Interreg Baltic Sea Region

Baltic Slurry Acidification

EUROPEAN UNION

EUROPEAN REGIONAL DEVELOPMENT FUND

Policy recommendations

for supporting slurry acidification technology

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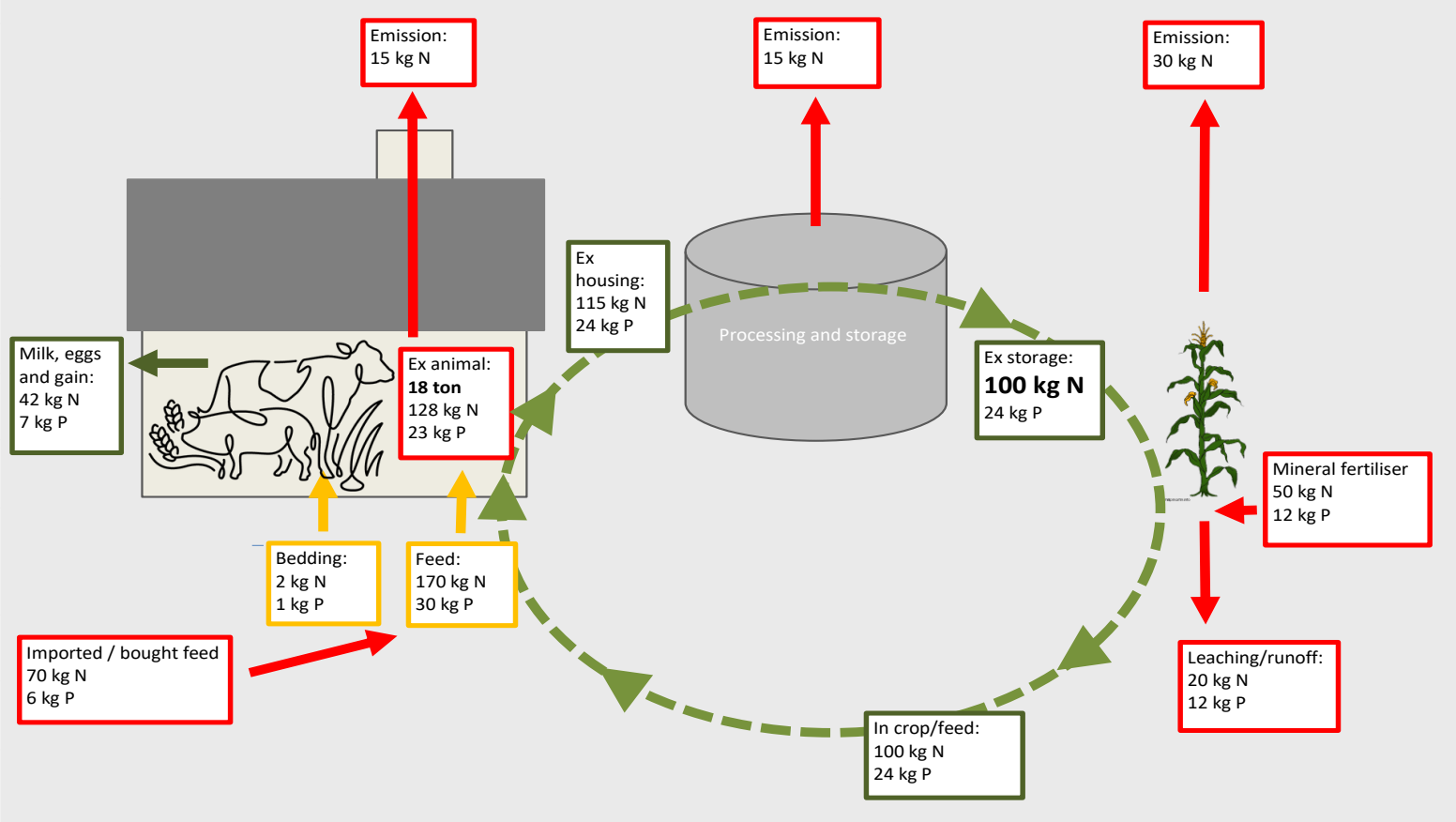
Organe Institute ApS

Where ammonia emissions come from

- Circular economy means that all red boxes shall be 0 (maybe except bought feed)
- Slurry acidification has positive effect on most red boxes (besides other positive effects)

