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# PROGRESS, LESSONS LEARNED AND BEST PRACTICES FOR REPORTING ON CROPLAND AND GRAZING LAND MANAGEMENT

JRC LULUCF WORKSHOP 28-29/05/2019

**ECOFYS**  
A Navigant Company

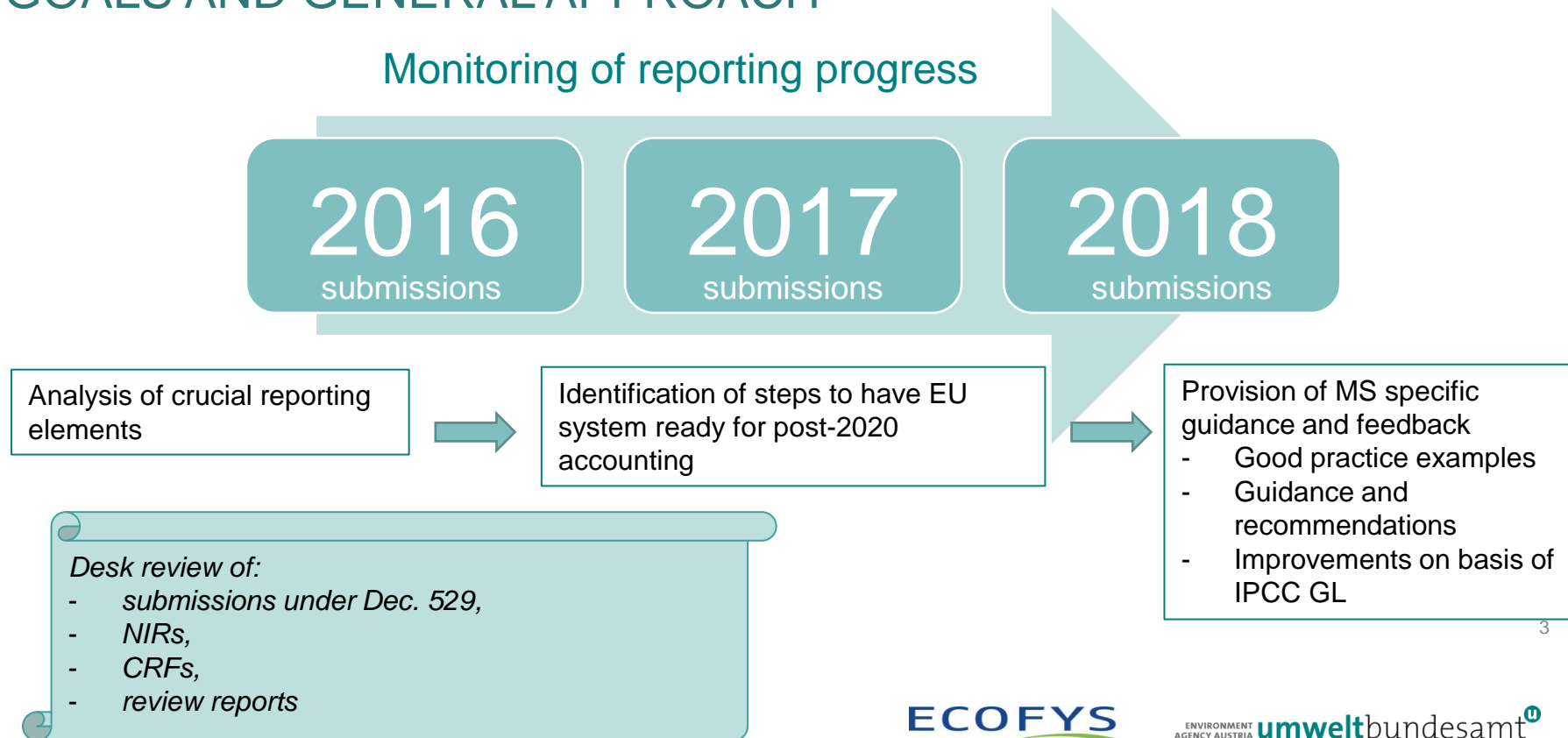
ENVIRONMENT  
AGENCY AUSTRIA **umweltbundesamt**<sup>U</sup>

