

JRC TECHNICAL REPORTS

LULUCF MRV

Analysis and proposals for enhancing
Monitoring, Reporting and Verification of
greenhouse gases from Land Use, Land
Use Change and Forestry in the EU.

FINAL REPORT

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In December 2011, DG CLIMA and the JRC's Institute for Environment and Sustainability (IES) signed the Administrative Arrangement "LULUCF MRV" Nº 071201/2011/211111/CLIMA.A2. This report contains a synthesis of each of the tasks carried out within the framework of this Administrative Arrangement. This report and its Annexes have been prepared by Raúl Abad Viñas, Viorel Blujdea, Roland Hiederer, Sandro Federici and Roberto Pilli, under the coordination of Giacomo Grassi.

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Acronym	Label
AA	Administrative Arrangement
AR/D	Afforestation-Reforestation/Deforestation
ARR	Annual review report
CBM	Carbon Budget Model
CL	Cropland
CL-CL	Cropland remaining cropland
CLC	Corine Land Cover
CM	Cropland Management
COP	Conference of the Parties
CP	Commitment Period
CRF	Common Reporting Format
DOM	Dead organic matter
DW	Dead wood
EF	Emission factor
EFFIS	European Forest Fires Information System
ERT	Expert review team
FL	Forest land
FL-FL	Forest land - remaining forest land
FM	Forest Management
GHG	Greenhouse gas
GL	Grassland
GL-GL	Grassland remaining grassland
GM	Grazing land Management
HWP	Harvest wood product
IE	Included elsewhere
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
KC	Key categories
KP	Kyoto Protocol
L-CL	Land converted to cropland
L-FL	Land converted to forest land
L-GL	Land converted to grassland
LPIS	Land Parcel Identification System
LT	Litter
LUCAS	Land use/cover area frame statistical survey
LULUCF	Land Use, Land Use Change and Forestry
MRV	Monitoring, reporting and verification
MS	Member State
NFI	National forest inventory
NIR	National Inventory Report
OL	Other lands
QA/QC	Quality Assurance /Quality Control
RV	Revegetation
SL	Settlements
SOC	Soil organic carbon
SOM	Soil organic matter
TACCC	Transparency, Accuracy, Consistency, Comparability, Completeness
UNFCCC	United Nations Framework Convention on Climate Change
WL	Wetlands

1. INTRODUCTION

1.1 OVERVIEW OF LULUCF REPORTING UNDER THE UNFCCC/KP

Annex I Parties to the United Nations Framework Convention on Climate Change (UNFCCC) must submit annual GHG inventories, including anthropogenic emissions and removals that are subject to annual review processes. The inventories are reported in a standardised format and must cover emissions and removals from several sectors, including the Land Use, Land Use Change and Forestry (LULUCF) sector.

The reporting of LULUCF under the UNFCCC is divided into six main land uses (Forest land, Cropland, Grassland, Wetlands, Settlements, and Other land) with associated carbon pools, and other emission source categories (e.g. biomass burning). It is only mandatory to report those pools and sources for which the IPCC provides guidelines.

By contrast, reporting and accounting under the Kyoto Protocol (KP) for the 1st Commitment Period (CP1: 2008-2012) is based on some mandatory activities: Afforestation and Reforestation (AR), and Deforestation (D), and some voluntary activities: Forest Management (FM), Cropland Management (CM), Grazing Land Management (GM) and Revegetation (RV).

In the context of the UNFCCC/KP:

- *Reporting* refers to the inclusion of GHG estimates in a national GHG inventory which is composed of two main elements: a set of Common Reporting Format tables (CRF, where numerical values of the estimates are reported) and a National Inventory Report (NIR, where information on methodologies and background data used for calculating the estimates, including information on their uncertainty as well as information on procedures and arrangements for preparing the GHG inventory, are reported).
- *Accounting* refers to use of the reported information to calculate the contribution of a sector towards a target (e.g. towards KP targets).

Methods for estimating GHGs must follow IPCC methodological guidelines, and national inventory submissions must follow five reporting principles (TACCC):

- *Transparency*: the assumptions and methodologies used in making an inventory should be clearly explained to facilitate its replication and assessment.
- *Accuracy*: estimates should not be systematically above nor below true emissions or removals, so far as can be judged, and uncertainty levels should be reduced as much as is practicable.
- *Consistency*: an inventory should be internally consistent in all its elements over a period of years. An inventory is consistent if the same methodologies are used for the base year and all subsequent years, and if consistent datasets are used to estimate emissions from sources or removals by sinks.
- *Completeness*: an inventory should give full geographic coverage of all sources, sinks, and emissions included in the IPCC Guidelines, in addition to other relevant source/sink categories which are specific to individual Parties.

