinea	1994	947.57	18.9	193.00	3.9	3 871.67	77.2	-	-	5 012.24	-413.00	4 599.24	-8.2
Philippines	1994	50 040.33	49.6	10 602.93	10.5	33 128.57	32.8	7 094.78	7.0	100 866.61	-126.49	100 740.12	-0.1
Republic of Korea	1990	248 546.00	85.9	17 617.00	6.1	12 889.00	4.5	10 406.00	3.6	289 458.00	-26 235.00	263 223.00	-9.1
Samoa	1994	102.83	18.3	-	-	430.68	76.8	27.32	4.9	560.83	-81.98	478.85	-14.6
Singapore	1994	26 647.92	99.2	-	-	-	-	211.16	0.8	26 859.08	-	26 859.08	-
Solomon Islands	1994	294.38	100.0	-	-	-	-	-	-	294.38	-	294.38	-
Sri Lanka	1994	6 749.00	22.9	300.55	1.0	11 924.20	40.5	10 455.10	35.5	29 428.85	27 884.55	57 313.40	94.8
Tajikistan	1994	5 434.90	63.9	497.50	5.8	2 437.50	28.6	138.60	1.6	8 508.50	-2 048.00	6 460.50	-24.1
Thailand	1994	129 867.65	58.0	15 976.91	7.1	77 393.30	34.6	739.62	0.3	223 977.48	61 853.82	285 831.30	27.6
Turkmenistan	1994	48 916.46	93.5	840.05	1.6	2 334.02	4.5	219.01	0.4	52 309.54	380.60	52 690.14	0.7
Tuvalu	1994	4.65	99.7	-	-	0.01	0.3	-	-	4.66	-	4.66	-
Uzbekistan	1994	127 854.00	83.1	4 942.00	3.2	17 837.00	11.6	3 255.00	2.1	153 888.00	-399.00	153 489.00	-0.3
Vanuatu	1994	64.23	21.5	-	-	235.16	78.5	-	-	299.39	-1.53	297.85	-0.5
Viet Nam	1994	25 632.69	30.4	3 807.19	4.5	52 444.90	62.1	2 565.02	3.0	84 449.80	19 384.78	103 834.58	23.0
Yemen	1995	10 131.90	56.7	546.67	3.1	6 295.92	35.2	894.06	5.0	17 868.55	-9 670.18	8 198.37	-54.1
Total Asia and the Pacific		5 657 176.98	71.3	509 466.78	6.4	1 467 163.21	18.5	295 882.72	3.7	7 929 689.69	-315 618.12	7 614 071.57	-4.0

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUCF	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
LATIN AMERICA AND THE CARIBBEAN													
Antigua and Barbuda	1990	288.30	74.3	-	-	22.26	5.7	77.39	19.9	387.95	-96.83	291.12	-25.0
Argentina	1994	127 125.20	48.2	6 529.90	2.5	115 449.80	43.8	14 774.20	5.6	263 879.10	-34 178.70	229 700.40	-13.0
Bahamas	1994	2 176.20	99.0	-	-	21.00	1.0	-	-	2 197.20	-	2 197.20	-
Barbados	1994	1 875.38	50.0	38.00	1.0	66.92	1.8	1 770.20	47.2	3 750.50	-11.00	3 739.50	-0.3
Belize	1994	606.85	9.6	0.29	0.0	270.37	4.3	5 457.48	86.1	6 335.01	-4 024.69	2 310.32	-63.5
Bolivia	1994	9 743.14	47.1	463.50	2.2	9 941.36	48.1	537.06	2.6	20 685.06	26 844.56	47 529.62	129.8
Brazil	1994	247 716.00	37.6	21 273.00	3.2	369 311.00	56.0	20 676.00	3.1	658 976.00	818 080.00	1 477 056.00	124.1
Chile	1994	37 360.10	68.4	2 162.10	4.0	13 155.99	24.1	1 981.00	3.6	54 659.19	-27 132.64	27 526.55	-49.6
Colombia	1994	62 260.40	45.3	5 297.99	3.9	61 444.35	44.7	8 482.40	6.2	137 485.14	14 602.84	152 087.98	10.6
Costa Rica	1996	4 179.10	39.8	571.48	5.4	4 883.50	46.5	870.24	8.3	10 504.32	-724.81	9 779.51	-6.9
Cuba	1994	22 912.14	60.1	978.88	2.6	12 395.34	32.5	1 836.03	4.8	38 122.39	-26 469.58	11 652.81	-69.4
Dominica	1994	77.01	50.6	-	-	14.73	9.7	60.43	39.7	152.17	-371.85	-219.68	-244.4
Dominican	1994	14 788.78	72.3	643.80	3.1	2 489.10	12.2	2 519.37	12.3	20 441.05	-6 504.22	13 936.83	-31.8

