How to use AgrEE tool to estimate air pollutant emissions from agricultural activities

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Agricultural **E**mission **E**stimation (AgrEE) Tool

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Agricultural **E**mission **E**stimation (AgrEE) Tool

➤ A user-friendly web tool with EU login designed to improve the consistency between air and GHG emission reporting

➤ Based on EMEP/EEA Guidebook 2019 and IPCC Guidelines 2006 and 2019

➤ Tier 2 as the main method allowing also the use of Tier 1 method

➤ Developed for Livestock, Agriculture Soils and Field Burning

➤ Provides emission estimates for relevant air pollutants from agriculture with emission reduction commitments established under the NECD (PM2.5, NH3, SO2, NOx, NMVOC), other air pollutants (PM10, TSP, CO, Heavy metals, Dioxins, POPs) and greenhouse gases (CH4, N2O)

➤ Possibility to consider the effect of abatement measures

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Agricultural **E**mission **E**stimation (AgrEE) Tool

➢ Air pollutant
NH_3, NOx, $NMVOC$, PM_{10}, $PM_{2.5}$, TSP, SO_2, CO, BC, Heavy Metals, Dioxins, POPs

➢ Greenhouse gas
CH_4 (in development and testing), N_2O

➢ 3B Manure Management
➢ 3D Agriculture Soils
   3Da1, 3Da2a, 3Da2b, 3Da2c, 3Da3, 3Dc, 3De
➢ 3F Field Burnig Agriculture Residues
➢ 3A1 Enteric Fermentation

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Outline

➢ Steps in the AgrEE Tool – from "Access to Perform calculations"

➢ Practical examples

■ Livestock (NH3, NMVOC) - Tier 2

■ Agriculture soils (NH3, NMVOC, PM10) - Tier 2

➢ Questions

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Step 1 – AgrEE Tool access

| Register to ECAS EU login | → | Go to the Tool | → | Unique Identifier Role Target country | → | Access the tool |

The access to the tool is done through the "EU login". The user need to register on ECAS (European Commission Authentication Service).

After registering and reaching the tool, to the user will be provided instructions on how to access the tool (the user should indicate the EU Login Unique Identifier, country, and the role i.e inventory compiler/researcher/stakeholder).

JRC-AGREETOOL@ec.europa.eu

At this first release of the tool each user can only have access to the tool page related to the target country.

User Guide v1.3 is available for download

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Step 2&3 – Selection year/sector/method/pollutant

Use drop menu for the selections

Step 4 – Selection of categories/subcategories

Only for Livestock sector the tool includes country specific livestock structure.

Be careful: the sum of subcategories livestock number should correspond to the total livestock number for the selected category

Contact AgrEE Tool team if you want to add a country-specific livestock

Step 5 – Input page

Input template structure depends on the selections done through Steps 2 - 4.

Activity Data	Emission Factor

The user can **download** the input template and **save** it in Excel. One can **work** with the template **filling/changing data** and then **upload** it in the tool. The name of the input template is defined by the selections done in Steps 2 - 4.

It is important not to change the structure of the input template

Pollutant	Sector	SubSector	Category	SubCategory	NFR	Data type	Description	System	Fuel	Unit

Save data	Perform calculations

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More in the tool

➢Activity data in common assigned to all pollutants within the same method

➢Dedicated 'go back' button – improving navigation

➢Copy/paste function - insert activity data and emission factors for the new years

➢Reminder if the sum of Animal Waste Management System is above 1 (100%)

➢Reminder if a cell is empty – no calculations are performed

In the input template the tool distinguishes:

➢Default values – cells with white background
➢ Country specific values – cells with light green background
➢Precompiled country specific values – cells with light violet background
➢Value changed by uploaded file – cells with light turquoise background

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Some tips….

➢ Related calculations

- Calculations of NMVOC emissions from Livestock <u>should be performed after the calculation of NH_3</u> ($ENH_{3\_storage}$/ENH_{3_house})

- Calculations of NH_3, NO_x, NMVOC and N_2O emissions from Livestock have several inputs in common

➢ Insert in the tool all the inputs (AD & EFs) you are using for the calculations

➢ Download/upload - do not change the name of the input file

➢ Check the total of the numbers/amount/surface in case more than one category/subcategory is used

➢ Check always the sum of AWMS – the tool will remind you every time you click in one of the cells for which the control is applied

Results

Enable extracting results conform the required Annex 1 template – aggregated emissions if more than one subcategory/subdivision is selected

