AgrEE tool for air pollutant inventories from agricultural activities

How can ammonia reducing technologies and measures be handled in the AgrEE tool

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Outline

Agricultural Emission Estimation (AgrEE) Tool

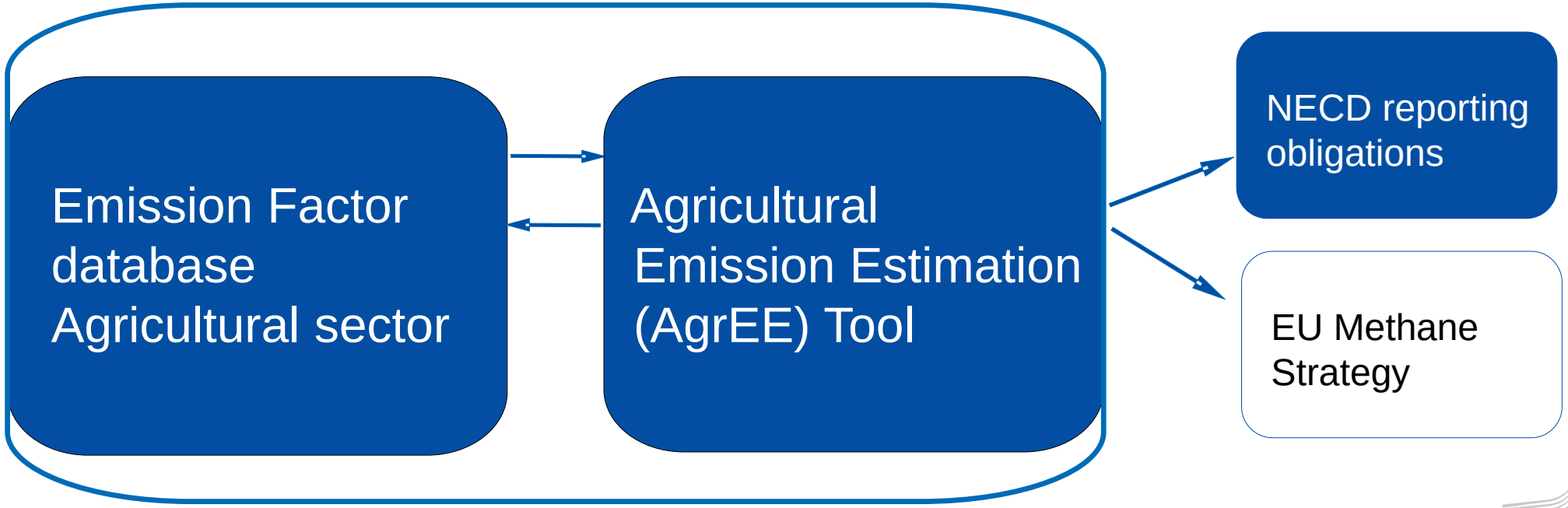
Possibilities to consider the abatement measures for ammonia in AgrEE Tool

