Advance Version

COMPLIANCE COMMITTEE

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Report of the individual review of the annual submission of Croatia submitted in 2010

Note by the secretariat

The report of the individual review of the annual submission of Croatia submitted in 2010 was published on 12 April 2011. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2010/HRV, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

United Nations FCCC/ARR/2010/HRV

Framework Convention on Climate Change

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Report of the individual review of the annual submission of Croatia submitted in 2010*

* In the symbol for this document, 2010 refers to the year in which the inventory was submitted, and not to the year of publication.

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Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2010 annual submission of Croatia, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 30 August to 4 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Suvi Monni (Finland) and Mr. Tinus Pulles (Netherlands); energy – Mr. Nicolas di Sbroivacca (Argentina) and Mr. Steven Oliver (Australia); industrial processes – Ms. Ils Moorkens (Belgium); agriculture – Ms. Olga Gavrilova (Estonia), Ms. Anoja Udaya Kumari Herath (Sri Lanka) and Ms. Tajda Mekinda-Majaron (Slovenia); land use, land-use change and forestry (LULUCF) – Mr. Héctor Ginzo (Argentina), Mr. Andis Lazdins (Latvia) and Ms. Kimberly Todd (United States of America); and waste – Ms. Kristin Hardardottir (Iceland) and Ms. Sirintornthep Towprayoon (Thailand). Ms. Towprayoon and Mr. Pulles were the lead reviewers. The review was coordinated by Mr. Matthew Dudley and Ms. Barbara Muik (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of Croatia, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in Croatia was carbon dioxide (CO_2), accounting for 76.1 per cent of total GHG emissions[1] expressed in carbon dioxide equivalent (CO_2 eq), followed by nitrous oxide (N_2O) (11.2 per cent) and methane (CH_4) (10.8 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.9 per cent of the overall GHG emissions in the country. The energy sector accounted for 72.2 per cent of total GHG emissions, followed by industrial processes (13.3 per cent), agriculture (10.8 per cent), waste (3.0 per cent) and solvent and other product use (0.8 per cent). Total GHG emissions amounted to 31,143.49 Gg CO_2 eq and increased by 0.9 per cent between the base year[2] and 2008. These figures do not include adjustments calculated by the expert review team (ERT) in accordance with procedures set out in the annex to decision 20/CMP.1 (see table 3 and section II.G below).

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector. Data shown in these tables do not include estimates adjusted by the ERT in line with procedures set out in the annex to decision 20/CMP.1 for a number of categories in the agriculture sector (see section II.G below). These tables are

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

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from Annex A sources only.

based on data submitted by the Party on 16 October 2010; however, final adjusted estimates and the difference when compared to values included in the 16 October 2010 resubmission are provided in the footnotes.

5. Table 3 provides information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2008[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A sources[b]		CO_2	23 107.92	23 107.92	17 000.92	19 926.81	23 378.01	23 519.79	24 833.29	23 687.45	2.5
		CH_4	3 437.00	3 437.00	2 863.01	2 670.38	3 125.76	3 354.17	3 471.77	3 371.55	–1.9
		N_2O	3 948.46	3 948.46	3 067.20	3 253.05	3 524.48	3 513.93	3 508.14	3 483.83	–11.8
		HFCs	0.00	0.00	7.80	23.16	350.38	431.93	466.67	586.70	NA
		PFCs	936.56	936.56	0.00	0.00	0.00	0.00	0.00	NA	NA
		SF_6	10.95	10.95	11.66	12.18	13.66	13.64	13.68	13.95	27.4
KP-LULUCF	Article 3.3[c]	CO_2								–43.02	
		CH_4								0.00	
		N_2O								0.00	
	Article 3.4[d]	CO_2	NA							–11 075.13	NA
		CH_4	NA							0.00	NA
		N_2O	NA							0.00	NA

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] The table does not reflect the adjusted estimates for a number of categories in the agriculture sector (see section II.G below) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the 16 October 2010 resubmission, which was subject to these adjustments. The adjustments led to a 89.80 Gg CO_2 eq increase in total greenhouse gas (GHG) emissions for 2008. The Party submitted revised KP-LULUCF information on 4 December 2010 for the latest inventory year and the above table reflects this revised information, even though it was not submitted by the Party using the common reporting format (CRF) tables.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year to 2008

			Gg CO_2 eq								*Change*
		Sector	*Base year[b]*	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A[a]		Energy	22 160.36	22 160.36	16 462.64	18 765.84	22 225.91	22 378.33	23 628.36	22 472.59	1.4
		Industrial processes	4 198.35	4 198.35	2 574.41	3 229.12	3 689.87	3 871.80	4 080.48	4 129.30	–1.6
		Solvent and other product use	130.95	130.95	123.79	115.19	203.38	231.29	254.70	252.73	93.0
		Agriculture	4 361.02	4 361.02	3 062.76	3 132.81	3 473.45	3 497.34	3 442.94	3 359.37	–23.0
		Waste	590.22	590.22	727.00	642.63	799.67	854.70	887.08	929.50	57.5
		Other	0.00	NO	NO	NO	NO	NO	NO	NO	
		LULUCF	–8 293.02	–8 293.02	–7 474.84	–10 079.95	–10 752.57	–10 784.86	–11 170.91	–11 118.14	34.1
		Total (with LULUCF)	**NA**	**22 557.66**	**14 748.75**	**15 163.00**	**18 840.04**	**19 193.90**	**21 122.65**	**20 025.35**	**NA**
		Total (without LULUCF)	**30 850.68**	**30 850.68**	**22 223.59**	**25 242.95**	**29 592.61**	**29 978.75**	**32 293.56**	**31 143.49**	**0.9**
KP-LULUCF	Article 3.3[c]	Afforestation & reforestation								–140.47	
		Deforestation								97.45	
		Total (3.3)								**–43.02**	
	Article 3.4[d]	Forest management								–11 075.13	
		Cropland management	NA							NA	NA
		Grazing land management	NA							NA	NA
		Revegetation	NA							NA	NA
		Total (3.4)	**NA**							**–11 075.13**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry; KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] The table does not reflect the adjusted estimates for a number of categories in the agriculture sector (see section II.G below) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the 16 October 2010 resubmission, which was subject to these adjustments. The adjustments led to a 89.80 Gg CO_2 eq increase in total greenhouse gas (GHG) emissions for 2008. The Party submitted revised KP-LULUCF and Convention LULUCF information on 4 December 2010. Revised Convention LULUCF information was submitted for the years 1991–2008 and the above table includes revised Convention LULUCF emissions data only for the latest inventory year as the revised information was not submitted by the Party using the common reporting format (CRF) tables.

[b] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

Table 3
Information to be included in the compilation and accounting database in tonnes of CO_2 equivalent

	As reported	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve[d]	155 658 224		156 166 446	
Annex A emissions for current inventory year[d]				
CO_2	23 687 453		23 687 453	
CH_4	3 374 492	89 802	3 461 353	
N_2O	3 470 762		3 483 831	
HFCs	584 986		586 699	
PFCs	0		0	
SF_6	13 953		13 953	
Total Annex A sources	**31 131 645**	**89 802**	**31 233 289**	
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	NA		–140 470	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA		NA	
3.3 Deforestation for current year of commitment period as reported	NA		97 450	
Activities under Article 3, paragraph 4, for current inventory year[e]				
3.4 Forest management for current year of commitment period	NA		–11 075 130	
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period				
3.4 Revegetation in base year				

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the expert review team (ERT) has calculated an adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

[d] The value of the commitment period reserve may change once the question of implementation of the calculation of the assigned amount has been resolved.

[e] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2010 annual inventory submission was submitted on 14 April 2010 and it contains a complete set of common reporting format (CRF) tables for the period 1990–2008. The national inventory report (NIR) was submitted on 15 April 2010 and did not include information required under Article 7, paragraph 1, of the Kyoto Protocol. Croatia resubmitted its NIR and CRF tables on 27 May 2010; this resubmission included information on: accounting of Kyoto Protocol units, changes in the national system, changes in the national registry and the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. This resubmission did not include information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The standard electronic format (SEF) tables were not required to be submitted by the Party as it had not acquired or transferred any Kyoto units. The annual submission was not submitted in accordance with decision 15/CMP.1.

7. Croatia officially submitted revised emission estimates on 16 October 2010 in response to questions raised by the ERT during the course of the centralized review. Croatia also submitted revised information and data on 16 October 2010 for KP-LULUCF in response to questions raised by the ERT during the review. Croatia submitted revised information concerning its GHG inventory on 4 December 2010. This revised information related to "inaccuracies" that it had identified in its Convention and KP-LULUCF inventories. Where necessary, the ERT also used the previous year's submission during the review.

8. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

9. During the review, Croatia provided the ERT with additional information and documents which are not part of the annual submission but are in many cases referenced in the NIR. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory generally covers all source and sink categories for the period 1990–2008 and is complete in terms of years and geographical coverage. However, the ERT noted that CH_4 emissions from sludge were not estimated for the entire time series. The ERT encouraged the Party to provide estimates for these categories in its next annual submission, in order to improve completeness.

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

11. The ERT concluded that the national system in general continues to perform its required functions. However, the ERT noted that Croatia did not submit its KP-LULUCF inventory to the ERT until 16 October 2010 and found that the GHG inventory was not prepared in line with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) or the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), which resulted in the implementation of adjustment procedures under decision 20/CMP.1 (see section II.G below). The ERT also found that the national system was not always responsive to questions before and during the review week.

12. Chapter 13 of the NIR states that there has been no change in the national system since the previous annual submission. The previous expert review recommended that Croatia adapt the national system to ensure that for its future submissions it is able to respond in a timely manner to requests for information during different stages of the review. In response to a question raised by the current ERT during the review week, Croatia stated that communication and information exchange between institutions had been improved and streamlined with a view to adequately responding to any questions from the ERT in a timely manner. The ERT welcomes this improvement, but noticed that Croatia still encountered some difficulties in responding to the ERT's questions. The ERT reiterates a recommendation from the previous expert review that Croatia respond in a timely manner to requests for information during different stages of the review.

Inventory planning

13. The NIR described the national system for the preparation of the inventory. The Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC) has overall responsibility for the national inventory, including the overall functioning of the national system, the approval of the inventory and submission of the inventory to the UNFCCC secretariat. Other agencies and organizations are also involved in the preparation of the inventory. The Croatian Environmental Agency (CEA) has overall responsibility for organizing the collection of activity data (AD), developing and implementing the quality assurance/quality control (QA/QC) plan, archiving all of the information used in the preparation of the GHG inventory, selecting the institution that prepares the inventory and reporting on changes to the national system. The CEA also oversees the administration of the national registry and the facilitation of the inventory reviews. The Energy and Environmental Protection Institute (Ekonerg) was selected as the authorized institution for the preparation of the 2010 inventory submission.