<u>The Annex I is one file that includes all the years used in calculations</u>
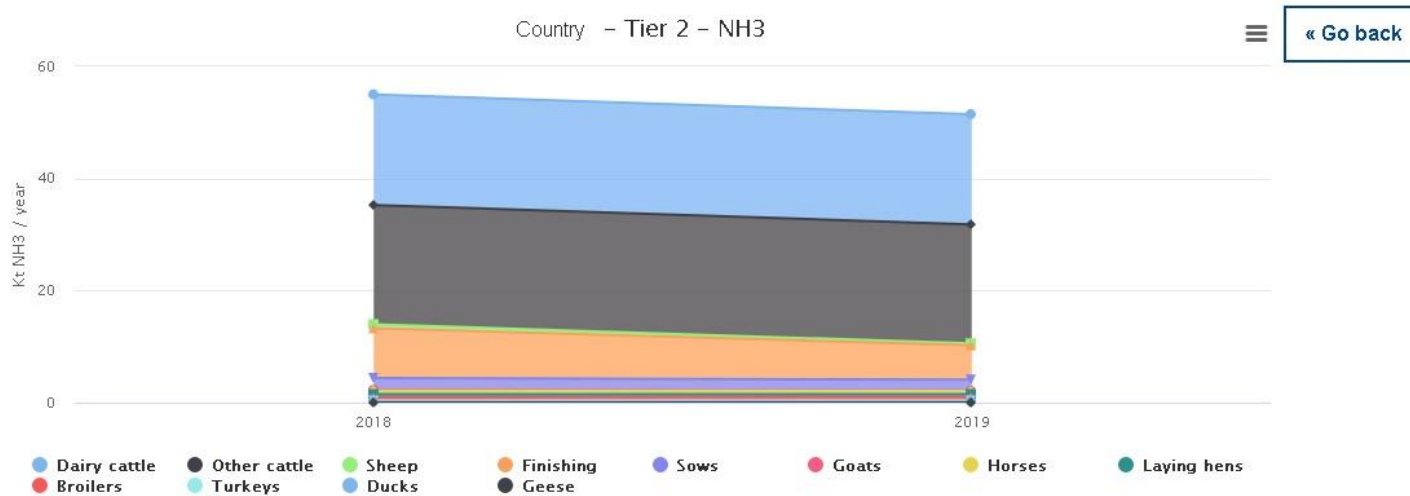
The tool will update the results for the selected pollutant every time a calculation is performed

Each time the emission calculation for a certain pollutant is performed the tool will add automatically that result in the Annex I template. As such the Annex I template will be populated each time a calculation is performed.

ANNEX 1: National sector emissions: Main pollutants, particulate matter, heavy metals and persistent organic pollutants

NFR 2019-1

COUNTRY:	AA	(as ISO2 code)
DATE:	DD.MM.YYYY	(as DD.MM.YYYY)
YEAR:	2018	(as YYYY, year of emissions and activity data)
Version:	v1.0	(as v1.0 for the initial submission)

AA: DD.MM.YYYY: 2018	NFR sectors to be reported				Main Pollutants (from 1990)			
					NOx (as NO$_2$)	NMVOC	SOx (as SO$_2$)	NH$_3$
NFR Aggregation for Gridding and LPS (GNFR)	NFR Code	Long name	Notes		kt	kt	kt	kt
K_AgriLivestock	3B1a	Manure management - Dairy cattle						11.573
K_AgriLivestock	3B1b	Manure management - Non-dairy cattle						12.73
K_AgriLivestock	3B2	Manure management - Sheep						0.427
K_AgriLivestock	3B3	Manure management - Swine						7.299
K_AgriLivestock	3B4a	Manure management - Buffalo						
K_AgriLivestock	3B4d	Manure management - Goats						0.07
K_AgriLivestock	3B4e	Manure management - Horses						0.303
K_AgriLivestock	3B4f	Manure management - Mules and asses						
K_AgriLivestock	3B4gi	Manure management - Laying hens						0.342
K_AgriLivestock	3B4gii	Manure management - Broilers						0.528
K_AgriLivestock	3B4giii	Manure management - Turkeys						0.131
K_AgriLivestock	3B4giv	Manure management - Other poultry						0.142
K_AgriLivestock	3B4h	Manure management - Other animals (please specify in the IIR)						
L_AgriOther	3Da1	Inorganic N-fertilizers (includes also urea application)						
L_AgriOther	3Da2a	Animal manure applied to soils						19.764
L_AgriOther	3Da2b	Sewage sludge applied to soils						
L_AgriOther	3Da2c	Other organic fertilisers applied to soils (including compost)						
L_AgriOther	3Da3	Urine and dung deposited by grazing animals						2.409
L_AgriOther	3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products						
L_AgriOther	3De	Cultivated crops						
L_AgriOther	3F	Field burning of agricultural residues						
L_AgriOther	3I	Agriculture other (please specify in the IIR)						