Take home messages

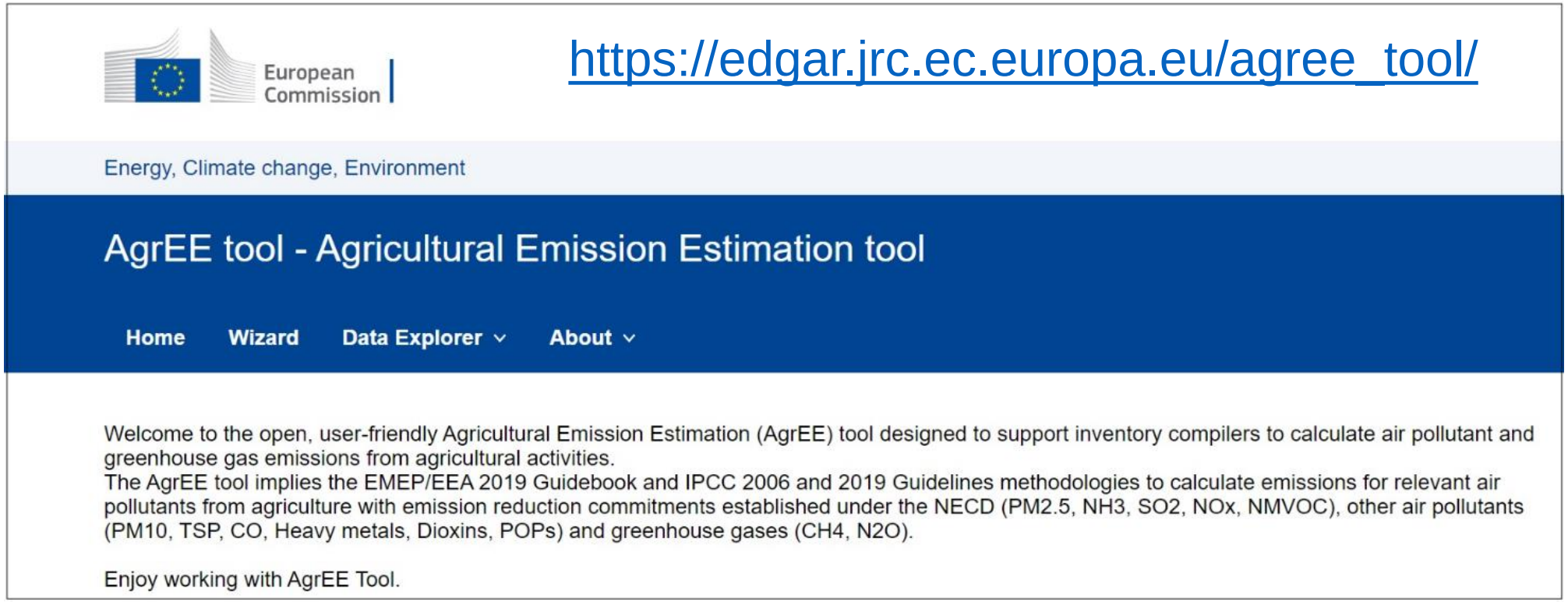
Background

Project launched by DG ENV in collaboration with the Joint Research Centre (Ispra) to "Support the improvement of national emission inventories for the agricultural sector in Europe".

Specific objective - development of a tool to provide more robust emissions inventories for agricultural sector through the involvement and data sharing from MS.