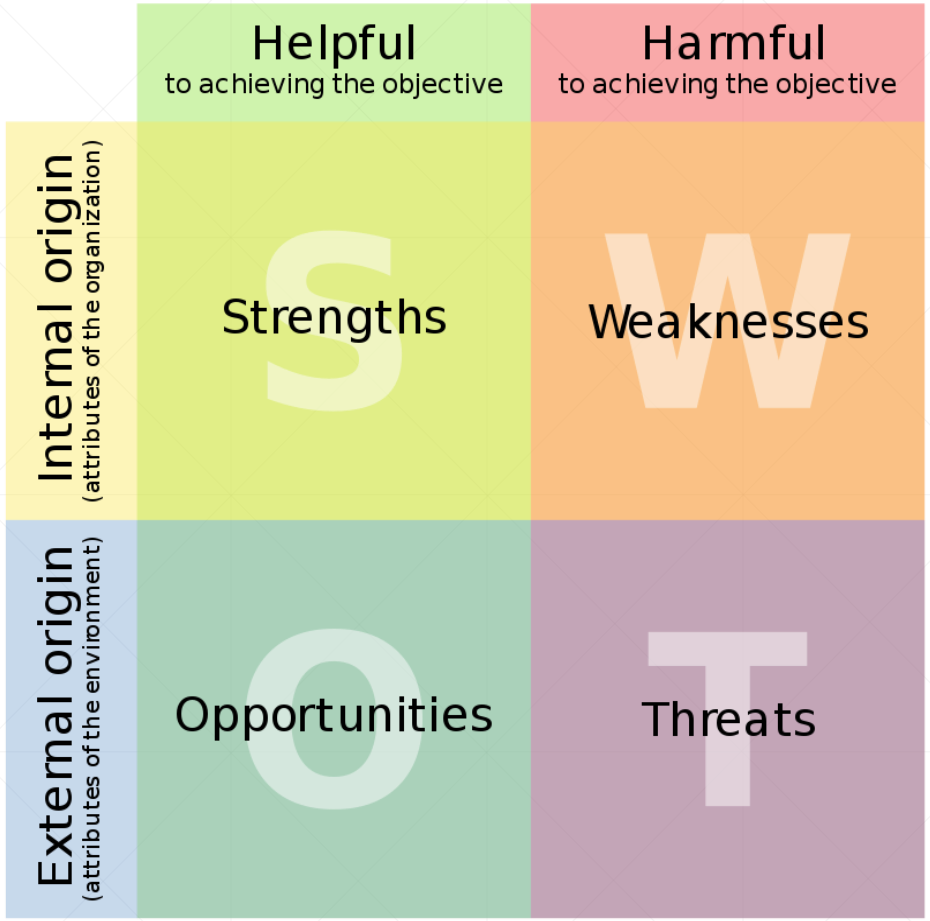


SATs for clear waters (and clean air)

Policy recommendations

SWOT matrix

- The SWOT matrix is used for visualising slurry acidification from a macroeconomic and political perspective.
- The SWOT matrix requires **clarification of objectives** and is **separating purely internal affairs from the context**, which in this connection is the individual countries and international affairs (EU, HELCOM, UN, etc.) respectively.



Farmer objectives

- An inherited, basic objective for a normal, commercially operated farm business would be economic survival, and the best guarantee for this be **maximisation of the profit**.
- In the perspective of farms, SATs affects their business economy via:
  - Investments – SAT installations, avoided investments in (solid) covers, slurry tanks
  - Operational costs and revenues – higher crop yields, higher subsidies, costs for sulfuric acid, lower expenses on N and S fertiliser, higher need for liming??, avoided costs for injection, (costs for fuel, electricity and labour is minor),
  - Corrosion of concrete??, labour accidents??

Society objectives related to slurry acidification - ammonia emissions

- Figures for actual ammonia emissions in 2014, 2015 and 2016, as well as politically set targets in 2020 and 2030. The table also shows the percentage from the target.

** Source: http://www.ceip.at/ms/ceip_home1/ceip_home/webdab_emepdatabase/reported_emissiondata/, national totals.*

*** Source: Calculated on basis of Annex II in Directive 2016/2284/EC except for Belarus, which is based on UNECE (2012).*

Country	2014*	2015*	2016*	2020**	2030**	2020	2030
	Actual emissions, Kt			Ceiling, Kt		2016 distance to ceiling, %	
BY	141	143	136	126	126	-8	-8
DA	74	74	75	63	63	-19	-19
DE	662	670	673	545	407	-23	-65
EE	12	13	12	10	10	-20	-20
FI	33	31	31	31	31	0	0
LA	17	16	16	15	16	-7	0
LT	35	35	34	35	35	3	3
PL	270	267	267	267	224	0	-19
RU	840	882	900	-	-		
SE	54	54	53	47	46	-13	-15
Σ / Δ	2.138	2.185	2.197	1.139	958	-14	-
Index	109	102	103	100	84	-10	-16