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUCF	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
Republic													
Ecuador	1990	19 892.17	64.6	1 150.00	3.7	8 387.89	27.3	1 344.42	4.4	30 774.48	14 599.97	45 374.45	47.4
El Salvador	1994	4 765.27	40.0	490.12	4.1	5 784.84	48.5	876.75	7.4	11 916.98	3 942.68	15 859.66	33.1
Grenada	1994	136.04	8.5	-	-	0.43	0.0	1 470.00	91.5	1 606.47	-92.00	1 514.47	-5.7
Guatemala	1990	4 584.02	31.1	544.66	3.7	8 831.52	59.9	781.97	5.3	14 742.18	-39 545.82	-24 803.64	-268.2
Guyana	1994	1 445.80	53.4	-	-	1 219.55	45.1	40.70	1.5	2 706.05	-26 485.80	-23 779.75	-978.8
Haiti	1994	642.45	12.5	-	-	4 087.03	79.6	402.28	7.8	5 131.76	955.49	6 087.25	18.6
Honduras	1995	3 985.08	36.8	514.79	4.8	3 381.17	31.2	2 944.88	27.2	10 825.92	4 629.28	15 455.20	42.8
Jamaica	1994	8 231.10	7.1	379.00	0.3	107 233.00	92.3	382.00	0.3	116 225.10	-167.00	116 058.10	-0.1
Mexico	1990	320 947.38	83.8	11 621.00	3.0	39 462.51	10.3	11 046.00	2.9	383 076.88	141 538.33	524 615.22	36.9
Nicaragua	1994	2 689.64	35.2	354.84	4.6	4 270.58	55.8	336.78	4.4	7 651.84	-13 056.66	-5 404.82	-170.6
Panama	1994	3 903.01	36.5	412.94	3.9	4 725.59	44.2	1 650.74	15.4	10 692.28	23 710.71	34 402.99	221.8
Paraguay	1994	3 264.52	2.3	733.65	0.5	136 297.33	97.0	160.63	0.1	140 456.13	19 504.26	159 960.39	13.9
Peru	1994	22 153.91	38.5	9 899.24	17.2	22 809.06	39.6	2 720.68	4.7	57 582.89	41 217.97	98 800.86	71.6
Saint Kitts and Nevis	1994	73.99	45.0	-	-	42.39	25.8	48.09	29.2	164.47	-89.75	74.71	-54.6
Saint Lucia	1994	271.06	30.6	-	-	26.05	2.9	589.34	66.5	886.45	-345.24	541.22	-38.9
Saint Vincent and the Grenadines	1994	95.49	25.2	-	-	245.32	64.6	38.70	10.2	379.50	-132.10	247.41	-34.8
Trinidad and Tobago	1990	9 926.29	60.6	5 116.91	31.2	338.44	2.1	1 008.16	6.2	16 389.79	-1 471.52	14 918.27	-9.0
Uruguay	1994	3 970.81	13.3	279.11	0.9	24 277.12	81.4	1 288.16	4.3	29 815.20	-865.21	28 949.98	-2.9
Total Latin America and the Caribbean		942 086.62	45.8	69 455.21	3.4	960 885.53	46.7	86 172.08	4.2	2 058 599.43	927 860.68	2 986 460.11	45.1

