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Background

Agricultural production remains a major contributor of nutrients into the Baltic Sea. That is why effective nutrient management in agriculture, assuring maximum recycling of these valuable components, is the top priority of the HELCOM Group on Sustainable Agricultural Practices (Agri group). In particular, having nutrient recycling as an overarching principle, the Agri group will, according to the 2013 HELCOM Ministerial Declaration, look into nutrient accounting on farm level and standards for nutrient content in manure as the two priority topics. Lead countries Germany and Denmark, and Finland have been identified for the two topics, respectively.

To facilitate the work of the Agri group and assist lead countries in their specific topics and with reference to the agreement by HOD 48-2015 (c.f. paragraph 3.53 of the Outcome of the Meeting), Agri-Environment Coordinator (Ms. Susanna Kaasinen) has been employed in the HELCOM Secretariat until March 2017.

Activities on nutrient accounting has been launched with the [HELCOM Workshop on status of nutrient bookkeeping in the Baltic Sea countries](#) (28-29 April 2015, Oldenburg, Germany), co-organized by HELCOM, the Chamber of Agriculture Lower Saxony and the Federal Environmental Agency in Germany. The workshop was missioned to create a common background for further promotion of nutrient bookkeeping in the region. The proceedings of the workshop, summarising knowledge and practices related to nutrient bookkeeping in the region as well as outlining further measures for its promotion have been published in November 2015 and are available on the [HELCOM web page](#).

A second workshop, closely linked to the first one, [HELCOM Workshop on manure nutrient content in the Baltic Sea countries](#) co-organized by HELCOM, the Ministry of the Environment Finland and Natural Resources Institute Finland (Luke), was held on 19-20 November 2015 in Vantaa, Finland. All Contracting Parties except Lithuania and EU as well as Observers BFFE and CCB attended the workshop. The Attachment contains the conclusions of the workshop. Proceedings of the workshop are to be published by Luke at a later stage.

One of the tasks of the workshop was to consider how to take the HELCOM work on manure standards forward in practice, and the participants of the workshop discussed and further developed an idea for a project to elaborate common approaches to national systems of manure standards and develop a HELCOM guideline for their use. National Resources Institute Finland (Luke) has offered to be the lead partner in the project and has requested other potential project partners from the Contracting Parties to express their interest. HELCOM Secretariat can assist in the project preparation and the intention is to link the project directly to the work of the Agri Group. The project proposal is planned to be submitted to the next call of the Interreg Baltic Sea Region Programme early spring.

The next meeting of the Agri group (AGRI 3-2016, planned to be held in early April in Estonia), will consider the outcomes of both workshops and plan for the next steps, as appropriate.

Action requested

The Meeting is invited to

- take note that the work on both priorities of the HELCOM Agri group (nutrient accounting on farm level and standards for nutrient content in manure) has been started and that the outcomes of the related workshops as well as next steps will be considered by AGRI 3-2016, as appropriate,
- Estonia is invited to confirm the dates for the next Agri group meeting (AGRI 3-2016), which has tentatively been planned for early April in Estonia,
- support HELCOM involvement as a project partner in the planned project on manure standards led by Finland,
- potential project partners from the Contracting Parties are invited to contact Luke (sari.luostarinen@luke.fi) as soon as possible.



Ympäristöministeriö
Miljöministeriet
Ministry of the Environment



HELCOM Workshop on manure nutrient content in the Baltic Sea countries 19-20 November 2015, Vantaa, Finland

CONCLUSIONS

The HELCOM workshop on manure nutrient content in the Baltic Sea countries was held on 19-20 November 2015 at the premises of the Natural Resources Institute Finland (Luke) in Vantaa, Helsinki. The workshop was co-organized by the Ministry of the Environment, Natural Resources Institute Finland (Luke) and HELCOM. The programme of the workshop can be found in **Annex 1**.

The workshop was attended by all Contracting Parties to the Helsinki Convention, except for Lithuania, representing agricultural and environmental authorities and research organizations, as well the HELCOM Observers Coalition Clean Baltic (CCB) and the Baltic Farmers' Forum on Environment (BFFE). The List of participants is contained in **Annex 2**.

