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**REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY
OF GERMANY SUBMITTED IN THE YEAR 2001¹**

(Centralized review)

I. OVERVIEW

A. Introduction

1. The Conference of the Parties (COP), at its fifth session, by its decision 6/CP.5, adopted guidelines for the technical review of greenhouse gas (GHG) inventories from Parties included in Annex I to the Convention (Annex I Parties), hereinafter referred to as the review guidelines,² for a trial period covering GHG inventory submissions for the years 2000 and 2001. The COP requested the secretariat to conduct individual reviews of GHG inventories for a limited number of Annex I Parties. The secretariat was requested to use different approaches to individual reviews by coordinating desk reviews, centralized reviews and in-country reviews.

2. In response to the mandate by the COP, the secretariat coordinated a centralized review of seven national GHG inventories submitted in 2001 (Austria, Belgium, Estonia, the European Community, Germany, Greece and Spain), which took place from 8 to 12 October 2001. The review was carried out by a team of nominated experts from the roster of experts working at the headquarters of the UNFCCC secretariat in Bonn. The members of the team were: Mr. Charles Russell (New Zealand), Mr. José Ramon Villarin (Philippines), Mr. Hristo Vassilev (Bulgaria), Ms. Irina Yesserkepova (Kazakhstan), Ms. Nadzeya Zaleuskaya (Belarus), Mr. André Van Amstel (the Netherlands), Ms. Punsalmaa Batima (Mongolia), Mr. Rizaldi Boer (Indonesia), Mr. Josef Mindas (Slovakia), Mr. Charles Jubb (Australia) and Mr. Emilio Sempris (Panama). The review was coordinated by Ms. Rocio Lichte (UNFCCC secretariat). Mr. Charles Russell and Mr. José Ramon Villarin were lead authors of this report.

3. The principle objective of the review of the GHG inventories was to ensure that the COP had adequate information on these inventories. The review should also further assess the progress of the Parties toward fulfilling the requirement outlined in the UNFCCC reporting guidelines.³ In this context, the review team checked the Parties' responses to questions raised in the previous stages of the review process, and the consistency of inventory submissions with the

¹ In the symbol for this document, 2001 refers to the year in which the inventory was submitted, and not to the year of publication. The number (3) indicates that for Germany this is a centralized review report.

² For the UNFCCC review guidelines and decision 6/CP.5, see document FCCC/CP/1999/7, pages 109 to 114 and 121 to 122 respectively.

³ The guidelines for the preparation of national communication by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories (FCCC/CP/1999/7) are referred to as the UNFCCC reporting guidelines in this report.

UNFCCC reporting guidelines and the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (hereinafter referred to as the IPCC Guidelines), and identified possible areas for improvement in the inventories of the seven Annex I Parties. Each IPCC sector was reviewed by two experts.

4. The review team also assessed to a certain degree whether the reporting fulfilled the requirements included in the IPCC good practice guidance and Uncertainty Management in National Greenhouse Gas Inventories (hereinafter referred to as the IPCC good practice guidance).⁴

5. The UNFCCC secretariat provided the review team with all necessary technical guidance, information and data, such as the national inventory submissions and the results of previous stages of the review process. Sources of data and information used for the review of Germany's inventory are outlined in paragraphs 7 to 12 below.

6. In accordance with the UNFCCC review guidelines, a draft version of this report was communicated to the Government of Germany.

B. Inventory submission and other sources of information

7. In its 2001 inventory submission, Germany did not submit a national inventory report (NIR). The submission consists of partial national inventory data covering only common reporting format (CRF) summary (1.A, 1.B, 2, 3, table 7) and trend tables (table 10) for the years 1990 to 1999, and the reference approach for 1990 to 1996.

8. The inventory data were submitted in an Excel spreadsheet similar to that of the CRF; however, the CRF Excel software application was not used for reporting the inventory data. Germany's CRF was submitted in electronic form only after the April deadline, in July 2001.

9. The status report 2001, the draft synthesis and assessment (S&A) report 2001 and the UNFCCC secretariat's preliminary key source assessment⁵ were provided by the secretariat as additional sources of information. In addition, the expert review team (ERT) had access to the secretariat's GHG inventory database through the provision of a data search tool. A response to the draft S&A report 2001 was not provided by Germany.