14. Planned improvements to the inventory are described in chapter 10.3 of the NIR. The improvements are categorized as either short-term (<1 year) or long-term (>1 year) improvements, and the content of the inventory improvement plan has not changed since the previous annual submission. In response to a question raised by the ERT, Croatia provided a list of improvements carried out for this inventory submission. The ERT commends Croatia for these improvements, but notes that most of the implemented improvements were not included in the inventory improvement plan. The ERT reiterates the recommendation of the previous review that Croatia provide a more detailed plan and include a time schedule for the planned improvements in its next annual inventory submission.

15. Recalculations and inventory improvements in Croatia are not always carried out in a systematic manner. As noted by the ERT of the initial report under the Kyoto Protocol, recalculations are largely performed by sectoral experts. The ERT recommends that Croatia: use the uncertainty and key category analyses as well as previous review recommendations to prioritize inventory improvements; record the review recommendations in the inventory improvement plan; and strengthen the national system and inventory management in a manner which ensures that the improvements are carried out as planned.

16. The previous review encouraged Croatia to strengthen the functional aspects of the national system by: focusing its attention on methodological issues, as the ERT found that priority, in most cases, is allocated to AD collection; enhancing collaboration with expert and research organizations and initiating research and studies to support the inventory preparation process, especially in the agriculture and LULUCF sectors, in order to enhance the consideration of national circumstances; and providing additional support for the sectoral experts when compiling the inventory (such as providing support on cross-cutting issues, ensuring availability of backup staff and increasing the interaction of experts across sectors). The ERT reiterates the recommendation of the previous review that the Party report on the implementation of the above-mentioned issues in its next annual submission.

Inventory preparation

Key categories

17. Croatia has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2010 submission. The key category analysis performed by the Party and that performed by the secretariat[4] produced similar results. Croatia has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

18. The ERT commends Croatia for having corrected the errors which previously occurred in the trend analysis, and for having included the key category analysis for 1990 for the first time in the 2010 submission.

19. It is not clear from the NIR whether the results of the key category analysis are used to guide the methodological choice and inventory improvements. The ERT recommends that Croatia continue its efforts to utilize the results of the key category analysis for methodological choice and prioritization of inventory improvements according to good practice, and to report on the implementation in the next annual submission.

Uncertainties

20. Croatia has performed a tier 1 uncertainty analysis both for level and trend in emissions. However, the uncertainty estimates of AD and emission factors (EFs) do not always reflect national circumstances. As also noted in the previous review, some uncertainty estimates of Croatia deviate from those of other Parties and those of the IPCC good practice guidance even if tier 1 methods are used to estimate emissions. For example,

[4] The secretariat identified, for each Party, the categories that 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 for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party 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.

the uncertainty for the N_2O EF for agricultural soils is estimated at 30 per cent in Croatia, whereas the uncertainty presented in the IPCC good practice guidance is up to 400 per cent.

21. The previous ERT recommended that Croatia improve and update the uncertainty estimates, especially when changes are made in the inventory or when country-specific methods or EFs are used (e.g. nitric acid production). The present ERT reiterates the recommendation that the Party report on the improvements in its uncertainty assessment in its next annual submission.

22. Croatia has entered both emissions and removals as positive values in table 6.1 of the IPCC good practice guidance on combining uncertainties (annex 5 to the NIR), and therefore the uncertainty analysis with LULUCF does not provide the correct results. In response to a question raised by the ERT, Croatia stated that it will use the "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 UNFCCC reporting guidelines), which give additional clarification on combining uncertainties, when preparing uncertainty estimates for the next submission. The ERT recommends that Croatia do so and include the corrected results in its next annual submission.

Recalculations and time-series consistency

23. Recalculations have been performed and reported generally in accordance with the IPCC good practice guidance, thus improving the quality and accuracy of the inventory submission. The ERT noted that recalculations reported by the Party of the time series 1990–2007 have been undertaken to take into account: new or corrected AD (industrial processes, solvent and other product use, agriculture and waste sectors); the reallocation of emissions from the energy to the industrial processes sector (limestone and dolomite use); new or improved methods (energy and industrial processes sectors); the correction of errors in calculation parameters (agriculture sector); and the correction of double counting (LULUCF). The overall impact of the recalculations is an increase of net emissions in 1990 (0.16 per cent) and a decrease in 2007 (6.9 per cent) when the LULUCF sector is included. Without LULUCF, the decrease in 2007 emissions is 0.32 per cent.

24. The rationale for the recalculations is provided in the NIR and in CRF table 8(b). However, the ERT encourages Croatia to improve the transparency of CRF table 8(b) by giving information at a more disaggregated level; for example, ferroalloy and steel production to be provided separately, instead of included in metal production.

25. There are potential inconsistencies in the time series due to a lack of AD, especially in the industrial processes sector. The ERT recommends that Croatia source this missing data and report a consistent time series in its next annual submission.

26. The initial review of Croatia recommended that the Party provide more information in the NIR on emissions data and documentation on trends. Chapter 2 of the NIR on trends is largely unchanged since the previous submission. Croatia informed the ERT that the inventory team will include more detailed information in this chapter in its next annual submission. The ERT recommends that Croatia improve the documentation on trends in chapter 2 and in the sector sections of the NIR in its next annual submission.

Verification and quality assurance/quality control approaches

27. Croatia provided its first QA/QC plan in its 2008 annual submission and the plan is updated annually. In response to a question raised by the ERT during the review week, Croatia confirmed that the QA/QC plan is updated annually, with the last update undertaken before preparing the 2010 annual submission. Upon request, Croatia provided the QA/QC plan, dated June 2009, to the ERT. The ERT recommends that Croatia provide

more information on the QA/QC plan and changes thereto in the annual submission, and report on its implementation in a transparent manner in the next annual submission.

28. According to the NIR, before the authorized institution submits the NIR to the CEA, the QA/QC manager carries out an audit which covers all IPCC sectors in the NIR in order to check which QC elements are already performed by sector experts and which improvements and corrective actions should be carried out in the future submissions. CRF tables for each sector are reviewed in accordance with the Quality Management Standard (ISO 9001) and Environmental Management Standard (ISO 14001) implemented within CEA and the authorized institution. Audit results are registered in control lists as well as performed correction activities. During the review week, the ERT asked Croatia to summarize the main findings of the audit undertaken by the QA/QC manager and the review of the CRF tables, and whether corrective actions were taken as a result of the findings. The Party did not provide the ERT with the requested information.

29. The Party explained in the NIR that the QA procedure involves the CEA submitting a complete inventory and CRF tables to the MEPPPC, which, upon receipt, approves the latter. The members of the National System Committee who have not been included in the inventory preparation provide their views on certain parts of the inventory, and the QA/QC coordinator documents all committee results/findings. During the review week, the ERT asked for an example of the findings of the National System Committee, and how the findings have been taken into account with a view to better understanding the implementation and actions arising from this QA procedure. The ERT was not provided with the requested information.

30. The ERT recommends that Croatia improve the transparency of its reporting by providing more information on the QA/QC activities, including the audit of the QA/QC coordinator, checks of CRF tables and the QA review procedure of the National System Committee. The ERT also recommends that Croatia provide examples of the kind of improvements these QA/QC procedures have initiated, if any.

Transparency

31. The NIR and the CRF tables are generally transparent. However, the ERT recommends that Croatia improve the transparency of the LULUCF sector as explained in paragraphs 91 and 92 (below). The ERT also recommends that Croatia improve the transparency of the industrial processes sector, for example by providing more information on limestone and dolomite use and iron and steel production, and improve the trend explanations of emissions and background data for the agriculture sector.

32. The ERT found several inconsistencies between the NIR and the CRF tables, and between the different chapters of the NIR (for example, for the energy sector, uncertainties, key categories and methodologies used). The ERT recommends that Croatia strengthen its QC procedures to avoid such inconsistencies in the next annual submission. Sector-specific recommendations are given in more detail in the sector chapters of this report.

Inventory management

33. Croatia has a centralized archiving system at the CEA, which according to NIR includes the archiving of AD and EFs. The archived information also includes documents used for inventory planning, preparation, and QA/QC. However, the inability of Croatia to provide the ERT with examples of QA/QC procedures carried out suggests that output from such procedures is difficult to archive and therefore the system may not be completely fulfilling its required functions.

3. Follow-up to previous reviews

34. The NIR states that recommendations from the previous annual review reports are one of the starting points for the inventory preparation process. It is reported in the NIR that in the preparation of the 2010 inventory, some recommendations made in the previous expert review were implemented. The ERT asked Croatia which recommendations were implemented, but the Party did not provide this information. The ERT recommends that Croatia report in a transparent manner in the next annual submission which recommendations of the ERT have been implemented, and if some recommendations have not yet been implemented, when the Party plans to implement them.

35. The ERT reiterates recommendations made in the previous annual review:

(a) To strengthen the national system in a manner which facilitates a timely response to questions raised by the ERT during the review;

(b) To include in its NIR a more detailed plan of improvements and a time schedule for their implementation in its next annual inventory submission;

(c) To improve uncertainty estimates to take into account national circumstances and improvements in data and methods.

4. Areas for further improvement

Identified by the Party

36. The 2010 NIR identifies several areas for improvement. The overall aim is to improve the collection of AD, EFs and overall emission calculations for key categories.

Identified by the expert review team

37. The ERT identifies the following cross-cutting issues for improvement:

(a) The provision of missing estimates (reported as not estimated ("NE")), in particular for HFC emissions from aerosols/metered dose inhalers and solvents;

(b) Improved inventory management to ensure that inventory improvements and recalculations are prioritized systematically using review recommendations and results of uncertainty and key category analysis;

(c) A description in the NIR of how recommendations from previous review reports have been implemented and/or addressed;

(d) The inclusion of more explanations on emission trends in the NIR;

(e) Improved transparency by adding more information in the NIR on the QA/QC plan and its changes;

(f) The provision of more information and examples in the NIR on how QA/QC procedures work in practice;

(g) The strengthening of QC procedures to avoid inconsistencies between the NIR and the CRF tables, as well as between different chapters of the NIR.

38. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

39. The energy sector is the main sector in the GHG inventory of Croatia. In 2008, emissions from the energy sector amounted to 22,472.59 CO_2 eq, or 72.2 per cent of total GHG emissions. Since 1990, emissions have increased by 1.4 per cent. The key driver for the rise in emissions is attributed to the increase in energy industry activity, namely public electricity and heat production. Within the sector, 29.9 per cent of the emissions were from energy industries, followed by 27.8 per cent from transport, 16.8 per cent from manufacturing industries and construction and 15.7 per cent from other sectors. Oil and natural gas (fugitive emissions from fuels) accounted for 9.8 per cent.

40. The ERT found the inventory to be complete and the reporting of the energy sector to be transparent. The ERT also found that Croatia had implemented recommendations from the previous expert review with respect to improved methodologies used for key categories (e.g. the COPERT IV model for road transportation and the tier 2 method for public electricity and heat production). The ERT found methodologies to be well documented in the NIR, including the provision of background information and a very detailed energy balance for 2008.