# PRESENTATION OUTLINE

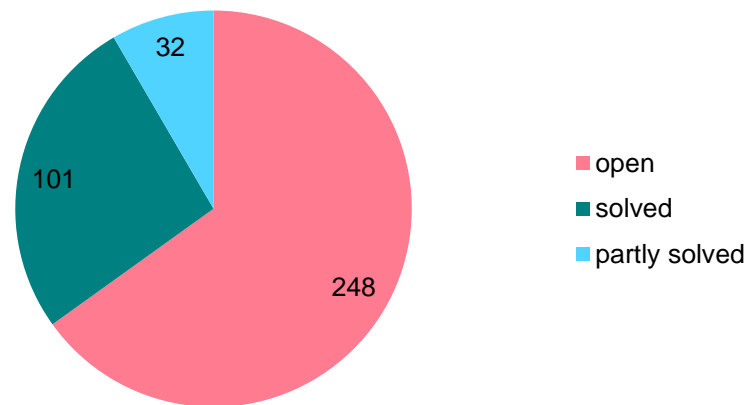
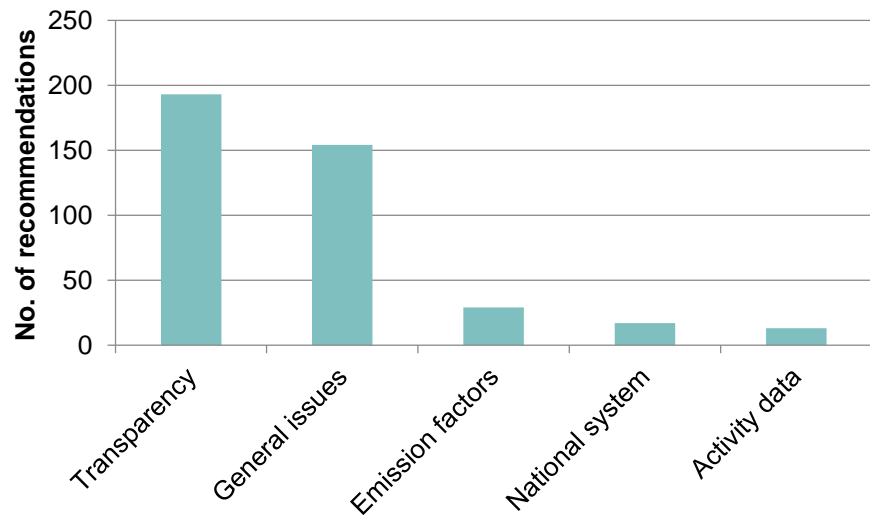
- Introduction to the project
- Progress and planned improvements
- Most common issues identified vs. good practice examples
- Outlook – new requirements according to EU LULUCF Regulation

## GOALS AND GENERAL APPROACH

### Monitoring of reporting progress



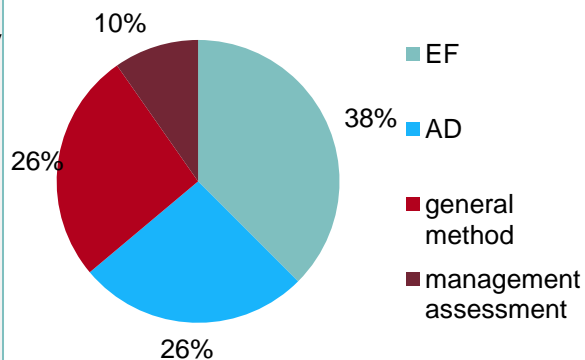
# STATUS OF RECOMMENDATIONS IN 2018



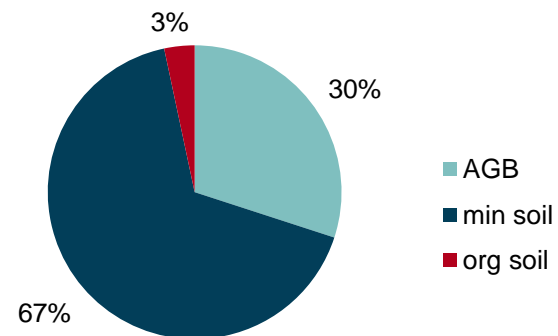
# PLANNED IMPROVEMENTS

- 76 planned improvements
- From 0 to 9 planned improvements per MS
- Planned improvements not necessarily correlated with quality of reporting (e.g. single well reporting MS try to further improve, while some MS with need for improvement have no/few such plans)