- *Comparability*: reported inventory estimates of emissions and removals should be comparable among all Parties. For this purpose, Parties should use the methodologies and formats agreed by the Conference of the Parties (COP) for estimating and reporting inventories.

For the LULUCF sector, the IPCC provides specific guidance on:

- Consistent representation of lands;
- Estimating changes in different carbon pools using three tiers of increasing methodological complexity and accuracy of estimates;
- Cross-cutting issues (uncertainties, key categories, time consistency, verification, etc.).

While the reporting and accounting of activities under the KP may be largely based on UNFCCC reports, it has some additional requirements, including (among others): (i) land identification and tracking: the areas subject to various activities should be identified and tracked over time with spatially explicit or statistical techniques; (ii) the 'Not a source' principle: if a carbon (C) pool is not included in the accounting, evidence should be provided to demonstrate that the pool is not a source of C emissions; (iii) documentation should be provided showing that KP emissions are the result of direct human-induced actions.

Finally, the GHG inventories are subject to an annual UNFCCC expert review process which may recommend improvements and, for the purpose of accounting under the KP, may "adjust" estimates which are considered to be inaccurate.

A set of new LULUCF accounting rules for the CP2 (i.e. 2013-2020) of the KP were agreed on at the UNFCCC COP17 in December 2011 (Decision 2/CMP.7) (see Table 1). Under these rules, reporting on Forest Management becomes mandatory, and new provisions are introduced for Natural Disturbances, Harvested Wood Products, Conversion of natural to planted forest, and Carbon-Equivalent Forests Conversion. In addition, the new Wetland Drainage and Rewetting activity may be included. Any voluntary activity included in the CP1 is mandatory for CP2. The possibility of developing more comprehensive accounting rules for the post-2020 LULUCF sector is currently being investigated within UNFCCC negotiations.

1.2 OVERVIEW OF EU LEGISLATION ON LULUCF

The EU has unilaterally committed to reducing its overall GHG emissions by 20% below 1990 levels by 2020. Emissions and removals of GHGs by the LULUCF sector are currently not part of the EU's commitment.

After a consultation process, the European Commission proposed a legislative package for the inclusion of the LULUCF sector in the EU emissions reduction target. As a first step towards its inclusion, a legal act on the accounting for GHG emissions in the LULUCF sector was agreed by EU legislators in December 2012, and entered into force in May 2013. Specifically, Decision 529/2013/EU sets out robust common accounting, monitoring and reporting rules on how MS shall account for the various LULUCF activities during the CP2 (i.e. 2013-2020). In a second step, when harmonised and robust accounting measures will

be implemented, consideration will be given to formally including the sector in the EU climate commitment.

In accordance with international obligations (UNFCCC) for CP2, the EU LULUCF Decision 529/2013/EU established mandatory accounting for all forest activities. This EU decision goes beyond UNFCCC obligations, because it includes the mandatory reporting (and future accounting, when LULUCF will be formally included in the EU climate targets) of Cropland management (CM) and Grazing land management (GM) under a net-net accounting approach (i.e. estimates during the accounting period are compared to the estimates for 1990).

Based on a review of information reported in MS GHG inventories, UNFCCC annual review reports, and internal EU quality assurance/quality control (QA/QC) processes, it emerged that MS will face some challenges in reporting agricultural categories for the CP2 (i.e. CM and GM) and in reporting carbon stock changes of mineral soils under FM, and in fulfilling the additional KP reporting requirements.

While the aim of the EU accounting framework is principally to obtain an environmentally sound measurement of the impact of LULUCF on the EU's GHG emissions, in practice its scope is significantly affected by the capacity of MS to estimate and report GHG emissions/removals in line with IPCC methods.

The assessment of current MRV (Measuring, Reporting and Verification) capacity and the development of steps forward to improve national submissions is key to the implementation of the EU LULUCF accounting framework.

