Framework Convention on Climate Change

Report of the technical assessment of the forest management reference level submission of the Netherlands submitted in 2011

Contents

I.   Introduction and summary

A.   Overview

1.   This report covers the technical assessment (TA) of the submission of the Netherlands on its forest management reference level (FMRL), submitted on 20 April 2011 in accordance with decision 2/CMP.6. The TA took place (as a centralized activity) from 30 May to 3 June 2011 in Bonn, Germany, and was coordinated by the UNFCCC secretariat. The TA was conducted by the following team of nominated land use, land-use change and forestry experts from the UNFCCC roster of experts: Mr. Aquiles Neuenschwander (Chile), Ms. Oksana Butrim (Ukraine), Mr. Mamadou Khouma (Senegal), Mr. Kyeong-hak Lee (Republic of Korea), Mr. Doru Irimie (Romania) and Ms. Anke Benndorf (Germany). Mr. Aquiles Neuenschwander and Ms. Oksana Butrim were the lead reviewers. The TA was coordinated by Ms. María José Sanz-Sánchez (UNFCCC secretariat).

2.   In accordance with the "Guidelines for review of submissions of information on forest management reference levels" (decision 2/CMP.6, appendix II, part II), a draft version of this report was communicated to the Government of the Netherlands, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B.   Proposed reference level

3.   In its original submission, the Netherlands proposed an FMRL of –1.438 million tonnes of carbon dioxide equivalent (Mt CO_2 eq) per year applying a first-order decay function for harvested wood products (HWP) and –1.578 Mt CO_2 eq per year assuming instantaneous oxidation of HWP. Owing to a technical correction in the calculation matrix of the HWP model used for setting the reference level, the Netherlands forwarded to the secretariat, on 20 May 2011, a communication[1] relating to the HWP value and proposed an FMRL of –1.539 Mt CO_2 eq per year applying a first-order decay function for HWP and –1.578 Mt CO_2 eq per year assuming instantaneous oxidation of HWP. Decay of HWP accounts for removals of –0.039 Mt CO_2 eq per year (in comparison with –0.14 Mt CO_2 eq per year as stated in the original submission).

4.   In response to the recommendation of the expert review team (ERT), the Netherlands reconciled the discrepancies in area data used by the models (see para. 5 below). The Party's rerun of the models with updated area data resulted in a revised FMRL of –1.464 Mt CO_2 eq per year (average 2013–2020) assuming instantaneous oxidation of HWP and a revised FMRL of –1.425 Mt CO_2 eq per year applying a first-order decay function for HWP.

II.   General description of the reference level

A.   Overview

5.   The Netherlands is one of the member States of the European Union (EU) for which the Joint Research Centre (JRC) of the European Commission developed projections in

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[1] <http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/awgkp_netherlands_corr.pdf>.

collaboration with two EU modelling groups. The models, G4M (Global Forestry Model)[2] (from the International Institute for Applied Systems Analysis) and EFISCEN (European Forest Information Scenario Model)[3] (from the European Forest Institute), project annual estimates of emissions and removals for forest management up to 2020 for the above-ground and below-ground biomass carbon pools. To estimate the FMRL, the emissions and removals estimated by the models for time series 2000 to 2020 were calibrated/adjusted using historical data from the country for the period 2000–2008.[4]

B. How each element of footnote 1 to paragraph 4 of decision 2/CMP.6 was taken into account in the construction of the reference level

1. Historical data from greenhouse gas inventory submissions

6. The national forest inventory (NFI) of the Netherlands and other forest statistics provide the historical data used for the Party's greenhouse gas (GHG) inventory and for the calculation of the FMRL. The Netherlands has not elected forest management under Article 3, paragraph 4, of the Kyoto Protocol for the first commitment period, but in its GHG inventory it distinguishes between forest land remaining forest land and forest land that fulfils the Kyoto Protocol definition of forest.

7. The FMRL is consistent with the GHG inventory as submitted in 2010, except for the differences noted below under "Pools and gases" (chapter II.C).

2. Age-class structure

8. Most forests in the Netherlands are relatively young (between 40 and 80 years old; see page 10 of the submission). This is consistent with the slow decrease of removals since 1990 (as the amount of carbon sequestration is reduced when forests approach maturity) under 'business as usual' conditions, in the context of maintaining stable forest carbon stocks in the long term.