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUCF	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
OTHER													
Albania	1994	3 104.99	56.1	209.87	3.8	1 879.28	34.0	339.74	6.1	5 533.87	1 525.48	7 059.35	27.6
Armenia	1990	23 107.74	91.3	630.30	2.5	1 038.67	4.1	535.50	2.1	25 312.21	-617.00	24 695.21	-2.4
Azerbaijan	1990	52 731.73	86.7	1 444.00	2.4	4 688.69	7.7	1 922.10	3.2	60 786.52	-3 509.00	57 277.52	-5.8
Georgia	1994	6 222.91	58.2	275.03	2.6	2 688.36	25.1	1 503.60	14.1	10 689.90	1 038.20	11 728.10	9.7
Malta	1994	2 318.51	86.8	-	-	95.44	3.6	256.29	9.6	2 670.24	-239.98	2 430.26	-9.0
Republic of Moldova	1994	12 202.16	79.5	689.21	4.5	1 954.22	12.7	511.35	3.3	15 356.94	-1 535.57	13 821.37	-10.0

Party	Year	Energy		Industrial processes		Agriculture		Waste		Total (without LUCF)	LUFC	Total (with LUCF)	Percentage of LUCF in total GHG
		Gg	%	Gg	%	Gg	%	Gg	%	Gg	Gg	Gg	%
The former Yugoslav Republic of Macedonia	1994	9 801.60	70.5	991.21	7.1	1 977.47	14.2	1 123.60	8.1	13 893.87	-1 735.58	12 158.29	-12.5
Total Other		109 489.63	81.6	4 239.62	3.2	14 322.13	10.7	6 192.18	4.6	134 243.56	-5 073.46	129 170.10	-3.8
Total 122 non-Annex I Parties		7 501 148.06	63.9	703 503.83	6.0	3 033 040.59	25.8	497 744.42	4.2	11 735 436.90	196 058.95	11 931 495.85	1.7

Table 3. Emissions (excluding LUCF) for three gases

Party	CO ₂	CH ₄	N ₂ O
	Gg		
AFRICA			
Algeria	63 703.74	894.00	29.45
Benin	802.34	1 810.24	1.71
Botswana	3 014.50	201.84	6.58
Burkina Faso	902.00	223.83	1.18
Burundi	143.18	44.91	2.93
Cameroon	2 769.52	843.30	468.54
Cape Verde	217.73	3.29	0.02
Central African Republic	212.00	563.70	84.82
Chad	309.65	330.36	2.50
Comoros	70.52	2.64	1.27
Congo	673.70	27.78	0.38
Côte d'Ivoire	4 345.77	889.56	5.48
Democratic Republic of the Congo	1 338.95	1 935.08	8.25
Djibouti	274.15	11.23	0.00
Egypt	84 459.00	1 055.91	34.30
Eritrea	719.84	73.77	6.02
Ethiopia	2 597.00	1 779.90	24.00
Gabon	4 407.74	55.59	3.06
Gambia	181.06	190.26	0.21
Ghana	3 329.80	396.95	2.94
Guinea	1 580.49	154.74	0.73
Kenya	5 511.96	739.86	1.35
Lesotho	635.99	46.21	0.69
Madagascar	1 146.17	369.29	42.04
Malawi	719.26	187.88	7.76
Mali	954.61	340.82	1.79
Mauritania	1 046.67	155.38	0.07
Mauritius	1 738.43	4.60	0.72
Morocco	28 364.00	349.00	28.00
Namibia	1 826.63	168.86	0.74
Niger	598.47	163.64	2.65
Nigeria	114 815.82	5 912.16	11.79
Senegal	4 005.50	251.82	0.08
Seychelles	178.74	2.56	0.08
South Africa	315 957.24	2 057.44	66.69
Sudan	4 501.00	1 896.00	32.00
Swaziland	873.87	64.17	1.34
Togo	1 277.94	44.50	8.98
Tunisia	17 096.40	180.15	13.75
Uganda	730.25	1 269.15	49.10
United Republic of Tanzania	3 224.73	1 030.23	46.38
Zambia	2 595.36	509.75	62.80
Zimbabwe	17 088.48	358.26	9.62
Total Africa	700 940.20	27 590.61	1 072.78
ASIA AND THE PACIFIC			
Bangladesh	16 459.74	1 190.84	14.38
Bhutan	228.46	19.22	2.13
Cambodia	1 321.93	370.15	11.83
China	3 073 469.00	34 287.00	851.00
Cook Islands	32.56	0.50	0.12
Democratic People's Republic of Korea	169 444.70	974.91	38.75
India	779 348.00	18 076.00	178.40
Indonesia	178 215.42	6 041.96	58.60
Iran (Islamic Republic of)	310 645.33	2 530.68	69.82
Israel	52 233.00	425.95	6.12
Jordan	13 390.00	403.54	0.25
Kazakhstan	179 265.00	1 901.60	0.13
Kiribati	18.56	0.45	0.00
Kyrgyzstan	14 620.00	159.00	0.73
Lao People's Democratic Republic	414.90	305.45	0.12
Lebanon	13 602.76	53.77	3.13
Malaysia	89 388.00	2 230.93	0.40
Maldives	129.00	1.14	-
Marshall Islands	-	-	-
Micronesia (Federated States of)	235.97	0.34	0.01
Mongolia	9 479.40	269.00	0.10

