

# Task Force on Emission Inventories and Projections

## Agriculture and Nature Expert Panel

Nick Hutchings, Aarhus University

Barbara Amon, ATB and UZG

Rainer Steinbrecher, IMK



# Welcome

- Unfortunate that we are not meeting in Bratislava
  - Look forward to seeing you there next year
- An advantage
  - No problem choosing between parallel sessions
  - More participants this year (about 100 signed up)
- Webinar will be run by Barbara and Nick
  - Backup from Chris and Co (Aether)
- Rainer Steinbrecher (natural emissions)
  - Not attending (normal practice)
  - Comment that natural emissions are again in focus
  - Guidebook chapters are still relevant



## Some practical matters

- Some people may be on slow internet connections
  - Most videos will be disabled
- Busy agenda
  - Three short periods for questions
  - If you have a question, type this in the Chat box (not Q&A or raise hand); if possible address comments to all participants
  - Your microphones will be muted
  - Barbara and Nick will take turns to monitor the Chat box
  - Selected questions will be answered
  - Any remaining questions will be answered afterwards and responses posted on the Expert Panel webpages (<https://tfeip-secretariat.org>)
- This session will be recorded



# Agenda

<b>Timing</b>	<b>Items</b>
14:00-14:15	Introduction
14:15-14:20	Background
14:20-14:35	Outstanding matters re 2019 Guidebook update
14:35-14:45	Progress with work plan
14:45-14:50	Questions
14:50-15:00	Progress with work plan (continued)
15:00-15:05	Questions
15:05-15:15	Improving national emission inventories for the agricultural sector in Europe
15:15-15:20	Questions to JRC
15:20-15:25	Work plan for 2020/2021
15:25-15:30	Conclusion

**NH** ■ Webinar on the N flow tool after this webinar



# Role of Agriculture and Nature Expert Panel

- Update the EMEP/EAA air pollutant emission inventory guidebook
  - New processes, sources and technologies
  - Identify need for new or updated methodologies and emission factors
  - Coordinate development of relevant chapters
- Gather feedback and answer queries from inventory compilers
- Encourage exchange of information
  - Special relation to Task Force on Reactive Nitrogen (TFRN)



# Outstanding matters from 2019 Guidebook update

- Ammonia emissions from:
  - Livestock housing and manure storage
  - Field-applied solid manure
  - Field-applied liquid manure
- *Ad hoc* group established to recommend adoption or delay
- Recommended adoption and incorporated in 2019 Guidebook
  - Ammonia emissions from livestock housing and manure storage
  - Ammonia emissions from field-applied solid manure
- Recommended delay
  - Ammonia emissions from field-applied liquid manure
  - Details later in this webinar



# Outstanding matters from 2019 Guidebook update – an additional matter

- Updated methodology for ammonia emissions from excreta deposited during grazing
  - Was recommended by TFEIP 2019 for adoption
  - The only Tier 2 ammonia emission factor in 3B (Manure management) based on total N rather than TAN (Total Ammoniacal Nitrogen), and a change from the 2016 Guidebook
  - Received comments that this would be confusing and lead to errors
- Expert Panel co-chairs agreed and recommended reverting to emission factor based on TAN
- TFEIP co-chairs requested consultation with *ad hoc* group
- Incorporated in 2019 Guidebook version



## Thanks to the *ad hoc* group

- Sebastian Wulf, KTBL, Germany
- Gwenaëlle le Borgne, CITEPA, France
- Roland Fuß, Thünen Institute, Germany
- Mette Hjorth Mikkelsen, Aarhus University, Denmark (4B)
- Rikke Albrechtsen, Aarhus University, Denmark (4D)



## Progress with work plan 2019/2020

- Methodology revisions
  - Ammonia emissions from liquid manure applied to soil
  - Ammonia emissions from synthetic fertilisers
  - Direct emissions of nitric oxide
- Methodology development
  - Indirect emissions of nitric oxide
  - Emissions of ammonia and NMVOCs from crops
  - Marine ammonia emissions
- Continue the collaboration with TFRN (EPMAN/EPNB)
- Assess consequences of 2019 refinement of agriculture chapter of IPCC Guidelines (2006) on Guidebook

## No progress (mainly due to lack of resources)

- Develop method to estimate ammonia and NMVOC emissions from crops
- Assess need for methodology for marine ammonia emissions
- Revise method to estimate ammonia emissions from synthetic fertilisers



# Revise methodology for direct emissions of nitric oxide (4D)

- Literature study funded by DEFRA (UK) found insufficient new information to justify changing the current methodology
- Recommend removal from workplan until new information is available

