UNITED
NATIONS

UNFCCC Framework Convention on Climate Change

Distr.
GENERAL

FCCC/ARR/2005/NLD
24 February 2006

ENGLISH ONLY

Report of the individual review of the greenhouse gas inventory of the Netherlands submitted in 2005*

* In the symbol for this document, 2005 refers to the year in which the inventory was submitted, and not to the year of publication.

CONTENTS

			Paragraphs	*Page*
I.	OVERVIEW		1–20	3
	A.	Introduction	1–2	3
	B.	Inventory submission and other sources of information	3	3
	C.	Emission profiles and trends	4	3
	D.	Key categories	5–6	3
	E.	Main findings	7–8	4
	F.	Cross-cutting topics	9–17	4
	G.	Areas for further improvement	18–20	6
II.	ENERGY		21–43	6
	A.	Sector overview	21–26	6
	B.	Reference and sectoral approaches	27–32	7
	C.	Key categories	33–42	8
	D.	Non-key categories	43	9
III.	INDUSTRIAL PROCESSES AND SOLVENT AND OTHER PRODUCT USE		44–51	9
	A.	Sector overview	44–45	9
	B.	Key categories	46–51	9
IV.	AGRICULTURE		52–60	10
	A.	Sector overview	52–55	10
	B.	Key categories	56–60	11
V.	LAND USE, LAND-USE CHANGE AND FORESTRY		61–77	12
	A.	Sector overview	61–72	12
	B.	Sink and source categories	73–77	13
VI.	WASTE		78–86	14
	A.	Sector overview	78–80	14
	B.	Key categories	81–83	14
	C.	Non-key categories	84–86	14

Annex

Documents and information used during the review 16

I. Overview

A. Introduction

1. This report covers the centralized review of the 2005 greenhouse gas (GHG) inventory submission of the Netherlands, coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with decision 19/CP.8. The review took place from 10 to 15 October 2005 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalists – Mr. Ignacio Sánchez García (Spain) and Mr. Audun Rosland (Norway); Energy – Mr. Scott McKibbon (Canada), Mr. Hristo Vassilev (Bulgaria) and Mr. Hongwei Yang (China); Industrial Processes – Mr. Menouer Boughedaoui (Algeria) and Mr. Manfred Ritter (Austria); Agriculture – Mr. Sergio González (Chile) and Ms. Lilian Portillo (Paraguay); Land Use, Land-use Change and Forestry (LULUCF) – Mr. Charalampos Petsikos (Greece) and Ms. María José Sanz Sánchez (Spain); Waste – Mr. Seungdo Kim (Republic of Korea) and Ms. Tatiana Tugui (Republic of Moldova). Mr. Sergio González and Mr. Audun Rosland were the lead reviewers. The review was coordinated by Mr. Sergey Kononov and Ms. Astrid Olsson (UNFCCC secretariat).

2. In accordance with the "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention", a draft version of this report was communicated to the Government of the Netherlands for comment prior to its publication.

B. Inventory submission and other sources of information

3. In its 2005 submission, the Netherlands submitted a complete set of common reporting format (CRF) tables for the years 1990–2003, including the LULUCF reporting tables as required by decision 13/CP.9, and a national inventory report (NIR). Where needed the expert review team (ERT) also used previous years' submissions, additional information provided during the review and other information. The full list of materials used during the review is provided in the annex to this report.

C. Emission profiles and trends

4. In 2003, the most important GHG in the Netherlands was carbon dioxide (CO_2), contributing 82.3 per cent to total[1] national GHG emissions expressed in CO_2 equivalent, followed by methane (CH_4) and nitrous oxide (N_2O), each of them contributing 8.1 per cent. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) taken together contributed 1.5 per cent of total emissions. The Energy sector accounted for 80.3 per cent of total national GHG emissions, followed by Agriculture (8.3 per cent), Industrial Processes (7.9 per cent), Waste (3.4 per cent), and Solvent and Other Product Use (0.1 per cent). Total GHG emissions increased by 1.5 per cent from 1990 to 2003 and amounted in 2003 to 214,817 Gg CO_2 equivalent.

D. Key categories

5. The Netherlands has reported key category tier 1 and tier 2 analyses, both level and trend assessment, as part of its 2005 submission. The Netherlands confirmed during the review that it has included the total Land-use Change and Forestry (LUCF)[2] sector in the key category assessment. A further breakdown as suggested in the Intergovernmental Panel on Climate Change (IPCC) *Good*

[1] In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO_2 equivalent excluding LULUCF, unless otherwise specified.