10. Other supporting sources of information used during the review included the 2000 inventory submission of Germany and an updated 2000 report "The development of greenhouse gas emissions in Germany (from 1990-1999)" which was submitted to the secretariat in August 2000. Since the 2000 inventory submission was not prepared according to the UNFCCC reporting guidelines using the CRF, Germany was not included in the S&A report of the year 2000. For this reason, the inventory section from the in-depth review (IDR) of Germany's second national communication (NC2) was also used, as a supporting source of information.

⁴ According to the conclusions of the SBSTA at its twelfth session, the IPCC good practice guidance should be applied by Annex I Parties as far as possible for inventories due in 2001 and 2002, and should be used for inventories due in 2003 and beyond.

⁵ The UNFCCC secretariat had identified, for each individual Party, those source categories that are *key sources* in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance. Key sources according to the tier 1 trend assessment were also identified for those Parties that provided a full CRF for the year 1990. The key sources presented in this report are based on the secretariat's preliminary key sources assessment. They might differ from the key sources identified by the Party itself.

11. Other materials used were the preliminary guidance for experts participating in the individual review of GHG inventories, and the UNFCCC reporting and review guidelines (FCCC/CP/1999/7).
12. During the review the Party was not contacted to request additional information.

C. Emissions profiles, trends, key sources

13. Germany's emissions are predominantly carbon dioxide (CO₂) with the energy sector accounting for 91% of these emissions. CO₂ emissions in Germany have decreased by 15% since 1990. There has been a decrease in energy sector emissions by approximately 16% since 1990. There has been a decline in emissions from the industrial processes sector of approximately 32%, the major part of this reduction occurring between the years 1997-1998 (21%). There have also been notable reductions in methane (CH₄), of 42%, and nitrous oxide (N₂O), of 34%. The reductions in CH₄ have been steady over the ten-year period; however, the majority of the N₂O emissions reductions occurred in the year 1997 to 1998 with a 20% reduction in that year (clearly the correlation with the industrial processes is notable here). There have been significant reductions in synthetic perfluorocarbons (PFC) gases (36%) although hydrofluorocarbons (HFCs) have increased by 82% and sulphur hexafluoride (SF₆) by 40%.

14. Germany's total reduction in emissions since 1990, approximately 19% including CO₂ from land-use change and forestry (LUCF), and 18.5% excluding CO₂ from LUCF, is a significantly greater decrease than those achieved by the majority of Annex I Parties. It was not possible to check consistency with previous submissions as Germany did not provide recalculation tables, and as Germany did not submit a CRF in 2000, direct comparison between the previous tables was not possible either.

Table 1. GHG emissions by gas, 1990-1999 (Gg CO₂ equivalent)

GHG	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Net CO ₂ emissions/removals	980,781	942,232	894,588	884,549	870,392	870,307	891,191	860,094	854,834	825,081
CO ₂ emissions (without LUCF) ^(a)	1,014,500	975,951	928,307	918,268	904,111	903,737	924,621	893,524	888,264	858,511
CH ₄	116,990	105,273	97,734	89,607	84,462	81,774	74,962	73,009	70,417	68,695
N ₂ O	66,216	64,666	66,526	63,736	64,046	64,852	66,557	62,217	49,507	43,741
HFCs	2,340	2,340	2,470	3,750	3,980	3,130	2,580	3,450	4,278	4,278
PFCs	2,694	2,352	2,138	2,012	1,676	1,764	1,830	1,554	1,709	1,709
SF ₆	3,896	4,350	4,876	5,401	5,784	6,238	5,808	5,688	5,473	5,473
Total (with net CO ₂ emissions/removals)	1,172,918	1,121,212	1,068,332	1,049,055	1,030,340	1,028,065	1,042,927	1,006,012	986,219	948,978
Total (without CO ₂ from LUCF) ^(a)	1,206,637	1,154,931	1,102,051	1,082,774	1,064,059	1,061,495	1,076,357	1,039,442	1,019,649	982,408

^(a) LUCF: land-use change and forestry

Table 2. GHG emissions by sector, 1990-1999 (Gg CO₂ equivalent)

GHG SOURCES AND SINKS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1. Energy	1,035,452	997,212	948,216	936,031	917,221	917,119	938,336	904,939	896,670	865,329
2. Industrial processes	62,018	59,586	63,703	62,465	63,504	63,187	62,046	59,107	46,925	41,965
3. Solvent and other product use	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860
4. Agriculture	66,299	59,439	56,519	55,642	56,840	56,485	56,257	55,622	56,279	55,339
5. LUCF	-33,719	-33,719	-33,719	-33,719	-33,719	-33,430	-33,430	-33,430	-33,430	-33,430
6. Waste	41,008	36,835	31,753	26,776	24,634	22,849	17,872	17,914	17,914	17,914

15. As the data provided in the CRF was not sufficiently disaggregated to allow for a key source determination according to the tier 1 level assessment of the IPCC good practice guidance using the recommended category disaggregation level, key sources have been identified at the level of category disaggregation as provided in table Summary 1.A of the CRF, instead of at the level of disaggregation recommended by the IPCC good practice guidance. Germany did not provide a list of its key sources.