## Planned improvements



## Planned improvements for pools



# PROGRESS ACROSS THREE YEARS OF ASSESSMENT

- 1/3 of recommendations already implemented - progress in CM/GM reporting obvious
- Planned improvements for CM/GM reporting
  - several planned
  - partly already completed within the three years
- Evidence of awareness for needed improvements in most MS

# BEST PRACTICE EXAMPLES FOR SOME OF THE IDENTIFIED ISSUES

# ISSUE “LACK OF TRANSPARENCY”

Issue	Suggested approach:	Some good practice examples:
<ul style="list-style-type: none"><li>● Lack of definitions of CM/GM</li><li>● Very basic descriptions of methodologies</li><li>● No stratified reporting of subcategories</li><li>● Lack of information on the national system</li><li>● Missing references/sources</li></ul>	<p>Comprehensive description of the methodological approaches</p> <ul style="list-style-type: none"><li>● Reporting of subcategories</li><li>● Approaches and sources for activity data, emission factors and estimates</li><li>● Information on key categories and significant pools</li><li>● Provision of conceivable explanation and definition of CM and GM – what is included since when and what is excluded</li></ul>	<ul style="list-style-type: none"><li>● <i>Ireland and UK: transparent descriptions and illustrations of methods and results</i></li><li>● <i>Slovakia: transparent description of the QC approaches</i></li><li>● <i>Luxembourg: very clear description of the CM and GM definitions</i></li><li>● <i>Sweden: very transparent definition of the pools</i></li><li>● <i>Italy: transparent description of key categories</i></li></ul>



# ISSUE “NON CONSIDERING OF LAND-USE CHANGES PRIOR TO BASE YEAR”

## Issue

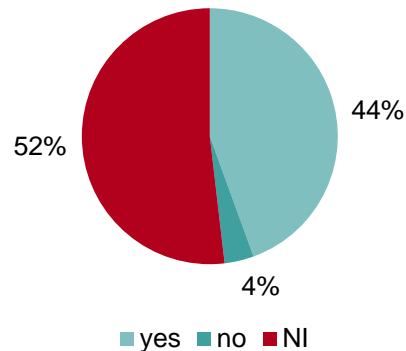
- Potential time series consistency problem up to 2009
- Problematic issue for net/net accounting of CM and GM (also for the base period 2005-2009 according to LULUCF Regulation)

### IPCC KP Supplement:

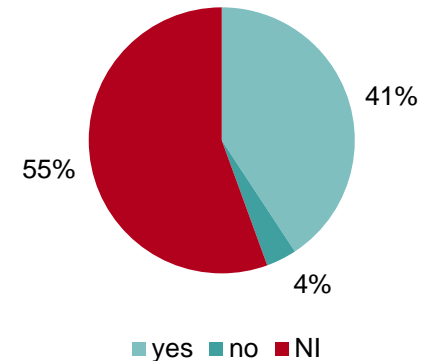
“Historical data on land use and management practices in 1990 (or the appropriate year(s)) and in years prior to 1990 are needed to establish the 1990 base year net emissions and removals of soil carbon from CM...”

“If area and activity data are not available for 1970 to 1990, countries can establish the base year 1990 carbon stock change using the most appropriate time series to estimate the 1990 value, in a manner consistent with guidance provided in Section 5.3, Chapter 5, Volume 1 of 2006 IPCC Guidelines. It is good practice to use a time period equivalent to 20 years that includes 1990 or as close to 1990 as possible.”

### Historical land use changes considered (pre-base year) CM



### Historical land use changes considered (pre-base year) GM



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- Problematic issue for net/net accounting of CM and GM (also for the base period 2005-2009 according to LULUCF Regulation)

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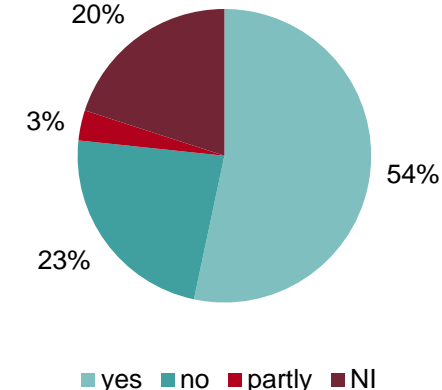
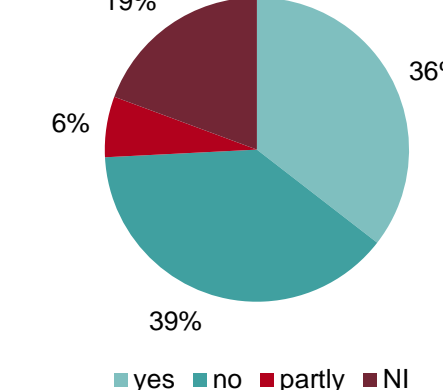
## Suggested approaches:

- Use of available data and information sources for these historic years, like:
  - Orthophotos
  - Satellite images
  - Statistics
  - Expert judgement
- Transfer of the existing plot system for LULUC assessment (e.g. from NFIs) to the historic images and assessment of the land use and land-use change in the pre-base year period
- Extrapolations adjusted with surrogate parameters (information from agricultural statistics, expert knowledge) for the LULUC trends for the historic years

## Some good practice examples:

- *Baltic countries, Finland and Sweden:*
- *fixed NFI grid used*
- *Grid transferred to historical digital orthophotos, satellite images*
- *Complemented by statistical data and further data sources*
- *all land uses and land-use changes in the country (and stratification into mineral and organic soils) are assessed with such system*

# ISSUE “TRACKING OF MANAGEMENT CHANGES IN CROPLAND AND GRASSLAND”

Issue	Consideration of management information CM	Consideration of management information GM
<ul style="list-style-type: none"> <li>• Relevant for estimating soil C stock changes in CM rem. CM and GM rem. GM</li> <li>• In combination with default or country specific „reference soil C stocks“ and „soil C stock change rates“ or models</li> </ul>	 <p>A pie chart titled 'Consideration of management information CM'. The chart is divided into four segments: a large light blue segment for 'yes' (54%), a teal segment for 'no' (23%), a small red segment for 'partly' (3%), and a dark red segment for 'NI' (20%). A legend below the chart identifies the colors: light blue for 'yes', teal for 'no', red for 'partly', and dark red for 'NI'.</p>	 <p>A pie chart titled 'Consideration of management information GM'. The chart is divided into four segments: a light blue segment for 'yes' (36%), a teal segment for 'no' (39%), a small red segment for 'partly' (6%), and a dark red segment for 'NI' (19%). A legend below the chart identifies the colors: light blue for 'yes', teal for 'no', red for 'partly', and dark red for 'NI'.</p>

# ISSUE “TRACKING OF MANAGEMENT CHANGES IN CROPLAND AND GRASSLAND”

Issue	Suggested approaches:	Some good practice examples:
<ul style="list-style-type: none"> <li>● Relevant for estimating soil C stock changes in CM rem. CM and GM rem. GM</li> <li>● In combination with default or country specific „reference soil C stocks“ and „soil C stock change rates“ or models</li> </ul>	<ul style="list-style-type: none"> <li>● Identification/Classification of management types with different default or country specific C stock change rates               <ul style="list-style-type: none"> <li>● survey through agricultural experimental plot data and soil monitoring results</li> </ul> </li> <li>● Use of IACS/LPIS and agricultural statistics for related management information</li> <li>● Models to estimate the C flux to soils</li> </ul> <p>Check for potential synergies with Agriculture sector</p>	<ul style="list-style-type: none"> <li>● <i>Austria, Belgium, Denmark, Estonia, Finland, Ireland, Latvia, Luxembourg, Slovakia, Spain, Sweden use the IACS/LPIS system for (e.g.):</i> <ul style="list-style-type: none"> <li>– <i>Determination of management/land-use changes in/between cropland and grassland</i></li> <li>– <i>Area of organic agriculture</i></li> <li>– <i>Areas of different crop types</i></li> <li>– <i>Determination of geographical locations of CL and GL areas</i></li> <li>– <i>Conversions to/from other land uses than CL and GL</i></li> <li>– <i>Distribution of crops/grassland on organic soils</i></li> <li>– <i>Verification of data from other sources</i></li> </ul> </li> </ul>

