



Calculating CRI 19: Reduced ammonia emissions. Experience from Flanders, Belgium

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Sustainability Database

General principle

The sustainability database makes it possible to calculate the contributions of certain investments supported by the RDP to climate mitigation and adaptation and the environmental objectives.

Timeline

- **2015**: started compiling the database
- **2016**: the concept is finished
- **2017**: programming the IT-systems for M04 (investments) to keep track of environmental data and start of the data collection
- **2018**: program is finalised and analysis begins
- **2019-2020**: annual calculation of the sustainability effects and updates in the database when new information becomes available

Sustainability Database

Sustainability Database Tracks

- Energy use and production
- GHG and ammonia emissions
- Odour emission
- Particulate matter emission
- Water use and quality
- Animal welfare

Indicators Concerned

- **R1/T4:** Percentage of agriculture holdings with RDP support for investment in restructuring or modernisation
- **CRI 13:** Increase in efficiency of water use in agriculture in RDP supported projects
- **CRI 14:** Increase in efficiency of energy use in agriculture and food processing in RDP supported projects
- **CRI 15:** Renewable energy production from supported projects
- **R16/T17:** Percentage of Livestock Units (LU) concerned by investments in livestock management in view of reducing GHG and/or ammonia emissions
- **CRI 18:** Reduced emissions of methane and nitrous oxide
- **CRI 19:** Reduced ammonia emissions

Sustainability database

<p>Energy use Ex. Type of glass, energy screens</p>	<p>GHG-emission: Ex. Heat pump, windmill</p>	<p>Odour emission: Ex. Air washers</p>	<p>Particulate matter emission: Ex. Air washers</p>	<p>Water use</p>	<p>Animal welfare:</p>
<p>Energy production Ex. Solar water heater, heating system on bio-fuel</p>	<p>Ammonia emission: Ex. Air washer, concrete floor</p>			<p>Water quality</p> <p>→ Volumes, type of investements, type of sanitation</p>	<p>→ Number of investments and number of animal places</p>

Data collection and calculation

Data provided by farmer (per stable or greenhouse)

- Most important animal category (stable)
- Number of animal places (stable)
- Type of fuel use
- Type of heating system
- Area of greenhouse
- Main cultivation (greenhouse)

Calculation of indicators

- Based on established methods
- Usage of several data tables and key numbers
 - For example: CO₂ eq. Emission coefficients, particulate matter reduction percentages, standard energy use for different types of cultivation,...

Sustainability Database

Experts:

Departement Landbouw en Visserij; Enerpedia; ILVO; Inagro vzw; Innovatiesteunpunt; Proefstation voor de Groenteelt vzw; Thomas More Hogeschool; Vlaams Energieagentschap

Scientific literatuur:

Derden A., L. Goovaerts, P. Vercaemst en K. Vrancken (2005); Buurma, J.S. en P.X. Smit (2014); Departement Landbouw en Visserij (2018); Kamp J., Van Reeuwijk P., Schoorl F., Montsma M. (2010); Lenders S. & Deuninck J. (2016); Maertens E., Dumez L. & Van Gijsegem D. (2016); Mosquera J. & Hol J.M.G. (2012); Van den PolDasselaar et al (2013); Van der Heyden C, Brusselman E, Volcke E & Demeyer P. (2016); Van linden V., Dekeyser D., Van Overbeke P., Baets B., Löffel J., & Degroote T. (2011)

Sustainability Database

Others:

Bedrijfseconomische resultaten en technische kengetallen Vlaamse land en tuinbouw

<https://lv.vlaanderen.be/nl/voorlichtinginfo/publicatiescijfers/landbouwcijfers#overzichtsrapporten>;

Bijlage Richtlijnenboek Landbouwdieren (versie 17/05/2019); Brochure “Energieke landbouw: Watt brengt het op?” (2014), Departement Landbouw en Visserij, Vlaamse overheid; Enerpedia - www.enerpedia.be;