Agricultural Emission Estimation (AgrEE) Tool



AgrEE tool testing phase was performed in June 2021 – MS feedback received

First launch of AgrEE Tool on 8 October 2021 – to serve in the 2022 NECD reporting of air pollutant emission inventories

Final version of AgrEE tool to be ready by end of February 2022

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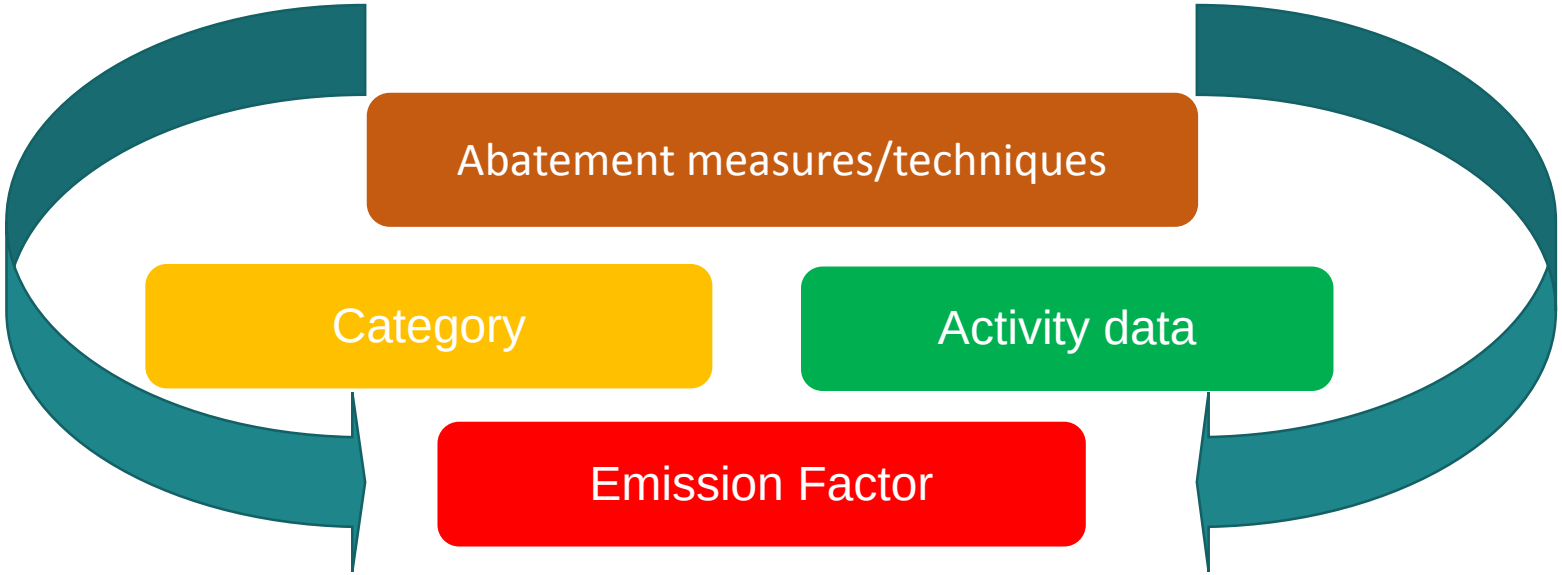
Agricultural Emission Estimation (AgrEE) Tool (2)