[2] The 2005 NIR of the Netherlands presents data and methodologies for the LUCF sector, whereas the CRF submission includes the new set of LULUCF reporting tables as required by decision 13/CP.9. The Netherlands used the LUCF sector in its key category analysis.

Practice Guidance for Land Use, Land-use Change and Forestry (hereinafter referred to as the IPCC good practice guidance for LULUCF) has not yet been carried out.

6. The tier 1 key category analyses performed by the Party and the secretariat[3] produced similar results. As a consequence of their using different levels of aggregation, the Netherlands' analysis results in additional key categories, such as Mobile Combustion: Road Vehicles – N_2O, and Other Chemical Product Manufacture – CO_2. The tier 2 analysis of the Netherlands had the effect of introducing further categories as key. Key categories are prioritized in accordance with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance).

E. Main findings

7. The Netherlands inventory is at an advanced stage of development. The Party started an improvement programme in 2000 which is by now to a great extent implemented. By September 2005 the Party expected to have a national inventory system in conformity with Article 5.1 of the Kyoto Protocol. The 2005 submission includes recalculations in many sources which bring them in line with the requirements of the UNFCCC "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the revised UNFCCC reporting guidelines) and the IPCC good practice guidance.

8. The Netherlands declares activity data (AD) as confidential in several sources of the Industrial Processes sector. The ERT believes that more could be done to facilitate an assessment of estimates for such sources.

F. Cross-cutting topics

1. Completeness

9. The inventory covers all gases for the whole time series 1990–2003, and it is complete in terms of geographical coverage. Following the recommendations of previous reviews, the Netherlands has estimated some of the sources that were missing in previous submissions, such as direct N_2O emissions from agricultural soils (crop residues and histosols), CH_4 and N_2O from horse manure, CH_4 and N_2O from the explicit inclusion of solid manure, emissions/sinks for some LULUCF subcategories, and CH_4 and N_2O emissions from industrial waste-water treatment and human sewage.

10. Nevertheless, the ERT noted that gaps remain in the inventory: fugitive emissions from distribution of oil products, CO_2 from lime production, CO_2 from asphalt roofing and paving, CH_4 from poultry, N_2O from industrial waste water, and potential emissions of PFCs and SF_6. The Party considers some of these sources to be negligible. The ERT recommends that the Netherlands further explain the rationale for this assessment.

[3] The secretariat identified, for each individual Party, those source categories which are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Key categories according to the tier 1 trend assessment were also identified for those Parties providing a full CRF for the year 1990. Where the Party has performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

2. Transparency

11. The NIR submitted by the Netherlands is highly transparent. Information is structured as established in the revised UNFCCC reporting guidelines. The CRF tables are also transparent and the use of the notation keys is appropriate.

12. Despite this general assessment, the ERT noted that there are specific areas where transparency should be improved. In particular, emission trends at the source category level could be better explained where large inter-annual fluctuations are found, and the NIR sections on LULUCF should be revised to make them fully transparent.

13. The Netherlands states that AD in several source categories within the Industrial Processes sector (e.g., in Ammonia Production) are considered as confidential. In addition, potential emissions of PFCs and SF_6 are not provided for reasons of confidentiality (they are wrongly reported as "not occurring" – "NO"). The ERT encourages the Netherlands to explore ways in which auxiliary data could be provided that would facilitate the review without disclosing confidential data. For example, the trend in AD could be presented only relative to 1990. In addition, more details should be given on the introduction of abatement technologies or other factors that would influence the emission trends.

3. Recalculations and time-series consistency

14. The Netherlands has undertaken major recalculations for the period 1990–2002 in the 2005 submission. To this end, new methods and/or AD have been used, some sources have been reallocated and previous errors have been corrected. The ERT noted that the explanations provided by the Party are satisfactory and transparent, and that the recalculations have improved compliance with the IPCC good practice guidance. The national totals are hardly affected by the recalculations when LULUCF is excluded: the estimates for total 1990 emissions have increased by 0.15 per cent, while the estimates of 2002 emissions have decreased by 0.14 per cent. If LULUCF is included, the changes are bigger: estimated total emissions in 1990 and 2002 increase by 2.21 per cent and 1.82 per cent, respectively. At the sector level, some estimates have changed considerably after the recalculations. Examples for the base year are: Industrial Processes (CO_2 emissions increase by 408 per cent); and Waste (N_2O emissions increase by 309 per cent).