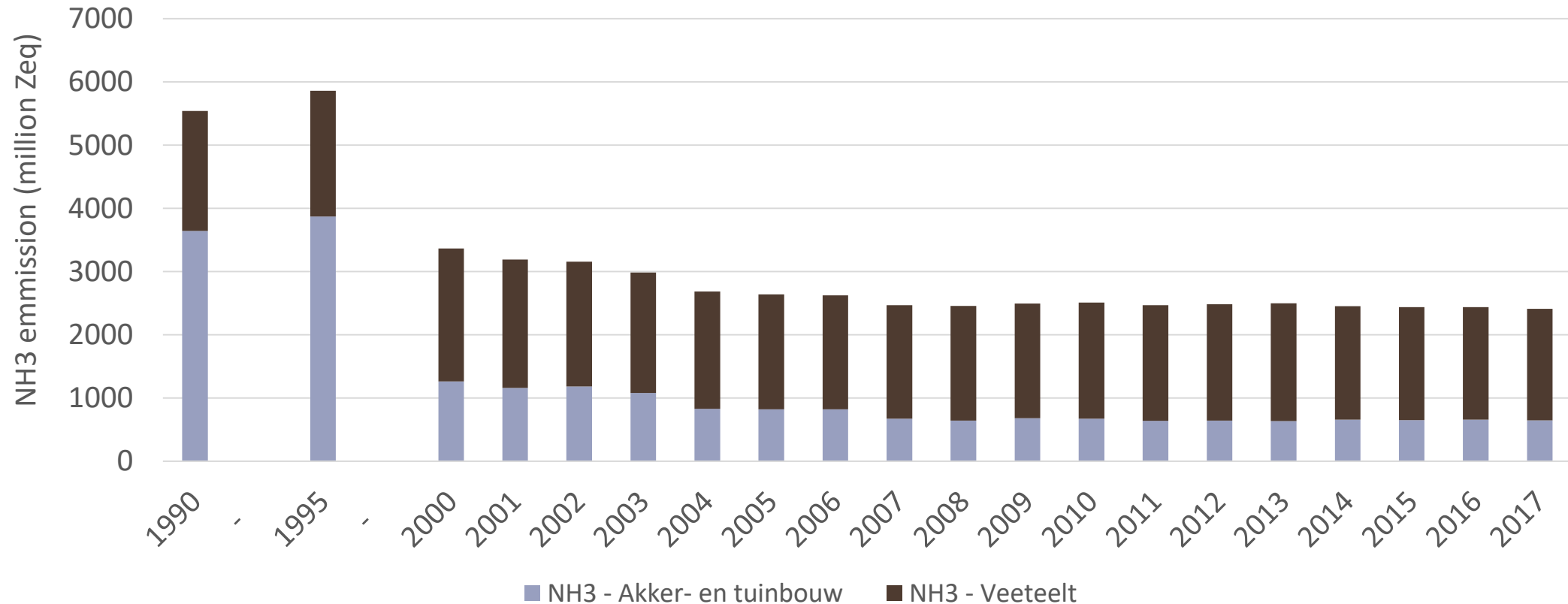
<https://www.gas.be/nl/graaddagen/>; KMI - <https://www.meteo.be/nl/belgie>; Leaflet “Energiebesparing varkens, Biggen warm houden met minder energie”, Animal Sciences Group, Wageningen UR.; PAS-lijst (laatst gebruikte update: oktober 2018).;

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[/PASlijst.aspx#.XAT90tKWzIU](https://www.ilvo.vlaanderen.be/NL/Onderzoek/Ammoniakemissiereducerendemaatregelenentechnieken/PASlijst.aspx#.XAT90tKWzIU); Richtlijn 2012/27/EU van het Europees Parlement en de Raad van 25 oktober 2012 betreffende energieefficiëntie, tot wijziging van Richtlijnen 2009/125/EG en 2010/30/EU en houdende intrekking van de Richtlijnen 2004/8/EG en 2006/32/EG, bijlage

Example – calculation of CRI 19 - Background

Emission of NH3 by Flemish agriculture



Source: MIRA based on VMM and Energiebalans VITO, www.milieuraapport.be

Calculation of CRI 19

Measures with primary contributions

- Support to investments on farms (M04.1)
- Agro-environment-climate commitments (M10)

Measures with secondary contributions

- Vocational training and skills acquisition actions (M01.1) (FA 1A, 1C, 2A, 4A, 4B, 4C)
- Demonstration activities and information actions (M01.2) (FA 1A, 1B, 1C, 2A, 4C, 5B)
- Support to help benefit from the use of advisory services (M02.1)
- Support for the processing, marketing and/or development of agricultural products (M04.2) (FA 3A)
- Agro-forestry systems (M08.2) (FA 5E)
- Co-operation (M16) (FA 1A, 1B, 1C, 2A, 4C, 5B, 6B)
- Support for LEADER local development (CLLD – community-led local development) (M19) → no completed projects at this time

Calculation of CRI 19

Guidelines protocol:	Implemented protocol:
Step 1: Establish the samples	Step 1: Setting up key data for different investments
Step 2: Implement the survey	Step 2: Gather base stable or greenhouse data from beneficiaries
Step 3: Estimate the gross indicators	Step 3: A) Calculate quantitative ammonia reduction based on established methods B) Qualitative estimation for those investments and other measures where calculations are not possible
Step 4: Estimate the net indicators	Step 4: Mix of qualitative (estimation) and quantitative (calculation) data form an overview of the reduced ammonia emission

Calculation of CRI 19 – Step 1

VLIF investment support (Ammonia emission reduction):

