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WORKING GROUP
"AGRICULTURE AND ENVIRONMENT"
OF THE STANDING COMMITTEE FOR
AGRICULTURAL STATISTICS

TO BE HELD IN LUXEMBOURG,
BECH BUILDING – ROOM QUETELET
ON 9 AND 10 FEBRUARY 2012, 9:30 A.M.

CHAIRED BY: M. ERNENS

POINT 2.1.5

EXCRETION AND EMISSIONS

Foreword

This document provides the background for the discussions under item 2.1.4 on the agenda of the Working Group meeting on 9 and 10 February 2012.

Please note that when referring to N and P excretion (coefficients) the nutrient content at the time of excretion is meant: that is no corrections are made for volatilisation of N during animal housing, storage or application to land.

There are 4 different issues to discuss:

1. The proposal to estimate N excretion based on UNFCCC reporting, see Chapter 1.
2. Long term goal of harmonising excretion coefficients, see Chapter 2.
3. Improving availability of underlying data to estimate excretion, see Chapter 3.
4. P excretion, see Chapter 4.

Ad 1.
We need to determine a single common data source to use to estimate N excretion in the GNB-N in a harmonised, transparent and consistent way. Eurostat proposes to use the excretion coefficients reported to the UNFCC as the starting point.

Ad 2.
The Commission services prefer to apply the same coefficients for various EU reporting requirements. A cow will produce for the same amount of N per year independently from whether this number is used for calculating the NO3 losses to water or GHG emissions. DG ENV aims at harmonising the excretion coefficients used in EU policy reporting in the long term. This aim is shared also by OECD, FAO and other stakeholders.

Ad 3.
Excretion coefficients in countries vary not only due to different methodologies applied but also due to differences in the availability of the necessary data to estimate excretion coefficients. Eurostat intends to implement DireDate recommendations' relating on improving the underlying data needed to estimate excretion and emissions.

Ad 4.
The situation for P is much different than for N. No guidelines or legislative requirements exist for the estimation of P excretion factors. Eurostat intends to improve this situation by issuing a contract in 2012. The contractor would be asked to design guidelines to estimate P excretion coefficients.

The questions which will be posed to the members of the Working Group can be found in Chapter 5.

Contents

1 N Excretion in GNB-N based on UNFCCC

1.1 Introduction

In the Task Force meeting on GNB on 14-15 November 2011, the different types of budgets or balances were discussed: the farm budget, the land budget and the soil budget. For the discussion on the type of balances, see document CPSA/AEI/100. In the farm budget inputs to and from the farm are accounted, manure excretion is a throughput and therefore does not need to be estimated. In the land budget, which corresponds more or less to the current methodology of the Gross Nutrient Balances, manure production needs to be estimated. The soil budget only accounts inputs and outputs to the soil, the manure applied needs to be estimated. The majority of the participants were in favour of continuing the land budget approach, though some experts favour the farm budget approach at national level. This document presumes the land budget approach and therefore concentrates on the estimation of manure production.

The estimation of excretion is directly linked with the estimation of emissions. In the Task Force the inclusion of data on nitrogen emissions in the GNB reporting allowing an indication of the part of the total N surplus at risk to the air (the N emissions), and of the part which is potentially risking N leaching and run-off (the total N surplus minus N emissions) was discussed. The participants were in favour to include data on N emissions in the GNB calculations. For further detail please see the discussion in document CPSA/AEI/100.

The manure production is estimated in the Gross Nutrient Balances (GNB) by multiplying livestock numbers with excretion coefficients. Currently MS use different sources for the excretion coefficients, for instance the Nitrates Directive (ND), UNFCCC and other sources.

1.2 Defining the appropriate data source

The excretion coefficients determine the outcome of the GNB to a large extent. Therefore it is necessary to ensure a transparent and harmonised approach. At the moment there are 2 legislative requirements at EU level concerning N excretion coefficients: the Nitrates Directive (ND) and the UNFCCC. The coefficients of these 2 data sources are not necessarily the same. In the Task Force it was proposed to define the data source for N excretion coefficients to be used in the GNB as those reported officially to the UNFCCC with the submissions of the GHG Inventories. The livestock data to use should match the coefficients applied to it and it was proposed to use the figures reported to the UNFCCC together with their coefficients. It is the responsibility of the countries to ensure that these data are consistent with livestock statistics send to Eurostat. Table 4.B(b) in the Common Report Format (CRF) reports[1] reported to the UNFCCC contain a summary in a common format of the detailed information on excretion coefficients and livestock numbers which can be found in the National Inventory Reports (NIR), see Table 1.