4. Uncertainties

15. The Netherlands has provided a tier 1 analysis (both level and trend) of quantitative uncertainty estimates, in accordance with the IPCC good practice guidance. The Party reports an overall uncertainty for the national total of 5 per cent and a trend uncertainty of 4 per cent (including LUCF in both cases). As compared to previous submissions, uncertainties have increased because of the inclusion of LUCF. The Party has also provided a qualitative assessment of uncertainties in CRF table 7. That table also includes a quantitative estimate of uncertainties for each gas at the national level. The ERT noted, however, that these figures do not match those found in the NIR. During the review the Party confirmed that the quantitative information in table 7 should not be considered.

5. Verification and quality assurance/quality control approaches

16. The Netherlands has put in place a quality assurance/quality control (QA/QC) programme which is well described in the NIR. The Party is now in the concluding stages of implementing a national inventory system as required by Article 5.1 of the Kyoto Protocol. In order to meet all the associated requirements, the Party has announced in the NIR that the QA/QC programme would be updated by September 2005.

6. Follow-up to previous reviews

17. The NIR includes a section explaining those issues from previous reviews that have been taken into account in the 2005 submission. As part of the follow-up, major recalculations have been performed to improve time-series consistency, completeness and comparability.

G. Areas for further improvement

1. Identified by the Party

18. The Party explains in the NIR that an improvement programme started in 2000, and that most of the planned actions have already been undertaken. Nevertheless, the Netherlands indicates that it expects to finalize an update of the QA/QC by September 2005.

2. Identified by the ERT

19. The ERT has identified the following cross-cutting issues for improvement. The Party should:

(a) Estimate emissions for sources that are still missing in the inventory (see paragraphs 9 and 10);

(b) Incorporate the LULUCF categories into the key category analysis;

(c) Provide auxiliary information to facilitate an assessment of the estimates for emission sources that are affected by confidentiality of data.

20. Recommended improvements relating to specific source/sink categories are presented in the relevant sector sections of this report.

II. Energy

A. Sector overview

21. In 2003, the Energy sector accounted for 80.3 per cent of total emissions in the Netherlands. The subsector Energy Industries is the major source category in the sector, accounting for 39.2 per cent of sectoral emissions and 31.5 per cent of total national emissions. The subsectors Manufacturing Industries and Construction, Transport, and Other Sectors contributed 15.7 per cent, 20.1 per cent and 23.5 per cent, respectively, to Energy emissions in 2003.

22. During the period 1990–2003, emissions from the Energy sector increased by 12.8 per cent, primarily due to increased emissions from Energy Industries and Transport.

23. The CRF tables for 2003 are largely complete. Estimates for most gases and sources are included consistently with the requirements of the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines). Emissions not included are primarily emissions of CO_2 and N_2O from solid and other fuels from Manufacturing Industries, as well as emissions from the Refinery subsector. During the review the Party provided additional explanations and corrected the notation keys used for 1990–1994 in CRF tables 1.A (a)s1 and 1.A (a)s2.

24. The Netherlands has improved its inventory considerably since the previous (2004) submission, but the ERT noted the lack of full documentation on data sources used (for example, on the main part of the national energy balance or the data files of national statistics).

25. The only biomass fuel included in the energy statistics in the Netherlands is organic waste gas. Fuel data reported by individual companies may include inconsistent information. Since 2004, the Netherlands has started to compile annual national statistics on the use of renewable energy by sectors.

26. Recalculations are reported in the CRF for the years 1990–2002. The following methodological changes have been implemented: AD have been reconsidered, based on the sectoral energy consumption statistics of Statistics Netherlands instead of individual reports by utilities; the allocation of some emission sources has changed, especially for off-road machinery and joint ventures in co-generation; and non-energy CO_2 emissions from the Energy sector have been moved to Industrial Processes.

B. Reference and sectoral approaches

1. Comparison of the reference approach with the sectoral approach and international statistics

27. Energy consumption and CO_2 emissions for 2003 are 20.7 per cent and 1.8 per cent higher, respectively, for the reference approach than for the sectoral approach. The differences in the consumption of liquid and solid fuels are high (49.4 per cent and 26.4 per cent, respectively). The NIR lists some reasons for the discrepancies in CO_2 emissions, as follows:

(a) CO_2 from incineration of waste that contains fossil carbon is not included in the reference approach;

(b) The fossil fuel-related emissions reported as process emissions are not included in the sectoral approach;

(c) Liquefied petroleum gas (LPG) is allocated to Transport in the sectoral approach under the category Other Fuels, whereas in the reference approach it is under the category Liquid Fuels;

(d) Plant-specific emission factors (EFs) were used in the sectoral approach, whereas country-specific EFs were used in the reference approach;

(e) Statistical differences exist between apparent consumption and total sectoral fuel use.