- Low ammonia emission stables (AEA stable)
- Air washers
- Concrete floors
- Manure cellars, manure storage, manure separation (not calculated)
- Manure slider, manure robot
- Manure injection (not calculated)
- Programmatic Approach to Nitrogen (PAS)-list

Calculation of CRI 19 – Step 1 (example)

EMISSIEFACTOREN VLEESVARKENS

Vlaams systeem	Vlaamse Omschrijving	Nederlands systeem	NH ₃ (kg/dp/jaar)	Geur (ou _e /dier/s)	PM ₁₀ (kg/dier/jaar)	PM _{2,5} (kg/dier/jaar)
Overige huisvestings systemen	hokopp max 0,8 m ²	D.3.100	2,5	29,2	0,093	0,0076
	hokopp > 0,8 m ²	D.3.100	3,5	29,2	0,093	0,0076
V-4.1	mestopvang in en spoelen met beluchte mestvloeistof - hokopp 0,65-0,8 m ²	geen echte overeenkomst	1,4	22,7	0,093	0,0076
V-4.2	mestopvang in beluchte mest en vervanging hiervan via een rioleringsysteem of ander van de lucht af te sluiten afvoersysteem (hokopp 0,65-0,8 m ²)	geen echte overeenkomst	1,4	22,7	0,093	0,0076
V-4.3	koeldekstelsysteem met metalen driekantroostervloer (170% koeldekopp) (max hokopp van 0,8 m ²)	D.3.2.3	1,1	22,7	0,093	0,0076
V-4.4	koeldekstelsysteem (200% koelopp) met metalen roostervloer (max. 0,8 m ² emitt. mestopp)	D.3.2.6.1.1	1,2	22,7	0,093	0,0076
V-4.5	koeldekstelsysteem (200% koelopp) met roostervloer anders dan metalen driekantroosters (max. 0,6 m ² emitt. mestopp)	D.3.2.6.2.1	1,4	22,7	0,093	0,0076
V-4.6	mestkelders met water- en mestkanaal, de laatste met schuine putwanden en metalen driekantroosters	D.3.2.7.1	1 of 1,4	22,7	0,093	0,0076
V-4.7	mestkelders met water- en mestkanaal, de laatste met schuine putwanden en met andere dan metalen driekantroosters	D.3.2.7.2.1	1,2	22,7	0,093	0,0076
V-4.8	gescheiden afvoer van mest en urine door middel van een mest- en een giergoot met mestschraper	geen echte overeenkomst	1,2	7,4	0,093	0,0076

Calculation of CRI 19 – Step 2

Basis stable data retrieved from beneficiaries:

- Most important animal category
- Number of animal places

- Volume of manure storage
- Type of manure injection
- ...

Calculation of CRI 19 – Step 3

Reduction factor per type of investment		Data provided by farmer
Low ammonia emission stables (AEA stable)	X	Animal category and places/per category
Air washers	X	Animal category and places/per category
Concrete floors	X	Animal category and places/per category
Manure cellars, manure storage, manure separation (not calculated)		Volume manure storage
Manure slider, manure robot	X	Animal category and places/per category
Manure injection (not calculated)		Type of manure injection
PAS-list	X	Animal category and places/per category

Calculation of CRI 19 – Step 4

- Mix of qualitative and quantitative data and results
 - Investments: quantitative data from a sustainability database mixed with some qualitative results where calculation was not possible (retrieved from beneficiaries)
 - Agri-environment-climate commitments: only data regarding output from our monitoring system (number of hectares, contracts, etc.)
- Main result is calculated in the sustainability database for investments

Challenges and solutions for the calculation of CRI 19

- Only investments after October 2016 available and investments from other funds are not incorporated
 - You will have to find a balance between accuracy of the results and the administrative burden for the farmer when it comes to data collection.
 - Because of lack of key number not all investments could be calculated
- We are constantly developing new methods and expanding the database based on new research results

Challenges and solutions for the calculation of CRI 19

Solution in AIR submitted in 2019 for those measures that cannot be calculated in the database:

- M10: the quantitative contribution could not be calculated so we gave output related results (number of contracts, hectares,...)
 - M04.1: not all investments are part of the database since there aren't established methods for the calculation of the effects.
- For the storage of manure we could only calculate the volume that is stored, which is a qualitative result
- We keep track of ongoing research in order to expand the database for new types of investments

Main conclusions and lessons learned

- Do not forget about the administrative burden for the farmer
- The database is never completely finished (new types of investments, new research results, etc.)
- You cannot quantify every contribution to a CRI, so creativity is necessary in order to evaluate every aspect of the RDP

Improving the Sustainability database

- Expand with new investment types
 - If the list of investments for M04 is updated, the database needs updating as well
- New, improved methodologies
 - For example: results from research institutions, EIP operational groups
- Simplified characteristics
- Gather more information from external instances
- Look into possibilities to expand the database with other kinds of measures

Thank you

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