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Background

The HELCOM Ministerial Meeting 2018 committed to elaborating by 2020 a Baltic Sea Regional Nutrient Recycling Strategy that aims for reduced nutrient inputs to and eutrophication of the Baltic Sea. The Ministerial Meeting further decided to develop, as a follow-up to the Strategy, possible nutrient recycling measures to be included in the updated Baltic Sea Action Plan.

During 2018-2019, the HELCOM Agri Group, leading the Strategy development in cooperation with the HELCOM Pressure Working Group, developed a vision and objectives of the Baltic Sea Regional Nutrient Recycling Strategy, which were endorsed by HOD 56-2019. Further work was focussed on measures to meet the objectives of the Strategy. A long list of possible measures (more than a hundred proposals) was compiled at the HELCOM Workshop on nutrient recycling measures, organized in Helsinki, Finland on 5-6 February 2020.

The Strategy is considered as a supplementary document to the updated BSAP. Thus, in line with the guidance given by HOD 57-2020, the Strategy should be linked to the updated BSAP, which should include strategic decisions and central points from the Strategy. The HELCOM Agri Group agreed that the link between the Strategy and the BSAP will be secured through inclusion of six key actions, corresponding to the Strategy's objectives in the updated BSAP. These strategic regional actions will also be utilized to follow up the implementation of the Strategy. The more specific optional measures given in the Strategy are voluntary for national implementation, since nutrient recycling in HELCOM countries is currently at different technological and political levels. Thus, a number of the proposed optional measures may have already been implemented in some countries while they remain relevant for future implementation in others. Some optional measures in this draft are given in square brackets as AGRI 10-2020 did not reach consensus on their formulation.

The first draft of the HELCOM nutrient recycling strategy (NRS).

The first draft of the Strategy was endorsed for submission to HOD 59-2020 by AGRI 10-2020. The document was prepared by the drafting group and considered by PRESSURE 13-2020. The document consists of an introductory part; vision and objectives, already agreed by HOD 56-2019; measures to enhance recycling of nutrients arranged by objectives and sub-objectives of the Strategy; proposal to follow-up the implementation. The draft is in the **Annex 1**.

Priority actions on nutrient recycling suggested for the updated BSAP

Based on the results of expert reviews, the drafting group for the NRS formulated and proposed for inclusion in the updated BSAP six strategic regional actions to achieve the objectives of the Nutrient recycling strategy. These actions of relevance for all HELCOM countries were derived from the long list of

specific measures through their analysis and generalization. They do not overlap with the optional measures listed in the draft Strategy, but the optional measures in the Strategy specify various aspects of their implementation. Being included in the HELCOM BSAP follow up system, the actions will also serve to follow up the implementation of the Strategy. The actions are given in the **Annex 2**. They are also included in the complete list of actions endorsed for inclusion in the updated BSAP (document X-X).

Action requested

The Meeting is invited to:

- consider the first draft of the nutrient recycling strategy and reflect on the completeness of the document, relevance to the commitments given by MD2018 and linkage to the updated BSAP;
- provide guidance for further drafting of the document including the procedure for its further consideration and adoption.

First draft of the Baltic Sea Regional Nutrient Recycling Strategy

Content

1. Introduction
2. Vision
3. Objectives
4. Measures
5. Follow-up

1. Introduction

Circular economy is one of the keys to more sustainable production and consumption systems of the future. Agriculture and food production rely on natural resources and cycles. As demands on natural resources grow, we risk depleting them beyond sustainable limits while simultaneously causing environmental problems due to leakage and loss. We therefore need to be more resource-efficient in the way we use and re-use resources, improving feedback loops and integrating circular economy principles. The recycling of nutrients is essential element of circular economy and sustainable food production.

Nutrients that have leached into the Baltic Sea cause eutrophication. This is the most serious challenge to the Baltic Sea. Phosphorus and nitrogen are essential nutrients to the growth of plants and the food production. The valuable resources have turned into a serious problem, when in the wrong place, in surplus to need, and not efficiently used. There is a need to improve recycling of nutrients on land and to reduce their losses to the sea to minimize the harmful impact on the Baltic Sea. Recycling of nutrients from eutrophicated waters to land can also be developed. These measures would help to preserve phosphorus resources for the future generations.