Table 3. Key sources Germany 1999: Level assessment (summary disaggregation level) (by UNFCCC secretariat)^(a)

Key source	Gas	Level assessment (%)	Cumulative total (%)
Energy industries	CO ₂	33.6	34
Transport	CO ₂	18.9	53
Other sectors	CO ₂	17.8	70
Manufacturing industries and construction	CO ₂	14.2	84
Agricultural soils	N ₂ O	2.5	87
Mineral products	CO ₂	2.4	89
Enteric fermentation	CH ₄	2.0	91
Solid waste disposal on land	CH ₄	1.7	93
Solid fuels	CH ₄	1.2	94
Manure management	CH ₄	1.1	95

^(a) See footnote 5 of this report.

D. General assessment of the inventory

1. Completeness and transparency of reporting

16. The 1990 to 1999 inventories covered the direct GHGs CO₂, CH₄ and N₂O, and the precursor gases CO, NO_x, NMVOCs and SO₂. Disaggregated estimates for HFCs, PFCs and SF₆ were provided for actual emissions only (in the trend table). Potential HFC, PFC and SF₆ emissions were not estimated. All major IPCC source/sink categories were covered in the inventory; at the level of sub-sources, however, information was often lacking, because estimates were reported only at the level of summary tables. Notation keys were used throughout the tables. The completeness table of the CRF (table 9), which should provide further explanation on those sources where no data were provided, was not completed.

17. Germany provided neither a NIR, nor a full set of CRF tables. The CRF included only tables Summary 1.A and 1.B, Summary 2, Summary 3, table 7 and trend tables (table 10) for all years 1990 to 1999, and the reference approach for 1990 to 1996. No sectoral reports (tables 1, 2(I), 2(II), 3, 4, 5 and 6) were provided, nor were sectoral background data tables (except for the reference approach), which means that emissions estimates only were provided. Except for the data provided as part of the reference approach, no activity data were provided for any sector.

18. For all sectors the inventory was found to be incomplete and lacking in transparency.

2. Cross-cutting issues

Institutional arrangements

19. No NIR was provided and no information could be found on institutional arrangements.

Verification and quality assurance/quality control (QA/QC) approaches

20. Germany did not provide any information on the QA/QC or verification procedures used in the preparation of the inventory, although table 7, which indicates quality level within the CRF, was included. However there was no information on the tier levels used in the preparation of the inventory.

Recalculations

21. The inventory did not include any recalculated data or explanatory information on recalculations. Relevant CRF tables, tables 8(a) and (b), were not submitted, although the checklist of the CRF (table 11) indicates that recalculations have been made for energy (CO₂, CH₄, N₂O), industrial processes (CO₂, CH₄, N₂O), agriculture (CH₄, N₂O), LUCF (CO₂) and waste (CH₄). Due to the scarcity of information with respect to recalculations, no reference to recalculations is made in the individual sectoral chapters of this report.

Uncertainty

22. Neither uncertainty estimates nor a qualitative discussion of contributors to uncertainty were provided by Germany. For some sectors/source categories and gases, a qualitative evaluation was performed and reported in standard data overview table 7 from the IPCC 1996 Guidelines (table 7 of the CRF). In the case of land-use change and forestry (LUCF), an estimate of the quality of the CO₂ removal estimates was not provided. The overview table showing the quality of estimates (table 7) was left blank.

3. Issues relating to previous reviews

23. It was not possible to make any assessment as to whether Germany has made any improvements to previous inventories submitted.

24. The draft S&A report 2001 highlighted the lack of sectoral information. No response was provided by the Party.

4. Areas for further improvement

Planned or ongoing work by the Party

25. In the 2001 inventory submission, no information was provided as to whether the Party is engaged in ongoing work to improve the quality of its inventory.