28. The NIR shows the impact of correcting for these differences for waste incineration and process emissions. As a result, the difference between the reference and the sectoral approaches decreased, and varied from –1.0 per cent to +0.9 per cent in 1990–2003.

29. During the review the Party explained that differences in the AD for liquid and solid fuels are due to a large fraction of energy in feedstock use. The ERT noted that differences in fuel consumption could be reduced by accounting for non-energy AD in the sectoral approach.

2. International bunker fuels

30. Emissions of CO_2 from international aviation increased by 116.2 per cent in 2003 compared to 1990, and those from international navigation increased by 26.9 per cent. Because of the growth in international air traffic, its share in international bunker emissions increased from 11.7 per cent in 1990 to about 18.4 per cent in 2003.

31. Default IPCC EFs are used for estimating CH_4 and N_2O emissions for international bunkers since no better data are currently available.

3. Feedstocks and non-energy use of fuels

32. The Netherlands uses a country-specific method to evaluate these emissions. Not all CO_2 emissions from the use of feedstocks and other non-energy use are allocated under the Industrial Processes sector. For example, for blast furnace gas which is combusted in the Energy sector, the emissions are allocated to the Energy sector. The ERT agreed that this is the right way to account for emissions from non-energy use of fuels.

C. Key categories

1. Stationary combustion: All fuels – CO_2

33. CO_2 emissions from stationary combustion accounted for 62.8 per cent of total national emissions in 2003, and increased by 10 per cent between 1990 and 2003. A country-specific tier 2 method is used for calculating CO_2 emissions from Energy Industries. The method is based on AD from national statistics and IPCC default EFs but, when available, company-specific or sector-specific EF have been used.

34. The ERT noted that, compared to the Netherlands' 2004 and earlier submissions, some fuels in Energy Industries that had been formerly allocated to Other Fuels are now reported in the appropriate fuel categories. The ERT recognizes this effort of the Netherlands to follow up on the findings from previous reviews.

35. Country-specific tier 2 methods are used for calculating CO_2 emissions in Manufacturing Industries and Construction. For CO_2 from gas and coal combustion, country-specific EFs are used, whereas for other fuels IPCC default EFs are used.

36. For Other Sectors country-specific EFs and IPCC tier 2 methods are used. Emissions from national fisheries have been reported in 2005 for the first time, which has improved compliance with the IPCC good practice guidance.

37. The Residential category is the largest source of CO_2 emissions in Other Sectors. It accounted for 51.5 per cent of CO_2 emissions from Other Sectors in 1990 and for 47.6 per cent in 2003. CO_2 emissions from Residential decreased by 0.7 per cent from 1990 to 2003, but the NIR notes that these emissions are sensitive to weather conditions because the greater part of the fuels is used for space heating. When a temperature correction is included, CO_2 emissions show a decrease by 10.8 per cent for the same period.

2. Mobile combustion – Road vehicles: Liquid – CO_2, CH_4, N_2O

38. CO_2 emissions from Road Transportation increased by 31.3 per cent from 1990 to 2003 and in 2003 contributed 97.8 per cent to total CO_2 emissions from Transport. The share of these in total national GHG emissions was 15.6 per cent in 2003.

39. Emissions are estimated using an IPCC tier 2 method for CO_2, and tier 3 methods for CH_4 and N_2O. CO_2 emissions are calculated using data on fuel sales from the national statistics and country-specific EFs in accordance with the IPCC good practice guidance.

40. There is a difference for Road Transportation between the IPCC approach, under which fuel consumption is calculated on the basis of fuel sold in the country, and the national approach, which is based on transport statistics and expressed in terms of vehicle-km travelled; this national approach is only included in the NIR for comparison. Estimates of fuel consumption based on the national approach are 4–5 per cent higher for gasoline and 12–15 per cent lower for diesel oil and LPG than estimates based on the IPCC approach. In the past five years the difference has decreased and stabilized. On the basis of

information received from the Party during the review, the ERT considered the differences to be satisfactorily explained.

3. Fugitive Emissions: Oil and gas operations – CH_4

41. CH_4 emissions are estimated using an IPCC tier 3 method. The method is in full compliance with the IPCC good practice guidance, as this is a key category.

42. The AD and emissions from distribution of oil products are reported as "not estimated" ("NE"). The Party noted that data are not available. The ERT recommends that the Party develop procedures to collect and apply AD for this source.