The aim of the workshop was to consider manure standards in more detail and propose how common methodologies could be derived or developed. The workshop also discussed establishing and seeking finances for a new regional project on creating widely accepted manure standards in the Baltic Sea countries.

These conclusions have been agreed on by the participants of the workshop. In addition to these conclusions, abstracts prepared by the speakers will be combined into a joint report to be published in the Luke report series. The conclusions and presentations have been made available on the [HELCOM web page](#).

Background

Sustainable agricultural production is one of the key elements for reaching a good state of the Baltic Sea marine environment. Effective manure management can bring significant opportunities for decreased nutrient losses to the sea and also enhance nutrient recycling.

The HELCOM Group on Sustainable Agricultural Practices provides a platform for agri-environmental policy measures and instruments and joint discussion on the Baltic agriculture in the context of the protection of the marine environment, in order to address nutrient inputs and emissions from agriculture.

The Baltic Sea countries agreed at the 2013 HELCOM Ministerial Meeting to promote and advance towards applying by 2018 at the latest annual nutrient accounting at farm level, to establish by 2016 national guidelines or standards for nutrient content in manure and to develop by 2018 guidelines/recommendation on the use of such standards. The HELCOM Agri group has identified these measures closely related to the principles of circular economy as their key priorities.

The HELCOM workshop held in Oldenburg, Germany, in April 2015, focused on the promotion of nutrient accounting and highlighted a strong need to elaborate nutrient standard systems, which are applicable in all the Baltic Sea countries and create a joint basis for nutrient accounting and management. The Agri group agreed to organize a workshop focused on standards of nutrient content in manure and welcomed the offer by Finland to host the event.

Examples of manure standards already exist in some Baltic Sea countries. Such standards are seen as an opportunity to unify understanding on manure quality and thus building a joint basis for manure management and fertiliser use.

Introduction to the workshop

The workshop noted the presentation by the HELCOM Secretariat on the HELCOM framework for work on developing further a system of manure standards in the Baltic Sea region and the presentation by Ms. Sari Luostarinen, Luke, on why a system of nutrient standards in manure is desirable.

The participants also took note of information by Mr. Dietrich Schulz, Federal Environment Agency, on the main outcomes of the HELCOM workshop on status of nutrient bookkeeping in the Baltic Sea countries held on 28-29 April 2015 in Oldenburg, Germany, and highly appreciated the effort by Germany as one of the lead countries on this topic in HELCOM to promote nutrient bookkeeping in the region. Participants welcomed the proceedings of the workshop, which compiles the information on existing practices of nutrient bookkeeping in the region and includes suggestions for its further advancing. The publication is available at the [HELCOM web page](#).

Country presentations on national standards for nutrient content in manure

Denmark: In the Danish system of manure standards the nutrient content in manure is calculated in three steps: ex animal, ex housing, ex storage. There are several categories for different animals, housing systems and manure systems, which lead to more than 150 possible combinations. The system is based on farm recordings of e.g. feed nutrient content, feed intake and production. The standards include nitrogen, phosphorus, potassium, dry matter and volume. The farmers have a possibility for correction with their own data. One problem with the system is dealing with added water, which is difficult to evaluate. The system is updated annually. Updating of the system by the University of Aarhus is based on a contract with the ministry. There is good cooperation with the farmer organization because they also want the best data.

Estonia: In the Estonian system of manure standards the manure nutrient content is calculated in three steps: ex animal, ex housing, ex storage. The Danish system has been the basis for the Estonian system but there aren't as many animal categories in the Estonian system. The existing system works well with large scale farms e.g. cattle farms without grazing. There is an unofficial online calculation tool available for farmers. There are some problems with the system e.g. quantifying additives like rain or process water and losses during storage. Updating the standards is in process for the cattle standards. The system is not updated on a regular basis.

Finland: In Finland manure must be analyzed at least every 5 years. Farmers have, however, the possibility to use either manure analysis results or table values as a basis for fertilization with manure. The standards for manure quantity are calculational and were updated in 2014. The quality of manure samples is subject to many errors in sampling, analysis in laboratory etc. There are also some challenges with the current table values: they are limited to only few animals and manure types and the practices in farms are not taken into account. Furthermore, because they are based on a vast amount of manure analysis results, they are subject to the same sampling and analysis related problems as listed above. A normative manure system is under development including: three steps for calculations (ex animal, ex housing, ex storage), emissions calculations, more categories for different animals, possibility to consider farm specificity, database. The challenge with the system under development is that it is complex, needs a lot of different data, and requires regular updating and resources for that.