Society objectives related to slurry acidification – nutrient loads to the Baltic Sea

- The table shows HELCOM obligations (CART – Country Allocated Reduction Targets)

Source: HELCOM

Country	2007	2013	2014	
	Country-Allocated Reduction Targets for all sub-basins, Kt/a		Extra reduction (total input) compared to ceilings for Baltic Sea basins since 1997-2003, Kt/a	Missing reduction (total input) to fulfil ceilings for Baltic Sea basins since 1997-2003, Kt/a
DA	17.21	2.89	10.17	0
DE	5.6	7.17 +0.5	3.36	7.28
EE	0.9	1.8	0.90	1.08
FI	1.2	2.43 +0.6	0.33	1.72
LV	2.56	1.67	7.22	5.40
LT	11.7	8.97	0.04	18.51
PL	62.4	43.61	0.10	27.54
SE	20.78	9.24	15.97	1.87
RU	6.97	10.380	0	24.72
Transboundary Common pool (including BY)	3.78	3.32 1.98	0 0	11.11 7.40

Society objectives related to slurry acidification – climate change

- Only DE is under the target for 2020, whereas all countries have to reduce GHG emissions until 2030.

Country	1990*	2005*	2015*	2020**	2030**
	Actual emissions, $MtCO_{2e}$			Effort-sharing decision, % in relation to 2005-emissions / ceiling, calculated as MtCO2e ***	
DA	72	69	51	-20 / 55	-39 / 42
DE	1,263	1,015	927	-14 / 873	-38 / 629
EE	41	19	18	11 / 21	-13 / 17
FI	72	71	58	-16 / 60	-39 / 43
LA	26	12	12	17 / 14	-6 / 11
LT	48	23	20	15 / 26	-9 / 21
PL	487	400	388	14 / 456	-7 / 372
SE	73	69	56	-17 / 57	-40 / 41
IALT	2,082	1,677	1,530	-	-

* Source: http://ec.europa.eu/eurostat/statistics-explained/index.php/Greenhouse_gas_emission_statistics_-_emission_inventories
** Source: https://ec.europa.eu/clima/policies/effort_en
*** Own calculations.

Annual value of realising the use of SATs for the weighed slurry potential. All figures in M€.

Country	Avoided EU penalty related to ammonia, M€	Savings in the healthcare sector, M€	Value of reduced greenhouse gas emission, M€	Annual costs of investments in SAT installations, M€	Net value, M€	Additional, estimated value of N abatement, M€*
BY	NA	(102**)	0	-13.2	-13.2	9
DA* **	1.7	58	0.5	-6.7	49.6	9
DE	0	2,105.4	0.3	-147.3	1,958.4	100
EE	0.4	2.0	0	-1.0	1.4	0.7
FI	1.5	7.0	0	-3.6	4.9	2.5
LA	0.4	2.2	0	-0.8	1.8	0.6
LT	0	1.8	0	-1.4	0.4	0.9
PL	0	155.5	0	-19.7	135.8	13.6
RU	NA	(5.9****)	0	-3.0	-3.0	2.1
SE	0	56.3	0	-12.4	43.9	8.4
TOTAL	**4.0**	**2,388.2 (+107.9)**	**0.8**	**212.7**	2.180	**147**

Annotations

** The estimated reduced airborne deposition would further have a considerable value for the society according Hautakangas et al. (2014) and Sutton et al. (2011). The abatement costs is varying, dependent on sector and other pre-conditions, and we have here assumed it to be only € 2 per kg N.*

*** Savings in the healthcare sector was not assessed for Belarus by Sutton et al. (2011), and we have assumed the value to be the same as for the neighbour country Poland, but the figure is not included in the net value for Belarus of using SATs and is therefore placed in brackets.*

**** For Denmark, all figures are based on Foged (2017), assuming half of the Danish slurry production is acidified, which is about 17 million tonnes of slurry, whereas the weighed potential for Denmark is 25 million tonnes of slurry.*

***** Savings in the healthcare sector was not assessed for Russia by Sutton et al. (2011), and we have assumed the value to be the same as for the neighbour country Finland, but the figure is not included in the net value for Russia of using SATs and is therefore placed in brackets.*