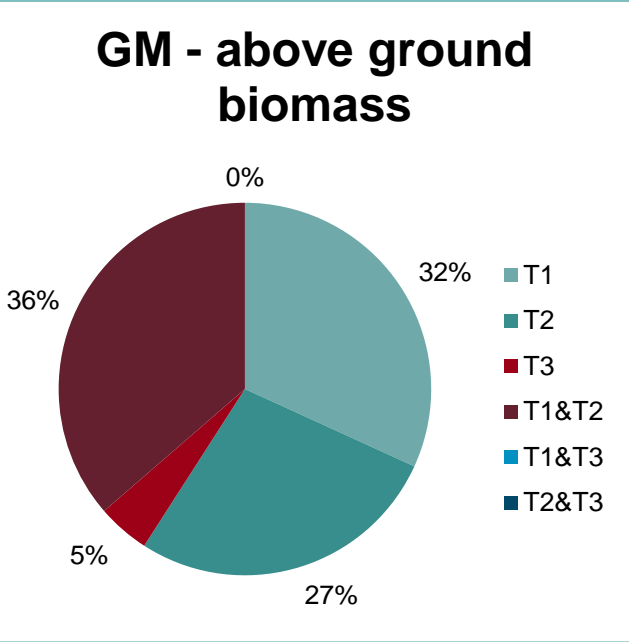
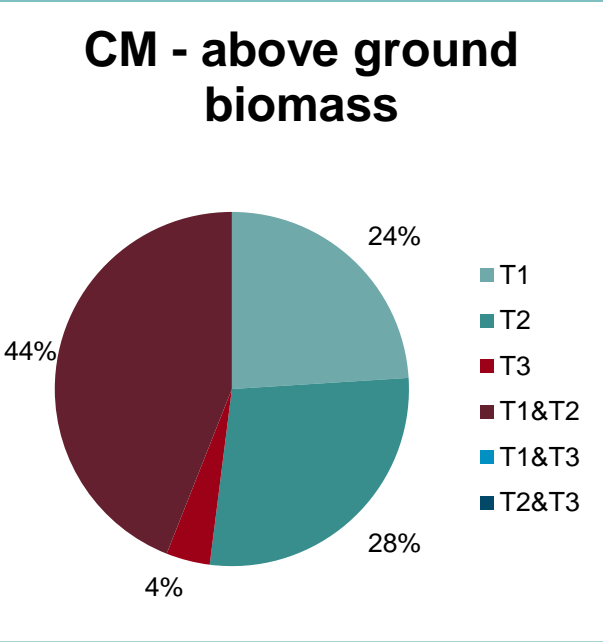
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# ISSUE “COUNTRY SPECIFIC PERENNIAL BIOMASS“

**Issue**

- Evidence that the default IPCC C stocks and growth rates of perennial cropland biomass lead to over-estimations for European countries
- No defaults for perennial biomass in grasslands



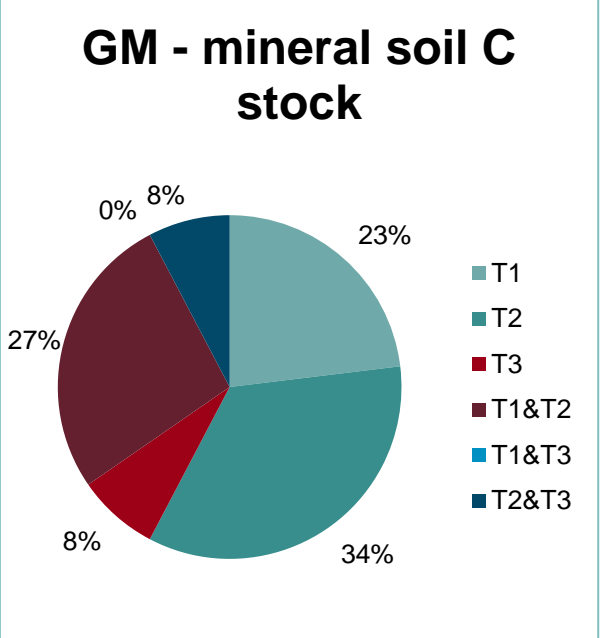
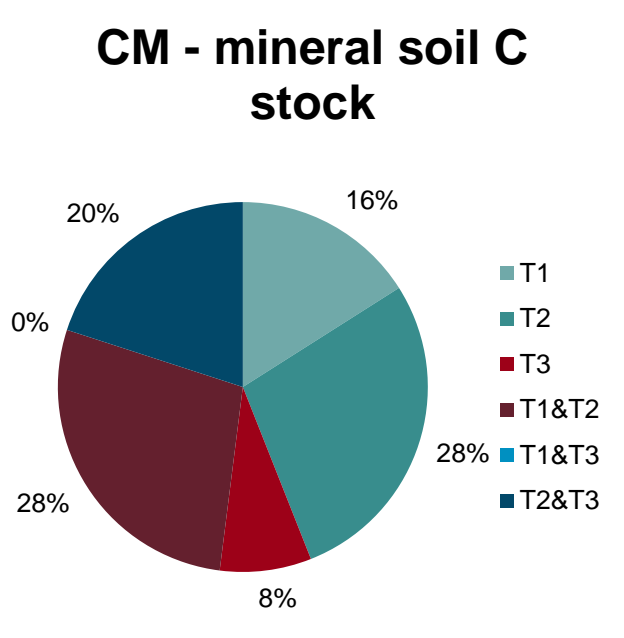
# ISSUE “COUNTRY SPECIFIC PERENNIAL BIOMASS“