The Annex I template with results can be found at the bottom part of the result page
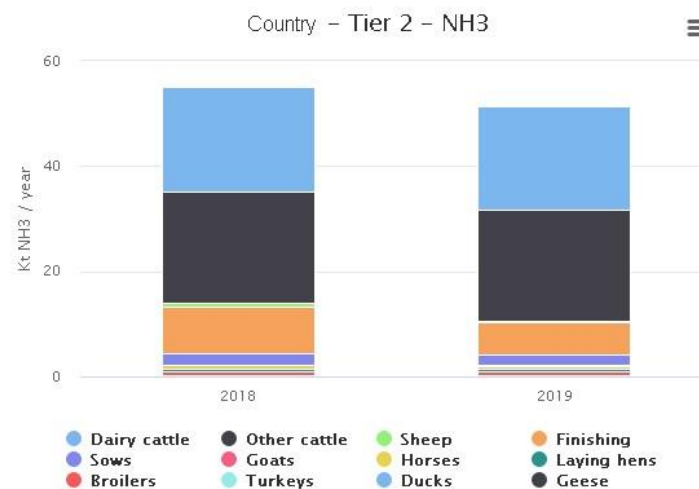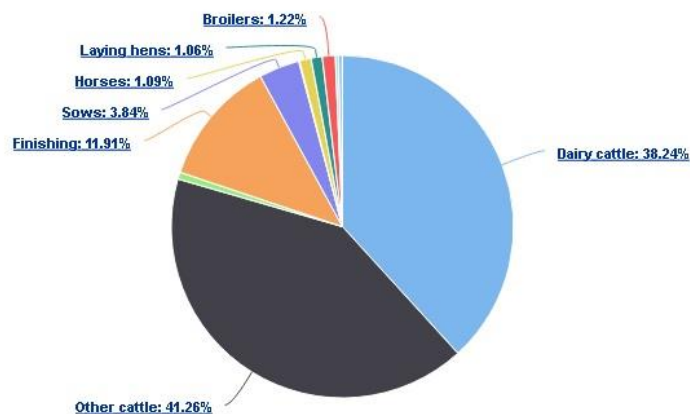
Visualisation

- ➤ Table
- ➤ Area chart
  - ▪ Categories
- ➤ Pie chart (drill down)
  - ▪ Categories
  - ▪ Sectors
- ➤ Column chart
  - ▪ Sectors –Livestock
  - ▪ Categories

Show/Hide input template

Practical examples

Dairy cattle NH3 - Tier 2

The mass flow approach – based on Total Ammoniacal Nitrogen (TAN)

Animal Waste System Management – country specific

Number Livestock
Housed Period
Animal weight
Animal Waste System Management (AWMS)
(House, Storage, Yard, Biogas –solid, slurry)
Nrate
Nexcretion (Nex)
Straw
N added in straw
fimm (TAN immobilised in organic matter)
fmin and fmin_biogas (fraction of N mineralized to TAN)

EF NH3 House (slurry, solid)
EF NH3 Storage (slurry, solid)
EF NH3 pre-storage
EF NH3 Manure application (slurry, solid)
EF NH3 Tied housing(Dairy cattle)
EF NH3 Yard
EF NH3 Grazing

EF N2 Storage (slurry, solid)
EF N2O Storage (with & w/o natural crust)
EF N2O Storage (solid)
EF NO Storage (slurry, solid)

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Dairy cattle NMVOC - Tier 2

The calculations to be performed after NH3 (ENH$_3$_storage/ENH$_3$_house)

Number Livestock
Housed Period
Animal weight
Animal Waste System Management (AWMS)
(House, Storage, Yard, Biogas –solid, slurry)
Nrate
Nexcretion (Nex)
Straw
N added in straw
fimm (TAN immobilised in organic matter)
fmin and fmin_biogas (fraction of N mineralized to TAN)

Gross Feed Intake
Fraction silage

EF NH3 House (slurry, solid)
EF NH3 Storage (slurry, solid)
EF NH3 pre-storage
EF NH3 Manure application (slurry, solid)
EF NH3 Tied housing(Dairy cattle)
EF NH3 Yard
EF NH3 Grazing

EF N2 Storage (slurry, solid)
EF N2O Storage (with & w/o natural crust)
EF N2O Storage (solid)
EF NO Storage (slurry, solid)

EF NMVOC (house, grazing, silage)
Feed Intake & Volatile Solids

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Inorganic Fertilisers NH3 – Tier 2

Total amount Inorganic Fertiliser 12 types	EF NH3 Climate Soil pH

➢ Climate – cool, temperate, warm

➢ Soil pH – normal, high

➢ More than one combination Climate – Soil pH can be selected

The total amount of a certain inorganic fertiliser should be equal with the sum of the amount of this fertiliser applied to each combination

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Agricultural soils PM10 - Tier 2

Crops area
Number of operations
(cleaning, drying, harvesting, soil cultivation)

EF PM10
Climate (dry, wet)

Agricultural soils NMVOC - Tier 2

Cultivated area
Crop yield
Crop dry matter yield
Crop distribution
Crop fraction emitting

Weighted EF NMVOC
(calculated)

The tool calculates the weighted EF NMVOC for each crop and total crops

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Questions

Thank you

Contact us at JRC-AGREETOOL@ec.europa.eu

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