Issues identified by the ERT

26. The inventory does not provide sufficient information and detail. In relation to all sectors, it is suggested that:

(a) A complete set of CRFs should be compiled for each year with all sectoral background data tables completed for all sectors. All tables of the CRF containing supporting information (such as recalculation and completeness tables) should also be completed.

(b) A NIR should be submitted with a brief explanation of methodologies, activity data sources and emission factors, together with a clear explanation of underlying assumptions that have been made in compiling the inventory.

5. Conformity with the UNFCCC reporting guidelines and the IPCC Guidelines

27. The inventory was found not to conform with the UNFCCC reporting guidelines. It was not possible to assess for any sector whether the estimates were derived in line with the IPCC Guidelines, or whether any elements of the IPCC good practice guidance had been applied.

28. For the reasons outlined above, a thorough review of the individual sectors was not possible.

II. ENERGY

A. Sector overview

29. This sector's share in the total emissions is 84.5%, the main key sources being CO₂ from 1.A.1 Energy industries, 1.A.3 Transport, 1.A.4 Other sectors and 1.A.2 Manufacturing industries and construction.

30. The general trend for CO₂, CH₄ and N₂O is, respectively, -15.7%, -43.2% and +5.4% from 1990 to 1999.

31. Data from 1996 to 1999 are flagged as preliminary.

32. A through review of the energy sector was not possible due to the lack of information in Germany's inventory submission, as outlined in the overview section of this report.

1. Completeness

33. The emission data reported (for each of the years from 1990 to 1999) were derived in line with the most recent findings on the comprehensive estimation of GHG emissions. The sector is not completely covered in terms of sectoral reports and background data tables. It could not be verified whether all relevant sub-sources of IPCC source categories were covered. There were summary level estimates for indirect GHGs and trend tables.

2. Transparency

34. There was no information about confidential data.

3. Methodologies, emission factors and activity data

35. Germany used the IPCC calculation methodology for quantifying national emissions. The underlying energy source data were derived from the energy balances which were commonly approved as official and which were provided on an annual basis by the Federal Statistics Agency.

36. Expert judgement was used where values for old and new *Länder* differed. The majority of emission factors were country-specific although in some cases the IPCC default factors were used.

4. Conformity with the UNFCCC reporting guidelines and the IPCC Guidelines

37. The present GHG energy sector inventory for the period 1990 to 1999 was not compiled according to the recommendations for inventories set out in the UNFCCC reporting guidelines.

B. Reference and sectoral approach**1. Comparison between reference and sectoral approach**

38. The reference approach was documented for the years 1990-1996 in the CRF format tables. There were no data for the 1997-1999 period.

39. The draft 2001 S&A report indicated differences between the results from the reference approach and the sectoral approach to be around 3.5% (except for 1996 with the highest difference at 6.9%).

40. The total estimate from the sectoral approach was 832,036 Gg CO₂, or 96.9% of CO₂ emissions (excluding LUCF) for 1999.

2. Treatment of feedstocks and non-energy use of fuels

41. Feedstocks were not reported.

3. International bunker fuels

42. Germany reported both aviation and marine bunkers, but without providing information on the types and quantities of fuels used.

C. Key sources

43. Germany provided summary tables only; for this reason, key sources could be identified only at the level of category disaggregation provided in these tables.

1. 1.A.1 Energy industries – CO₂

Emissions trends

44. CO₂ from energy industries is a key source for Germany, representing 33.6% of all reported emissions (without LUCF). Emissions from this source decreased by 20.1% compared to 1990.

Completeness

45. There were estimates for all years 1990-1999 in the CRF summary tables.

Methodologies

46. Estimation of emissions was based on country-specific methodology. The time series were consistent. According to CRF table 7, there was a full estimation of all possible sub-sources with high confidence in estimates for CO₂, and medium confidence in those for CH₄ and N₂O.

Activity data

47. The sources of activity data is the Federal Statistics Agency. No activity data figures were provided in any of the materials available.

Emission factors

48. The emission factors used for CO₂ emissions were country-specific, and were based on measurements and mass calculations.

2. Mobile combustion: transport – CO₂

Trends

49. Emissions from mobile combustion - transport are a key source for Germany, representing 18.9% of all reported emissions (without LUCF) and there was a 14.7% increase compared to 1990 (1.65% per year). Time series are consistent with a rise year by year. It is strange that at the same time the CH₄ series shows a decreasing trend of about 13.0% on average per year, or a total decrease of 68.7% for 1990-1999.