41. A tier 2 method is used to estimate CO_2 emissions from stationary combustion (solid, liquid and gaseous fuels). This method is based on a detailed bottom-up approach using plant-specific data from power plants and public cogeneration plants. The ERT noted from the NIR that Croatia compared this plant-specific data with corresponding data from its national energy balance, and the results showed that there is no significant difference between the two sets of data. A tier 1 method was used for the estimation of petroleum refining and other energy industries' GHG emissions.

42. The ERT identified inconsistencies in the reporting between the NIR and the CRF tables in relation to emissions data (in particular, NIR table 3.1-4 when compared to the CRF tables). The ERT recommends that Croatia rectify these inconsistencies in its next annual submission.

43. Croatia reported recalculations in its 2009 annual submission. These recalculations are in response to improvements made in addressing recommendations from previous expert reviews as well as revisions resulting from improvements in data used to estimate emissions from:

(a) Public electricity and heat production, as a result of revised AD and the application of a more detailed tier 2 method;

(b) Manufacturing industries and construction, as a result of including energy use of industrial cogeneration;

(c) Road transportation as a result of using the COPERT IV model.

44. The ERT noted that Croatia used drivers as a basis to estimate emissions from domestic and international aviation (i.e. the ratio between domestic and international passengers). Croatia reported a quantitative uncertainty analysis for all energy categories.

45. Category-specific planned improvements are provided in the NIR including, inter alia: addressing data gaps; improving data collection, uncertainties of AD and EFs; improving AD and EFs and methodologies, including a shift from a tier 1 to a tier 2/3 method for key categories; and improving the documentation on and description of the inventory system.

2. Reference and sectoral approaches

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

46. CO_2 emissions are estimated in accordance with the Revised 1996 IPCC Guidelines in relation to the sectoral and reference approaches. Emissions estimated using the reference approach for the year 2008 are 1.3 per cent greater than those estimated using the sectoral approach. The NIR provides a time series reflecting the difference since 1990. The ERT noted that for each year of the time series the difference is less than 2 per cent.

47. In response to a question raised by the ERT during the review week, Croatia confirmed that the gas works gas reported in the production column of the reference approach is an error as it is a secondary fuel and, as such, could lead to a double count. The ERT recommends that Croatia make this correction.

International bunker fuels

48. In response to a recommendation from the previous ERT, Croatia based this expert judgement on drivers, including the ratio between domestic and international passengers, and average kilometres travelled by passengers on domestic and international routes. Croatia also reported a recalculation based on a recommendation provided in the previous expert review to correct the net calorific value (NCV) used for jet kerosene in the year 2007.

Feedstocks and non-energy use of fuels

49. In response to a recommendation from the previous expert review, Croatia corrected the value for the carbon stored in non-energy use of natural gas. In response to a question raised during the review week, Croatia indicated that it would correct the use of notation keys in relation to the consumption of refinery feedstocks, which are imported and should be recorded as included elsewhere ("IE") and not occurring ("NO") in CRF table 1.A(b). The ERT recommends that Croatia correct this notation key.

3. Key categories

Road transportation: liquid fuel – CO_2, CH_4 and N_2O

50. In response to a recommendation from the previous expert review, Croatia estimated emissions using the COPERT IV model (having previously used the COPERT III model) for all years of the inventory time series. The impact of this recalculation on the year 2007 was: a decrease of –0.8 per cent for CO_2; a decrease of –29.2 per cent for CH_4; and a decrease of –52.9 per cent for N_2O.

Oil and natural gas: natural gas – CH_4

51. Croatia did not address the recommendation of the previous ERT to estimate emissions for this key category using a higher-tier method. This ERT reiterates this recommendation. Further, the ERT recommends that Croatia estimate emissions for each stage of oil and gas operations (production, unloading, processing, underground storage, transportation, and distribution).

C. Industrial processes and solvent and other product use

1. Sector overview

52. In 2008, emissions from the industrial processes sector amounted to 4,129.30 Gg CO_2 eq, or 13.3 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 252.73 Gg CO_2 eq, or 0.8 per cent of total GHG emissions. Since the base year, emissions have decreased by 1.6 per cent in the industrial processes sector, and increased by 93.0 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector is the closure of aluminium, ferroalloy and pig iron production facilities. However, the increase in emissions from mineral products has largely compensated the emissions reduction. The main driver for the increase in emissions from solvent and other product use was an increase in other uses of solvents, in particular the application of glues and adhesives. Within the industrial processes sector, 44.0 per cent of the emissions were from mineral products, followed by 41.3 per cent from chemical industry, 14.6 per cent from the consumption of halocarbons and SF_6 and 0.2 per cent from metal production.

53. The inventory of industrial processes is generally complete; however, HFC emissions from aerosols/metered dose inhalers and solvents were reported as "NE". In response to questions raised by the ERT, Croatia submitted revised estimates on 16 October 2010.

54. The NIR and the CRF tables are generally transparent. However, transparency can be improved, in particular by providing more information on calculation parameters for the iron and steel sector and by explaining in a more transparent manner whether the emissions of fluorinated gases (F-gases) provided in the NIR represent actual and potential emissions.

55. Croatia reported recalculations for ferroalloys production (new AD), iron and steel production (higher-tier method), limestone and dolomite use (reallocation of emissions from the energy sector to the industrial processes sector) and SF_6 emissions from electrical equipment (corrected and new AD). Indirect CO_2 emissions from solvent and other product use were recalculated due to a revision of non-methane volatile organic compound (NMVOC) emissions in 2007. The ERT found that these recalculations have improved the quality of the inventory.

56. The ERT found the emission time series to be largely consistent; however, inconsistencies in the time series were identified for limestone and dolomite use (see para. 66 below) and consumption of halocarbons and SF_6 (see para. 61 below).

2. Key categories

Ammonia production – CO_2

57. Croatia estimates emissions for this key category based on the amount of natural gas consumed. The ERT noted that Croatia includes both combustion- and process-related emissions from ammonia (NH_3) production in the industrial processes sector. However, considering that Croatia is able to calculate CO_2 emissions separately from natural gas used as feedstock and natural gas used for combustion, the ERT reiterates the recommendation that Croatia report all combustion-related emissions under the energy sector, consistent with the Revised 1996 IPCC Guidelines, in order to enhance the comparability of emission estimates with other Parties.

Ferroalloys production – CO_2

58. Ferroalloys production ceased in Croatia in 2003. CO_2 emissions are estimated based on the consumption of coke and coal electrodes. For this inventory submission,

Croatia revised the AD for 2003 and recalculated the estimate for that year. Previous reviews and earlier stages of the 2010 review process identified a high fluctuation of the implied emission factor (IEF). In response to a question raised by the ERT on this matter, Croatia informed the ERT that the fluctuations arise as a result of interpolation between 1994 and 1996, and 1999 and 2001 due to a lack of data. The ERT recommends that Croatia examine whether the interpolation method has been applied in an appropriate manner, and, if possible, examine the reasons for the unusual trend. The ERT encourages Croatia to report on the results of this examination in its next annual submission.

Consumption of halocarbons and SF_6 – HFCs and SF_6

59. Croatia reported potential HFC emissions from refrigeration and air-conditioning equipment (1995–2008), fire extinguishers (2006–2008) and foam blowing (2006–2007). In 2008, HFC use for foam blowing was not occurring and the notation key "NO" was correctly used in the CRF tables. The actual emissions from these sources were reported as "NE". The ERT recommends that the Party, in the context of reporting a complete emission time series, estimate emissions from fire extinguishers and foam blowing (or to use appropriate notation keys) for the years before 2006 which are currently reported as "NE". The ERT also recommends that the Party estimate actual emissions of these gases.

60. The actual and potential emissions from aerosols/metered dose inhalers were reported as "NE" in the 2010 submission. In response to a question raised by the ERT, Croatia submitted revised estimates on 16 October 2010 for potential emissions for these categories for the period 2003–2008, and reported emissions between 1996 and 2002 as "NO". These revised estimates were based on new data and information on HFC-134a consumption obtained from the MEPPPC. The ERT recommends that the Party provide a description of the methodology used in the next annual submission and continue to obtain the data for HFC emissions from aerosols/metered dose inhalers. Furthermore, the ERT recommends that Croatia estimate the actual emissions as well.

61. Potential HFC emissions from solvents were reported as "NE". In response to a question raised by the ERT, Croatia submitted revised information on 16 October 2010 that corrected the notation key from "NE" to "NO" based on information and data from the MEPPPC. The ERT recommends that Croatia include this information in its next annual submission.

62. Croatia has recalculated actual emissions of SF_6 from electrical equipment for the period 1990–2007. The ERT noted from the NIR that this recalculation is a result of additional data provided by one operator for the period 1995–2008 and a correction of data from one single operator for the period 1990–2007. The recalculation resulted in a decrease in emissions of 18 per cent when compared to the previous annual submission. In response to a question raised by the ERT, Croatia explained that the revised data were provided by the operators when the inventory team requested further information on data accuracy and transparency. The ERT commends Croatia for this improvement in accuracy and encourages the Party to implement QC procedures to data provided by companies, even if the category is not a key source. The ERT also reiterates the recommendation of the previous review that Croatia complete CRF table 2(II).F for SF_6 emissions from electrical equipment to improve transparency. Furthermore, the ERT also recommends that Croatia estimate the potential emissions.

63. The ERT noted that Croatia reports "NO" for all other uses of SF_6 for the entire time series. In response to a question raised by the ERT, Croatia informed the ERT that it is planning to improve data collection with a view to including all sources of SF_6 emissions. The ERT recommends that Croatia explore whether other uses of SF_6 occur in the country and report thereon in its next annual submission, including any recalculations undertaken.

Solvent and other product use – CO_2

64. CO_2 estimates are based on the conversion of NMVOC and Croatia uses a constant country-specific conversion factor of 0.8 for the carbon-NMVOC ratio. The ERT noted that the initial review report of Croatia came to the conclusion that as these sources of emissions make up only a small component of Croatia's emissions inventory, and because more important improvements to the inventory are required elsewhere, this approach was considered acceptable by the ERT. Further, the ERT recommended that Croatia include documentation on the assumptions made for this country-specific factor in its next NIR submission. The present ERT reiterates this recommendation.

3. Non-key categories

Limestone and dolomite use – CO_2

65. AD for dolomite use in glass, ceramic and refractory materials manufacture in the period 1990–1996 were extracted from annual industrial reports published by the Central Bureau of Statistics, Department of Manufacturing and Mining. After this period, national classification of activities does not distinguish dolomite use in the above-mentioned activities and since then AD has been collected from only one glass manufacturer. The ERT found this to be a potential inconsistency in the time series between 1997 and 2008. In response to a question raised by the previous ERT, the Party stated that it would strengthen its efforts to provide more detailed data. It also informed the ERT that according to the Regulation on the Monitoring of Greenhouse Gas Emissions in the Republic of Croatia (Official Gazette No. 1/2007) each industrial facility that is a source of GHGs should report the required AD. The ERT recommends that Croatia collect the missing AD and report thereon in its next annual submission, including any recalculations undertaken.

66. Limestone use in the desulphurization process was transferred from the energy sector to the industrial processes sector in line with the IPCC good practice guidance. The ERT commends Croatia for this improvement in transparency.