Germany: The German system of manure standards is based on mass flow analysis. It is not based on manure sampling because manure is heterogenous and the correct sampling requires considerable professional experience. The system works well and is also well accepted. The values take into account 10 % ammonia losses in stable and storage. The values are used for fertilizer planning (another 20 % ammonia losses during spreading are taken into account) and nutrient bookkeeping and they are used by farmers where analyses are not available. The system is updated every five years.

Latvia: New legislation entered into force in the end of 2014 that include manure standards, which were previously only used as guidelines. The new system includes 18 animal species. The standards are based on scientific research for the most categories and literature for a minority of categories. Livestock feeding, housing system and productivity are the basis of the system. Standards are used by farmers, governmental organizations (e.g. control purposes), advisory service, constructors for manure storages and other stakeholders. There is a need for new standards due to changes in livestock feeding, growing livestock productivity and new technologies.

Poland: The current Polish system is based on a nutrient mass flow model, which deals with all stages of animal production and manure storage (gases, emissions accounted). The mass flow model is validated with wide actual farm monitoring data. The model takes into account different production levels and specific housing systems (grazing, straw bedding). The Polish system is currently under revision, could be developed further with third pillar of the system comprising monitoring of 7000 farms where manure samples will be collected and analyzed twice a year. Background information from the farms (crops, animal number, bedding system etc.) will be collected as well. Manure sampling and enquiries are also vital for the stakeholders' point of view and considered very useful for them.

Russia: There is no requirement for farms to count nutrient content of manure. There are reference manuals used for fertilization purposes. Regional centres offer manure analyses. Document RC-APC 1.10.15.02 contain information for 56 animal categories on nutrient content in manure. The data is collected from whole Russia. Regional data for North-West Russia is needed.

Sweden: There is a planning tool VERA (mass flow model) for calculating manure nutrient content in the different handling steps. In the tool e.g. standard feeding or actual feeding can be used so there is some flexibility. The planning tool is used in advisory purposes especially in the nutrient vulnerable zones. The data is updated but not on a regular basis. There are default values for some parameters like ammonia emissions. The system could be developed as regards more frequent update, validation of errors and dilution of manure. Swedish inventory of fertilizer use is done every second year.

Group work outcomes

The participants of the workshop split into two groups to consider how national systems of manure nutrient standards can be made operational and transparent. The groups were moderated by Ms. Sari Luostarinen, Luke, and Mr. Mikhail Durkin, Coalition Clean Baltic (CCB).

1. General aspects of developing national systems of manure standards and guidelines for their use

The experts identified benefits of introducing advanced national systems of nutrient content in manure.

The experts identified environmental benefits, pointing especially to the potential for reduction of nutrients losses into the Baltic Sea. In addition, advanced systems would lead to increased efficiency of the use of natural resources and energy and decreased gaseous emissions. Such systems are also a way to ensure resource, and consequently national food security.

In addition to environmental benefits, the workshop recognized that the advanced and transparent systems of manure nutrient standards provide for a level playing field for agricultural producers and are a good basis for environmental branding of national agricultural production.

Advanced systems of manure standards together with effective data exchange also facilitate cooperation between the countries in the region to ensure transparency of the assessment of environmental impacts and equal efforts in protecting the environment. In addition, better compliance of the national environmental policies to international commitments could be achieved.

Nationally the system could also be used for other purposes, in particular, improving land resource management through better access to information.

The workshop discussed and identified the major obstacles in establishing advanced national systems of nutrient content in manure.

Participants indicated that in some of the countries a decision on developing the systems further is yet to be taken. The lack of acceptance of the methodology is one of the significant obstacles. On the other hand, there are countries where the advanced system is well accepted and widely used in farming practice.

The legal framework in many countries does not serve for promotion of the development of a more advanced national system of nutrient content in manure.