Party	CO ₂	CH ₄	N ₂ O
	Gg		
Nauru	28.32	0.35	0.00
Nepal	1 630.00	948.47	31.10
Niue	4 395.87	0.67	0.04
Pakistan	88 441.40	2 891.10	36.92
Palau	85.59	1.55	0.02
Papua New Guinea	1 140.57	4.27	12.20
Philippines	57 932.00	1 377.71	45.17
Republic of Korea	256 514.00	1 361.80	14.02
Samoa	102.20	3.30	1.26
Singapore	26 800.18	-	0.19
Solomon Islands	294.38	-	-
Sri Lanka	5 647.55	763.10	25.02
Tajikistan	5 613.20	111.30	1.80
Thailand	141 453.20	3 111.18	55.45
Turkmenistan	31 859.07	967.87	0.40
Tuvalu	4.65	0.00	0.00
Uzbekistan	102 157.00	1 991.00	32.00
Vanuatu	55.15	11.20	0.03
Viet Nam	25 382.79	2 328.29	32.82
Yemen	10 514.95	128.30	15.03
Total Asia and the Pacific	5 661 993.80	85 242.75	1 540.64
LATIN AMERICA AND THE CARIBBEAN			
Antigua and Barbuda	288.30	4.67	0.01
Argentina	119 603.00	4 160.30	183.58
Bahamas	1 866.20	1.00	1.00
Barbados	1 913.38	85.12	0.16
Belize	598.07	265.04	0.55
Bolivia	8 146.26	555.90	2.79
Brazil	253 375.00	11 368.00	538.30
Chile	37 147.00	481.99	23.84
Colombia	60 916.60	2 296.13	91.45
Costa Rica	4 554.70	175.14	7.33
Cuba	23 508.14	445.85	16.94
Dominica	76.53	2.98	0.04
Dominican Republic	15 003.05	221.90	2.51
Ecuador	20 027.80	503.48	0.56
El Salvador	4 714.30	147.98	13.21
Grenada	135.00	70.02	0.00
Guatemala	4 245.07	194.66	20.68
Guyana	1 445.80	42.15	1.21
Haiti	156.77	126.19	7.50
Honduras	4 085.25	274.40	3.16
Jamaica	8 561.00	58.17	343.36
Mexico	308 631.64	3 400.66	9.78
Nicaragua	2 728.38	196.66	2.56
Panama	4 314.90	170.68	9.01
Paraguay	3 801.73	3 020.16	236.23
Peru	30 656.75	637.84	43.65
Saint Kitts and Nevis	70.89	2.83	0.11
Saint Lucia	268.59	28.37	0.07
Saint Vincent and the Grenadines	95.07	2.97	0.72
Trinidad and Tobago	14 987.00	55.54	0.76
Uruguay	4 209.50	736.99	32.67
Total Latin America and the Caribbean	940 131.66	29 733.76	1 593.74
OTHER			
Albania	3 101.66	101.81	0.95
Armenia	22 013.08	152.76	0.29
Azerbaijan	44 702.00	723.12	2.90
Georgia	6 525.80	151.51	3.17
Malta	2 310.50	16.30	0.06
Republic of Moldova	12 081.31	146.83	0.62
The former Yugoslav Republic of Macedonia	8 905.21	168.63	4.67
Total Other	99 639.56	1 460.96	12.66
Total 122 non-Annex I Parties	7 402 705.22	144 028.08	4 219.81

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