In nutrient recycling biomass or other matter containing nutrients is utilized and managed by man so that it will end up back to the cycle for the use of the plants. Recycled matter can be used as such or be processed to products, materials or raw materials.

Nutrient recycling and efficient use aim at creating a systemic approach to optimal use of nutrients in plant production while also minimizing nutrient loss in all parts of food system from field to fork. Key issues are

- fertilization according to the plant needs and soil nutrient content,
- good soil structure and other conditions for optimal nutrient intake,
- efficient manure management,
- efficient management to reduce impact from animal grazing and trampling,
- returning nutrients from food industry side streams back to the fields,
- reduction of food waste from the whole food system, and
- proper treatment of sewage sludge from waste water treatment plants returning nutrients back to the cycle without risks to human health and the environment.

The development of the Baltic Sea Regional Nutrient Recycling Strategy was stipulated by the decision of the HELCOM 2018 Ministerial Meeting which also recognized that, in addition to abating eutrophication, recycling of nutrients could contribute to reducing greenhouse gas emissions and securing phosphorus resources. The Ministerial Declaration also pointed out that environmentally safe nutrient recycling in the Baltic Sea region is to be based on the best available scientific knowledge.

2. Vision

Nutrients are managed sustainably in all HELCOM countries, securing the productivity of agriculture and minimizing nutrient loss to the Baltic Sea environment through efficient use of nutrients and cost-effective nutrient recycling.

3. Objectives

Objectives and sub-objectives
<p><i>Baltic Sea region as a model area for nutrient recycling</i></p> <ul style="list-style-type: none"> - Increasing nutrient use efficiency - Increasing the circulation of the available nutrient resources and reducing nutrient inflows to the region - Utilizing nutrient rich organic residues originating from areas with high nutrient surplus for production of fertilizer products
<p><i>Reducing environmental impacts</i></p> <ul style="list-style-type: none"> - Reducing nutrient losses to the Baltic Sea area and closing nutrient cycles - Reducing greenhouse gas emissions - Reducing ammonia emissions - Utilizing appropriate solutions to recycle nutrients for the specific conditions preventing contamination of the environment - Improving soil quality and enhancing carbon sequestration by using organic fertilizers - Promoting/advancing site specific optimized fertilization plans
<p><i>Safe nutrient recycling</i></p> <ul style="list-style-type: none"> - Minimizing the risks for humans and environment posed by contamination
<p><i>Knowledge exchange and awareness raising</i></p> <ul style="list-style-type: none"> - Promoting new research and technological development - Increasing research and knowledge sharing on risks and safe practices - Facilitating knowledge transfer and information exchange on nutrient recycling - Cooperating with other regions and global organizations to exchange information on the most up-to-date knowledge and techniques - Raising awareness of the benefits of nutrient recycling - Promoting holistic view of food production
<p><i>Creating business opportunities</i></p> <ul style="list-style-type: none"> - Encouraging new business models with cross-sectoral cooperation - Improving the economic viability of nutrient recycling
<p><i>Improving policy coherence</i></p> <ul style="list-style-type: none"> - Increasing cooperation of governmental agencies to improve policy coherence - Updating legal framework to facilitate nutrient recycling

4. Measures

Each objective of the Strategy has a prioritized measure that is included in the updated Baltic Sea Action Plan. In addition, each sub-objective of the Strategy contains a longer list of possible measures, which the HELCOM Contracting Parties can implement according to their specific needs and circumstances. The list of possible measures is a toolbox which gives Contracting Parties expert advice and ideas how to develop nutrient recycling in their respective countries.