3. The need to exclude removals from accounting in accordance with decision 16/CMP.1, paragraph 1

9. The Netherlands considers that the indirect effects of elevated CO_2 concentrations above pre-industrial levels and indirect nitrogen deposition tend to factor out when subtracting the reference level from net emissions/removals of the commitment period. For other provisions for factoring out, see paragraph 27 below.

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[2] The G4M model relies on spatial data. These data may or may not have been provided by countries. Other forest and forest management parameters (e.g. age-class structure, increment and historical harvest) were taken from NFIs or other country statistics.

[3] EFISCEN uses as data input the forest area data from national forest inventories scaled to match the forest area reported in the national inventory report (the forest land remaining forest land area, from which the deforested area is deducted, or the forest management area if elected under the Kyoto Protocol) and provides projections on basic forest inventory data (stem wood volume, increment, age-class structure, as well as carbon in forest biomass and soil.

[4] 2008 forest management data are taken as provided by the Party in its 2010 greenhouse gas inventory submission.

C. Pools and gases

1. Pools and gases included in the reference level

10.   The FMRL includes above-ground and below-ground biomass and HWP. Non-CO_2 gases from wildfires are not included in the FMRL since they are reported as not occurring in the Netherlands. Soil organic carbon (SOC) is not included in the GHG inventory (2010 and 2011 submissions) or the FMRL submission.

2. Consistency with inclusion of pools in the estimates

11.   In the 2010 and 2011 GHG inventories, dead organic matter estimates are partially included (i.e. not estimated for the subcategory trees outside forests) under forest land remaining forest land (table 5.A). The carbon stock changes for litter in the FMRL submission were assumed to be zero, with the Party stating that given the high uncertainty associated with SOC and litter, they were not included in the calculation of the FMRL. As emissions from fertilization, liming and drainage are not common practice in forest lands in the Netherlands, they were not provided, or included in the FMRL.

12.   The ERT requested the Netherlands to provide further information to support its assumption that these pools are not a source and the reasons for the exclusion of SOC and the zero value for litter in the FMRL submission. In response to this request, the Netherlands provided detailed information about several aspects relating to non-vegetative pools and, basing its argument on scientific research, reiterated that these pools are not carbon sources.

13.   The inclusion of pools in the FMRL is consistent with the inclusion of pools in the calculation of emissions and removals in future years.

D. Approaches, methods and models used

1. Description

14.   As described in paragraph 5 above, the Netherlands used the G4M and EFISCEN models to project emissions and removals from forest management. Harvested wood was calculated based on the FAOSTAT database values, applying a correction from underbark to overbark of 6 per cent on average. Future harvesting rates are derived from the PRIMES (wood for bioenergy) and GLOBIOM (Global Biomass Optimization Model) (timber) models. Data between 2008 and 2020 are interpolated (see page 15 of the FMRL submission). Future harvest demand is based on gross domestic product, population growth and demand for timber, and the bioenergy demand resulting from the implementation of EU energy policies up to 2009 using the PRIMES model.[5] Models are adjusted by post-calibration with figures of historical data based on forest inventories carried out in the period 1988–1992 (HOSP[6] data) and in 2001–2002 and 2004–2005 (MFV[7] data).

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[5] See: Capros P, Mantzos L, Tasios N, De Vita A and Kouvaritakis N. 2010. *EU energy trends to 2030. Update 2009*. European Commission Directorate-General for Energy in collaboration with Climate Action DG and Mobility and Transport DG. Luxembourg: Publications Office of the European Union. Available at <http://ec.europa.eu/energy/observatory/trends_2030/doc/trends_to_2030_update_2009.pdf>.

[6] Timber Production Statistics and Forecast (in Dutch: "Hout Oogst Statistiek en Prognoseoogstbaar hout").

[7] Measuring Network Functions (in Dutch: "Meetnet Functievervulling").

2. Transparency and consistency

15. The description of methods and models used in the estimation of the FMRL is transparently documented in the FMRL submission, as was the complementary information provided in response to questions posed by the ERT prior to, during and following the TA. The approaches, methods and models used to develop the FMRL are consistent with the methodology used in the latest national inventory reports (NIRs).

16. During the TA, the Party acknowledged that there is a discontinuity in the data for the living biomass pool between 1999 and 2000. The Party explained that the discontinuity is due to the use of different emission factors in the HOSP (1990–1999) and MFV (2000 to the present) data. The Netherlands informed the ERT that an uncertainty analysis of the factors carried out in 2006 showed that the overall uncertainty is greater than the differences between the two different data sources. This complementary information improved the transparency of the FMRL submission.