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<ul style="list-style-type: none"><li>● Evidence that the default IPCC C stocks and growth rates of perennial cropland biomass lead to over-estimations for European countries</li><li>● No defaults for perennial biomass in grasslands</li></ul>	<ol style="list-style-type: none"><li>(1) Monitoring of changes (e.g. within the NFI assessments)</li><li>(2) Studies to derive country specific C stocks, growth rates and rotation periods (in combination with specific LULUC data)</li><li>(3) Delegate the assessment to farmers clearing some of their perennial crops<ul style="list-style-type: none"><li>● Survey with assessment lists for the farmers</li><li>● Distributed through the stakeholder organisations to the farmers</li><li>● Assessed parameters: type, area, weight of plants (with and/or without roots), number of plants per ha, age</li><li>● Some financial remuneration to the farmers for the extra work</li></ul></li></ol>	<ul style="list-style-type: none"><li>● <i>Mediterranean: Recent compilation/literature survey by Canaveira et al. 2018</i></li><li>● <i>Italy: Shrubland biomass stocks/changes assessed by model, country specific BEFs and R/S ratios; based on NFI results and national research projects.</i></li><li>● <i>Portugal: study on perennial cropland and grassland biomass increments</i></li><li>● <i>Denmark : biomass changes of hedgerows based on measurements of Danish NFI</i></li><li>● <i>Austria, Estonia, Germany, Hungary: studies for country-specific emission factors for perennial crops</i></li><li>● <i>Germany: representative study of hedges and copses</i></li><li>● <i>Estonia and Latvia: direct measurements at NFI plots</i></li></ul>

# ISSUE “COUNTRY SPECIFIC SOIL C STOCKS AND C STOCK CHANGE RATES – MINERAL SOILS”

## Issue

- Required as „reference” or typical soil C stocks to estimate soil C stock changes due to management and land-use changes
- Country specific soil C stock change rates for management types („management factors“)