Iron and steel production – CO_2

67. The ERT commends Croatia for its use of a higher-tier method to estimate emissions from steel production that use electric arc furnaces. The recalculations resulted in emissions that are between seven and 20 times higher when compared to the previous annual submission.

68. In response to a question raised by the ERT during the review week, Croatia provided the ERT with data on the quantity of input material consumed (tonne) and the EFs (t CO_2/t). However, it still remains unclear to the ERT how the emissions presented in the CRF tables were derived using the provided AD and EFs. The ERT recommends that Croatia improve the transparency of its reporting in its next annual submission.

D. Agriculture

1. Sector overview

69. In 2008, emissions from the agriculture sector amounted to 3,359.37 Gg CO_2 eq, or 10.8 per cent of total GHG emissions. Since the base year, emissions have decreased by 23.0 per cent. The key driver for the fall in emissions is the reduction in the cattle population since 1991. Within the sector, 66.7 per cent of the emissions were from agricultural soils, followed by 22.9 per cent from enteric fermentation and 10.5 per cent from manure management.

70. The ERT commends Croatia for providing improved information in its NIR on crop production and mineral fertilizer time series. However, the ERT reiterates a recommendation provided by the previous expert review that Croatia include in its next annual submission clear and detailed information on AD (e.g. tables with time series information on livestock population, mineral fertilizer use and types of crops cultivated) and explanations of the trends and annual fluctuations in the data.

71. The ERT noted from the previous expert review that the characterization of dairy and non-dairy cattle was not in line with the IPCC good practice guidance as all mature cows were reported as dairy cattle. In the 2010 annual submission, the Party obtained more detailed data on cattle types from the Central Bureau of Statistics for the entire period 1990–2008 and performed the recommended reclassification. The ERT commends Croatia for this important improvement in the consistency and accuracy of the inventory and recommends that Croatia provide a detailed list of cattle types included in each cattle group in its next annual submission.

72. Recalculations were performed for the period 1990–2007 and for all categories. This recalculation was a result of the aforementioned reclassification of cattle, a revision of livestock population and crop production data for 2000–2007, and due to a correction of errors in both dairy cattle manure in solid storage and in the use of synthetic fertilizers. The recalculation increased emissions by 0.3 per cent in the base year and by 0.07 per cent in 2007. Despite this revision of the livestock population, the uncertainty of the AD remains unchanged when compared to the previous annual submission (30 per cent) and is among the highest of the reporting Parties. With regard to agricultural soils, the uncertainty of the EF (40 per cent) is much lower than that reported by other Parties, although Croatia uses the same IPCC default factor (0.0125 kg N_2O-N/kg N). The ERT repeats the encouragement of earlier ERTs for Croatia to investigate these issues and to report thereon in its next annual submission, including any recalculations undertaken.

73. During the review of Croatia's initial report, the ERT identified some categories where the methods and EFs used were not fully in line with the IPCC good practice guidance. The ERT concluded that the continued use of these methods and EFs has resulted in a potential underestimation of emissions in 2008 for:

(a) CH_4 emissions from enteric fermentation;

(b) CH_4 emissions from manure management;

(c) N_2O emissions from agricultural soils (4.D).

74. In response to questions raised by the ERT on these specific potential underestimations, Croatia submitted on 16 October 2010 revised estimates for N_2O emissions from agricultural soils. However, Croatia did not submit revised estimates for CH_4 emissions from enteric fermentation and manure management. The ERT concludes that the above-mentioned reported CH_4 emission estimates are underestimated and initiated procedures under decision 20/CMP.1 with respect to adjustments (see chapter II.G below for more detailed information on these adjustments).

75. These adjustments resulted in a 2.7 per cent increase in the emissions estimate for the agriculture sector in the year 2008, from 3,359.37 Gg CO_2 eq as reported in the resubmission of 16 October 2010 to 3,449.18 Gg CO_2 eq. The total effect of these adjustments on total GHG emissions was a 0.3 per cent increase (89.80 Gg CO_2 eq) in 2008. Further details on the rationale for the adjustments are given in the descriptions of the relevant categories.

2. Key categories

Enteric fermentation – CH_4

76. A tier 2 method is now used to estimate emissions from cattle and an improved characterization of cattle. The ERT found this approach to be in line with the IPCC good practice guidance. For animals other than cattle, Croatia uses a tier 1 methodology with IPCC default EFs for developing countries. In its 2010 annual submission, Croatia provides limited information on its national circumstances. This submission also highlighted a low percentage of gross value added from agricultural activities and an insufficiency in agricultural production as the basis for choosing EFs for developing countries. The choice of proper EFs depends much more on other parameters than financial ones, the most important being animal weight. The ERT considers that animals in Croatia are similar to those in other European countries with regard to weight and feed. During the review, the ERT recommended that the Party justify its use of EFs for developing countries or recalculate relevant categories using EFs for developed countries as provided in the Revised 1996 IPCC Guidelines: for sheep use an EF of 8 kg/head/year instead of 5 kg/head/year; and for swine use an EF of 1.5 kg/head/year instead of 1 kg/head/year. EFs for other animals are the same. The ERT found that the response of Croatia (16 October 2010) did not adequately address or correct the potential problem; Croatia did not provide revised estimates, nor did it provide any satisfactory additional information.

77. The ERT initiated the procedures contained in the annex to decision 20/CMP.1 with respect to adjustments. Further details on the adjustment are provided in chapter II.G below.

78. Emissions from mature dairy cattle in 1991 are the same as in 1990 and the related IEF in 1991 (84.78 kg/head/year) is too high with regard to the milk yield. In response to questions raised by the ERT, Croatia submitted revised estimates for dairy cattle. In the same resubmission, Croatia also corrected the IEF for 1991 to 75.96 kg/head/year, which is considered by the ERT to be more reasonable with respect to the milk yield.

Manure management – CH_4

79. A tier 1 methodology with IPCC default EFs specific of a cool climate zone for Eastern Europe is used to estimate emissions from cattle and swine, and EFs for a developing country for other animals. The ERT considered the use of EFs for developing countries as inappropriate. During the review week, the ERT asked Croatia to justify its use of EFs for developing countries or to recalculate relevant categories using EFs for developed countries contained in the Revised 1996 IPCC Guidelines: for sheep the EF is 0.19 kg/head/year instead of 0.10 kg/head/year; for goats the EF is 0.12 kg/head/year instead of 0.11 kg/head/year; for horses the EF is 1.4 kg/head/year instead of 1.1 kg/head/year; for mules and asses the EF is 0.76 kg/head/year instead of 0.60 kg/head/year; and for poultry the EF is 0.078 kg/head/year instead of 0.012 kg/head/year. In response to questions raised by the ERT, Croatia submitted revised estimates of N_2O from agricultural soils that also include some changes in emissions from manure management related to horses, mules and asses, and poultry. The ERT noted that the changes in manure management emissions for horses, mules and asses, and poultry were 1,000 times lower than the 27 May 2010 annual submission. The ERT concluded that Croatia did not adequately address or correct the identified problems by providing revised estimates or satisfactory additional information.

80. The ERT initiated procedures contained in the annex to decision 20/CMP.1 with respect to adjustments. Further details on the adjustment are provided in chapter II.G below.

81. Croatia, in response to a recommendation from the previous expert review, corrected allocations in CRF table 4.B for all years and animal types except mature dairy cattle for which the sum of the allocation values equals 200 per cent instead of 100 per cent. The ERT recommends that Croatia correct this error in its next annual inventory submission.

Manure management – N_2O

82. Emissions are estimated using a tier 1 methodology with IPCC default EFs for Eastern Europe. In CRF table 4.B(b) the sum of nitrogen (N) excreted from animal waste management systems is not equal to the mathematical product of livestock number and excretion rates. For goats, the N excretion rate is not reported (the notation key "NO" is used). The ERT reiterates the recommendation of the previous expert review that Croatia review and correct this discrepancy in its next annual inventory submission.

Agricultural soils – N_2O

83. Croatia uses a tier 1b methodology to estimate the direct and indirect emissions of N_2O and uses IPCC default parameters except for the volatilization of nitrogen oxide (NO_x) and NH_3 for which more detailed country-specific values are used.

84. The total amount of N excreted from animal waste management systems (CRF table 4.B(a)) after discounting the volatilized N (FracGASM = 0.2) does not match the value reported for N from animal manures applied to the soil in CRF table 4.D. The reason for this is the use of an equation from the Revised 1996 IPCC Guidelines instead of from the IPCC good practice guidance. There is also an error in the FracGRAZ value, which was used as constant value 0.24 instead of the truth value for every year. During the review, the ERT recommended that Croatia revise its emission estimates using equation 4.23 from the IPCC good practice guidance and the correct value for FracGRAZ. In response to this request from the ERT, Croatia submitted revised estimates on 16 October 2010 using the recommended equation and actual value of FracGRAZ. As a result, its estimate for N_2O emissions from agricultural soils has increased by 0.6 per cent, from 2,227.24 Gg CO_2 eq to 2,240.31 Gg CO_2 eq.

E. Land use, land-use change and forestry

1. Sector overview

85. In 2008, net removals from the LULUCF sector amounted to 11,118.14 Gg CO_2 eq. Since the base year, net removals have increased by 34.1 per cent. The key driver for the rise in removals is forest land remaining forest land. Forest management practices in Croatia have increased over time, especially compared to the war period from 1991–1995. From 1995–2007, commercial fellings significantly increased. Further, there were increases in forest area and in the annual increment of growing stocks. These factors have collectively contributed to the rise in removals in the time series.

86. CO_2 emissions and removals are reported by Croatia only for land-use categories involving forest lands, namely forest land remaining forest land, other land converted to forest land and forest land converted to settlements.

87. Emissions and removals of CO_2 in cropland, grassland, wetlands, some settlements and other land categories are reported as "NE" and "NO"; GHG emissions from wildfires are reported as "NE" under cropland, grassland and wetlands. In response to a question raised by the ERT during the review, Croatia informed the ERT that the country is planning to establish a national task force to address the completeness of its LULUCF inventory. The ERT strongly recommends that Croatia carry out this work to ensure that the LULUCF inventory is complete and to report thereon in its next annual submission.

88. The ERT strongly recommends that Croatia improve the completeness of the inventory submission and provide a land-use matrix for the years since 1990 in line with the IPCC good practice guidance for LULUCF. Further, the ERT recommends that the Party review the use of notation keys for land-use conversion categories (e.g. the conversion of land to forest land is reported as "NE" for grassland, but is reported as "NO" for all other land categories) as it is not clear to the ERT whether these land-use conversions are not occurring as Croatia is not tracking land-use change patterns over the time series. In the previous expert review, the Party informed the ERT of the progress made when evaluating available land–cover data and planning for reporting land-use conversions in the future. In the 2010 NIR, and in response to a question raised by the ERT, the Party flagged the importance of a complete GHG inventory for all land-use categories. However, Croatia did not elaborate further on its plans to address the reporting of these other categories, in particular when this would happen. The ERT recommends that Croatia include consistent land representation in its next annual submission.