The quality of collected data on nutrient content in many cases does not assure reliability of the standards based on this data. Insufficient reliability of the data also results from the complexity of the sampling methodologies and uncertainty of the analytical results. Data from small farms are often not available. Even when sampling is done, the accuracy is quite low due to the lack of awareness by farmers of the sampling method. All together it may pose challenges for accepting the system by farmers, authorities and other stakeholders.

The use of an advanced system of nutrients standards in manure requires increased competence of the farmers in combination with advisory services.

Advancing the system of manure standards can result in reassessment of the emissions so that they are increased. This fact requires political acceptance, which may also be a major obstacle in effectively promoting a new system.

An introduction of a new advanced system of standards requires funding, which in many countries could hinder the development significantly.

The experts discussed the next steps which can be taken in order to advance national systems of manure standards.

As the first step and following the regional political commitments, the workshop recommended to establish a working platform to elaborate a regional guidance for setting up a common methodological framework for national systems of nutrient standards in manure. The methodology could imply several levels suitable for different intensity of agricultural production.

The experts also emphasized that research activities could be initiated, which would cater for continuous improvement of the methodology. The methodology (model) developed by the working platform could be unified for the region and adopted by the countries providing equal conditions for agricultural production throughout the region.

Open public discussion could be started in order to reach political agreement in the countries on integration of the unified methodology to the national legal frameworks. Then the communication with the stakeholders could be continued.

When the methodology has been developed an online system providing tools for calculating nutrients flows could be elaborated and operationalized. The system could also incorporate analytical data base of the concentration of nutrients in manure and also contain information on available standardized analytical methods.

2. Sampling and modelling in development of the nutrient standards

Experts discussed pros and cons of using sampling and calculations as a basis for the development of a national system of manure standards. Mass flow calculation approaches are sometimes used instead of analysing or in combination.

Sampling

Benefits

Development of the system of standards from sampling has the following benefits:

- analysis serve for calibration and validation of calculations;
- regular sampling allows to react to quick changes of nutrient content in manure (due to e.g. changes in feed nutrient content) and to adjust the system;
- sampling does not require significant resources from public authorities since it is performed by farmers.

Obstacles

The main obstacles for building the standards system on measured data are the following:

- inaccuracy of sampling;
- uncertainty of analytical methods used by different laboratories;
- quantity of manure is not taken into account.

Next steps

Setting up a transparent system of manure standards requires common methodological and analytical basis. That is why the following next steps have been suggested:

- agree on common guidelines for sampling (incl. information on a sampling point and season);
- agree on common use of certified analytical methods including a pre-treatment procedure;
- development and operationalization of a regional database of measured content of nutrients in manure.

Calculating

Benefits

Benefits from using a modelling approach are:

- the system is transparent and comparable between countries;
- countries can benefit from experiences of other countries which already use a modelling approach;
- the model is better suited for subnational, national and regional inventories;
- a modelling approach allows taking into account more parameters compared to sampling e.g. manure quantity, estimating manure that remained on pastures;
- modelling could also be used for an assessment of impact or effectiveness of measures to reduce emissions.

Obstacles

A modelling approach forms a firm basis for the system of standards but obstacles were identified:

- potential data gaps in input data for modelling in some countries;
- a model requires regular adjustment and updates based on continuous research;
- a model requires public resources for maintenance, regular verification and updates;
- organization/authorities responsible for running the model and validation of modelling results may not be identified;
- more advisory is needed to interpret the results, which once organized, becomes a benefit.

Next steps

The next step could be to:

- develop common calculation methods and a guideline for its use;
- develop a regional database;
- possibly create an internet based programme for calculation of nutrient content in manure available for all.

Discussions on a regional project on manure standards

The workshop took note of the presentation by Ms. Sari Luostarinen, Luke, on a project idea to elaborate common approaches to national systems of manure standards and development of a guideline for their use. The participants of the workshop in general supported the project idea. However, internal consultations will be required for deciding if to join the project. The participants made the following comments on the project idea:

- Denmark has a national interest to develop transparent systems at the regional level and convince local society that Danish farmers are treated the same way as the other agricultural producers in the region.
- Russia informed on ongoing harmonization of national environmental legislation with the EU and ongoing technological and methodological development in manure handling. Therefore, Russia is interested to join the project and share the achieved results.
- Germany emphasized that the project should be flexible to accommodate different systems making them comparable.
- Sweden emphasized that the political commitment as expressed by the HELCOM Ministerial Meeting 2013 is already in place.
- CCB indicated interest to join the project and in particular to contribute to the task related to the public awareness and engaging society.