The use of UNFCCC excretion coefficients would ensure a harmonised and transparent approach: there are common (IPCC) guidelines, the methodology and data used are reported in the National Inventory Reports and the Common Report Format reports, which

[1] The CRF and NIR reports can be found at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php

are publicly available and the use of excretion coefficients reported to the UNFCCC would also ensure consistency between the GNB-N, GHG and NH3 emission estimations.

UNFCCC excretion coefficients	**Nitrates Directive excretion coefficients**
Common handbook: (IPCC) guidelines	No common handbook
excretion coefficients and metadata publicly available: (NIR + CRF)	Underlying data not public available
Consistent with NH3 + GHG emissions	Not consistent with NH3 + GHG emissions

The majority of the participants were in favour to define the data source as the excretion coefficients reported to the UNFCCC.

Table 1. Information GHG Inventories CRF reports Table 4.B(b) year x

GREENHOUSE GAS SOURCE	**ACTIVITY DATA AND OTHER RELATED INFORMATION**	
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	**Population size**	**Nitrogen excretion**
	(1000s)	**(kg N/head/yr)**
Cattle		
Option A:		
Dairy Cattle		
Non-Dairy Cattle		
Option B:		
Mature Dairy Cattle		
Mature Non-Dairy Cattle		
Young Cattle		
Sheep		
Swine		
Poultry		
Buffalo		
Goats		
Camels and Llamas		
Horses		
Mules and Asses		
Other livestock *(please specify)*		
Other non-specified		
Total per AWMS		

2 Harmonising N excretion coefficients

The Commission services agree it would be preferable if there would be a single coefficient in use for EU reporting requirements. A cow will produce for example 100 kg N/year independently from the fact that this number has to be used for calculating the NO3 losses to water or GHG emissions. Another concern is the comparability of excretion coefficients across countries. There are no common guidelines for the ND. The UNFCCC has established common guidelines, but a Tier1 approach can hardly be compared to a Tier3 approach.

DG ENV aims at harmonising the excretion coefficients used in EU policy reporting in the long term. This aim is shared by the OECD, FAO and other stakeholders. DireDate recommended installing a Task Force to develop a uniform methodology across EU to estimate excretion. To achieve this, the political DG's and other international institutions should take the lead to organise such a workshop and to muster the necessary political commitment for such a project.

Eurostat could support this objective by making funds available for a contract in 2012, potentially with the aim to compare the methodologies and data used by the Member States (MS) for the ND and the methodologies and data used by the MS for the reporting to the UNFCCC and to provide recommendations to come to a harmonised and improved estimation of excretion coefficients. Next to this a workshop could be organised where the findings of the study can be discussed with all interested national experts and other relevant stakeholders, before the final recommendations are drafted.

3 Improving availability of underlying data

DireDate recommends estimating the GHG and NH3 emissions in the short term at Tier 2 for the major livestock types: dairy cattle, beef cattle, sows, fattening pigs, broilers and laying hens. In countries where sheep and goats are of significance it is recommended to estimate the emissions from these livestock as well at Tier 2. For all other categories the Tier 1 approach is sufficient. In the long term GHG emissions for the major livestock types should be estimated at Tier 3 and NH3 emissions using a Total Ammonia Nitrogen (TAN) -based approach to catch abatement measures. The additional data needed to achieve these recommendations are listed in DireDate report Task 3 and DireDate report Task 4&5, a summary is provided in the following paragraphs.

At the moment emissions are only calculated at a national level. There is no recommendation to estimate GHG or NH3 emissions at regional levels. Disaggregation to regional level could be achieved by applying national emission factors to regional data on animal numbers and area (this means that it is assumed that emissions factors do not vary significantly between regions). In this case regional differences in farmer practices to mitigate N emissions are not captured. If emissions are expected to vary significantly emissions could be estimated at regional level if the underlying data are available at regional level.

3.1 Livestock

Moving to a higher Tier-level lead to a more detailed classification of livestock required. According to DireDate the livestock classification used in Eurostat is sufficient to meet these requirements. Data on livestock are also sufficient available to estimate the excretion

coefficients, see for more detailed discussion paragraph 6.1 in the Working Document provided for the Task Force meeting on GNB.

According to the IPCC guidelines the livestock numbers should represent the annual average livestock population. The **Annual average population** represents the average population of a livestock type present during a year, this includes fall-out (animals which die before coming to production age). For livestock types without seasonal variations in the population and empty stable places the annual average population can be considered equal to the population counted at any specific day. For livestock types with seasonal variations or occurrence of empty stables the population counted on a specific day need to be corrected for these factors to represent the average population present in a year. For livestock types involving multiple production cycles within a year the annual average population can be derived from slaughter/production statistics corrected for non-sold or non-slaughtered animals (animals dying before production age has been achieved) divided by the number of production cycles. The annual average population of livestock types involving multiple production cycles can also be derived from the number of animal places corrected for the average amount of empty stable places during a year.