E. Description of the construction of the reference level

1. Area under forest management

17. The forest land remaining forest land area for the 1990 to 2009 time series as shown in the submission (table 4a) is steadily decreasing over time (i.e. 360 thousand hectares (kha) in 1990 and 327 kha in 2008). This is consistent with the area reported in the 2010 and 2011 NIRs. The historical area time series (see 2010 NIR, chapter" 7.5.5.) between 1990 and 1999 are based on land use maps, the emission factors are based on the HOSP forest inventory and the values from 2000 onward based on the MFV forest inventory.[8]

18. Different forest areas are used as input for the different models; G4M uses spatial information on forest management that is based on CORINE Land Cover classification data, while EFISCEN uses area data based on the Netherlands' NFI (i.e. MFV). G4M projected area data up to 2020 using information from forest maps and EFISCEN assumes that forest land remaining forest land under the Convention is equal to land under forest management minus the area of deforestation since 1990 (as included in reporting under the Kyoto Protocol) and therefore uses values that are on average 5 per cent higher than those used by G4M (from 4.83 per cent in 2005 to 5.20–5.01 per cent in 2015 and 2020, respectively (see table 4 in the FMRL submission). For the projected period 2010–2020, data from 2008 minus the area of deforestation projected by G4M was used (see the footnote to table 4 in the FMRL submission). After averaging the data of the two models after post-calibration, the net removals were 1.578 Mt CO_2 eq, as shown in the original FMRL submission. As mention in paragraph 4 above, EFISCEN was rerun using updated forest area data, resulting in a revised FMRL of –1.464 Mt CO_2 eq (see section B of the annex for further information).

2. Relationship of the forest land remaining forest land category with the forest management activity reported previously under the Convention and the Kyoto Protocol

19. The Netherlands has chosen to define the land-use category forest land as all land with woody vegetation, now or expected in the near future. This is further stratified into forest (Kyoto Protocol definition) and trees outside forests (i.e. an area having woody vegetation, but not to the strict forest definition that the Netherlands applies to forest under the Kyoto Protocol definition).

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[8] 2003 data were not collected owing to constraints in accessing the forest during an outbreak of a contagious cattle disease.

3. Forest characteristics

20. The Netherlands described its forests as temperate, with 30 per cent of the forests being coniferous, 22 per cent broadleaved and the remaining area a mix of the two (2010 NIR, chapter 7.5). The definition of forests chosen by the Netherlands for reporting under the Kyoto Protocol is patches of land exceeding 0.5 ha with a minimum width of 30 metres (m), with tree crown cover at least 20 per cent and tree height at least 5 m, or, if this is not the case, these thresholds are likely to be achieved at the particular site. Roads in the forest less than 6 m wide are also considered to be forest. The land-use category forest land is subdivided into managed and unmanaged units and is also subdivided by ecosystem type.

21. The Netherlands provided information on the age-class structure, which is modelled by EFISCEN based on the Netherlands' NFI (i.e. MFV) data. Trees with the age classes 21–40 and 41–60 years cover the majority of the forest area. There is a rapid decrease in forest area covered by the age class 61–80 years, and, as indicated by the Party during the TA, older age classes are scarce.

22. The increment estimated by G4M is 8.7 m^3 ha^{-1} per year for 2000 and is predicted to decrease to 5.7 m^3 ha^{-1} per year by 2020. EFISCEN estimated a decrease from 8.1 m^3 ha^{-1} per year in 2010 to 7.9 m^3 ha^{-1} per year by 2020. During the TA, the Party provided additional information on the biomass increment for the forests of the Netherlands.

23. Explicit data on rotation length as well as information on forest management activities under 'business as usual' were also provided.

4. Historical and assumed harvesting rates

24. Historical and assumed harvesting rates can be found in tables 11 and 11a, respectively, of the FMRL submission. Total wood harvesting in the Netherlands ranged from 1.61 to 1.16 million m^3 per year in the period 1990–2008. Harvested wood and assumed harvesting rate under the 'business as usual' scenario were calculated based on FAOSTAT values (see page 15 of the FMRL submission). When a correction factor of 6 per cent on average for underbark to overbark is applied, wood demand, and consequently the harvesting rate, is assumed to decrease by 3 per cent under the 'business as usual' policy scenario for the period 2005–2020. This figure was derived from the modelling exercise (using PRIMES and GLOBIOM) developed by the JRC, which resulted in a total increase of wood demand at the EU level of 9 per cent by 2020.