Completeness

50. There are estimates for all years 1990-1999 in the CRF, including indirect GHGs.

Methodologies

51. Estimation of emissions was based on country-specific methods with partial implementation of the IPCC methods.

Activity data

52. The energy source data were derived from the energy balances commonly approved as official, which are provided on an annual basis by the Federal Statistics Agency. No activity data figures were provided in any of the materials available.

Emission factors

53. The emission factors used for CO₂ emissions estimation were country-specific. The values were not referenced but in additional material it was pointed out that they resulted from measurements.

3. 1.A.4 Other sectors – CO₂Trends

54. CO₂ from other sectors is the third key source for Germany, representing 17.8% of all reported emissions (without LUCF). CO₂ emissions decreased in 1990-1999 by 14.3%. Time series are consistent with the fluctuation range -5% to +13%.

Completeness

55. The level of completeness is the same as in the two key sources above, including indirect GHGs.

Methodologies

56. Estimation of emissions was based on country-specific methods.

Activity data

57. The energy source data were derived from the energy balances commonly approved as official, which are provided on an annual basis by the Federal Statistics Agency. No activity data figures were provided in any of the materials available.

Emission factors

58. The emission factors used for CO₂ emissions estimation were country-specific.

4. 1.A.2 Manufacturing industries and construction – CO₂Emission trends

59. CO₂ from manufacturing industries is the last energy key source for Germany, representing 14.2% of all reported emissions (without LUCF). Emissions from this source decreased by 29.2% compared to 1990. Time series are consistent with not much fluctuation.

Completeness

60. The level of completeness is the same as in the above three key sources.

Methodologies

61. Estimation of emissions was based on country-specific methods.

Activity data

62. The energy source data were derived from the energy balances which are provided on an annual basis by the Federal Statistics Agency. No activity data figures were provided in the available materials.

Emission factors

63. The emission factors used for CO₂ emissions were country-specific. No implied emission factors (IEFs) could be analysed due to the lack of activity data.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

64. The contribution of these two sectors to total emissions was 5.4% and 4.6% in 1990 and 1999 respectively (share of industrial processes only: 5.3% and 4.4% in 1990 and 1999 respectively).

65. The key source analysis performed by the secretariat was limited due to the fact that emission estimates were reported only at the category disaggregation level of summary tables. According to the level assessment of this key source analysis, two key sources were identified within this sector in 1990: N₂O from the chemical industry and CO₂ from mineral products, corresponding to approximately 2.1% and 2.0% of total aggregate GHG emissions in 1990. In 1999, only CO₂ from mineral products was identified as a key source in the industrial sector, the share being 2.4% of total GHG emissions in Germany. Therefore, the key sources represent 76% and 52% of the total sector emissions in 1990 and 1999 respectively.

66. The general trend of the total emissions for this sector was negative. The emissions decreased by 19% during the period 1990-1999.

67. A through review of the industrial processes and solvent use sectors was not possible due to the lack of information in Germany's inventory submission, as outlined in the overview section of this report.

1. Completeness

68. Germany did not provide sectoral report and sectoral background data for industrial processes in its CRF tables, but provided emissions estimates only in Summary tables. Detailed information was therefore not available. Moreover, Germany reported the data for 1996-1999 as preliminary.

69. The information on completeness of the submitted subsectors is reported in table 7 of the CFR. According to that table, for industrial processes all CO₂ and N₂O sources in the sector are covered. The sources for the other gases are covered partly. The sources of N₂O emissions for the solvent sector are all not estimated ("NE").

70. This sector is completely covered in terms of IPCC source/sink categories and GHGs. The information has been reported for all categories by using notation keys where no numerical data has been provided. The absent or non-applicable emissions have been identified in the inventory as not reported categories or not estimated, by using notation keys, such as "NE".

2. Transparency

71. There is not enough transparency for this sector because the CRF tables are only partly completed. The NIR is not provided; so neither the comparison with the CRF nor additional explanations are available.

3. Methodologies, emission factors and activity data

72. The methodologies are country-specific for CO₂, CH₄ and N₂O emissions. For HFCs, PFCs and SF₆ the tiers 1, 2, 2a, 2b and T3a of the IPCC methodologies are used. Country-specific emission factors have predominantly been used for this sector too. But there is no description of these methodologies. Emission factor values and activity data are not available because tables 2 for the sectoral information are not provided.