Objective 1. Baltic Sea region as a model area for nutrient recycling

- *Sub-objective: Increasing nutrient use efficiency*
Possible measures:
 - Enhance fertilization planning and optimization according to crop need instead of amount of nutrients
 - Define clear joint goals for plant nutrient balances
- *Sub-objective: Increasing the circulation of the available nutrient resources and reducing nutrient inflows to the region*
Possible measures:
 - Prioritize the use of manure and other recycled nutrients as fertilizers
 - Promote the use of manure and recycled nutrients by e.g. increasing the cooperation between crop and livestock farmers
 - Promote the development and application of new technologies for removal and recovery of nutrients from WWTPs
 - Promote production and use of locally produced feeds and reduce import of nutrients
- *Sub-objective: Utilizing nutrient rich organic residues originating from areas with high nutrient surplus for production of fertilizer products*
Possible measures:
 - Create regional nutrient balance and nutrient recycling strategies for each country
 - Introduce incentives for use and production of recycled nutrients

Objective 2. Reducing environmental impacts

- *Sub-objective: Reducing nutrient losses to the Baltic Sea area and closing nutrient cycles*
Possible measures:
 - Optimize the use of recycled nutrients in all agricultural production making use of best available technologies and fertilize according to crop needs
 - Advice and assist farmers in sustainable farming including e.g. soil tests and using the results as a basis for fertilization planning
 - Promote strengthening nutrient reduction requirement for WWTP implementation and cleaning level (97 % P)
- *Sub-objective: Reducing greenhouse gas emissions*
Possible measures:
 - Calculate the impact of nutrient recycling on local, national and regional level Carbon Footprint
 - Promote research to clarify the role of nutrient recycling for carbon neutrality
 - Specify rules for reduced climate impact regarding farming and fertilization on peatlands
- *Sub-objective: Reducing ammonia emissions*
Possible measures:

- Promote air treatment/scrubbing, acidification and other technologies for animal housing and fertilizer spreading systems
- Support the use of Best Available Technology (BAT) to reduce ammonia emissions for all farms
- *Sub-objective: Utilizing appropriate solutions to recycle nutrients for the specific conditions preventing contamination of the environment*
Possible measures:
 - Promote upstream separation of sewage water
 - Establish common quality standards, e.g. certification systems for fertilizer trade
- *Sub-objective: Improving soil quality and enhancing carbon sequestration by using organic fertilizers*
Possible measures:
 - Raise awareness among farmers about benefits of organic fertilizers, including soil improvers, and appropriate farming methods for carbon sequestration
 - Support research on carbon sequestration methods in nutrient recycling
- *Sub-objective: Promoting/advancing site specific optimized fertilization plans*
Possible measures:
 - Support precision farming

Objective 3: Safe nutrient recycling

- *Sub-objective: Minimizing the risks for humans and environment by contamination*
- *Possible measures:*
 - Raise awareness on the need to address the risks related to nutrient recycling when processing and reusing variable biomasses in relation to
 - Inorganic harmful substances
 - Organic harmful substances, including antibiotics and antimicrobial resistance
 - Hygiene
 - Support research on
 - the migration and transformation of pathogens and harmful substances during the management, processing and use of recycled fertilizer products
 - the impact of pathogens and harmful compounds in recycled fertilizer products on the environment and human health
 - Use the scientific data to set and reinforce limit values/quality criteria for safe production and use of recycled fertilizer products in relation to hygiene and harmful substances
 - Develop measures to reduce pathogens and harmful substances entering the biomasses used for producing recycled fertilizer products
- *Sub-objective: Increasing research and knowledge sharing on risks and safe practices*
Possible measures:
 - Increase awareness of stakeholders on the health and safety perspective

Objective 4. Knowledge exchange and awareness raising

- *Sub-objective: Promoting new research and technological development*
Possible measures:
 - Include education on nutrient recycling especially in agricultural universities and colleges
 - Promote research to improve fertilizer value and management practices for recycled nutrient products
 - [Offer seed funding for technology development and up-scaling]