The participants acknowledged the importance of involving policy makers into the implementation of the project in order to ensure that the project results will be implemented at the national level. The participants also noted that the HELCOM Agri group can serve as a platform to discuss the project results with the representatives of the national authorities.

Acknowledging that the project application will likely have to be submitted in the first quarter of 2016, the participants agreed on the following steps to proceed:

1. Countries to nominate their expert(s) for communication on the project idea and developments by the end of November 2015 by informing Ms. Sari Luostarinen (sari.luostarinen@luke.fi),
2. HELCOM Secretariat and Luke jointly to inform Lithuania,
3. Luke to circulate the project proposal by 10 December 2015 to the national experts,
4. Countries are to investigate their possibility to join the project based on a set of questions to be prepared by Luke together with the Secretariat, to clarify national interests and expectations towards the project, as well as to explore possibilities for co-financing and to confirm participation in the project by the end of 2015.
5. A (online) meeting to develop further the project proposal in the middle of January 2016 can be arranged by HELCOM.

The participants thanked the organizers for the arrangements and Ms. Marja-Liisa Tapio-Biström for chairing the workshop. The organizers thanked the participants for the active participation and discussion.

Programme

Thursday, 19 November

Chair: Marja-Liisa Tapio-Biström, Ministry of Agriculture and Forestry

9:00 Opening
<p>Welcoming words by the organizers <i>Monika Stankiewicz, HELCOM</i> <i>Leena-Marja Kauranne, Ministry of the Environment</i></p> <p>Presentation of the Proceedings of the workshop on nutrient bookkeeping <i>Dietrich Schulz, Federal Environment Agency</i></p>
9:20 Introduction
<p>HELCOM framework for introducing a system of manure standards in the Baltic Sea region <i>Dmitry Frank-Kamenetsky, HELCOM</i></p> <p>Why is a system for nutrient standards in manure required? <i>Sari Luostarinen, Natural Resources Institute Finland</i></p>
9:50 Country presentations
<p>Denmark <i>Peter Lund, Aarhus University</i></p> <p>Estonia <i>Allan Kaasik, Estonian University of Life Sciences</i></p>
10:30 Break
<p>Finland <i>Juha Grönroos, Finnish Environment Institute</i></p> <p>Germany <i>Dietrich Schulz, Federal Environment Agency</i></p> <p>Latvia <i>Iveta Ozolina, Ministry of Agriculture</i></p>
11:45 Discussion
12:00 Lunch

13:00 Country presentations continue
<p>Poland <i>Jacek Walczak, National Research Institute of Animal Production</i> <i>Karina Makarewicz, Ministry of Agriculture and Rural Development</i></p> <p>Russia <i>Vladislav Minin, Institute of Agri Engineering and Environment Problems of Agriculture</i></p> <p>Sweden <i>Lena Rodhe, Swedish Institute of Agricultural and Environmental Engineering</i></p>
14:00 Commentary
<p>Global experiences with Manure Nutrient Contents <i>Mikhail Durkin, Coalition Clean Baltic</i></p>
14:20 Discussion
14:30 Break
14:45 Group work
<p>Group work and discussion: Moderators: <i>Sari Luostarinen, Natural Resources Institute Finland</i> <i>Mikhail Durkin, Coalition Clean Baltic</i></p>
16:15 – 16:30 Wrap up of day 1
18:00 Dinner at Original Sokos Hotel Vantaa

Friday, 20 November

Chair: Marja-Liisa Tapio-Biström, Ministry of Agriculture and Forestry

9:00 International cooperation
<p>New regional project on manure nutrient standards in the Baltic Sea countries Discussion and plans to proceed</p>
10:30 Break
10:45 Next steps
<p>Next steps toward introducing a system of manure standards in the Baltic Sea region in the light of implementation of the 2013 HELCOM Ministerial Meeting commitments</p>
12:15 Closing of the workshop
12:30 Lunch

List of Participants

Name	Representing	Organization	Email
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