B. Key sources

1. 2.A Mineral products – CO₂

73. Emissions from this subsector decreased slightly by 3%, from 1990-1999. This subsector is the largest contributor to industrial processes emissions (23,945 Gg CO₂ equivalent in 1999), corresponding to more than half of the total emissions from industrial processes (57%). Germany is recommended to specify the sub-sources within the mineral product source category by providing data for the sources required in CRF table 2(I) A-G.

2. 2.B Chemical industry – N₂O

74. N₂O from the chemical industry was identified as a key source according to the level assessment in the year 1990, contributing 2.1% to the total inventory. With emissions declining from 25,400 to 4,030 Gg of CO₂ equivalent from 1990 to 1999 (a reduction of 84%), this was also an important key source according to the trend assessment. No information was provided in the inventory to explain this trend.

3. Solvent and other product use

75. The same level of N₂O emissions were reported for all years from 1990 to 1999 (1,860 Gg) which confirms the nature of the estimation of the emissions. An explanation providing the same estimate throughout the period should be provided. There was no information regarding methodologies and emission factors used, except the indication that they were country-specific.

IV. AGRICULTURE

A. Sector overview

76. In its 2001 submission, Germany provided a CRF with only summary information for agriculture for 1999. According to table 10 (emission trends summary), total agricultural emissions as CO₂ equivalent decreased from 10.3% to 1.5% between 1990-1993 and increased by 2.1% in 1994; after this there was little decrease until 1994 (0.4%-1.1%). They increased again in 1998, by 1.2%, and then decreased a little in 1999. From 1990 to 1999, CO₂ equivalent emissions decreased to 16.5%.

77. A sectoral background table for agriculture was not provided. Some emission information for this sector is provided in table Summary 2 and trend table 10.

78. A through review of the agriculture sector was not possible due to the lack of information in Germany's inventory submission, as outlined in the overview section of this report.

1. Completeness

79. CH₄ was estimated for enteric fermentation and manure management. Not occurring (“NO”) was indicated for rice cultivation, prescribed burning of savannas, and field burning of agricultural residues.

2. Transparency

80. Germany’s 2001 submission was not transparent because no NIR and no sectoral background data tables were provided.

3. Methodologies, emission factors and activity data

81. According to Summary 3 of the CRF, Germany uses country-specific methods with country-specific emission factors.

4. Conformity with the UNFCCC reporting guidelines and the IPCC Guidelines

82. See general assessment in the overview section of this report.

B. Key sources

83. According to the key source analysis for 1990 and 1999 prepared by the secretariat, N₂O from agricultural soils and CH₄ from enteric fermentation were identified as key sources. In addition to these two sources, CH₄ from manure management was identified as a key source for 1999.

1. 4.D Agricultural soils – N₂O

84. The first key source is N₂O emissions from agricultural soils, accounting for 2.2% of national total GHG emissions in 1990. Its contribution had increased to 2.5% by 1999.

Emission trends

85. According to the table 10 (emission trends), N₂O from agricultural soils declined by 7.2% from 1990-1999 with annual changes of –5.5% to 8.2%.

2. 4.A Enteric fermentation – CH₄

86. The second key source is CH₄ from enteric fermentation, accounting for 2.2% of national total GHG emissions in 1990. Its contribution decreased to 2.0% by 1999.

Emission trends

87. According to table 10 (emission trends), CH₄ from enteric fermentation had decreased by 24% by 1999 as compared to 1990, with a rapid decrease from 1990 to 1991 (11.6%) .

3. 4.B Manure management – CH₄

88. The third key source is CH₄ from manure management. This was not a key source in the base year 1990 but is defined as a key source for 1999 and accounts for 1.1% of the national total.

Emission trends

89. According to table 10 (emission trends), CH₄ from manure management had decreased by 21.6% by 1999 as compared to 1990, with a rapid decrease from 1990 to 1991 (12.4%).

V. LAND-USE CHANGE AND FORESTRY**A. Sector overview****Table 5. General summary overview of the LUCF inventory**

Sectoral report tables	Available
Notation keys	Available
Sectoral background data	Not available
NIR	Updated 2000 report on GHG inventory available
Methods	Country-specific
Emission factors	Country-specific
Explanation of non-IPCC method	No information
Uncertainty	Yes
Emission trends	Yes (1990-1999)
Procedure for QA/QC	No information
Complete set of CRF tables (LUCF)	No (summary tables only)
CO ₂ reported	Yes
Non-CO ₂ gases reported	No
Plans for future improvements	No information

90. In Germany, the role of LUCF in offsetting CO₂ emissions from other sectors is not very significant. This sector was able to offset the emissions of other sectors by only about 3%. In the period 1990-1999, the net CO₂ removal by this sector from year to year was relatively constant. The total amount of CO₂ removed from the atmosphere was about 33,588 Gg per year.