89. The ERT reiterates a specific recommendation included in the previous annual review report that Croatia be more transparent regarding QC procedures, particularly those for AD, and that the Party provide a description of methods for estimating uncertainty values for the LULUCF sector. During the centralized review, Croatia provided more information on sources of AD as well as the type of uncertainty analysis applied. The ERT encourages the Party to include this additional information in its next annual submission.

90. In response to a question raised by the ERT in relation to Croatia not reporting its KP-LULUCF inventory in its annual submission, the Party submitted revised estimates on 16 October 2010 for its LULUCF inventory under the Convention.[5] Largely, the first part of this resubmission highlights the differences in either emissions or removals of CO_2 as a result of the recalculation of data since the official submission of 27 May 2010. Methods, AD and EFs used for deriving emissions/removals of CO_2 – this was the only GHG for the LULUCF category – are included in the second part of that report on supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol. The ERT recommends that Croatia report this methodological information in chapter 7 of its next NIR submission as it is integral to the reporting under the Convention as well. Including this methodological information in the relevant chapter of the NIR provides transparency under both the Convention and the Kyoto Protocol, with the latter largely adapted to the particular reporting requirements thereunder.

91. The ERT noted that the 16 October 2010 resubmission of the LULUCF inventory did not include information on the recalculations in CRF table 8(a). The ERT recommends that the Party include this information, including the rationale for the recalculations and the impact on the emissions trend and time-series consistency.

2. Key categories

Forest land remaining forest land – CO_2

92. Carbon stock changes for this category are estimated using a tier 2 methodology. Country-specific data on the average annual increment in net carbon are used, but all other EFs and parameters are taken from the IPCC good practice guidance for LULUCF. During the centralized review, Croatia updated the ERT with information on the new National Forest Inventory System (CRONFI). These data are still under consideration and are therefore not available for use in the GHG inventory at this time. According to the Party,

[5] The resubmission of Croatia's 2010 annual submission on 16 October 2010 comprised an "addendum to National Inventory Report 2010 related to Chapter 7 LULUCF (Part I) and Chapter 11 KP-LULUCF (Part II – supplementary information required under Article 7, para. 1)".

once the CRONFI data becomes official and published, it could be used to fill in gaps in order to report on all forests, regardless of ownership and protected status. The ERT recommends that Croatia continue to advance its consideration of the CRONFI data in order to improve the comprehensiveness of its LULUCF GHG inventory.

93. The ERT identified several cases in the NIR and the "addendum" of 16 October 2010 of limited or missing descriptions of methods, AD, EFs and underlying assumptions. For instance, the EFs used for estimating non-CO_2 emissions from forest fires were not specified. In addition, assumptions and methodologies associated with constant annual increases in biomass carbon stocks between 1990 and 1995, and between 1996 and 2005 are not explained. The ERT recommends that the Party provide more detailed descriptions of methods, underlying assumptions and AD in its next annual submission.

94. The previous ERT recommended that Croatia further stratify its forests into more detailed forest types, according to the data available at that time in the Statistical Yearbooks. During the 2010 review, this issue was raised again by the ERT, and Croatia explained that there is more recent data on the distribution of forest areas for the period 2006–2009, which only distinguishes between deciduous and coniferous forest types. These more recent data are harmonized with the National Forestry Act and its requirements. According to the Party, this cannot be compared with previously stratified areas presented in Statistical Yearbooks. The ERT accepts the explanation that the distribution of deciduous and coniferous forest is the best available stratification approach at the current time, but encourages Croatia to further investigate options to improve the stratification approach and ensure consistency in applying it over the entire times series.

95. CRF table 5.A reports changes in carbon stocks only for the living biomass carbon pool. Net carbon stock changes in dead organic matter and net carbon stock change in mineral soils and organic soils are reported as "NE" for forest land remaining forest land. In response to a question raised by the ERT, the Party informed the ERT that the AD required to apply the methodology of the IPCC good practice guidance for LULUCF to estimate these pools are still not available, though it has undertaken efforts to collect the relevant AD in this regard. Further, the Party indicated that other carbon pools will be addressed in the next annual submission. The ERT reiterates the recommendation of the previous expert review that all carbon pools are reported for forest land remaining forest land.

96. Areas with degraded forest vegetation are not included in the carbon stock change estimates for forest land remaining forest land. However, the Party informed the ERT that the CRONFI system does include data on degraded forests. The CRONFI data are still under consideration and, therefore, are not available for use in the GHG inventory. According to the Party, once the CRONFI data becomes official and published, it could be used to fill in gaps in order to report all forests. The ERT recommends that Croatia continue to advance its consideration of the CRONFI data in order to improve the comprehensiveness of its LULUCF GHG inventory.

F. Waste

1. Sector overview

97. In 2008, emissions from the waste sector amounted to 929.50 Gg CO_2 eq, or 3.0 per cent of total GHG emissions. Since the base year, emissions have increased by 57.5 per cent. The key driver for the rise in emissions is, according to the NIR, an improved standard of living, leading to increased consumption, therefore more waste, even though this rise has been compensated by measures undertaken to reduce and recycle waste. Within the sector, 70.5 per cent of the emissions were from solid waste disposal on land, followed by 29.5 per cent from wastewater handling and 0.0 per cent from waste incineration.

98. CH_4 emissions from sludge were not estimated for the entire time series. The ERT recommends that Croatia make all the necessary effort to report emission estimates for this category in its next annual inventory submission. The use of notation keys in the CRF tables is complete and consistent with the information in the NIR.

99. Recalculations were reported in the waste sector, including for domestic and commercial wastewater and human sewage as a result of new biochemical oxygen demand (BOD) data for 2007, new data on protein intake for the years 1990–1991 and for the years 2006 and 2007, and new population data for the period 2000–2003. The ERT recommends that Croatia compare its data on annual protein intake with corresponding data from the Food and Agriculture Organization of the United Nations (FAOSTAT) and report thereon in its next annual submission.

2. Key categories

Solid waste disposal on land – CH_4

100. Croatia uses the tier 2 method to estimate CH_4 emissions from solid waste disposal on land, with country-specific AD and a combination of country-specific EFs and IPCC default values. The estimate covers managed and unmanaged (deep and shallow) solid waste disposal.

101. The ERT noted that historical data on the total amount of generated waste and municipal solid waste disposed are only provided since 1970. According to the IPCC good practice guidance, it is necessary to include data on solid waste disposal (amount and composition) for three- to five-year half-lives for the waste deposited at the solid waste disposal sites to achieve accurate emission estimates. The ERT recommends that historical data be estimated back to 1955, as Croatia uses the IPCC default value $k = 0.05$.

G. Adjustments

102. The ERT identified and recommended seven adjustments in the agriculture sector for 2008. In accordance with the guidance for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1), the adjustments to the agriculture sector were prepared by the ERT in consultation with Croatia. Also, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1), the ERT officially notified Croatia of the calculated adjustments.

103. The underestimations leading to adjustments in the agriculture sector in 2008 include: CH_4 emissions from enteric fermentation for sheep (4.A.3) and swine (4.A.8), and CH_4 emissions from manure management for sheep (4.B.3), goats (4.B.4), horses (4.B.6), mules and asses (4.B.7) and poultry (4.B.9).

104. The adjusted estimate for GHG emissions for the agriculture sector in 2008 amounts to 3,449.18 Gg CO_2 eq, with the 3,359.37 Gg CO_2 eq originally reported by Croatia in its 2010 annual submission. The calculation of the adjustments leads to an increase in estimated total GHG emissions of 0.3 per cent (89.80 Gg CO_2 eq), from 31,143.49 Gg CO_2 eq as reported by Croatia to 31,233.29 Gg CO_2 eq as calculated by the ERT.

105. In its response to the draft annual review report, Croatia failed to notify the secretariat of its intention to accept or reject the calculated adjustment.

106. The ERT notes that Croatia may submit revised estimates for a part of its inventory to which adjustments were applied, in conjunction with its next inventory, or at the latest with the inventory for the year 2012. The revised estimates will be part of the Article 8 review and if accepted by the ERT the revised estimates will replace the adjustments.

1. Enteric fermentation – CH_4

The original estimate

107. In its 2008 inventory, Croatia provides an estimate for CH_4 emissions from enteric fermentation of 767.96 Gg CO_2 eq. The estimate was the same in the resubmission on 16 October 2010.

The underlying problem

108. Croatia has used a tier 1 method to estimate CH_4 emissions for animals other than cattle and IPCC default EFs for developing countries to estimate CH_4 emissions from enteric fermentation. In the NIR of the 2010 submission Croatia, in response to a recommendation of the 2009 annual review report, provided only limited information on its national circumstances and highlighted a low percentage of gross value added from agriculture activities as one of the main reasons to choose EFs for developing countries.

The rationale for adjustment

109. According to the Revised 1996 IPCC Guidelines, EFs for developing countries are appropriate for animals with the typical weight, which is not common for livestock in Europe. The average weight of swine and of sheep in developing countries is 28 kg, while the average weight of swine and sheep in developed countries is 82 kg and 43 kg, respectively. The ERT considers that animals in Croatia are similar to those in other European countries with regard to weight and that the use of EFs in this case for developing countries is inappropriate. The ERT concludes that this category has been potentially underestimated.

The recommendation to the Party

110. During the review, the ERT recommended that Croatia justify its use of EFs for developing countries, providing also the data on relevant parameters like animal weight, or that the Party revise estimates for these categories using appropriate EFs for developed countries.

111. Croatia responded to the notification on this potential problem within the six-week period. The ERT has assessed Croatia's response and concluded that the information provided does not adequately address or correct the problem as Croatia justifies the use of EFs for developing countries with parameters (e.g. area of agricultural land, number of fatlings per sow) and descriptions of conditions (e.g. extensive nature of livestock production, insufficient meat production, etc.) which have no direct influence on the choice of EFs. In the six-week time frame, Croatia did not provide any estimates for relevant parameters like animal weight.

112. After the six-week time frame, on 30 October 2010 Croatia submitted two tables with data including information on the weight of swine and lambs. However, the ERT concluded that these data do not justify the use of EFs for developing countries. (The first one demonstrates that the average weight of swine on enterprise farms at the end of the fattening period is 106 kg and the second one is a performance test for male lambs until the age of 3–4 months and not for grown-up sheep.)

The assumptions, data and methodology used to calculate the adjustment

113. The ERT concluded that the most appropriate methodology for the adjustment in accordance with the technical guidance for adjustments, as set out in the annex to decision 20/CMP.1, would be the use of IPCC default values for developed countries (table 4-3) from the Revised 1996 IPCC Guidelines to estimate CH_4 emissions for sheep and swine.

For other animals (goats, horses, and mules and asses) the IPCC default EFs for developing countries are the same as those for developed countries and, therefore, the emissions are not underestimated. Adjusted emissions have been calculated using AD (animal population data) as provided in the Croatian 2010 annual submission.