- 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, IPCC Guideline 2006 and 2019 Refinement
- Tier 2 as the main method allowing also the use of Tier 1 method
- Developed for Livestock, Agriculture Soils and Field Burning



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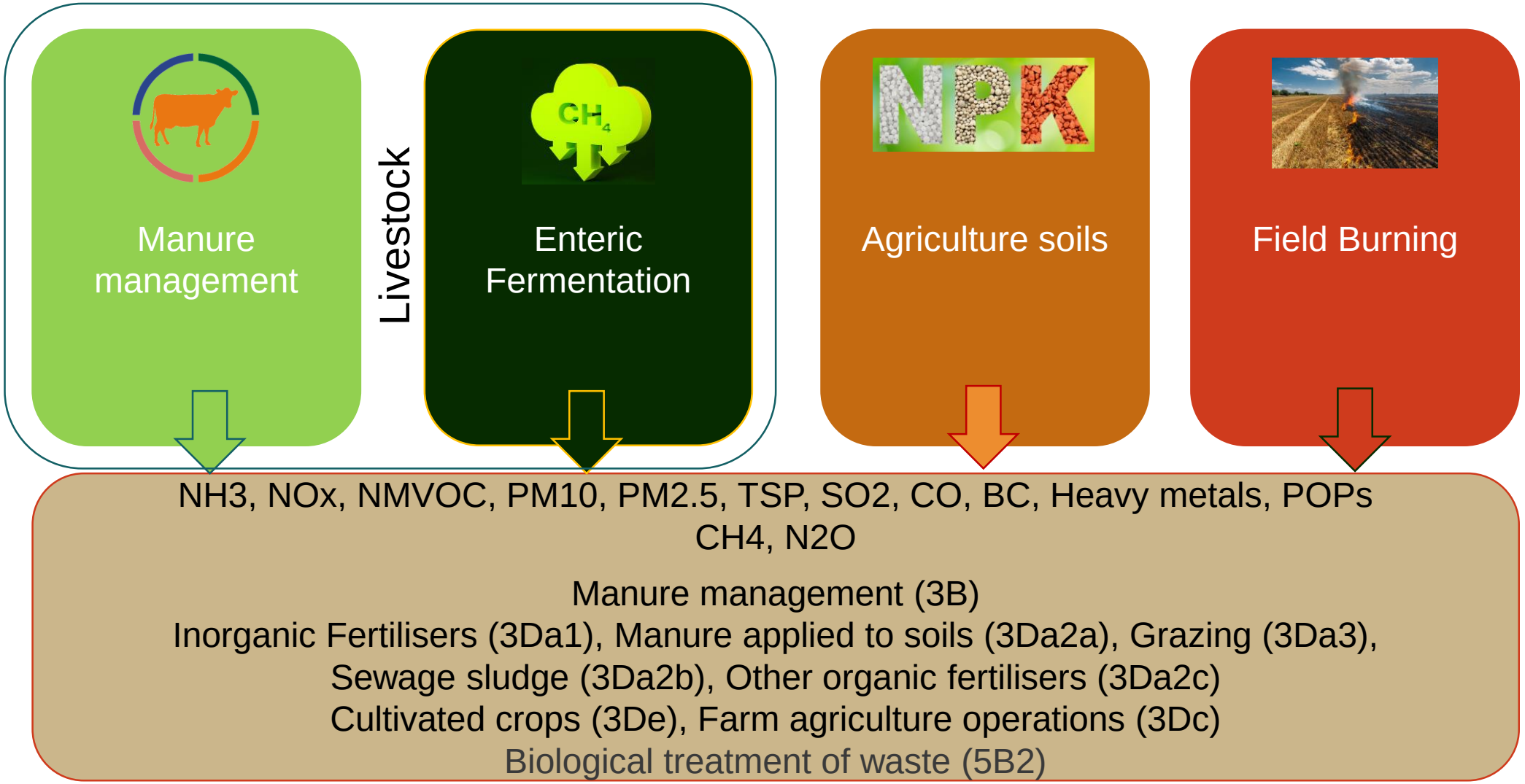
Agricultural Emission Estimation (AgrEE) Tool (3)