As a result of the abovementioned changes introduced at the UNFCCC and EU levels, MS will face the following scenario during the CP2:

Table 1: Main changes in LULUCF sector accounting in the EU for the 2nd CP of the KP

Land activity	1st CP (2008-2012)	2nd CP (2013-2020)
Afforestation/reforestation (AR)	M	M
Deforestation (D)	M	M
Conversion of natural forest to planted forests	V (if FM elected implicitly reported)	M (explicit under FM)
Natural disturbances (ND)	M (implicit for ARD lands)	V (emissions can be excluded from FM and AR with specific rules)
	V (implicit if FM, CM, GM elected)	M (implicitly accounted if CM, GM elected)
Carbon equivalent forests (CEF)	-	V
Revegetation activities (RV)	V	V *
Cropland management (CM)	V	M#
Grazing land management (GM)	V	M#
Wetland drainage and rewetting (WDR)	-	V
Forest management (FM)	V	M (using the FM reference level)
Harvested wood products (HWP)	V	M (with specific rules)

M: Mandatory; V: Voluntary.

*Mandatory if selected for the 1st CP. #Established as mandatory by Decision 529/2013/EU.

1.3 SCOPE OF THE “LULUCF MRV” ADMINISTRATIVE ARRANGEMENT

In the context described above, and in light of the new challenges that the introduction of those new requirements pose for MS, DG CLIMA and the JRC signed an Administrative Arrangement (AA) on LULUCF MRV (starting early 2012) with the aim of supporting DG CLIMA in identifying priority actions that could be initiated to:

- Help MS to improve their national LULUCF MRV in terms of implementation of the principles of accuracy, completeness, transparency and comparability in accordance with the *IPCC Good Practice Guidance for LULUCF*;
- Improve the comparability and consistency of estimates over space and time at the EU level through the gradual harmonization of methods and definitions for data collection and reporting.

Following these objectives, **three specific tasks** were defined within the LULUCF MRV AA:

1. *Assess the current MRV capacity and future challenges:*
 - 1a: Comparative assessment of methods, approaches and nomenclature used for estimating emissions/removals by LULUCF.
 - 1b: Assessment of the current situation in relation to reporting / accounting requirements which may pose challenges in the near future.
2. *Develop recommendations / action plans to help MS improve LULUCF MRV and start implementing them for selected MS:*
 - 2a: Recommendations for improving LULUCF MRV.
 - 2b: Start to implement the recommendations of task 2a.
3. *Help improve the comparability of MRV across EU MS and their preparedness for the new reporting requirements.* Issues to be considered in this analysis originally included¹: (i) disaggregation of climate zones for the purpose of choosing the default IPCC values; (ii) forest land use changes; (iii) modelling the carbon stock change of forest soils.

¹ In November 2013, in agreement with DG CLIMA, task 3 was extended in scope and duration (to the end of July 2014). In the first half of 2014 it was considered that the issue “Forest land use changes” was no longer a priority due to the improvements made by MS in their 2014 GHG inventory. As a consequence, in agreement with DG CLIMA, this issue has been replaced with the new issue “Biomass burning reporting: a comparative assessment of data reported under UNFCCC and EFFIS”

2. OVERVIEW OF RESULTS OF THE “LULUCF MRV” ADMINISTRATIVE ARRANGEMENT

2.1 GENERAL CONSIDERATIONS ON THE LULUCF MRV AA RESULTS

In order to implement the three tasks defined in the AA, a significant amount of information was collected covering the main aspects of the reporting/accounting of the LULUCF sector by EU MS. This information was based on:

- EU MS National Inventory Submissions (i.e. National Inventory Reports and Common Reporting Format tables);
- Annual EU Quality Assurance and Quality Control (QA/QC) carried out by the JRC in the context of the EU GHG monitoring mechanism;
- Annual Review Reports of the UNFCCC;
- IPCC Guidelines on LULUCF and KP reporting.

The collection of this information was needed to meet the specific requirements of each task. As individual tasks were defined in a continuous and cumulative mode, each task is also built on information collected in earlier stages of the project.

As a result, an individual report was created for each task, outlining the associated results and actions undertaken. While each report can be considered independently, in some cases they should also be considered as part of a joint project to help better understand the information provided.

To date, some of the outcomes of the AA have already helped MS to improve their LULUCF MRV: some improvements have already been implemented as part of the latest submissions, and others are expected in upcoming submissions as stated by MS in their National Inventory Reports.

As UNFCCC GHG inventory reporting is an ongoing process in which MS implement changes and improvements on an annual basis, and given the fact that this AA started in 2012, some aspects the earlier reports of this project are not fully updated (i.e. some changes could have been introduced in latest 2014 MS submissions, and are not fully reflected in reports for task 1).

