

FINAL RECOMMENDATIONS OF MANURE STANDARDS PROJECT

MANURE STANDARDS PROJECT RECOMMENDATIONS FOR MANURE DATA GENERATION AND USE

All materials available at www.luke.fi/manurestandards/en

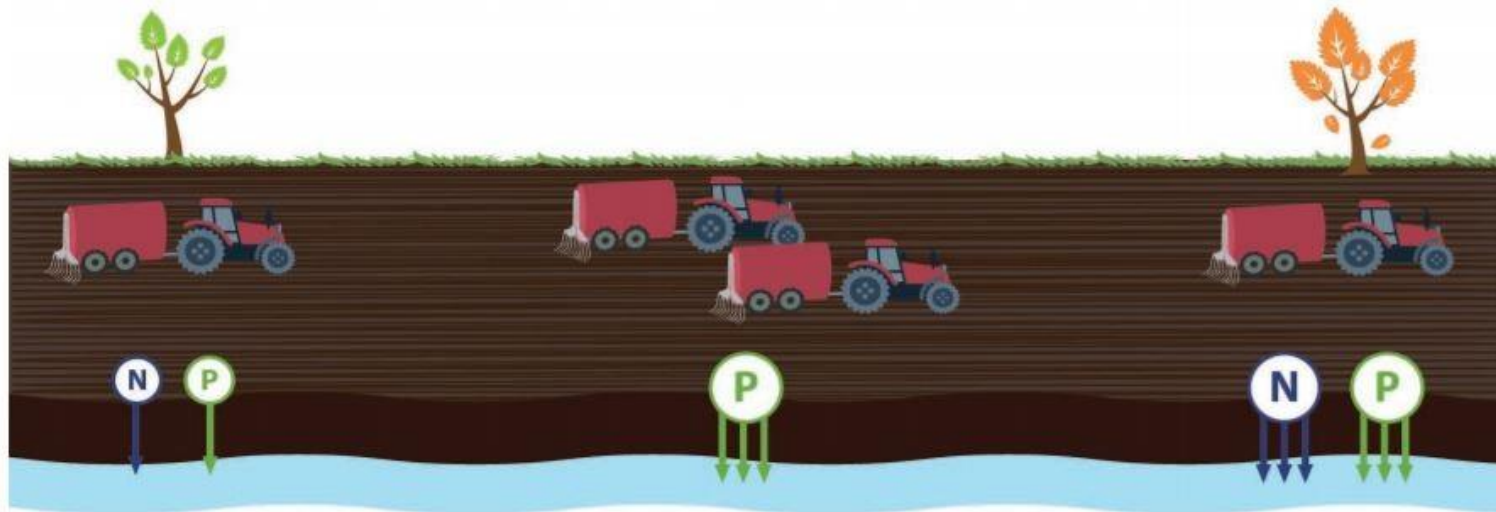


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MAIN PRINCIPLES

- ✓ Manure management should be carried out in ways that maximize its benefits as a valuable fertilizer while minimizing losses to the environment.
- ✓ Manure fertilization should be based on up-to-date data on manure quantity and composition generated with clearly documented methods.

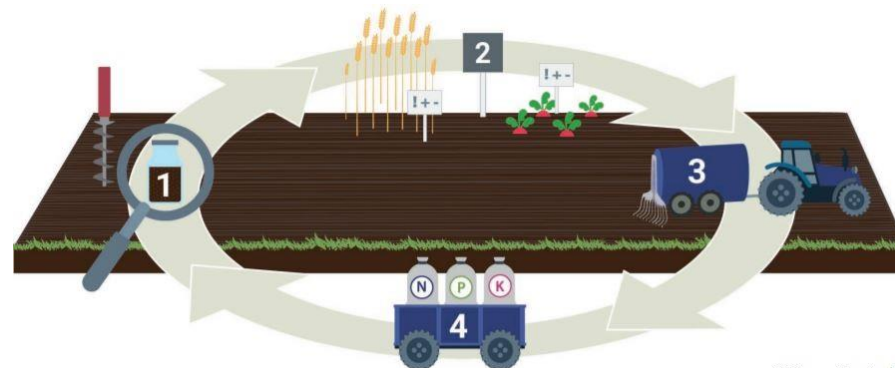


MAIN PRINCIPLES

- ✓ All farm-scale practices and manure-related policies and authoritative measures should be regularly updated to the latest manure data available.
- ✓ Manure-related regulation should be built to enable regular updating of the manure data without opening the entire legislation or other regulatory/voluntary system.
- ✓ The same national data should be used as the basis for all manure regulation, emission inventories, national nutrient budgets etc. to avoid conflicts between different measures.
- ✓ The official national manure data (quantity and composition) should be made easily available for all users e.g. as average table values for a country/region.
 - When multiplied with the number of animals in a country/region, they provide data on manure quantities produced, shares of different manure types produced, and amounts of nutrients available for nutrient recycling within a country/region.