91. A through review of the LUCF sector was not possible due to the lack of information in Germany's inventory submission, as outlined in the overview section of this report.

1. Completeness

92. The Party provided only the time series of summary tables of the GHG inventory from 1990 to 1999. Notation keys were provided in all sources and sinks categories. The Party reported that emissions of non-CO₂ trace gases were not occurring in this sector.

2. Transparency

93. Further explanations regarding notation keys were not presented. The Party did not follow the IPCC methodology in developing the GHG inventory, but explanations or references to the methodology were not presented. This reduced transparency.

3. Conformity with the UNFCCC reporting guidelines and the IPCC Guidelines

94. The Party has provided GHG inventory tables which are consistent with the IPCC Guidelines and the CRF. However, summary tables only for 1990 to 1999 were provided.

B. Source and sink categories

95. The Party considered CO₂ to be the only GHG emitted from or removed by the LUCF sector, while other non-CO₂ gases were reported as "NO". Estimates of CO₂ removal were averaged into two periods of time, the first from 1990 to 1994 and the second from 1995 to 1999. Thus, the same estimate of CO₂ removal was repeated for all years within each period (33,719 Gg for 1990-1994, and 33,430 Gg for 1995-1999).

96. Sectoral background data for this sector, i.e. emission factors and activity data, were not provided. However, in the second national communication submitted in April 1997, it was indicated that CO₂ removal occurred in production forest (i.e. about 3 m³/ha/year, equivalent to 0.75 t C/ha/year or a total of 8 million tonnes of carbon per year) and in afforested land. The rate of afforestation was between 5,000 to 7,000 ha per year and this was equivalent to about 1 million tonnes of CO₂ per year.

C. Areas for further improvement

97. The ERT suggests that the Party could improve the reporting in its GHG inventory by adding information on (i) activity and emission factors used in the estimation of CO₂ emissions and removals, (ii) methods or techniques used to estimate or develop emission factors (e.g. expert judgement, field measurement, modelling or remote sensing), (iii) any details that may need further clarification, such as the absence of non-CO₂ emissions from LUCF, recalculation of estimates, plans for improving the quality of the estimates and so on.

VI. WASTE

A. Sector overview

98. The waste sector contributed 1.8% of total emissions in 1999 compared with 3.4% in 1990. The primary emissions source is CH₄ from solid waste disposal sites (SWDS) and these emissions fell by 56.9% from 1990 to 1999. The only key source for this sector is 6.A Solid waste disposal on land, which comprised all of the emissions reported for 1999 and 3.3% of the emissions reported for 1990. There are no emissions reported from 6.B Wastewater handling for 1999. Emissions from 6.C Waste incineration are shown as not estimated.

1. Completeness

99. The inventory is not complete because only parts of the CRF have been used. Summary tables only are provided and it is not possible to review the inventory in detail due to the limited information that has been submitted. It could be implied from the summary tables that all sources and sinks are included but without the requisite explanatory information this is not an acceptable basis for concluding that the inventory is complete.

2. Transparency

100. The inventory is not transparent. Sectoral tables, background tables and a NIR have not been provided.

3. Consistency with the UNFCCC reporting guidelines and the IPCC Guidelines

101. The inventory is not consistent with the UNFCCC reporting guidelines and there is insufficient information to determine whether the inventory is consistent with the IPCC Guidelines. To the extent that no information is provided on methodologies, activity data or emission factors, the inventory does not conform to the IPCC Guidelines.

B. Key sources

1. 6.A Solid waste disposal on land – CH₄

Methodology, activity data and emission factors

102. No information on the methodology was available. It was not clear whether methane recovery was accounted for as “NE”, “NA” (not applicable) or “NO”. Information on activity data and emission factors was not available.

C. Non-key sources

103. 6.B Wastewater handling and 6.C Waste incineration are non-key sources. Wastewater handling emissions have fallen from 52Gg of CH₄ in 1990 to 0 Gg in 1999. This requires clarification. Waste incineration is shown as “NE”; this needs to be explained. No information is available on methodologies, activity data or emission factors.