The adjusted estimate

114. Tables 4 and 5 below present the results of the ERT's calculation, including the original estimate as reported by Party, the adjusted estimate as calculated by the ERT, and the impact of the adjustment on total GHG emissions in 2008. After the calculation of adjustments, the emissions of CH_4 from enteric fermentation have increased by 69.27 Gg CO_2 eq or 9.0 per cent in 2008. The impact on total GHG emissions in 2008 is an increase of 0.2 per cent.

Table 4
Description of the adjustment calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: enteric fermentation – sheep			
Party's estimate of: EF for CH_4	5	kg/head/year	CRF table, v3.1, official resubmission on 16 October 2010
Party's emission/removal estimate from enteric fermentation: sheep – CH_4	3.217	Gg CH_4	CRF table, v3.1, official resubmission on 16 October 2010
Input data/parameter for calculation of adjustment	8	kg/head/year	Revised 1996 IPCC Guidelines
Calculated estimate for enteric fermentation: sheep – CH_4	5.147	Gg CH_4	ERT calculation
Conservativeness factor	1.12		Table 2 of appendix III to the technical guidance for adjustments attached to decision 20/CMP.1
Adjusted conservative estimate for enteric fermentation: sheep – CH_4	5.765	Gg CH_4	ERT calculation
Adjusted conservative estimate for enteric fermentation: sheep – CH_4	121.059	Gg CO_2 eq	ERT calculation
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	31 143.487	Gg CO_2 eq	CRF table, v3.1, official resubmission on 16 October 2010
Total aggregated GHG emissions (excluding LULUCF) after calculation of adjustment	31 196.991	Gg CO_2 eq	ERT calculation
Difference between original and adjusted total aggregated GHG emissions	53.504	Gg CO_2 eq	ERT calculation
	0.172	%	ERT calculation

Abbreviations: CRF = common reporting format, EF = emission factor, ERT = expert review team, GHG = greenhouse gas, IPCC = Intergovernmental Panel on Climate Change, LULUCF = land use, land-use change and forestry.

Table 5
Description of the adjustment calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: enteric fermentation – swine			
Party's estimate of: EF for CH_4	1	kg/head/year	CRF table, v3.1, official resubmission on 16 October 2010
Party's emission/removal estimate from enteric fermentation: swine – CH_4	1.104	Gg CH4	CRF table, v3.1, official resubmission on 16 October 2010
Input data/parameter for calculation of adjustment	1.5	kg/head/year	Revised 1996 IPCC Guidelines
Calculated estimate for enteric fermentation: swine – CH_4	1.656	Gg CH_4	ERT calculation
Conservativeness factor	1.12		Table 2 of appendix III to the technical guidance for adjustments attached to decision 20/CMP.1
Adjusted conservative estimate for enteric fermentation: swine – CH_4	1.854	Gg CH_4	ERT calculation
Adjusted conservative estimate for enteric fermentation: swine – CH_4	38.945	Gg CO_2 eq	ERT calculation
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	31 143.487	Gg CO_2 eq	CRF table, v3.1, official resubmission on 16 October 2010
Total aggregated GHG emissions (excluding LULUCF) after calculation of adjustment	31 159.251	Gg CO_2 eq	ERT calculation
Difference between original and adjusted total aggregated GHG emissions	15.763	Gg CO_2 eq	ERT calculation
	0.051	%	ERT calculation

Conservativeness of the ERT's calculation of the adjustment

115. The ERT applied a conservativeness factor of 1.12 (agriculture (enteric fermentation, EF), table 2 of appendix III contained in the technical guidance for adjustments in the annex to decision 20/CMP.1) to estimate sheep and swine CH_4 emissions from enteric fermentation. The ERT therefore considers that the resulting adjusted value is conservative.

2. Manure management – CH_4

The original estimate

116. In its 2008 inventory, Croatia provides an estimate for CH_4 emissions from manure management of 144.24 Gg CO_2 eq. In the resubmission on 16 October 2010 this estimate was changed to 141.30 Gg CO_2 eq.

The underlying problem

117. Croatia has used a tier 1 method to estimate CH_4 emissions for animals other than cattle and swine, and cool climate zone IPCC default EFs for developing countries to estimate CH_4 emissions from manure management.

The rationale for adjustment

118. The reasons mentioned in paragraph 109 above as the basis for an adjustment are valid here and the ERT concludes that the emission estimate is a potential underestimate.

The recommendation to the Party

119. During the review, the ERT recommended that Croatia justify its use of EFs for developing countries or revise estimates for relevant categories using appropriate EFs for developed countries.

120. Croatia responded to the notification on this potential problem within the six-week period. The ERT has assessed Croatia's response and information and concluded that the information provided does not adequately address or correct the problem. Moreover, in the revised CRF tables submitted on 16 October 2010, the EFs for horses, mules and asses, and poultry are 1,000 times lower than the IPCC default values for developing countries. A more detailed explanation of the issue is provided in the description of the adjustment mentioned above in paragraph 109 above in relation to enteric fermentation.

The assumptions, data and methodology used to calculate the adjustment

121. The ERT concluded that the most appropriate methodology for the adjustment in accordance with the technical guidance for adjustments, as set out in the annex to decision 20/CMP.1, would be the use of IPCC default values for developed countries and cool climate (table 4-5) from the Revised 1996 IPCC Guidelines to estimate sheep, goats, horses, mules and asses, and poultry CH_4 emissions from manure management. Adjusted emissions have been calculated using AD (animal population data) as provided in the 2010 annual submission of Croatia.

The adjusted estimate

122. Tables 6 to 10 below present the results of the ERT's calculation, including the original estimate as reported by the Party, the adjusted estimate as calculated by the ERT, and the impact of the adjustment on total GHG emissions in 2008. After the calculation of adjustments, the emissions of CH_4 from manure management have increased by 20.54 Gg CO_2 eq or 14.5 per cent in 2008. The impact on total GHG emissions in 2008 is an increase of 0.1 per cent.

Table 6
Description of the adjustment calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: manure management – sheep			
Party's estimate of: EF for CH_4	0.1	kg/head/year	CRF table, v3.1, official resubmission on 16 October 2010
Party's emission/removal estimate from enteric fermentation: sheep – CH_4	0.064	Gg CH_4	CRF table, v3.1, official resubmission on 16 October 2010

Parameter/estimate	*Value*	*Unit*	*Source*
Input data/parameter for calculation of adjustment	0.19	kg/head/year	Revised 1996 IPCC Guidelines
Calculated estimate for enteric fermentation: sheep – CH_4	0.122	Gg CH_4	ERT calculation
Conservativeness factor	1.12		Table 2 of appendix III to the technical guidance for adjustments attached to decision 20/CMP.1
Adjusted conservative estimate for enteric fermentation: sheep – CH_4	0.137	Gg CH_4	ERT calculation
Adjusted conservative estimate for enteric fermentation: sheep – CH_4	2.875	Gg CO_2 eq	ERT calculation
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	31 143.487	Gg CO_2 eq	CRF table, v3.1, official resubmission on 16 October 2010
Total aggregated GHG emissions (excluding LULUCF) after calculation of adjustment	31 145.011	Gg CO_2 eq	ERT calculation
Difference between original and adjusted total aggregated GHG emissions	1.524	Gg CO_2 eq	ERT calculation
	0.005	%	ERT calculation

Table 7
Description of the adjustment calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: manure management – goats			
Party's estimate of: EF for CH_4	0.11	kg/head/year	CRF table, v3.1, official resubmission on 16 October 2010
Party's emission/removal estimate from enteric fermentation: goats – CH_4	0.009	Gg CH_4	CRF table, v3.1, official resubmission on 16 October 2010
Input data/parameter for calculation of adjustment	0.12	kg/head/year	Revised 1996 IPCC Guidelines
Calculated estimate for enteric fermentation: goats – CH_4	0.010	Gg CH_4	ERT calculation
Conservativeness factor	1.12		Table 2 of appendix III to the technical guidance for adjustments attached to decision 20/CMP.1
Adjusted conservative estimate for enteric fermentation: goats – CH_4	0.011	Gg CH_4	ERT calculation
Adjusted conservative estimate for enteric fermentation: goats – CH_4	0.237	Gg CO_2 eq	ERT calculation

Parameter/estimate	*Value*	*Unit*	*Source*
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	31 143.487	Gg CO_2 eq	CRF table, v3.1, official resubmission on 16 October 2010
Total aggregated GHG emissions (excluding LULUCF) after calculation of adjustment	31 143.530	Gg CO_2 eq	ERT calculation
Difference between original and adjusted total aggregated GHG emissions	0.043	Gg CO_2 eq	ERT calculation
	0.0001	%	ERT calculation

Table 8
Description of the adjustment calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: manure management – horses			
Party's estimate of: EF for CH_4	0.0011	kg/head/year	CRF table, v3.1, official resubmission on 16 October 2010
Party's emission/removal estimate from enteric fermentation: horses – CH_4	0.00002	Gg CH_4	CRF table, v3.1, official resubmission on 16 October 2010
Input data/parameter for calculation of adjustment	1.4	kg/head/year	Revised 1996 IPCC Guidelines
Calculated estimate for enteric fermentation: horses – CH_4	0.022	Gg CH_4	ERT calculation
Conservativeness factor	1.12		Table 2 of appendix III to the technical guidance for adjustments attached to decision 20/CMP.1
Adjusted conservative estimate for enteric fermentation: horses – CH_4	0.025	Gg CH_4	ERT calculation
Adjusted conservative estimate for enteric fermentation: horses – CH_4	0.527	Gg CO_2 eq	ERT calculation
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	31 143.487	Gg CO_2 eq	CRF table, v3.1, official resubmission on 16 October 2010
Total aggregated GHG emissions (excluding LULUCF) after calculation of adjustment	31 144.014	Gg CO_2 eq	ERT calculation
Difference between original and adjusted total aggregated GHG emissions	0.526	Gg CO_2 eq	ERT calculation
	0.002	%	ERT calculation

Table 9
Description of the adjustment calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: manure management – mules and asses			
Party's estimate of: EF for CH_4	0.0006	kg/head/year	CRF table, v3.1, official resubmission on 16 October 2010
Party's emission/removal estimate from enteric fermentation: mules and asses – CH_4	0.000002	Gg CH_4	CRF table, v3.1, official resubmission on 16 October 2010
Input data/parameter for calculation of adjustment	0.76	kg/head/year	Revised 1996 IPCC Guidelines
Calculated estimate for enteric fermentation: mules and asses – CH_4	0.003	Gg CH_4	ERT calculation
Conservativeness factor	1.12		Table 2 of appendix III to the technical guidance for adjustments attached to decision 20/CMP.1
Adjusted conservative estimate for enteric fermentation: mules and asses – CH_4	0.003	Gg CH_4	ERT calculation
Adjusted conservative estimate for enteric fermentation: mules and asses – CH_4	0.072	Gg CO_2 eq	ERT calculation
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	31 143,487	Gg CO_2 eq	CRF table, v3.1, official resubmission on 16 October 2010
Total aggregated GHG emissions (excluding LULUCF) after calculation of adjustment	31 143.559	Gg CO_2 eq	ERT calculation
Difference between original and adjusted total aggregated GHG emissions	0.071	Gg CO_2 eq	ERT calculation
	0.0002	%	ERT calculation