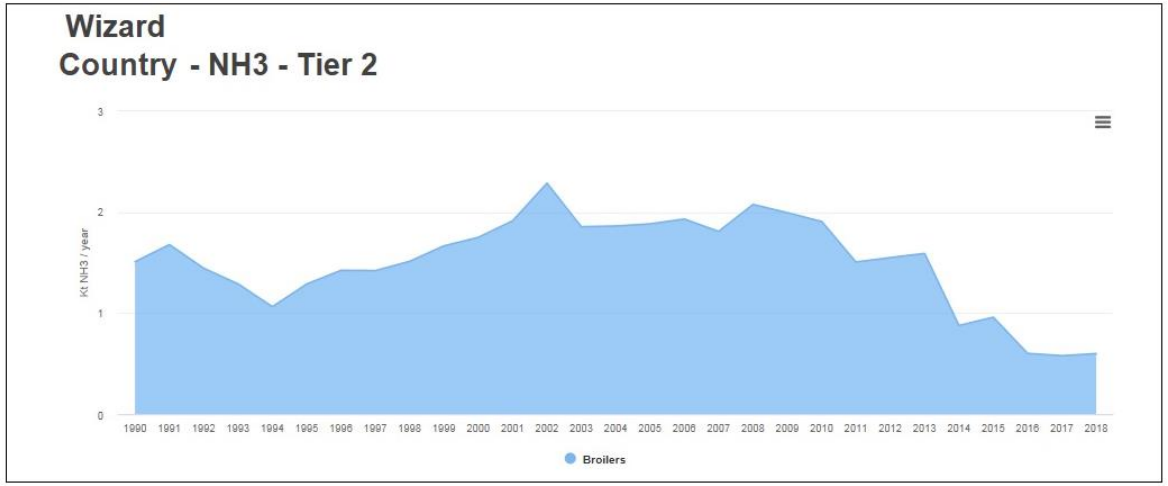


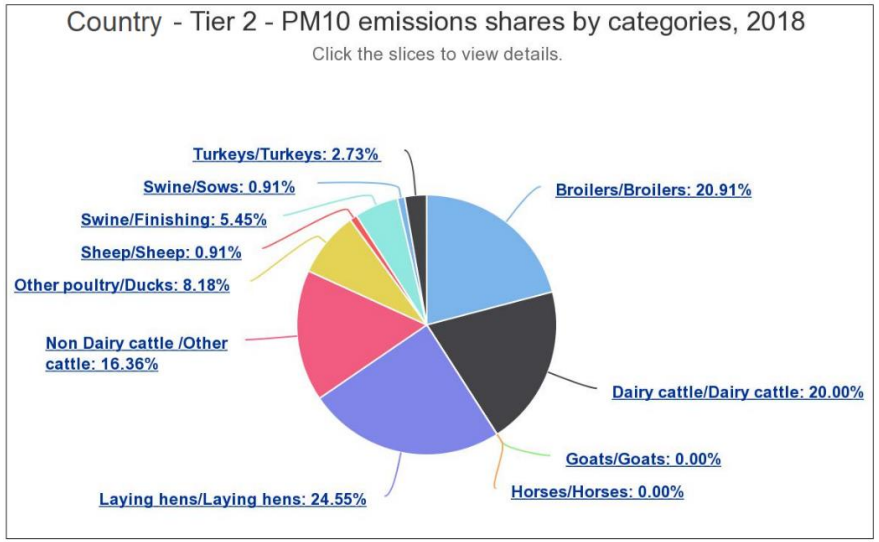
Agricultural Emission Estimation (AgrEE) tool (4)