- Promote the development of methods and technologies to manage accumulated nutrient reserves in the Baltic Sea and inland water reservoirs
- Support development, up-scaling and implementation of nutrient recovery technologies (incl. energy capture)
- *Sub-objective: Facilitating knowledge transfer and information exchange on nutrient recycling*
Possible measures:
 - Educate agricultural advisors on nutrient recycling
 - Open a best practice information and collaboration platform with e.g. demo farms and WWTPs
 - Support open access to and popularization of nutrient recycling research
 - Enhance market information availability on nutrient recycling (open access to data)
- *Sub-objective: Cooperating with other regions and global organizations to exchange information on the most up-to-date knowledge and techniques*
Possible measures:
 - Establish closer cooperation with international phosphorus platforms
 - Create innovation funds for nutrient recycling and cross-border technology development
- *Sub-objective: Raising awareness of the benefits of nutrient recycling*
Possible measures:
 - Organize focused projects and knowledge campaigns for different stakeholders and groups
- *Sub-objective: Promoting holistic view of food production*
Possible measures:
 - Promote balance between animal production and plant production via education and advisory service
 - Design environmental labels that include nutrient recycling (e.g. implement in existing labels)
 - Design a quality system to increase traceability in food production

Objective 5. Creating business opportunities

- *Sub-objective: Encouraging new business models with cross-sectoral cooperation*
Possible measures:
 - Organize grant policies and financial support (seed-funding / investment support) to prioritize applications with documented cross-sectoral cooperation (vertically and horizontally), which connects at least two of the following: companies, universities, research institutions, etc.
 - Create incentives for biogas producers to process digestate in order to optimize the use of nutrients
 - Create guidelines regarding environmental safety and support central testing and knowledge facilities for start-up companies rather than sector- or product-oriented financial support. (Businesses should meet minimum criteria to access)
- *Sub-objective: Improving the economic viability of nutrient recycling*
Possible measures:
 - Develop economical tools and incentives for making organic fertilizers to be more attractive for the end users, by creating and securing an appropriate legal framework
 - Enhance economic feasibility of nutrient recycling by supporting bio-methane production and use
 - Identify targets for the share of recycled nutrients a) in fertilizers and/or b) on the land area of a farm holding.

Objective 6. Improving policy coherence

- *Sub-objective: Increasing cooperation of governmental agencies to improve policy coherence*

Possible measures:

- Ensure cross-sectoral policy cooperation between sectors (agriculture, WWT, businesses)
- Define clear roles and responsibilities for policymakers around nutrient recycling
- Create joint verification systems for nutrient recycling technologies (BAT)

- *Sub-objective: Updating legal framework to facilitate nutrient recycling*

Possible measures:

- [limit the use of mineral fertilizers and not only manure] Facilitate the trade and use of recycled fertilizer products
- Strengthen regulation that promotes balanced crop and livestock production and/or prevents/offers solutions for regional manure surplus/ high livestock density
- [Identify regional boundaries for N/P (nutrient badges) for setting N/P reduction/recycling targets and actions] *Requires clarification*
- [Find regional key problems for targeted policy instruments, and for targeted implementation and incoherence of existing policies.] *Requires clarification*

5. Follow-up

The Strategy will be followed up by following the implementation of the priority measures that are included in the updated Baltic Sea Action Plan. The reporting on the implementation of the priority measures will be organized as part of the follow-up of accomplishment of the BSAP measures.

Regional actions on nutrient recycling endorsed for the inclusion in the updated BSAP

- Objective 1. Baltic Sea as a model area for nutrient recycling:
 - Priority measure: Implement adequate measures to achieve the objectives of the Baltic Sea Regional Nutrient Recycling Strategy
- Objective 2. Reducing environmental impacts:
 - Priority measure: Optimize the use of recycled nutrients in agriculture making use of best available [recovery] technologies and fertilize according to crop needs. / according to crop need through enhanced fertilization planning
- Objective 3. Safe nutrient recycling:
 - Priority measure: Avoid unnecessary use/Control the use of harmful compounds to minimize their presence in recycled nutrient products and develop safety standards for recycled fertilizer products
- Objective 4. Knowledge exchange and awareness raising:
 - Priority measure: Develop the knowledge and promote education and advisory on nutrient recycling and share experiences between various actors to learn from each other
- Objective 5. Creating business opportunities:
 - Priority measure: Promote the production of recycled fertilizer products by making their use equally attractive to farmers as the use of mineral fertilizers.
- Objective 6. Improving policy coherence:
 - Priority measure: Enhance cooperation between sectors to create a holistic view on sustainable food system including nutrient recycling across sectors