Table 10
Description of the adjustment calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: manure management – poultry			
Party's estimate of: EF for CH_4	0.000012	kg/head/year	CRF table, v3.1, official resubmission on 16 October 2010
Party's emission/removal estimate from enteric fermentation: poultry – CH_4	0.0001	Gg CH_4	CRF table, v3.1, official resubmission on 16 October 2010
Input data/parameter for calculation of adjustment	0.078	kg/head/year	Revised 1996 IPCC Guidelines

Parameter/estimate	*Value*	*Unit*	*Source*
Calculated estimate for enteric fermentation: poultry – CH_4	0.781	Gg CH_4	ERT calculation
Conservativeness factor	1.12		Table 2 of appendix III to the technical guidance for adjustments attached to decision 20/CMP.1
Adjusted conservative estimate for enteric fermentation: poultry – CH_4	0.875	Gg CH_4	ERT calculation
Adjusted conservative estimate for enteric fermentation: poultry – CH_4	18.372	Gg CO_2 eq	ERT calculation
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	31 143,487	Gg CO_2 eq	CRF table, v3.1, official resubmission on 16 October 2010
Total aggregated GHG emissions (excluding LULUCF) after calculation of adjustment	31 161.857	Gg CO_2 eq	ERT calculation
Difference between original and adjusted total aggregated GHG emissions	18.370	Gg CO_2 eq	ERT calculation
	0.059	%	ERT calculation

Conservativeness of the ERT's calculation of the adjustment

123. The ERT applied the conservativeness factor 1.12 (agriculture (manure management, EF), table 2 of appendix III contained in the technical guidance for adjustments in the annex to decision 20/CMP.1) to estimate sheep, goats, horses, mules and asses, and poultry CH_4 emissions from manure management. The ERT therefore considers that the resulting adjusted value is conservative.

H. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

124. The submission of 27 May 2010 did not include information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. In response to the potential issues and questions submitted to the Party at the end of the review week, Croatia submitted on 16 October 2010 its KP-LULUCF submission (the "addendum" referred to in paragraph 90 above). On 4 December 2010 Croatia submitted revised information based on inaccuracies it had identified in its KP-LULUCF CRF submission.

125. The KP-LULUCF submission included information on afforestation, reforestation and deforestation (ARD) under Article 3, paragraph 3. Croatia elected forest management under Article 3, paragraph 4, of the Kyoto Protocol.

126. In chapter 2 of the aforementioned addendum, Croatia reports information in accordance with the provisions contained in the annex to decision 15/CMP.1.

127. The ERT found that emissions from carbon stock have been estimated in line with the IPCC good practice guidance for LULUCF. Carbon stock changes under ARD have

been estimated using a tier 1 method, whereas a tier 2 method has been used to estimate emissions from forest management activities. The ERT recommends that Croatia explore the development of a tier 2 methodology to estimate carbon stock change emissions from ARD activities.

128. The ERT was not able to clearly identify from the information in the NIR the parameters used to estimate carbon stock change emissions, including those used to estimate the living biomass increments (i.e. biomass expansions factors BF1 and BF2). The ERT recommends that Croatia improve the transparency of its annual submission by providing in its NIR the parameters and values used to estimate carbon stock changes.

129. The ERT noted from the addendum (section 1.2.1.1) submitted on 16 October 2010 "the approach and methodology used for the year 2008 for Kyoto Protocol supplementary information were used for the entire period concerned in order to satisfy the time consistency criteria". The ERT found that CO_2 emissions/removals for 2008 reported in the addendum under the Convention LULUCF and KP-LULUCF were recalculated using the same methods, AD and EFs. Based on the above finding, the ERT would expect that for the same area of land area there would be the same carbon density under both the Convention LULUCF and KP-LULUCF. However, the ERT concluded that this is not the case, as illustrated in the following example:

(a) The area of forest land remaining forest land under the Convention is 1,874.13 kha (CRF table 5.A.1, version 3.1) in 2008, which is the same area reported for forest management activities (CRF table 5(KP-I)B.1);

(b) However, reported net changes in carbon stocks in living biomass were –3.020.49 Gg carbon under the Convention (CRF table 5.A.1, version 3.1), whereas net changes in carbon stocks of aboveground living biomass were –11.075.13 Gg carbon (approximately 3.7 times larger) under KP-LULUCF (CRF table 5(KP-I)B.1). This difference was explained by the Party which provided revised information to the ERT on 4 December 2010. The main reason for this inaccuracy was an error in the compilation of the CRF tables (usage of Gg CO_2 instead of Gg C).

130. The ERT found the same discrepancy between the Convention LULUCF and KP-LULUCF estimates from the following categories: land converted to forest land and afforestation and reforestation activities; and forest land converted to settlements and deforestation activities. The explanation was provided by the Party which provided revised information on 4 December 2010. The main reason for this inaccuracy was, again, the error during the compilation of the CRF tables (usage of Gg CO_2 instead of Gg C).

131. In order to ensure that units of land and areas of land subject to each activity are identifiable, Croatia applies geographical units related to ownership, contained as thematic maps in an annex to the national forest database (FMAP). However, land identification by ownership is not enough to locate land areas. The ERT recommends that the Party identify land areas at the largest feasible disaggregation level defined in the FMAP and (if possible) geo-reference the resulting units of land. The spatial assessment unit to determine the area of units of land under Article 3, paragraph 3, is 0.1 ha, which is the same as the minimum area of forest. The ERT strongly recommends that the Party elaborate and improve its land representation.

132. All forests that meet the definition of forest are considered as managed and are under forest management. Therefore, the entire Croatian forest area is considered to be managed forest land.

133. According to the definitions provided in the NIR, forest is land spanning more than 0.1 ha with trees higher than 2 meters and canopy cover above 10 per cent, or trees able to reach these thresholds in situ.

134. Only aboveground and belowground biomass carbon pools were accounted in the inventory for ARD and forest management activities. Dead wood, litter and soil are not included, based on the assumption that these are not emission sources. The justification for this assumption is that the nature of forest management practices, as well as the legal framework, do not allow these pools to be sources. Croatia does offer a pool-by-pool justification along these lines. However, the ERT considers this insufficient, noting, for example, that the former land use of afforested land is not known in Croatia's case, hence there could be a loss of soil carbon stocks through afforestation or the legal framework may not actually be complied with. The ERT recommends that Croatia provide in its next annual submission quantitative documentation to verify that the missing carbon pools are not net sources of emissions.

135. Croatia states in the NIR that it has not factored out removals from elevated CO_2 concentrations, indirect N deposition or the dynamic effects of age structure resulting from activities prior to 1 January 1990.

136. There is no debit incurred under Article 3, paragraph 3, hence no information has been submitted by the Party that indicates to what extent the anthropogenic GHG removals by sinks will offset any debit incurred under Article 3, paragraph 3.

137. In line with paragraph 8(a) of the annex to decision 15/CMP.1, Croatia reported in its NIR that the FMAP was used as the basis to determine if ARD activities occurred on or after 1 January 1990. This database covered the period 1986–1995. In its addendum submitted 16 October 2010, Croatia explained that FMAP only includes data on afforestation events that are human-induced.

138. With respect to the requirement of paragraph 8(b) of the annex to decision 15/CMP.1, the Party states in its NIR that harvesting is regulated through regional rules, which establish procedures to follow in case of harvesting. Deforestation is allowed only in very limited circumstances and has to follow administrative regulations in order to be permitted. Given the specific circumstances under which deforestation is permitted, it may be distinguished from harvesting or disturbance followed by re-establishment.

139. Croatia stated in its addendum to the annual submission submitted to the ERT on 16 October 2010 that harvesting (fellings) has not occurred on afforested land since the beginning of the commitment period.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

140. Croatia reports reforestation as "NO". Total net removals resulting from afforestation activities are 515.04 Gg CO_2 eq. A tier 1 method is used to estimate carbon stock changes in living biomass for the entire time series. Emissions from all other carbon pools are not reported. It is not likely that these pools are sources; however, this is a possibility, especially given that the starting state of afforested land is not clear. Therefore, the ERT strongly recommends that Croatia estimate emissions and removals from all carbon pools and report thereon in its next annual submission.

Deforestation – CO_2

141. Croatia assumes that all deforestation is a result of the conversion of forest land to settlements. Emissions are estimated with use of a tier 1 method. The Party assumes that all living biomass is lost upon conversion, and this is the only carbon pool reported by the Party that results in a potential underestimation of emissions. The ERT recommends that Croatia include verifiable information in its next annual submission which confirms that the missing carbon pools are not individually a net source of emissions.

142. The deforested area reported by Croatia only includes the area managed by the Croatian Forests Limited and excludes any deforestation on other state lands managed by other legal bodies or private lands. The Party explained that this was due to unavailable data. The ERT concludes that this is also a potential underestimation of emissions if deforestation is occurring on these other lands. The ERT recommends that Croatia collect the necessary data to determine if deforestation is occurring on these lands, and, if so, that the Party estimate emissions from all carbon pools and report thereon in its next annual submission.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2

143. Forest management was a net sink in 2008, removing 40,608.80 Gg of CO_2 eq. Croatia submitted revised information to the ERT on 4 December 2010 on inaccuracies identified by the Party in its 2010 KP-LULUCF inventory. This revised information indicates that the Party's removals from forest management activities are 11,075.13 Gg CO_2 eq. Emissions and removals from forest management were calculated based on newly available, more detailed data obtained from Croatian Forests Limited and with use of a tier 2 method. The ERT noted that living biomass is the only carbon pool reported by the Party. The ERT recognizes that Croatia included explanations regarding the exclusion of the other pools in the addendum to the annual submission provided to the ERT on 16 October 2010, but recommends that this information be elaborated in the next annual submission in order to verify that the missing carbon pools are not individually a net source of emissions.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

144. Information on the accounting of Kyoto units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1. However, the Party did not report information in the SEF, as required by decision 14/CMP.1, as it has not acquired or transferred Kyoto Protocol units in the reporting period and therefore is not required to submit the SEF from its national registry.

National registry

145. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. However, the SIAR identified the following problems:

(a) Croatia has provided descriptions of how its national registry continues to perform the functions and how it adheres to the technical standards for data exchange between registry systems, but a clear statement on whether changes have occurred in the reporting period is not reported. The ERT reiterates the recommendation of the SIAR from the previous ERT that the Party specifically address the recommendation contained in paragraph 88 of the report FCCC/ARR/2009/HRV and report on any changes in its national registry in accordance with chapter I.G of the annex to decision 15/CMP.1;

(b) Information on the national registry is not currently publicly available. Croatia stated that this information would be made publicly available once the pending issue of the calculation of the assigned amount of Croatia, with reference to document FCCC/KP/CMP/2010/2 (19 February 2010), was resolved. The ERT reiterates the recommendation of the SIAR that Croatia provide through its national registry the public information referred to in paragraphs 45–48 of the annex to decision 13/CMP.1, and report, in its next annual submission, on any changes to that public information;

(c) The ERT reiterates a recommendation provided in the SIAR from the previous ERT that Croatia specifically address the recommendation contained in paragraph 85 of the report FCCC/ARR/2009/HRV by providing more complete and detailed information on the Network Time Protocol (NTP) procedure and the disaster recovery plan.