AVAILABILITY OF MANURE DATA

- ✓ Manure data should be made available for different purposes in as precise manner as possible, considering
 - At a minimum, different animal categories and manure types, and
 - If possible, also differences in animal feeding and manure management practices.
- ✓ Manure data should be made available for
 - Farm-scale uses, including manure quantity and nutrient content to ensure sufficient manure storage capacity and precise manure fertilization planning and implementation, and
 - National/regional uses, including average statistics of manure quantities and nutrient contents in different animal production types and in shares of different manure types to enable effective guidance, emission control and regulation aiming at efficient manure use.



MAINTENANCE OF MANURE DATA AND RESPONSIBILITIES

- ✓ Data on manure quantity and composition should be regularly updated, considering
 - For farms that the data on manure nutrient content used in fertilization planning is as fresh as possible to minimize potential error in the dose spread.
 - On national level that the data represents the current animal production and manure management.
- ✓ Statistics on national manure management practices should be collected from farms regularly (e.g. at minimum every 4 years) to enable using the data e.g. in planning, regulating, supporting and implementing best practices and in maintaining updated emission inventories and manure mass balance calculations.
 - The farm survey templates prepared by the project “Manure Standards” can be used as a starting point.
- ✓ A responsible organization or a group of organizations should clearly be named and given resources to generate the official national / regional manure data to ensure the availability of harmonized, documented and up-to-date data.

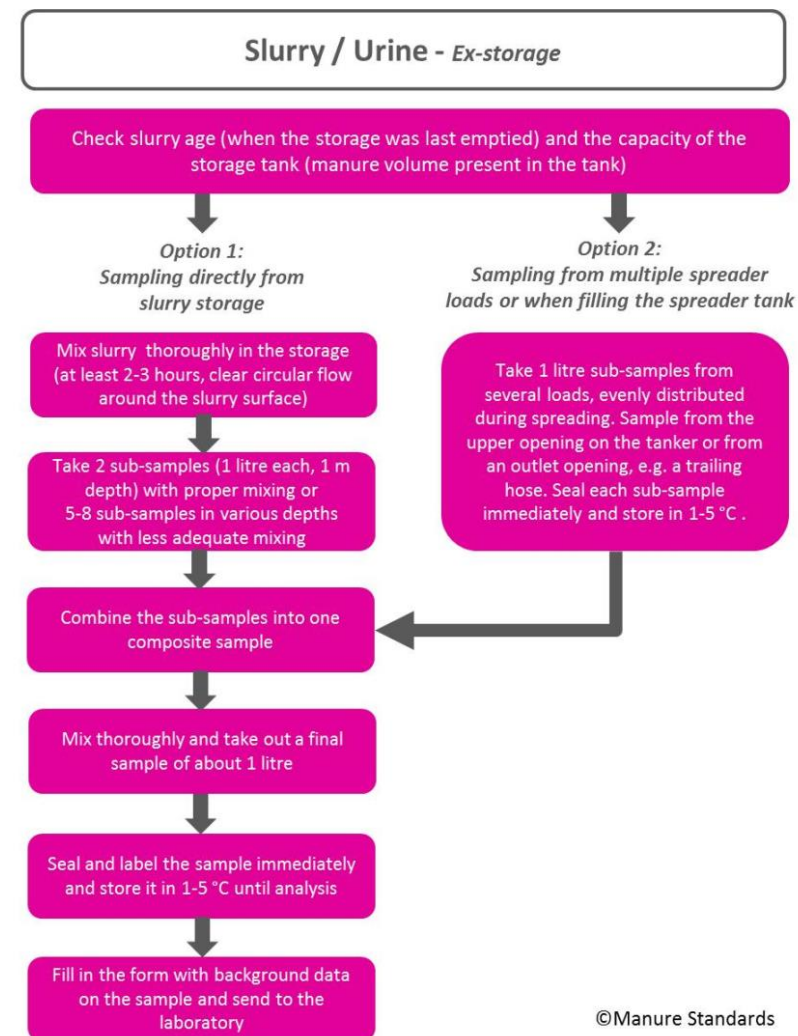
METHODS FOR MANURE DATA GENERATION

The methods for manure data generation, despite potential national specificities, should follow the same basic principles as follows...



MANURE SAMPLING AND ANALYSIS

- ✓ Manure sampling and analysis can be used as a means to measure manure composition, including nutrient content, provided...
 - The sampling is properly done using *at minimum* the sampling instructions prepared by the project “Manure Standards” or more precise guidelines, when available,
 - The samples are representative according the type and storage of the manure and noting the challenges related to heterogeneity,
 - The samples are preserved and pretreated in a manner minimizing losses (e.g. no drying of the samples), and
 - The analyses are performed using standardized analysis methods in accredited laboratories experienced with manure as a matrix.