In the case of static animal populations (e.g., dairy cows, breeding swine) the annual average population could be assumed to equal the population counted in the FSS or Livestock production Surveys. However, for estimating the annual average populations for a quickly changing population (e.g., meat animals, such as broilers, turkeys, beef cattle, and fattening pigs), data from the FSS or Livestock statistics may be biased as seasonal variations are not taken into account.

GNB data and data from the UNFCCC show that countries do not always adjust the data from the FSS or Livestock Surveys to take into account seasonal variations. The contract referred to in the previous Chapter 2 could also look at this issue and define the appropriate data sources and adjustments to estimate the annual average livestock population.

3.2 DireDate recommendations on data needs related to excretion

DireDate's recommends to establish at minimum the alternative approach to Tier 2 to estimate excretion coefficients. This means that the following data are needed to be collected[2]:

- Data on time in housing/grazing at regional level: these data are currently not available in many MS but could be collected in the FSS.
- Average daily milk production and average fat content: annual production data and protein content are available from European milk statistics.
- Data mentioned in Table 5 at p51 of the Working Document (animal weight, digestibility of feed, protein content of feed etc etc). These are data which preferable should be available from country specific research.

[2] See for more information: DireDate report Task 3 and DireDate report Task 4&5 and paragraph 6.2.2 and 16.2 in the Working Document provided for the Task Force meeting on GNB.

3.3 DireDate recommendations on data needs related to emissions

Housing system

- Short term: solid and liquid manure
- Intermediate term (IPCC guidelines): (i) anaerobic lagoon, (ii) liquid system, (iii) daily spread, (iv) solid storage and dry lot, (v) pasture range and paddock, (vi) used fuel, and (vii) other systems.
- Long-term (Tier 2 approach): Housing with fully-slatted floor, partially slatted floor, tied, loose, mechanical ventilation, scrubbers or biofilters, manure separation, anaerobic digester (without/with added supplements)

Manure storage system

- Short term: solid and liquid manure
- Intermediate term (IPCC guidelines): (i) anaerobic lagoon, (ii) liquid system, (iii) daily spread, (iv) solid storage and dry lot, (v) pasture range and paddock, (vi) other systems.
- Long-term (Tier 3 approach): Slurry stored in open tanks, Slurry stored in covered tanks, Slurry stored in lagoons, Slurry stored in under floor pits, Manure stored in manure heaps, Manure composted, and Manure incinerated

Manure application techniques

- Short-term: broadcast (no incorporation) and reduced ammonia application technique (i.e. the other techniques). Use estimates derived for the GAINS model and start a survey to collect data on farms.
- Long-term: Broadcast - no incorporation, Broadcast - incorporation <2hrs, Broadcast - incorporation <1 day, Band spread, Deep injection, and Shallow injection

Proposed actions:
Introduce data collection on type of housing and manure storage systems in FSS (satellite) and manure application techniques in a farm-level survey to be set up for fertilisers (see for a discussion on a possible fertiliser survey the document (TF/F/2012/001) provided for the TF on Fertilisers.

4 P Excretion

For P there are no legal requirements for excretion coefficients. Some MS therefore do not have them. As there is no legal requirement for these coefficients at international level there is neither a review process in place at international level.

To improve this situation, the contract mentioned in Chapter 2 could also look at the establishment of common guidelines for the estimation of P excretion. Next to this a workshop should be organised where the findings of the study can be discussed with all interested national experts and other relevant stakeholders, before the final recommendations are drafted.

A grant-program could follow after the project to aid countries in estimating or adjusting their coefficients according to the new guidelines.

5 Questions

[1] Do you agree with using the data reported to the UNFCCC, see also Table 1, to estimate the N excretion?

[2] Do you agree with the proposal for a contract on harmonising N coefficients as discussed in Chapter 2?

[3] Do you agree with the proposal of DireDate to estimate excretion coefficients for dairy cows at regional level? Is there a need to estimate excretion coefficients for other animal types as well at regional level?

[4] Do you agree to collect data on grazing/housing systems at regional level in FSS (satellite)?

[5] Do you agree to collect data on type of housing and manure storage systems in FSS (satellite) and manure application techniques in the survey to be set up for fertilisers? Do you agree to differentiate in the data collected in the short, medium and long term, following the transition of emissions to be estimated at Tier 2 in the short term and Tier 3 in the medium/long term?

[6] Do you agree to estimate regional emissions using national factors applied to regional data or should regional factors be estimated?

[7] Do you agree with the proposal for a contract on establishing guidelines for P coefficients as discussed in Chapter 4?