2.2 SUMMARY OF THE LULUCF MRV AA RESULTS

As mentioned above, for each task of this AA an individual report was produced to provide information about the activities undertaken. A summary of those activities is provided in this section. For more detailed information, please refer to the specific reports provided in the annexes to this document.

❖ TASK 1: Assess the current MRV capacity and the future challenges

- 1a: Comparative assessment of methods, approaches and nomenclature used for estimating emissions/removals in LULUCF (Annex 1a).

This task, the starting point of the project, involved the collection of a significant amount of information to establish the status of reporting for each MS.

This information was collected from the MS 2012 submissions, and subsequently updated with information from the 2013 submissions where necessary (but not from 2014 submissions). This information was compiled and elaborated in an Excel database (available upon request), which served as the basis for this and the subsequent tasks.

The results of the detailed comparative assessment of data, methods, approaches, and nomenclature used by MS for reporting LULUCF are included in the final report of the task (see Annex 1a).

The comparative assessment focused on a synthesis of methodologies and criteria used by each MS for land representation/identification and for the estimation of carbon stocks. It covered the main land use categories and land use changes, as well as all carbon pools and other important features of the LULUCF reporting process.

Specifically, the report provided information regarding:

- *Land representation and identification:* information was collected to assess, for each MS, (i) approaches used for land representation, (ii) definitions used, (iii) completeness and time series consistency of the LULUCF sector, (iv) tools and methods used for land representation, and (v) the Reporting Methods used to identify and track land uses since 1990 under the KP.
- *Estimation of carbon stock changes:* the report covers the main land uses (i.e. Forest land, Cropland and Grassland) and carbon pools (i.e. above- and below-ground biomass, dead organic matter and soil organic carbon): (i) definitions used, (ii) completeness of the reporting of carbon pools, (iii) tiers and methods used, and (iv) specific methodological issues.
- *Emissions hotspots and cross-cutting issues of the LULUCF reporting process* were also covered in individual sections of the report, for instance: (i) organic soils, (ii) models used for reporting carbon stock changes in soils, (iii) reporting of wetlands, (iv) other source of emissions, (v) harvested wood products (vi) key categories, (vii) uncertainties, (viii) verification activities, (ix) overview of the QA/QC process.

As already mentioned, this information was essential in order to implement the subsequent steps of the project and, although some updates may be required (using the 2014 inventory), it can generally still be seen as being a reliable source of information on LULUCF reporting across EU MS.

➤ 1b: Assessment of the current situation in relation to reporting / accounting requirements which may pose challenges in the near future (Annex 1b).

For this task, a report was prepared showing the current level of MS preparedness to face the main challenges that EU and international policies pose for the reporting of LULUCF during the CP2. The report includes: (i) open issues of the reporting process, (ii) new challenges for future reporting, and (iii) the level of preparedness for future reporting by EU MS.

(i) The main open issues of the reporting process were compiled for each MS based on the information collected for task 1a, the completeness and QA/QC checks performed by the JRC on the 2012 reports of the EU MS to the UNFCCC, and the 2011 Annual Review Report (ARR) of the UNFCCC. These were sorted according to the five reporting principles (TACCC) and cross-cutting issues.

(ii) The main challenges that MS will have to overcome in the future reporting and accounting of the LULUCF sector were also analysed. This analysis covered the following new provisions that have been introduced for the CP2 of the KP by international and EU policies:

- mandatory accounting of FM,
- natural disturbances,
- harvested wood products,
- feasibility of accounting for emissions from and removals by CM and GM.

Where relevant and possible, the current status of MS reporting was analysed for each of these issues in relation to the need to fulfill the new requirements.

Moreover, a short assessment of the challenges related to the implementation of a broader LULUCF accounting framework was also carried out and included in the report.

(iii) To conclude, a quantitative assessment of the preparedness for LULUCF MRV by EU MS was developed in order to identify MS in most need of improvements to their LULUCF reporting and to rank the candidates to be supported in the context of next steps of the project. This quantitative assessment was based on three criteria:

- completeness of the reporting,
- number and type of recommendations included in the ARR,
- quantitative and qualitative assessment of MS inventories based on the EU QA/QC process.

Subsequent bilateral support to MS was provided in the context of this AA based on the results of this assessment.

❖ **Task 2: Develop recommendations/action plans to help MS to improve their LULUCF MRV, and help selected MS to implement them**

➤ 2a: Recommendations for improving LULUCF MRV (Annex 2a).