MANURE SAMPLING AND ANALYSIS

- ✓ Laboratories analyzing manure samples are encouraged to improve their expertise and accuracy in manure analysis via proficiency testing or inter-laboratory comparison.
- ✓ To improve usability of the analyzed manure data as a databank, laboratories are encouraged collect and save more precise background data per manure sample using the accompanying note prepared by the project “Manure Standards” or similar (considering the GDPR).
 - With such background data, the analyzed data can be more precisely used e.g. as the basis for average table values on manure composition.
- ✓ Due to the importance of recycling organic matter into field soil, the organic matter and/or carbon content in manure should be included into the analyzed parameters.

ACCOMPANYING NOTE

Sample name/ID _____
Date _____
Sampler _____
Contact person _____
Email _____
Mobile _____
NUTS-2 Region _____

LOCATION OF MANURE SAMPLING

In the housing unit

- Slurry channel
- Slurry pit
- Slatted floor
- Solid floor
- Other.....

In the manure storage

- Open slurry tank
- Covered slurry tank, covering type.....
- Open solid manure storage
- Covered solid manure storage, covering type.....
- Other.....

ANALYSIS PARAMETRES

- Dry matter
- Total nitrogen
- Soluble nitrogen
- Total phosphorus
- Soluble phosphorus
- Total potassium
- Total carbon
- C/N ratio
- Magnesium
- Calcium
- Zinc
- Manganese
- Iron
- Copper
- Sodium
- Sulphur
- pH
- Other.....
- Other.....
- Other.....
- Other.....
- Other.....
- Other.....

BACKGROUND INFORMATION

Animal species

- Dairy cattle
- Beef cattle
- Sows
- Slaughter pigs
- Weaned pigs
- Laying hen
- Broilers
- Turkeys
- Horses
- Sheep
- Goats
- Minks
- Foxes
- Other.....

ADDITIONAL INFORMATION

MANURE MASS BALANCE CALCULATION

- ✓ Manure composition, including nutrient content, can be derived from a manure mass balance calculation, provided...
 - There is a suitable calculation tool available for
 - National / regional calculation, or
 - Farm-scale calculation,
 - The tool matches the national animal feeding and rearing, and manure management practices,
 - There are sufficient and high quality input data available for the calculation, and
 - The tool is tested and documented for each country before its official use.



MANURE MASS BALANCE CALCULATION

- ✓ Manure mass balance is the recommended method for determining manure quantity taking into account
 - animal production (feed, growth, product yield, reproduction),
 - management choices in housing (housing technology, addition of water and bedding), and
 - choice of manure storage (covering, precipitation, evaporation).
- ✓ Manure mass balance calculation is the recommended method to quantify manure and its nutrients for a country or a region.

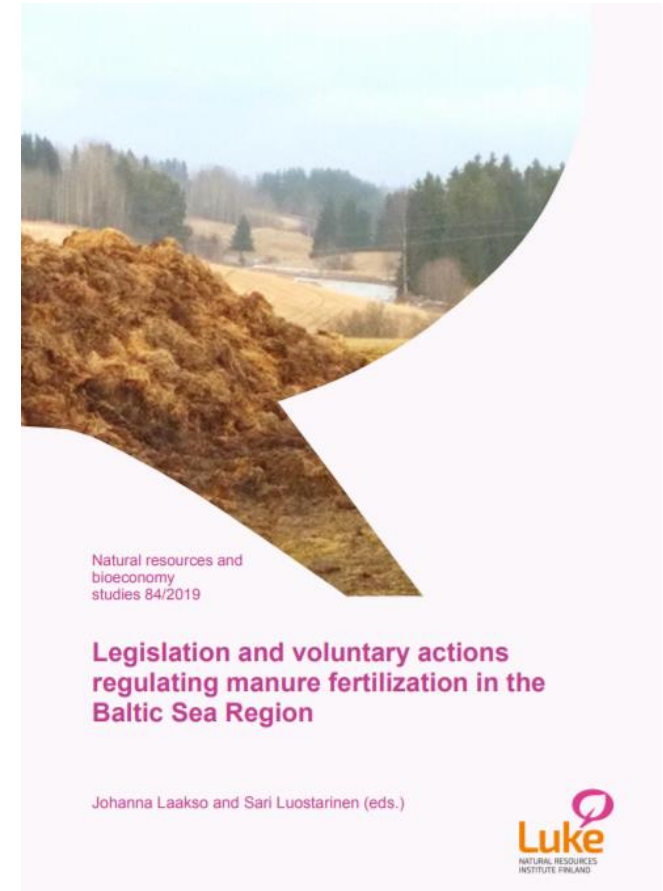
Animal category	Manure													
	Ex-animal				Ex-housing				Ex-storage					
	Quantity	N	P	K	Quantity	N	P	K	Quantity	N	P	K		
	t	kg			t	%	kg			t	%			
Cattle	4738	27513	4109	17648	4527	12,5	26954	4287	20985	5073	10,4	24930	4279	20758
Pigs	0	0	0	0	0	0,0	0	0	20,0	0	0,0	0	0	0