5. Harvested wood products

25. In its original submission, the Netherland stated that the contribution of HWP to the FMRL was –0.14 Mt CO_2 eq per year. However, as described in paragraph 3 above, a corrected value of –0.039 Mt CO_2 eq per year was forwarded to the secretariat on 20 May 2011. This was calculated using the C-HWP model as outlined in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories,* equation 12.1, with default half-lives of two years for paper, 25 years for wood panels and 35 years for sawn wood. The activity data on production and trade of sawn wood, wood-based panels and paper and paperboard are derived from the TIMBER database (United Nations Economic Commission for Europe 2011, time series 1964 to 2009). The historic CO_2 net emissions between 1990 and 2009 from the HWP pool are reported both in table 13 of the original submission and in the communication of 20 May. Historical data from 1990 were taken into account and the estimates included exports.

6. Disturbances in the context of force majeure

26. The Party did not consider force majeure in the construction of the FMRL since the post-calibration procedure applied automatically incorporated the average rate of past

disturbances (for the period 2000–2008) into the projections. In addition, emissions from forest fires for the period 1990–2008 were 0.0 Mt CO_2 eq because forest fires seldom occur in the Netherlands (see the FMRL submission, table 16, and the 2010 NIR, the last paragraph in chapter 7.5.6).

7. Factoring out

27. The Netherlands uses a projected reference level that includes age-class structure, which is considered to factor out dynamic age-class effects. With the present state of scientific knowledge, the effects of elevated CO_2 concentrations and indirect nitrogen deposition are considered to be approximately the same in the reference level and in the commitment period, and therefore they can be assumed to be factored out.

F. Policies included

1. Description of policies

28. Energy policies taken into consideration in the FMRL are provided in annex II to the FMRL submission. In addition to the EU energy policies implemented up to April 2009, national measures are also listed in the annex. Information on how these EU-level policies are being implemented at the national level and their anticipated impact on the FMRL is provided.

2. How policies are taken into account in the construction of the reference level

29. All energy policies implemented at the EU and domestic levels are taken by the EU model PRIMES as input values for the estimation of wood fuel demand driven by these policies. Output of PRIMES is further used as input for next step models (i.e. C-HWP model). Models do not use forest management policies directly as input parameters, but the impact of forest management policies is integrated into the projection process through increment and harvesting rates, and changes in age-class structure. Furthermore, the Netherlands confirmed that no domestic policies other than those included by PRIMES had been taken into account when estimating the FMRL.

III. Conclusions and recommendations

30. The Netherlands has calculated projections for an FMRL consistent with the methodology used for the current estimates of emissions and removals from the forest management activity. This report is based on the Party's submission of 20 April 2011, as well as complementary information provided in response to questions raised by the ERT prior to and during the TA. The ERT presumed the accuracy of the methodological assumptions indicated by the Party, and concentrated on the TA of the methodology and data used in constructing the FMRL proposed, in relation to forest management estimates.

31. The ERT notes that the Netherlands has responded to requests to provide the information needed to assess transparency and consistency and believes that the projections are consistent with the historical inventory data and continuance of established policies. However, during the TA, the Party acknowledged that there is a discontinuity for the living biomass pool between 1999 and 2000. The Party explained that the discontinuity is due to the use of different emission factors in the HOSP (1990–1999) and MFV (2000 to the present) data. The ERT recommends that the Party ensure consistency in the use of emission factors for the construction of the FMRL and the estimation period, and apply technical corrections to the FMRL if different emission factors are used in the future.

Annex

Documents and information used during the technical assessment

A.   Reference documents

Submission of information on the forest management reference levels by the Netherlands, 20 April 2011. Available at <http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/awgkp_netherlands_frml_2011.pdf>

National greenhouse gas inventory of the Netherlands submitted in 2010. Available at <http://unfccc.int/5270.php>.

National greenhouse gas inventory of the Netherlands submitted in 2011. Available at <http://unfccc.int/5888.php>.