D. Non-key categories

Mobile combustion – Road vehicles: All fuels – N_2O

43. For Road Transportation the Party uses country-specific EFs for N_2O, reflecting the decreasing EF for catalyst-equipped cars at the end of the time series and the increasing share of diesel cars with relatively low N_2O EFs. However, the N_2O implied emission factors (IEFs) for gasoline and diesel oil reported by the Netherlands are much lower than those reported by neighbouring countries and are the lowest in the European Union. The ERT recommends that the Party provide information supporting the numbers used.

III. Industrial Processes and Solvent and Other Product Use

A. Sector overview

44. In 2003, emissions from the Industrial Processes sector in the Netherlands accounted for 7.9 per cent of total national emissions. These emissions had decreased by 28.5 per cent compared to 1990. Emissions from the Solvent and Other Product Use sector declined by 53.8 per cent between 1990 and 2003.

45. Chemical Industry is the largest source of CO_2, CH_4 and N_2O emissions from industrial processes (43.9, 87.5 and 89.6 per cent, respectively, in 2003). As all source categories in the Chemical Industry subsector (ammonia (NH_3); nitric acid (HNO_3); Carbide Production; Other) are key categories and data are confidential, the ERT was not able to make any comparison with other countries' inventories or other analysis. The ERT considered this part of the inventory as less transparent and encourages the Netherlands to investigate the possibility of improving the transparency of the reporting without disclosing confidential information.

B. Key categories

1. Ammonia production – CO_2

46. Emissions of CO_2 decreased by 12.2 per cent from 1990 to 2003 and by 24.7 per cent from 2000 to 2003. It was not clear to the ERT whether this reduction came from a technology improvement or from a reduction in volume of production. The ERT recommends that the Netherlands include this information in its next NIR.

2. Nitric acid production – N_2O

47. The Party has used a tier 2 method and plant-specific measured data to estimate emissions, which is in line with the IPCC good practice guidance. There is a decrease of N_2O emissions by 20.1 per cent from 1990 to 2003. The ERT was not able to explain this decrease, and recommends that the Netherlands provide an explanation in its next NIR.

3. Caprolactam production – N_2O

48. The ERT encourages the Party to explain the emissions decrease in 2003, from 4.0 Gg (which remained constant from 1990 to 2002) to 3.1 Gg, in its next NIR.

4. Iron and steel production – CO_2

49. Emissions of CO_2 decreased by 38.0 per cent from 1990 to 2003, while the AD increased by 21.7 per cent. The inter-annual changes of both CO_2 emissions and AD vary, from –25.6 and +5.4 per cent, respectively, between 1991 and 1992, to +20.5 and +2.6 per cent, respectively, between 1993 and 1994. The ERT recommends that the Party give an explanation of these fluctuations and report in more detail on the impact of any increase in AD and decrease of CO_2 emissions in its next NIR.

5. Aluminium production – PCFs

50. The IEF for hexafluoroethane (C_2F_6) decreased from 0.13 kg/t in 1997 to 0.08 kg/t in 1998 after the first producer (of the two national producers) switched to point feed technology (PFPB) in 1998, but increased to 0.12 kg/t in 1999 and dropped again to 0.06 kg/t in 2000–2003 following a technology change at the second producer in 2003. The ratio of C_2F_6 emissions to tetrafluoromethane (CF_4) emissions is 0.23 for 1999 after the change of the process for the first producer, while it was about 0.1 for all other years. The Netherlands indicated that the data for C_2F_6 emissions from the largest producer in 1999 are based on measurements, while for the period 1990–1998 the estimates are based on calculations. The Party plans to carry out a recalculation for the sake of time-series consistency and will report it in its 2006 NIR. The ERT welcomes the efforts by the Netherlands to recalculate PFC emissions from aluminium production.

6. Other – N_2O

51. Under category 2.G Other the Netherlands has estimated N_2O emissions resulting indirectly from nitrogen oxide (NO_x) and NH_3 emissions of non-agricultural sources. The methodology is taken from the IPCC good practice guidance for the category Indirect Emissions from Agricultural Soils and transparently described in a background document annexed to the NIR. However, there is no IPCC good practice guidance on the reporting of indirect emissions from non-agricultural sources specific to category 2.G. In addition, these estimates cannot be compared with those of other countries, as the Netherlands is the only country reporting such emissions under 2.G in 2005. While the ERT recognizes the similarity of the approach between indirect emissions from soils and indirect emissions from Industrial Processes, it encourages the Netherlands to reconsider the inclusion of these sources in the interests of comparability between Parties' inventories.