MANURE MASS BALANCE CALCULATION

- ✓ The calculation tools developed in the project “Manure Standards” can be used
 - As the starting point to develop new national manure calculation tools for both farm- and national/regional scale calculation, or
 - In developing existing national manure calculation methods further and in line with the calculation methods used in other countries.
- ✓ The input data and the methodology for the manure calculation system should always be clearly documented, preferably also in English, so that the calculation methods and data used in different countries can be compared, the methods harmonized, and internationally equal results produced.

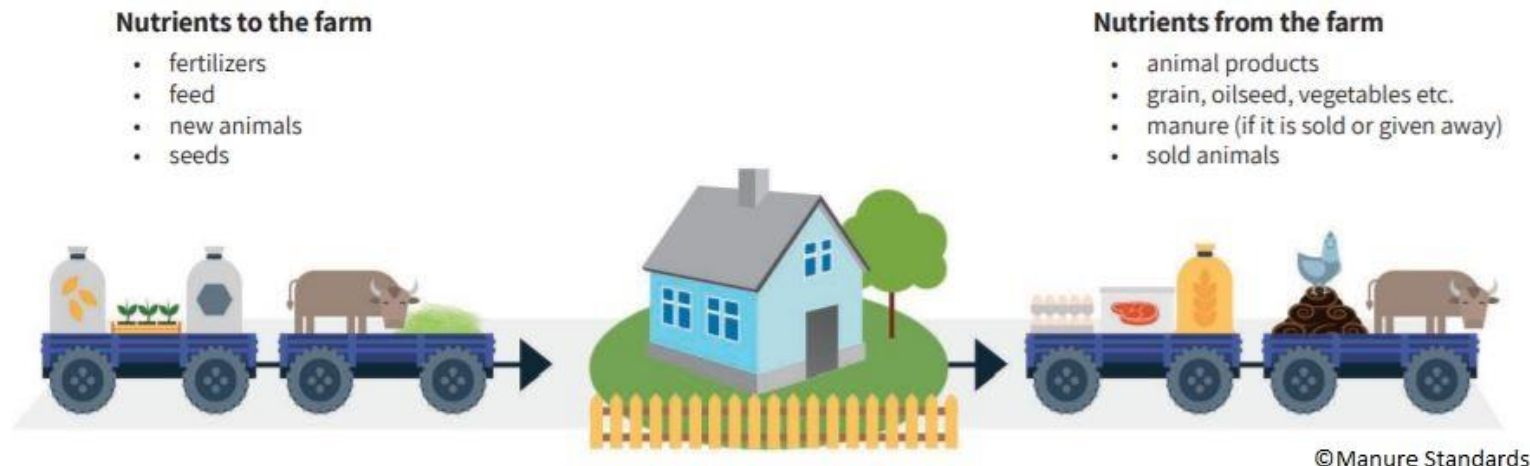
MANURE FERTILIZATION

- ✓ To enhance regional nutrient recycling and to improve nutrient self-sufficiency, manure nutrients should be utilized as precisely as possible also on regional scale. Mineral fertilizers should be used as additional nutrient sources, if needed.
- ✓ Fertilization planning using manure should always be based on up-to-date data on manure nutrient content regardless of the nationally supported method for data generation. Also the fertilization requirements of different crops, soil quality, pre-crop and climate conditions have to be taken into account.
- ✓ All fertilization should always take into account national limits for nitrogen and phosphorus use.



NUTRIENT BALANCES

- ✓ Farm-specific nutrient balances should always be calculated and their results implemented to ensure balanced nutrient input-output on farms. They would also reveal the potential need to export part of the manure nutrients to other farms or to manure processing outside the farm.
- ✓ The expertise of advisors should be strengthened to improve farmer support on practical and efficient manure-related measures.



PROJECT INFORMATION

Manure Standards was a two-year (10/2017–12/2019) Flagship project of the EU Strategy for the Baltic Sea region providing farmers, advisors, authorities and policy-makers enhanced capacity to govern and to turn manure use towards improved sustainability and resource-efficiency. It was funded by Interreg Baltic Sea Region Programme.

Manure Standards was coordinated by Natural Resources Institute Finland (Luke) and included 19 partners from nine countries around the Baltic Sea: Finland, Sweden, Denmark, Germany, Poland, Lithuania, Latvia, Russia and Estonia.



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