# ISSUE “COUNTRY SPECIFIC SOIL C STOCKS AND C STOCK CHANGE RATES – MINERAL SOILS”

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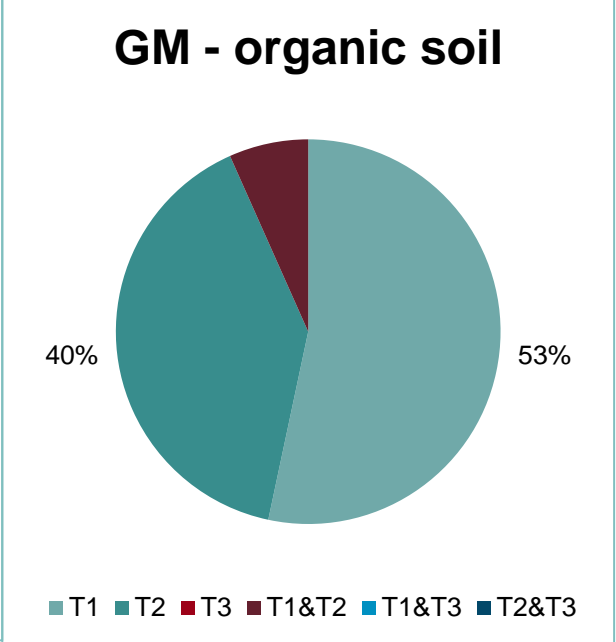
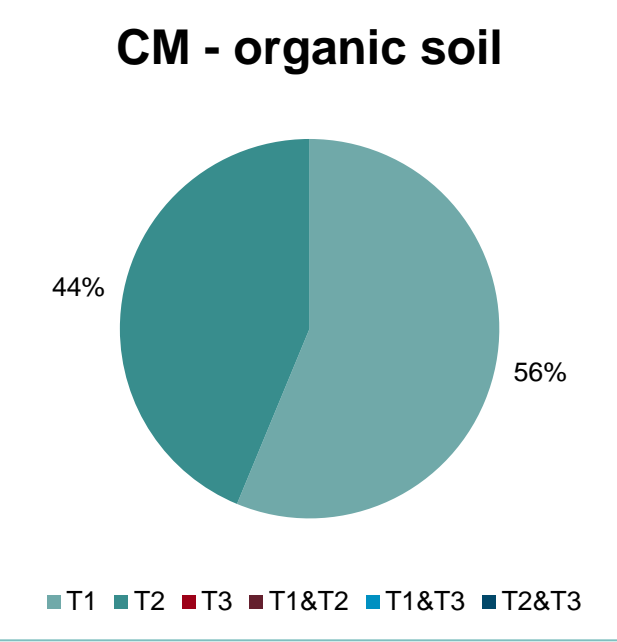
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# ISSUE “COUNTRY SPECIFIC SOIL C STOCKS AND C STOCK CHANGE RATES – ORGANIC SOILS”

## Issue

- Challenge in all countries with significant shares of organic soils
- Organic soils represent frequently a significant pool in such countries
- Difficult to assess



# ISSUE “COUNTRY SPECIFIC SOIL C STOCKS AND C STOCK CHANGE RATES – ORGANIC SOILS”

Issue	Suggested approaches:	Some good practice examples:
<ul style="list-style-type: none"><li>● Challenge in all countries with significant shares of organic soils</li><li>● Organic soils represent frequently a significant pool in such countries</li><li>● Difficult to assess</li></ul>	<ul style="list-style-type: none"><li>● Higher tier methods are demanding, but indirect approaches and proxies for improvements of the estimates exist (e.g. soil subsidence measurements, water table depth measurements)</li><li>● Transfer of the available knowledge from research and response functions to the national conditions</li></ul>	<ul style="list-style-type: none"><li>● <i>Denmark: New national emission factors for organic soils based on research programme to monitor the CO<sub>2</sub> emissions from organic soils with annual crops in rotation and permanent fertilized grassland</i></li><li>● <i>Sweden: Use of a national emission factor for CL on organic soils based on literature review containing the references within the IPCC (2014) WL supplement. For representativeness, only Swedish, Norwegian and Finnish studies were considered.</i></li></ul>

# ISSUE “NATIONAL SYSTEM”

Issue	Suggested approach:	Some good practice examples:
<p>Evidence for need of strengthening of the National System in single MS due to, e.g.:</p> <ul style="list-style-type: none"><li>● No, very late or incomplete submissions</li><li>● (Almost) complete Tier 1 reporting of CM and GM (incl. key categories and significant pools)</li><li>● No embedding of related national expertise</li></ul>	<ul style="list-style-type: none"><li>● More personal and financial resources</li><li>● Collaboration with national institutions with related expertise</li><li>● Reorganisation of tasks and procedural arrangements in the involved units</li><li>● Contractual or legal arrangements</li><li>● Collaboration with similar neighbouring countries (e.g. through international funds)</li></ul>	<ul style="list-style-type: none"><li>● <i>National Systems of some countries which elected CM and GM (Denmark, Ireland, Portugal, UK)</i></li><li>● <i>Latvia: comprehensive improvements for CM and GM reporting and legal and procedural steps</i></li><li>● <i>Spain: Very transparent description and overview of the collaboration between the institutions, the data providers and the responsibilities</i></li></ul>

# OUTLOOK – LULUCF REGULATION

- Managed cropland and managed grassland will include emissions and removals for:
  - Remaining CL and GL
  - CL to GL and GL to CL
  - OL, SL, WL converted to CL or GL
  - **CL or GL converted to WL, SL, OL (new inclusion of emissions/removals)**
- Base year period **2005-2009**
- **Approach 3** for area assessment
- Application of **at least Tier 2 for significant pools**, encouragement to apply Tier 3

# CONTACT INFORMATION

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