This subtask involved the preparation of a report, including: (i) a compilation of suggestions to help MS improve their LULUCF MRV, (ii) a preliminary assessment of the potential usefulness of existing European datasets for reporting LULUCF, (iii) a first approximate

analysis of the costs of implementing those suggestions, and (iv) an assessment of the role that models could play in the reporting/accounting of the LULUCF sector for CP2.

(i) The main open issues that need to be addressed for improving the reporting of LULUCF MRV were identified based on the information provided in previous tasks, and a detailed list of suggestions was compiled (at the level of each MS when relevant).

Suggestions were grouped, firstly by land use and then by duration (short-term actions relating to reporting requirements of the CP1, and medium-term actions to respond to the additional reporting requirements of the CP2 as defined in the new LULUCF rules (Decision 2.CMP/7)).

(ii) In order to assess synergies with and/or potential benefits of other existing European initiatives, a preliminary assessment of European datasets that were potentially useful for reporting the LULUCF sector was included. Among others, this analysis included the Land use/cover area frame statistical survey (LUCAS), the Corine Land Cover (CLC) inventory, and the Land Parcel Identification System (LPIS).

(iii) In order to estimate the additional costs of implementing the suggestions provided in the report, a preliminary analysis was carried out based on:

- The Commission Staff Working Document "Impact Assessment on the role of land use, land use change and forestry (LULUCF) in the EU's Climate change commitments" accompanying the document "Proposal for a decision of the European Parliament and of the Council on accounting rules and actions plans on greenhouse gas emissions and removals resulting from activities related to land use, land use changes and forestry";
- Specific information provided by two MS that have recently launched projects to collect country-specific values for reporting carbon stock changes in soil;
- Mäkipää et al. (2008)².

(iv) Finally, an assessment was carried out of the role that models may play in preparing and verifying LULUCF estimates, providing arguments on why models may be useful in LULUCF reporting and some general recommendations for using when models could be used.

➤ *2b: Start to implement the recommendations of task 2a (Annex 2b).*

In line with the information collected in the previous tasks, and specifically with the results from the quantitative assessment of preparedness for LULUCF MRV by EU MS undertaken in task 1b, seven MS were selected (i.e. HR, EE, GR, IT, LV, PL, RO) for the provision of ad-hoc support on LULUCF MRV by the JRC.

This support was intended to improve LULUCF MRV in terms of the five reporting principles (TACCC) with a main focus on increasing the level of preparedness for the CP2. When needed, issues related to CP1 were also considered.

In the first step of this task, an individual report was made of each of the selected MS, including preliminary findings on two areas of activities:

² Mäkipää, R., Hakkinen, M., Muukkonen, P. & Peltoniemi, M. (2008): The cost of monitoring changes in forest soil carbon stocks. Boreal Env. Res. 13 (suppl. B):120-130

- implementation of country-specific recommendations developed by the JRC, with the aim of improving LULUCF reporting, and
- comparison of FM estimates obtained using the forest Carbon Budget Model (CBM, run by the JRC) with the GHG inventory of the country (FM or forest land remaining forest land). The CBM model is a valuable tool that MS can use for verification purposes in this context.

These preliminary reports were sent to each MS in early October 2013, and discussed in detail during bilateral meetings with MS experts held after the JRC LULUCF workshop of November 2013.

As a result of this ad-hoc support, several improvements were implemented by MS in their 2014 UNFCCC reports, or will be soon implemented as part of ongoing projects.

Finally, in order to meet the requirements of this task, a joint final report was created for the seven selected Member States, containing three sections:

- suggested actions for improving LULUCF MRV,
- preliminary model estimates for FM, and
- results of the interaction with the Member States.

❖ **Task 3: Improving the comparability of MRV across EU MS and the preparedness for the new reporting requirements (Annex 3)**

The following issues were identified as being key to improving the comparability of the LULUCF sector across the EU MS: (i) support MS in the proper selection of default factors for the implementation of the IPCC tier 1 methods, (ii) comparative assessment of data on biomass burning reported under the UNFCCC and by EFFIS (the European Forest Fires Information System), and (iii) support MS in improving the completeness of the reporting of mineral soils through the use of models.

Specific outputs included:

(i) For each MS, three maps (i.e. climate zone, soil type and Global Ecological Zones) were created and made available on the Forest Resources and Climate Unit website (<http://forest.jrc.ec.europa.eu/activities/lulucf/ipcc-classifications/>) to help MS select default factors in line with the IPCC Guidelines.