Calculation of the commitment period reserve

146. Croatia has reported its commitment period reserve (CPR) (155,658.224 t CO_2 eq) in its 2010 annual submission. The 2010 NIR states that the CPR calculation is based on the 2008 inventory and not the assigned amount as a decision of the compliance committee under the Kyoto Protocol on the calculation of the CPR in accordance with paragraph 6 of the annex to decision 11/CMP.1 and of the assigned amount of Croatia in accordance with Article 3, paragraphs 7 and 8, of the Kyoto Protocol, is pending.

147. In response to questions raised by the ERT during the review, Croatia reported its CPR to be 155,717.436 t CO_2 eq, based on the national emissions in its most recently reviewed inventory (31,143.49 Gg CO_2 eq). The ERT disagrees with this figure. The ERT calculated the CPR based on the most recently reviewed inventory (2010 submission) since, at the time of the preparation of the draft ARR, Croatia did not have an established assigned amount, and the calculation of the CPR based on the comparison of the assigned amount and the initial assigned amount in accordance with paragraphs 6 and 8 of the annex to decision 11/CMP.1 was not possible. The ERT recommends that once the assigned amount is established, the CPR be calculated fully in accordance with paragraphs 6 and 8 of the annex to decision 11/CMP.1. Based on the most recently reviewed GHG inventory (31,233.29 Gg CO_2 eq), which includes the calculated adjustments to the emissions in 2008, the ERT calculates the CPR to be 156,166.446 t CO_2 eq.

3. Changes to the national system

148. Croatia reported that there are no changes in its national system since the previous annual submission. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

149. Croatia did not provide information on changes in its national registry in its annual submission. However, the SIAR identified that there was no change in the Party's national registry when compared to the previous annual submission. The ERT concluded that Croatia's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). The ERT recommends that the Party report in its next annual submission any change(s) in its national registry in accordance with chapter I.G of the annex to decision 15/CMP.1.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

150. Croatia has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its 2010 annual submission. The Party submitted this information on 27 May 2010.

151. The reported information is generally complete and transparent. Croatia reports on policy elements for mitigation of climate change in order to fulfil its commitments under Article 3, paragraph 1, of the Kyoto Protocol, and on the 33 measures included in the Air Quality Protection and Improvement Plan of the Republic of Croatia. The ERT encourages Croatia, if it is in position to do so, to improve completeness and transparency by reporting on how it gives priority, in implementing its commitments under Article 3, paragraph 14, to the actions listed in paragraph 24 of the annex to decision 15/CMP.1.

III. Conclusions and recommendations

152. Croatia made its annual submission on 15 April 2010. The annual submission contains the GHG inventory (comprising CRF tables and an NIR), but did not include supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol. Croatia resubmitted its NIR and CRF tables on 27 May 2010; this resubmission included information on: Kyoto Protocol units, changes in the national system, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. This resubmission did not include information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, which was submitted on 16 October 2010. The SEF tables were not required to be submitted by the Party as it had not acquired or transferred any Kyoto units. The annual submission was not submitted in accordance with decision 15/CMP.1.

153. The inventory submission by Croatia is complete and the Party has submitted a complete set of CRF tables for the years 1990–2008 and an NIR; these are complete in terms of geographical coverage, years and sectors as well as generally complete in terms of categories and gases. CH_4 emissions from sludge were not estimated for the entire time series, and HFC emissions from aerosols/metered dose inhalers were reported as "NE". The Party submitted revised HFC emissions from aerosols/metered dose inhalers on 16 October 2010.

154. The submission of 27 May 2010 contained information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1, except for information on KP-LULUCF which was submitted on 16 October 2010.

155. The Party's inventory is generally in line with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, Croatia used inappropriate parameters in its estimation of emissions for a number of categories in the agriculture sector. The ERT concludes that it was an underestimation of emissions and implemented adjustment procedures under decision 20/CMP.1 that led to an increase of 89.80 Gg CO_2 eq in total GHG emissions for 2008.

156. Croatia did not report information on KP-LULUCF until its response received by the ERT on 16 October 2010 to potential issues and questions raised by the ERT after the review week. This information was provided as an addendum to its submission on 16 October 2010. The ERT concluded that emissions from carbon stock have been estimated in line with the IPCC good practice guidance for LULUCF; however, some

carbon pools (dead wood, litter and soil) were not included in the inventory as Croatia assumed that, individually, they are not a net source of emissions.

157. Croatia has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1. As Croatia has not acquired or transferred Kyoto Protocol units in the reporting period, the Party is not required to submit an SEF from its national registry.

158. The ERT concluded that the national system continues to perform its required functions. However, the ERT noted that Croatia did not submit its KP-LULUCF inventory to the ERT until 16 October 2010, and found that the GHG inventory was not prepared in line with the Revised 1996 IPCC Guidelines or the IPCC good practice guidance, which resulted in the implementation of adjustment procedures under decision 20/CMP.1.

159. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

160. Croatia has reported the information requested in chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2010 annual submission. The submitted information is generally complete and transparent (see para. 151 above).

161. In the course of the review, the ERT formulated a number of recommendations relating to inventory management, the completeness of the annual submission (including supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol), transparency, and the reporting of KP-LULUCF information. The key recommendations are that Croatia:

(a) Submit a complete submission by 15 April 2011 as required by decision 15/CMP.1;

(b) Improve its inventory management by:

(i) Systematically prioritizing improvements and recalculations using review recommendations and results of the uncertainty and key category analyses;

(ii) Describing in the NIR how recommendations from previous review reports have been implemented and/or addressed;

(iii) Providing more information and examples in the NIR on how QA/QC procedures work in practice;

(iv) Strengthening QC procedures to avoid inconsistencies between the NIR and the CRF tables as well as between different chapters of the NIR;

(c) Include in its next annual submission the missing estimates (reported as "NE"), in particular for HFC emissions from aerosols/metered dose inhalers and solvents that were submitted during the review;

(d) Provide more explanations on emission trends in the NIR, and also improve transparency by adding more information on the QA/QC plan and its changes when compared to the previous submission;

(e) Ensure that estimates of biomass pools under the Convention and under the Kyoto Protocol are consistent and that differences between the two are explained;

(f) Improve land representation under the Convention and the Kyoto Protocol;

(g) Provide further evidence that dead wood, litter and soil in the biomass carbon pools are not net sources of carbon and hence can be neglected when calculating biomass carbon pools.

IV. Adjustments

162. The ERT concludes, based on the review of the 2008 inventory, that for the following categories: CH_4 emissions from enteric fermentation for sheep and swine; and CH_4 emissions from manure management for sheep, goats, horses, mules and asses, and poultry, the EFs used are not fully in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance as required by Article 5, paragraph 2, of the Kyoto Protocol. The ERT recommended that the Party submit revised estimates or provide further justifications for its calculations for the identified categories as a way of resolving the identified potential problems. The ERT, following the review of the additional information provided by Croatia during and after the centralized review, concluded that the Party did not satisfactorily correct the problem through the submission of acceptable revised estimates and therefore decided to calculate and recommend seven adjustments in accordance with the technical guidance for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1).

163. Croatia, in its communication of 17 February 2011, failed to notify the secretariat of its intention to accept or reject the calculated adjustments. In accordance with the guidelines for review under Article 8 of the Kyoto Protocol, this failure was considered as acceptance by Croatia of the adjustments, and the ERT applied the calculated adjustments.

164. The application of the calculated adjustments would result in a change in the estimate of the 2008 emissions from the agriculture sector:

(a) CH_4 emissions from enteric fermentation;

(i) Sheep – from 67.56 Gg CO_2 eq, as originally reported by Party, to 121.06 Gg CO_2 eq or 0.17 per cent of the total national emissions;

(ii) Swine – from 23.18 Gg CO2 eq, as originally reported by Party, to 38.95 Gg CO_2 eq or 0.05 per cent of the total national emissions;

(b) CH_4 emissions from manure management;

(i) Sheep – from 1.35 Gg CO_2 eq, as originally reported by Party, to 2.88 Gg CO_2 eq or 0.005 per cent of the total national emissions;

(ii) Goats – from 0.19 Gg CO_2 eq, as originally reported by Party, to 0.24 Gg CO_2 eq or 0.0001 per cent of the total national emissions;

(iii) Horses – from 0.0004 Gg CO_2 eq, as originally reported by Party, to 0.53 Gg CO_2 eq or 0.002 per cent of the total national emissions;

(iv) Mules and asses – from 0.00005 Gg CO_2 eq, as originally reported by Party, to 0.07 Gg CO_2 eq or 0.0002 per cent of the total national emissions;

(v) Poultry – from 0.003 Gg CO_2 eq, as originally reported by Party, to 18.37 Gg CO_2 eq or 0.06 per cent of the total national emissions.

165. This in turn resulted in a change in the estimated total emissions of Croatia for 2008 – from 31,143.49 Gg CO_2 eq, as originally reported by Croatia, to 31,233.29 Gg CO_2 eq or 0.3 per cent.

V. Questions of implementation

166. No questions of implementation were identified by the ERT during the review. At the time of preparation and publication of this report, the question of implementation on the calculation of its assigned amount and its commitment period reserve identified in the initial review report[6] for Croatia remained unresolved.

[6] FCCC/IRR/2008/HRV (paras. 157–159).

Annex I

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc–nggip.iges.or.jp/public/ 2006gl /index. html>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc–nggip.iges.or.jp/public/gl/ invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc–nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc–nggip.iges.or.jp/public/gpglulucf/ gpglulucf.htm>.

"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/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09. pdf>.

"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>.

"Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03 .pdf# page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/ eng /08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

Status report for Croatia 2010. Available at <http://unfccc.int/resource/docs/2008/asr/ hrv.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2010. Available at <http://unfccc.int/resource/webdocs/sai/2010.pdf>.

FCCC/ARR/2009/HRV. Report of the individual review of the greenhouse gas inventory of Croatia submitted in 2009. Available at <http://unfccc.int/resource/docs/2009/ arr/hrv.pdf>.

UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/ 4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Vlatka Palcic (Directorate for Environmental Management), including additional material on the methodologies and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
ARD	afforestation, reforestation and deforestation
BOD	biochemical oxygen demand
C	carbon
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
EF	emission factor
ERT	expert review team
FAOSTAT	database of the Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
N	nitrogen
NA	not applicable
NCV	net calorific value
NE	not estimated
NH_3	ammonia
NO	not occurring
N_2O	nitrous oxide
NO_x	nitrogen oxide
NIR	national inventory report
NMVOC	non-methane volatile organic compounds
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change