IV. Agriculture

A. Sector overview

52. In 2003, total emissions from the Agriculture sector in the Netherlands amounted to 17,844 Gg CO_2 equivalent, or 8.3 per cent of total national emissions; CH_4 emissions from the sector amounted to 404 Gg (48.6 per cent of national CH_4 emissions), and N_2O emissions amounted to 30 Gg (54.0 per cent of national N_2O emissions). From 1990 to 1995, sectoral emissions remained stable, but then decreased and were, in 2003, 18.3 per cent lower than in 1990.

53. The submission is complete in terms of gases, sources and years covered. The results of the key category analysis are comparable with the secretariat's analysis, although some differences are found, which are due to the use of a different disaggregation level.

54. The Netherlands plans to improve the estimates for Enteric Fermentation, Manure Management and Agricultural Soils, to better reflect national circumstances. The ERT recognizes the high quality of the 2005 submission and supports the Party's planned improvements, but encourages the Netherlands to expand the methodological information given in the NIR to allow a better understanding of the underlying assumptions.

55. Recalculations have been performed due to improved AD and new and more accurate methods, leading to a reduction in the estimates of CH_4 emissions from enteric fermentation (with changes in the range of –3.3/–14.1 per cent), and increases in the figures for CH_4 and N_2O emissions from manure management (+32.6/+52.8 per cent and +65.1/+75.2 per cent, respectively) as well as in the estimates of N_2O emissions from agricultural soils (+26/+39.5 per cent).

B. Key categories

1. Enteric fermentation – CH_4

56. CH_4 emissions have been estimated using a tier 2 method and country-specific EFs for dairy and non-dairy cattle and the significant animal species, and a tier 1 method and default EFs (for developed West European countries and cool conditions) for all other animals, which is in line with the IPCC good practice guidance.

57. The NIR explains the opposing effects of decreasing cattle population and increasing milk yields. The IEFs for non-diary cattle are 25–33 per cent lower than the default value for Western Europe. No supporting information is provided in the NIR, and the ERT recommends that the Netherlands include this information in its next NIR. There is a minor inconsistency for the IEF for sheep in 1993: it is reported as 6.96 kg/head/year, while for the rest of the time series it is 8.00 kg/head/year, which is the default value that the Party reports that it uses. The ERT encourages the Party to correct this in its next submission.

2. Manure management – CH_4 and N_2O

58. For CH_4 emissions, the Netherlands has applied the IPCC tier 2 method and country-specific EFs, which is in line with the IPCC good practice guidance. The CH_4 IEFs for non-diary cattle, sheep, swine, goats and horses fluctuate; the fluctuations are not fully explained in the NIR. The ERT encourages the Party to explain these fluctuations in its next NIR.

3. Agricultural soils – Direct and indirect N_2O emissions

59. Although AD are collected at a tier 2 level, direct N_2O emissions from synthetic fertilizers and manure applied to soils have been estimated using a tier 1b method; a tier 2 method has been applied for histosols, crop residues and nitrogen-fixing crops; and country-specific EFs have been applied for all subcategories. To estimate indirect emissions, the Netherlands reports the use of a tier 1 method, with a mixture of country-specific and default AD and EFs.

60. Some changes in IEFs (a decrease for synthetic fertilizers in the last two years; inter-annual fluctuations for nitrogen-fixing crops) need to be supported by additional information. Also, the trends in AD for animal wastes, nitrogen-fixing crops and crop residues are not fully explained in the NIR. The ERT recommends that the Netherlands include this information in its next NIR.

V. Land Use, Land-use Change and Forestry

A. Sector overview

61. In 2003, the LULUCF sector was a net source of GHG emissions, representing 1.3 per cent of total national emissions. Land-use changes between 1990 and 2000 are interpolated and between 2001 and 2003 they are extrapolated.

62. The LUCF[4] sector as a whole was included in the Party's key category analysis and it became a key category for 2003. A key category analysis without LUCF is not provided.

63. The reporting of the sector has been improved compared to previous submissions in terms of completeness, time-series consistency and explanations of how estimates are calculated. For its future submissions, the Party is recommended to incorporate the information provided in the annex to chapter 7 of the 2005 NIR into the main body of the chapter.