(ii) A comparative assessment of data on biomass burning reported under the UNFCCC and by EFFIS, with two general conclusions: a) several potential inconsistencies between data reported in both datasets need to be explained, and b) EFFIS should be used for verification of UNFCCC GHG inventories – and any discrepancy should be explained.

(iii) In order to test the feasibility of using models to improve the completeness of the reporting of forest mineral soils, a Task Force was launched (with external contractors) to investigate the use of the Yasso model (a well-known soil model) by three experienced MS (Finland, Austria and Switzerland) and to test its use by four of the selected MS (Spain, France, Romania, Estonia). Preliminary results are quite encouraging: although further efforts are clearly needed, in general the implementation of Yasso for reporting carbon stock changes in mineral soil, or for demonstrating that certain soils are “not a source” of carbon emissions, seems feasible in most cases.

3. ADDITIONAL ACTIONS UNDERTAKEN WITHIN THE AA LULUCF MRV

In addition to the aforementioned specific actions undertaken in the context of each task of the LULUCF MRV AA, other actions were also carried out during this period. In most cases these actions were the result of issues raised during the development of the tasks but not necessarily framed within a concrete task.

Specifically, the additional actions undertaken during the development of the LULUCF MRV AA include (see Annex 3):

- A simple model developed to support MS in the reporting of living biomass carbon pools on perennial woody crops in line with IPCC methods.
- The compilation of country-specific values regarding the reporting of the living biomass carbon pool on perennial woody crops.
- The analysis of methods used by MS for estimating emissions from SOM and DOM pools in forest land (FL) converted to settlements (SL); these methods can be considered by other MS for improving the completeness of their reporting of deforestation (given that the IPCC 2003 Good Practice Guidance does not provide methods for such conversions).
- Decision tree and JRC analysis of the “not a source” provision to support KP reporting by MS when specific carbon pools have not been estimated.

Finally, it should be noted that, along with the development of this LULUCF MRV AA, the JRC has:

- Undertaken annual LULUCF QA/QC of all MS submissions, identifying hundreds of findings which required answers by specific MS;
- Compiled all the LULUCF-related chapters of the annual EU GHG inventory reports, and defended these reports during the annual UNFCCC reviews;
- When necessary, held bilateral communications with MS to help solve specific issues (e.g. issues raised by the review team).

In addition, the JRC organized the following workshops³, which can be seen as actions undertaken to support MS in improving their LULUCF MRV:

- *JRC technical workshop on reporting LULUCF for CP2 with IPCC 2013 KP Supplement (5-7 May 2014 in Arona (Novara, Italy))*
- *JRC technical workshop on reporting LULUCF under the Kyoto Protocol (4-6 November 2013 in Arona (Novara, Italy))*
- *JRC technical workshop on reporting LULUCF (27 February – 1 March 2013 in Ispra (Varese, Italy))*

³ Agenda and presentations available at <http://forest.jrc.ec.europa.eu/activities/lulucf/workshops/>

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Abstract

The land use, land use change and forestry (LULUCF) sector is a greenhouse gas (GHG) inventory sector that covers the emissions of GHGs from and their removal by terrestrial carbon stocks, living biomass, dead organic matter and soil organic carbon according to six main anthropogenic land use categories: Forest land, Cropland, Grassland, Wetlands, Settlements, and Other land.

According to the United Nations Framework Convention on Climate Change (UNFCCC), all Parties shall periodically report an update inventory of anthropogenic emissions and removals of GHGs using comparable methodologies provided by the Intergovernmental Panel on Climate Change (IPCC). Parties are also required to report and account for such emissions under the Kyoto Protocol (KP). These emission inventories are then factored into an international reduction target commitment.

In recent years, international negotiations have resulted in the adoption of new rules for the second commitment period of the KP (CP2: 2013-2020), e.g. mandatory accounting of Forest management. Furthermore, Decision 529/2013/EU goes beyond the international UNFCCC negotiations by adding the mandatory accounting of Cropland management and Grassland management. All these changes pose new challenges that Member States (MS) will need to address from 2015 (i.e. the start of the CP2 reporting period).

This report describes the actions undertaken in the context of the JRC's "LULUCF MRV" (Monitoring, Reporting, and Verification) Administrative Arrangement with DG CLIMA, through a sequence of tasks (described in detail in the Annexes). The aim of the AA is to support MS in improving the quality and comparability of their LULUCF reporting during CP2, in line with IPCC methods and the new UNFCCC and EU rules.

JRC Mission

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

*Serving society
Stimulating innovation
Supporting legislation*