Weighed potential for slurry acidification

Country	Weighed potential for slurry acidification, million tonnes of slurry*	Other strengths
BY	14.3	-
DA**	25	SATs are developed in Denmark, where they are well-known and used on beforehand, which is an advantage in case of upscaling. SATs are officially recognised as BATs that livestock farms can use for obtaining environmental permits.
DE	159.5	-
EE	1.1	Farmers are aware of the benefit of reducing ammonia emissions and inject about 60% of slurries although no legal requirement exists.
FI	3.9	-
LA	0.9	-
LT	1.5	-
PL	21.6	-
RU	3.3	-
SE	13.4	-
TOTAL	244.5	Experience and commercial solutions are available in the Region.

Recommendations

- Our recommendation is to the eight EU Member States in the Region to implement the use of SATs.
- The immediate recommendation is to establish official expert work groups to consider the impacts of this, and the way to do it. Hence, we recognise that our analyses are made without consideration to the specificities of the legal and institutional context in the individual countries.
- For the five north-western regions in Russia as well as for Belarus, we do not immediately have sufficient basis for recommending the implementation of SATs use. The policy context in these countries are different from that of EU, and the value of SATs use is unclear.

Our way

- Clear goal – wider use of SATs
- Spreading the messages to the right people – roundtables
- All important issues taken into account, positive and negative – SWOT
- We leave it up to the countries, how to do it
- Our recommendations are quick, easy and cheap to follow

Politicians tools

Politicians have basically 2 tools for achieving a certain effect in the market:

- The carrot symbolises financial incentives / subsidies, as well as giving attractive advantages for certain actions = legal enablers.
- The whip symbolises regulations, penalties.
- It is in any case important that no legal barriers exists.

Available subsidies for SATs

- None of the countries offers earmarked subsidies for use of SATs – this can be considered
- SE has subsidies available for ammonia emission reduction technology - can easily be equalised with SATs
- FI has subsidies available for slurry injection - can easily be equalised with SATs
- Several countries (LV, PL, BY, RU, EE, LT, ..) have general subsidies for investments in the farms. Such are of course used for the most profitable investments, which is not agro-environmental technology. However, such subsidy budgets could (partly) be earmarked for ammonia emission reduction technology or even for SATs.

Legal enablers

Only DK has legal enablers:

- Field spreading of acidified slurry with band laying system is equalised with slurry injection, which is a requirement for black soils and grassland. In DK, contractors price for slurry injection is about € 0.5 per ton higher than for spreading by band laying system.
- For all SATs, solid cover on slurry tanks is avoided in case of in-house acidification.

Legal barriers

Direct legal barriers are few:

- Germany: The supplementary text to the *Ordinance on the handling of substances hazardous to water (Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen, (AwSV))* clearly states: "... with the objective of the best possible protection of the waters, only storage and filling of liquid manure without additives is allowed ...". Although not directly said, **this is interpreted to prohibit storage of acidified slurry** (in-house and in-storage acidification). However, the interpretation of this regulation is currently being re-considered.
- Germany: *Road Traffic Regulations (StVO)* prescribes a maximal distance of 3.5 meters between the steering wheel center and the front front of the tractor. This could make it difficult to use in-field acidification. *Should this rule be re-considered? Is it justified? Is it outdated? None of the other countries in the Region have similar rules!*
- Sweden: The *Animal Protection Agency's Provisions for approval of new technology (2007: 1), also referred to as L37*, require new technique to be tested, unless it was already tested and approved abroad. It could be considered whether EU's BAT Conclusion and VERA Verification of in-house acidification is sufficient for allowing in-house acidification in Sweden. There seems to be some misunderstandings, alone.

Legal barriers

- Germany and Sweden are the only countries where we identified current (possible) legal barriers for SATs use.
- Germany and Sweden is among the countries in the region with the most urgent and highest need for measure / solutions to reduce ammonia emissions.
- However……

BAT conclusions

Commission Implementing Decision (EU) 2017/302 of 15 February 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the intensive rearing of poultry or pigs (notified under document C(2017) 688) (Text with EEA relevance.) - https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.043.01.0231.01.ENG:

- **SATs are mandatory BATs in all EU Member States (all types of SATs – including in-house acidification, which is mentioned in table 2.1d and section 4.12.3)**
- **It appears from the EU Decision that (citation): "These BAT conclusions apply without prejudice to other relevant legislation, e.g. on animal welfare."**

Sweden and Germany cannot use national legislation as barriers for use of SATs.

Thank you for your attention

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