- Enable extracting results conform the CLRTAP Annex I template
- Facilitate trend analysis, result comparison, relative contributions (by categories/sectors), overall EU overview

ANNEX 1: National sector emissions: Main pollutants, particulate matter, heavy metals and persistent organic pollutants		
NFR 2019-1		
COUNTRY:	ISO2	(as ISO2 code)
DATE:	DD.MM.YYYY	(as DD.MM.YYYY)
YEAR:	YYYY	(as YYYY, year of emissions and activity data)
Version:	v1.0	(as v1.0 for the initial submission)

ISO2: DD.MM.YYYY: YYYY	NFR sectors to be reported	
NFR Aggregation for Gridding and LPS (GNFR)	**NFR Code**	**Long name**
K_AgriLivestock	3B1a	Manure management - Dairy cattle
K_AgriLivestock	3B1b	Manure management - Non-dairy cattle
K_AgriLivestock	3B2	Manure management - Sheep
K_AgriLivestock	3B3	Manure management - Swine
K_AgriLivestock	3B4a	Manure management - Buffalo
K_AgriLivestock	3B4d	Manure management - Goats
K_AgriLivestock	3B4e	Manure management - Horses
K_AgriLivestock	3B4f	Manure management - Mules and asses
K_AgriLivestock	3B4gi	Manure management - Laying hens
K_AgriLivestock	3B4gii	Manure management - Broilers
K_AgriLivestock	3B4giii	Manure management - Turkeys
K_AgriLivestock	3B4giv	Manure management - Other poultry
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
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
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)





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Agricultural Emission Estimation (AgrEE) Tool (5)

Consistency across Member States and with EMEP/EEA Guidebook 2019

One stop shop – all air pollutants and agriculture categories in one place

Applicable for country, region and local scale

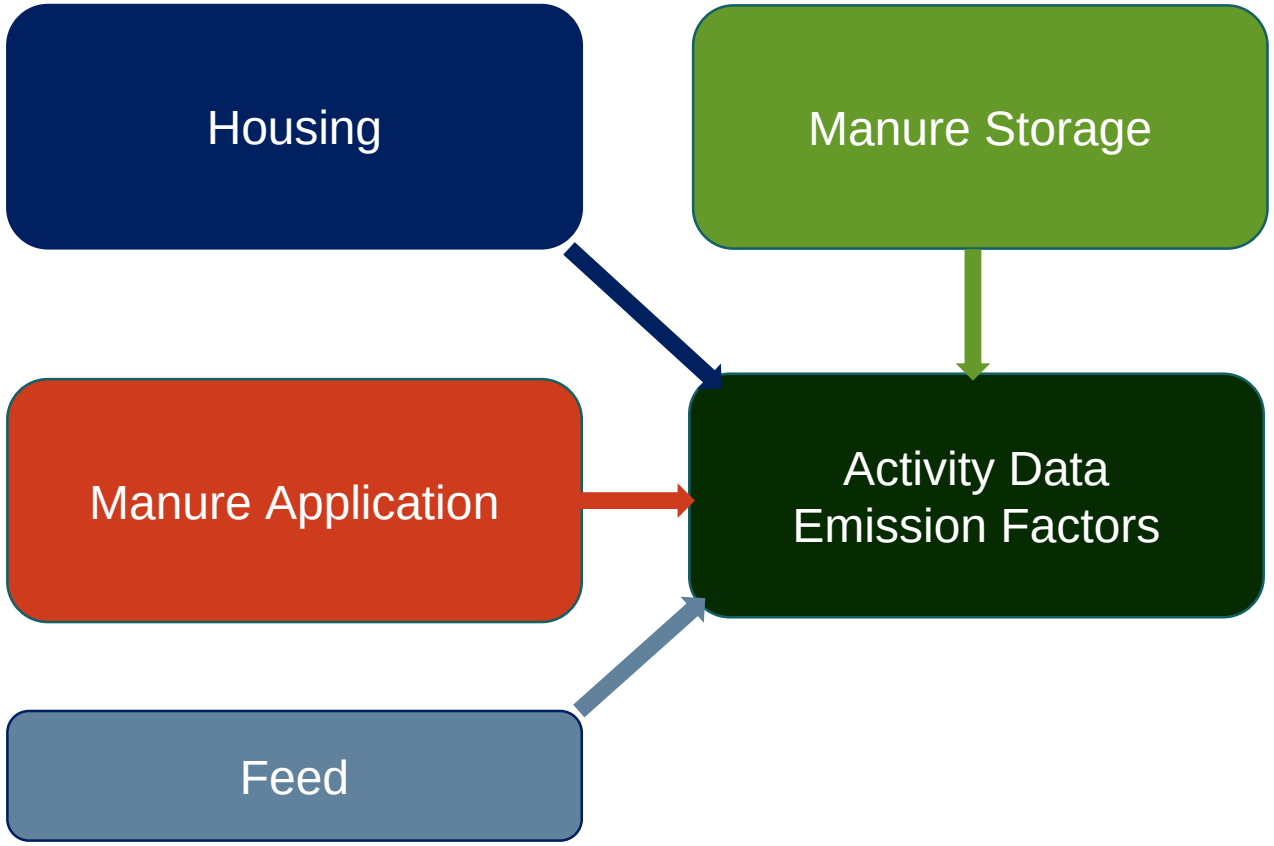
Fed by activity data and emission factors sourced from EDGAR and other sources/literature