1. Completeness

64. The Netherlands has provided a complete set of the new CRFs for the LULUCF sector for 1990–2003 (in line with decision 13/CP.9). In addition, the LUCF CRF tables have been provided for CO_2 sources and sinks from subcategories 5.A to 5.D. The ERT considered the inclusion of LUCF table 5, in line with decision 18/CP.8, as a useful aid for mapping between the old and new categories.

65. In the LULUCF CRFs, not all pools are included for all land categories and it is not always clear whether they are assumed not to change or are not estimated. For the category Cropland, AD are reported for all sub-source categories; however, emissions are reported as "NE", except for the aggregated category Land Converted to Cropland. Information on carbon stock changes as a direct result of agricultural management and land-use change is not yet available.

66. Emissions from biomass burning are not estimated. At the ERT's request, the Netherlands clarified that fires are of marginal importance, affecting areas in the range of 50–100 ha per year; statistics are reliable and after a fire land use stays the same.

67. In table 9 (Completeness) the acronym LUCF is used, but it should be LULUCF since the file contains the CRF tables required by decision 13/CP.9; also the explanation given in the explanation column does not correspond accurately to the information in the tables.

2. Transparency

68. Two sources of data are used for biomass calculation, the Timber Production Statistics and Forecast (HOSP) and the Measuring Network Functions (MFV), but no explanation of how the two databases are merged to produce the estimate is given. Estimates of CO_2 emissions/removals are calculated using country-specific factors and a tier 2 methodology. The Party uses a country-specific expansion factor from the Cost E21 database, and a complete table with expansion factors for calculating the total tree biomass (Mtree) was provided by the Netherlands upon the ERT's request.

69. For the Other Land Converted to Forest/Crop/Grass/Settlements/Other Land categories, soil carbon stock changes are estimated and the IEF is extremely high. The Party is recommended to explain further the process for estimating the country-specific factors and methods used.

[4] The 2005 NIR of the Netherlands presents data and methodologies for LUCF, whereas the CRF submission includes the set of LULUCF reporting tables as required by decision 13/CP.9. Therefore, in this section LUCF is referred to when key category analysis is discussed, and LULUCF is used in the rest of the section. Total CO_2 emissions from LUCF and the total CO_2 emissions from LULUCF were the same in 1990 and 2003.

3. Recalculations and time-series consistency

70. The methodology used to calculate the figures for the period 1990–2003 is consistent over the time series and simple interpolations and extrapolations are used for the yearly estimates.

71. The ERT noted that there is a discrepancy between the emissions reported for Forest and Land Conversion in 1990 (5.B in the 18/CP.8 tables: emissions of 865.7 Gg CO_2), and the estimate made by the ERT on the basis of the information provided for Forest Land Converted to Other Land (5.A, in the 13/CP.9 tables) and Other Land Converted to Forest Land (5.F in the 13/CP.9 tables): the ERT's estimate was 6.9 Gg CO_2 lower.

4. Uncertainties, QA/QC

72. The uncertainty level in emissions is estimated as being in the range of 20–50 per cent, but no further information on how the uncertainty assessment is done was provided in the NIR. The Netherlands states that the two major sources for uncertainty are cultivation of organic soils and the soil-related sinks and sources. The NIR does not include information on national verification and QA/QC procedures for the sector. The ERT recommends that the Netherlands provide more information on the method used for estimating the uncertainties, as well as any information on verification and QA/QC procedures.

B. Sink and source categories

1. Forest land remaining forest land

73. The estimates for Forest Land Remaining Forest Land include estimates for carbon stock changes in living biomass (increases and decreases) and net carbon stock changes in dead organic matter, but net carbon stock changes in soils have not been estimated.

74. In LULUCF table 5(I), for Forest Land Remaining Forest Land – N_2O, AD are reported as "NE"; however, emissions are reported, and in response to questions during the review the Netherlands clarified that a simple EF taken from the scientific literature to the whole of forest area is applied for the estimation of these emissions. The Netherlands is encouraged to include this clarification when reporting on these N_2O emissions.

2. Lands converted to forest land

75. The same area is reported as AD for the complete time series (1990–2003) for all lands converted to forest. However, no emissions are estimated, except for Other Land Converted to Forest Land. The Netherlands clarified during the review that for new afforestation, forest recovery has a growth rate half of that for existing forests (because these new forests are still very young), and for deforestation a loss of 80 per cent of all biomass is applied. For soils, it is assumed that there is no change in carbon stock after land-use conversion. The ERT encourages the Netherlands to justify this in its next NIR.