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The Carbon Copy of Human Activities: How Long-term Land Use Explains Spatial Variability of Soil Organic Carbon Stocks at Multiple Scales. 2009. Schulp CJE. PhD thesis. Available at <http://edepot.wur.nl/14356>.

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Meetnet Functievervulling bos 2001-2005. Vijfde Nederlandse Bosstatistiek. Ministerie van Landbouw, Natuur en Voedselkwaliteit. Rapport DK nr. 2007/065 Ede, 2007. Available at <http://www.natuurbeheer.nu/media/File/dk065%20%20meetnet%20functievervulling%20bos.pdf >

B.   Additional information provided by the Party[1]

Responses by the Netherlands submitted to the ERT

The EFISEN model was rerun, applying a new forest area. Given the amount of work required for adjusting the area of G4M, no correction of area was done in cases where the difference with GHG inventories is very small (Bulgaria, Estonia, Latvia, Luxembourg, Netherlands). Given the ex-post calibration of models' results, the impact of the remaining area discrepancies on FMRL can be considered absolutely negligible.

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[1] Reproduced as received from the Party.

Model results provided by the Netherlands:

		av. 2000-2008	2000	2005	2010	2015	2020	av. 2013-2020
Step 1: models' results (only biomass)	EFISCEN (1)	-1358	-1447	-1310	-1328	-1197	-1086	-1165
	G4M	-2187	-2542	-2118	-1578	-1115	-704	-996
	Average of models	-1773	-1994	-1714	-1453	-1156	-895	-1080
Step 2: ex-post processing	Offset (2) biomass	-369						
	Offset (2) non-biomass pools and GHG sources	-15						
	Offset (2) total offset	**-384**						
	Calibrated average of models (3)	-2156	-2378	-2097	-1837	-1540	-1279	**-1464**
Sensitivity analysis (4)	*+10% harvest*				*-1621*	*-1361*	*-1139*	*-1299*
	-10% harvest				*-1950*	*-1615*	*-1337*	*-2494*

(1) Efiscen does not estimate data for all countries for 2000 and 2005. When data were missing, backward extrapolation was applied as follow: sink in 2005 = sink in 2010 x ratio of harvest 2010/2005; this approach assumes that in the short term harvest is the main factor determining the sink. Estimates were extrapolated for the following countries: Bulgaria, Czech Republic, Estonia, Hungary, Italy, Latvia, Lithuania, Netherlands.

(2) The "offset" is distinguished between:

- Biomass: calculated as difference between [average of country's emissions and removals from biomass for the period 2000-2008] and [average of models' estimated emissions and removals from biomass for the period 2000-2008]

- Non-biomass pools and GHG sources: calculated as the sum of non-biomass pools and GHG sources as reported by the country for the period 2000-2008.

(3) The calibrated average of models, which is used for the setting of reference level, is obtained by adding the offset to the models' average

(4) Preliminary simulation of the impact of +/-10% harvest as compared as BAU harvest on the emissions and removals from FM. Data are calibrated averages of models' results.

Area provided by the Netherlands:

	AREA of FM in 2008						AREA of FM in 2020 used by models	
	from 2011 GHG inventories		used by models		difference % models vs. GHG inventories			
	area (kha)	source	G4M (6)	EFISCEN	G4M	EFISCEN	G4M (7)	EFISCEN (8)
Netherlands	327	(5)	330	327	0.9	0.0	322	304

(1) area of FM from KP LULUCF reporting (2011). For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(2) area of FL-FL in 2008 from GHG inventory 2011. For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(3) area of FM from KP LULUCF reporting, excluding overseas territories. For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(4) Since the FM area reported under KP is not correct, this estimate has been obteined as (e.g. (area of FL in 1990) - (area AR in 1990 (estimated as area AR in 2008 / 19)) - (area of D in 2008)). This estimate is very similar to FL-FL in 2008. For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(5) Forest under Kyoto definition, from CRF table 5A (2011).

(6) Given the amount of work required for adjusting the area of G4M, no correction of area was done in cases where the difference with GHG inventories is very small (Bulgaria, Estonia, Latvia, Luxembourg, Netherlands). Given the ex-post calibration of models' results, the impact of the remaining area discrepancies on FMRL can be considered absolutely negligible.

(7) from 2008 onward FM area was estimated considering the deforestation estimated by G4M (as explained in the Annex of EU submission).

(8) from 2008 onward FM area was estimated assuming the continuation of the deforestation trends (average 1990-2008) reported under the KP.