Addressing data gaps for categories/sources that have similar characteristics

Possibility to consider the effect of abatement measures (simple approach)

Possibilities to consider the abatement measures for ammonia in AgrEE tool

Category Selection → Intermediate Step → Input template



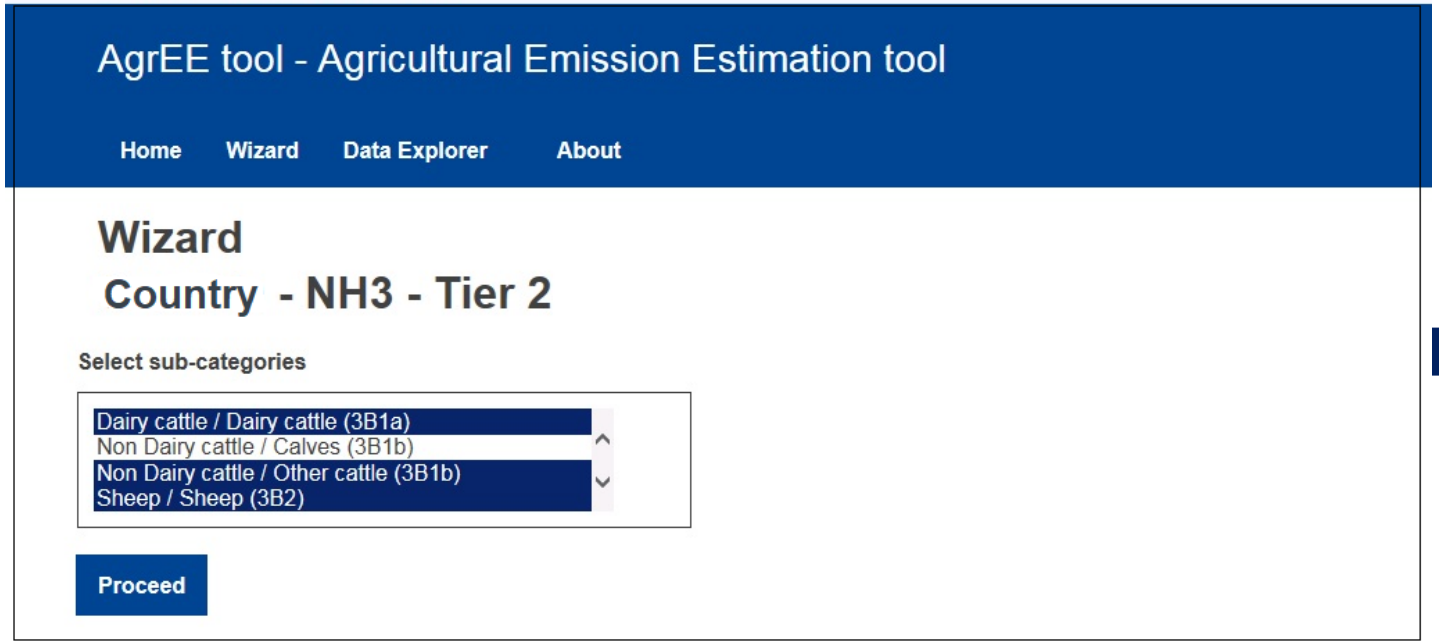
Livestock sector
Simple approach

(Advanced approach)

Informative Inventory Reports
EMEP/EEA Guidebook 2019
Literature

Possibilities to consider the abatement measures for ammonia in AgrEE tool (2)

- 13 main livestock categories
- Includes livestock subcategories and country specific livestock subdivision



Country specific sub-division

Cattle (upon age)
Dairy cattle (i.e lactating)
Other cattle (i.e suclking cows)
Heifers (i.e dairy, other)
Bulls (i.e fattening)
Calves (i.e slaughter calves)
Sheep (i.e ewes, lamb)
Swine (i.e boars)
Sows (i.e breeding sows)
Goats (i.e mature, kids)
Other animals (i.e ostrich)

Possibilities to consider the abatement measures for ammonia in AgrEE tool (3)

Housed floor (25% - 75% reduction)
Air scrubbing (70% - 90% reduction)

Tight lid (80% reduction)
Floating/Plastic cover (60% reduction)
Natural crust cover (40% reduction)
Other low technology covers (40% reduction)

Injection (>60% reduction)
Band application (>30% reduction)
Direct incorporation (30% - 55% reduction)
Dilution (>30% reduction)

Activity Data (abatment & reduction factor)
Emission Factors
(average EFs can be inserted)

Nexcreted calculated with IPCC 2006 method
Affected by crude protein levels

ECE EB.AIR/120 -Guidance document on preventing and abating ammonia emissions from agricultural sources

Handle abatement of ammonia with air scrubbers

BAT for pigs and poultry – a reduction between 55% and 80%

Assumption – nitrogen removed to be considered as TAN and applied to the field w/o storage losses in liquid form.

$E_{house\_slurry\_eff}$ will substitute E_{house_slurry}

In the AgrEE tool equation 15 of EMEP/EEA Guidebook 2019 will be transformed as below

$$(m_{house\_slurry\_TAN} * EF_{\_NH3\_Hou\_slurry}) * (((1-RE\_NH3_{\_Hou\_slurry\_scrubb}) * Fract_{\_Hou\_slurry\_scrubb}) + (1 - Fract_{\_Hou\_slurry\_scrubb}))$$

RE – removal efficiency of air scrubber (0 -1)

$Fract_{\_Hou\_slurry\_scrubb}$ – Fraction of livestock equiped with air scrubbers

Handle abatement of ammonia with partially slatted floor

Partially slatted (~ 50% of area) – a reduction up to 25%

Ehouse_slurry_red will substitute Ehouse_slurry

In the AgrEE tool equation 15 of EMEP/EEA Guidebook 2019 will be transformed

(mhouse_slurry_TAN * EF_NH3_Hou_slurry) * (1 - AF_NH3_Hou_slurry_slatt * RF_NH3_Hou_slurry_slatt)

AF – abatement factor

RF – reduction factor

Take home messages

- AgrEE tool is available for the upcoming 2022 NECD reporting
- Final version of AgrEE tool by end of February 2022
- AgrEE tool will apply a simple approach to include the effect of abatement measures
- AgrEE tool can estimate the effect of one abatement measure at a time
- Three main AgrEE tool modules are involved in the estimation of the ammonia emissions when applying abatement measures
- AgrEE tool will provide the same abatement structure for each MS

AgrEE tool can be enhanced applying an advanced approach to include more abatement measures country specific as well as to consider the effect of combined abatement measures in different systems

Questions

Contact: JRC-AGREETOOL@ec.europa.eu

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Thank you

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