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Horizon 2020 Societal challenge 5:
Climate action, environment, resource
efficiency and raw materials

VERIFY

Observation-based system for monitoring and verification of greenhouse gases

GA number 776810, RIA

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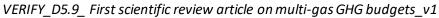|	
Changes with respect to the DoA	
This is a short deliverable that outlines the process of delivering the full scientific article as intended by D5.9. The article was submitted to the ESSD journal and was accepted for final publication on the 24th February 2020. This uploaded version is the last version submitted to ESSD for publication purpose. The article is available and published online.	
Dissemination and uptake **(Who will/could use this deliverable, within the project or outside the project?)**	
This deliverable is public, ESSD publication.	
Short Summary of results (<250 words)	
European anthropogenic AFOLU greenhouse gas emissions: a review and benchmark data (Petrescu et al, 2020, published in ESSD) Emission of greenhouse gases (GHGs) and removals from land, including both anthropogenic and natural fluxes, require reliable quantification, including estimates of uncertainties, to support credible mitigation action under the Paris Agreement. This study provides a state-of-the-art scientific overview of bottom-up anthropogenic emissions data from agriculture, forestry and other land use (AFOLU) in the European Union (EU28[1]). The data integrates recent AFOLU emission inventories with ecosystem data and land carbon models and summarizes GHG emissions and removals over the period 1990-2016. This compilation of bottom-up estimates of the AFOLU GHG emissions of European national greenhouse gas inventories (NGHGI) with those of land carbon models and observation-based estimates of large-scale GHG fluxes, aims at improving the overall estimates of the GHG balance in Europe with respect to land GHG emissions and removals. Whenever available, we present uncertainties, its propagation and role in the comparison of different estimates. While NGHGI data for EU28 provides consistent quantification of uncertainty following the established IPCC guidelines, uncertainty in the estimates produced with other methods needs to account for both within model uncertainty and the spread from different model results. The largest inconsistencies between EU28 estimates are mainly due to different sources of data related to human activity, referred here as activity data (AD) and methodologies (Tiers) used for calculating emissions and removals from AFOLU sectors. The referenced datasets related to figures are visualised at http://doi.org/doi:10.5281/zenodo.3662371 (Petrescu et al., 2020).	
Evidence of accomplishment **(report, manuscript, web-link, other)**	

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https://www.earth-syst-sci-data.net/12/961/2020/essd-12-961-2020.pdf

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Version	Date	Description	Author (Organisation)
V0	18/11/18	Creation/Writing	Han Dolman & Roxana Petrescu, VUA
V1	06/05/2020	Writing/Formatting/Delivery	Philippe Peylin, Aurélie Paquirissamy

1. Executive Summary

An accurate estimation of GHG emissions and sinks is designed to deliver new information as an aid for decision-making by policy-makers at the national and European levels, and by regional authorities in Europe and other regions, and to actively contribute to the international effort on GHG monitoring.

This current study, represents a synthesis of AFOLU GHG emission estimates from bottom-up approaches that can serve as a benchmark for future assessments, important during the reconciliation process with top-down GHG emission estimates. We use existing officially reported data from NGHGI submitted under the UNFCCC as well as other emission estimates based on research data, from global emissions datasets to detailed biogeochemical models. The bottom-up approaches considered, although based on independent efforts from those in the NGHGI, have some level of redundancy among them and the inventories, since they often use similar activity data (AD) and largely apply the current IPCC (2006) methodology, albeit using different 'Tiers'.

Figure 1 : Illustration of a deforestation

The Deliverable 5.9 represents the final version of the manuscript accepted for publication in ESSD. It is based on pre-VERIFY data, documented in peer reviewed literature between 1990-2016, at EU28[2] level, in an effort towards an operational system with yearly updates. It currently stands as a benchmark data collection of last available estimates of GHGs representing the AFOLU sector in Europe as derived from our knowledge of the scientific literature and the scientific

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[2] As in 2019 EU28

networks in Europe. The data forms the basis for the analysis of reconciliation between bottom-up (BU) and top-down (TD) GHG estimates, which is drafted under the deliverable D5.3.

The accepted ESSD manuscript referred here as Petrescu et al., 2020, is available here.