# Develop a methodology for indirect emissions of nitric oxide (4D)

- Indirect = nitrogen lost from agriculture that results in emissions elsewhere (e.g. from forests, lakes)
- There is a Tier 1 methodology for direct nitric oxide emissions
- Are the mechanisms driving indirect nitric oxide emissions similar to those driving direct nitric oxide emissions?
  - Discussion with Ute Skiba (UK); concluded that they are.
  - Propose using the Tier 1 direct emission methodology as a Tier 1 methodology for indirect emissions
  - Recommend inclusion during next scheduled Guidebook update (2022)



# Ammonia emissions from field-applied liquid manure

- Revised methodology was based on an empirical model
  - Concern expressed at TFEIP 2019 regarding sensitivity of model to precipitation
  - Asked for discussions with the *ad hoc* group
  - Conclusion; a more comprehensive analysis necessary
  - Recommended postponing any change in methodology until next scheduled Guidebook update
- Discussions with Germany
  - Suggested a work plan (methodology and assumed activity data)
  - Need for adaption to match the resources available
  - Delay due to Corvid-19 situation



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# Assess consequences of 2019 refinement of agriculture chapter of IPCC (2006)

Task Force on  
National Greenhouse Gas Inventories

ipcc  
INTERGOVERNMENTAL PANEL ON climate change



## 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories



BA

Barbara Amon

Lead Author Volume 4, Chap 10 Livestock



# Guidelines for the estimation of gaseous N emissions and reporting obligations

1. 2006 IPCC Guidelines for National Greenhouse Gas Inventories:
  - United Nations Framework Convention on Climate Change (UNFCCC)
  - Kyoto Protocol and Paris Agreement
  - **N<sub>2</sub>O and CH<sub>4</sub> emissions**
2. EMEP CORINAIR emission inventory guidebook:
  - UNECE Convention on Long-range Transboundary Air Pollution
  - EU National Emission Ceilings Directive
  - **NH<sub>3</sub> emissions**



# The 2019 refinement

- The overall aim of the 2019 Refinement is to provide an updated scientific basis for supporting the preparation and continuous improvement of national GHG inventories.
- Refinement in “Livestock and manure management” and “Soils”:
  - CH<sub>4</sub> emissions from enteric fermentation and from manure management
  - Improved guidance has been developed for the treatment of nitrogen transfers among livestock emission source categories and transfers to agricultural soils.
  - Soil N<sub>2</sub>O: Tier 1 estimates have been updated based on the latest science for direct and indirect emission factors; a key development is the disaggregation of emission factors by climate region.



# Continue the collaboration with TFRN

- Under the UNECE Convention on Long-Range Transboundary Air Pollution (Geneva Air Convention), the Task Force on Reactive Nitrogen (TFRN) is currently developing the **“Guidance Document on Integrated Sustainable Nitrogen Management.”**
- The Expert Panel on Mitigation of Agricultural Nitrogen (**EPMAN**)
  - To prepare a basis for updating the code of good practice for reducing ammonia emissions
  - To review the Guidance document on reducing ammonia emissions, especially in the light of other nitrogen interactions
  - To prepare options to form a basis for discussion on revision of Annex IX of the Gothenburg Protocol
    - Clearing House for new technologies
    - Database on measures to mitigate emissions (in collaboration with INMS)



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# Collaboration with EraNet Projects

- MilKey: “Decision support system for sustainable and GHG optimised milk production in key European areas”
  - MilKey analyses drivers and sustainability aspects of dairy production systems in key European regions; it identifies key GHG and N mitigation techniques and develops the MilKey platform for information and communication on key sustainability parameters of DPS.
- MELS: “Mitigating Greenhouse Gas Emissions from Livestock”
  - MELS collates data on emissions from manure management and activity data and generates functional relationships between emissions and activity variables, enabling a refinement of national inventories. MELS will allow the consequences of mitigation strategies on emissions and costs to be more accurately quantified and better documented, both at the national and farm scales.
- M4Models: “Manure management for methane mitigation - Improved inventory modelling to support policy actions”
  - A new method to estimate CH<sub>4</sub> emissions from manure will be used to investigate farm-level GHG mitigation, and for upscaling to national inventories. Experiments will study effects of feeding, biogas treatment, temperature and storage duration on CH<sub>4</sub> emissions from manure.



## Workplan 2020-2021

- Continue development of method to estimate ammonia emissions from liquid manure applied to soil
- Continue development of method to estimate ammonia emissions from synthetic fertilisers
- Continue the collaboration with TFRN, international projects and developments under IPCC
- Develop method to estimate ammonia emissions from crops
- Assess need for methodology for marine  $\text{NH}_3$  emissions
- Develop specific guidance on accounting for the import/export of manure
- Cooperate with JRC on improved emission inventory tools