3. Grasslands remaining grasslands

76. The AD (area) for the period 1990–2003 show an increase of 9.2 per cent (a constant annual increase of 0.7 per cent), whereas emissions from soils are reported as constant during the same period, leading to different values of the IEFs for different years; no explanation is given for this in the NIR. The ERT recommends that the Party include an explanation in its next NIR.

77. Soil net carbon stock changes are only reported for Grassland Remaining Grassland but not for Cropland Remaining Cropland. When estimating emissions from Grassland Remaining Grassland, mineral and organic soils should be distinguished in the AD.

VI. Waste

A. Sector overview

78. In 2003, GHG emissions from the Waste sector amounted to 7,379 Gg CO_2 equivalent (3.4 per cent of total national emissions) – a decrease by 42.4 per cent compared to the 1990 level.

79. The CRF tables are complete. All the CRF tables for the Waste sector are provided and they include emissions of CH_4, N_2O, NO_x, carbon monoxide (CO), non-methane volatile organic compounds (NMVOCs) and sulphur dioxide (SO_2), as well as additional information where needed (e.g. in table 6.A). The notation key "not applicable" ("NA") has been used correctly. Well-documented information is provided on methodologies, methods, AD, EFs, uncertainties, QA/QC, verification and recalculations.

80. The Netherlands has used a country-specific methodology based on the first-order decay (FOD) model, which is consistent with the IPCC good practice guidance for estimating of CH_4 emissions from solid waste disposal on land, and country-specific methodologies for CH_4 and N_2O emissions from waste-water handling.

B. Key categories

Solid waste disposal on land – CH_4

81. CH_4 emissions from solid waste disposal on land contributed 91.8 per cent to the total emissions of the Waste sector in 2003. Emissions from this source had decreased by 43.6 per cent since 1990. The Party explained the decrease by a large reduction in waste disposal at landfills (by about 66.5 per cent) and by an increase in methane recovery (from 5 per cent in 1990 to 21 per cent in 2003).

82. The Netherlands has provided detailed information on the methodologies and approach used, including justification for all parameters and AD.

83. In its 2005 submission, the Netherlands has provided a new value for waste generation rate, which has been changed from 8.90–9.82 kg/cap/day for 1990–2002 in the previous submission to 1.52–1.63 kg/cap/day for the period 1990–2003 in the 2005 submission, according to the recommendation from the 2004 in-country review. The new values are consistent with the IPCC default for the Netherlands (1.58 kg/cap/day). All recalculations for the Waste sector are documented in CRF table 8(a) for the period 1990–2002 with relevant explanations in table 8(b), taking into consideration the suggestions of the 2004 in-country review.

C. Non-key categories

1. Waste-water handling – CH_4

84. The Netherlands has followed the recommendation of the 2004 in-country review and added CH_4 emissions from industrial waste-water treatment plants and from septic tanks; these emissions are small compared to those from domestic and commercial waste-water treatment plants, but should be included for consistency.

2. Waste-water handling – N_2O

85. N_2O emissions decreased from 1.66 Gg in 1990 to 1.3 Gg in 2003 due to the introduction of a new method for domestic waste-water handling. Country-specific methodologies and IPCC default EFs

are used for CH_4 and N_2O emissions from waste-water handling (including sludge), which is consistent with IPCC tier 2 methods.

3. Waste incineration – CO_2

86. Emissions from waste incineration have been reported as "included elsewhere" ("IE") and are included under Energy Industries in the Energy sector, which is consistent with the Revised 1996 IPCC Guidelines.

Annex

Documents and information used during the review

A. Reference documents

IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

IPCC. Good practice guidance for land use, land-use change and forestry, 2003. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

IPCC/OECD/IEA. Revised 1996 IPCC Guidelines for national greenhouse gas inventories, volumes 1–3, 1997. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

UNFCCC. Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories. FCCC/SBSTA/2004/8. Available at <http://unfccc.int/resource/docs/2004/sbsta/08.pdf>.

UNFCCC. Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention. FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

UNFCCC secretariat. Status report for the Netherlands. 2005. Available at <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/2005_status_report_netherlands.pdf>.

UNFCCC secretariat. Synthesis and assessment report on the greenhouse gas inventories submitted in 2005. FCCC/WEB/SAI/2005. Available at <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/sa_2005_part_i_final.pdf>.

UNFCCC secretariat. The Netherlands: Report of the individual review of the greenhouse gas inventory submitted in the year 2004. FCCC/WEB/IRI/2004/NLD. Available at <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/2004_irr_in-country_review_netherlands.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Harry Vreuls and Mr. Dick Both (Netherlands Agency for Energy and the Environment).

- - - - -