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| Document title | Background for regional nutrient recycling strategy |
| Code | 2-7 |
| Category | DEC |
| Agenda Item | 2- Preparations for HELCOM Ministerial Meeting 2018 |
| Submission date | 30.11.2017 |
| Submitted by | Finland |
| Reference | |

Background

The attached third version of the background paper on nutrient recycling has been prepared to support drafting of a Ministerial decision on the development a HELCOM nutrient recycling strategy. The document has been prepared by Finland taking into account comments to the previous two versions from HOD 52A-2017, Agri online consultation meetings, PRESSURE 7-2017 and written comments by Sweden and BFFE. The document was also presented at HOD 52B-2017.

Action requested

The Meeting is invited to conclude that this document provides suitable background information for the Ministerial Meeting.

Background

Circular economy is one of the keys to more sustainable production and consumption systems of the future. Agriculture and food production relies on natural resources and cycles. As demands on natural resources grow we risk depleting them beyond sustainable limits. 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 to circular economy.

Nutrients that have leached into the Baltic Sea cause eutrophication. This is one of the most serious challenges 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 and not efficiently used. There is a need to improve recycling of nutrients on land and reduce losses to the sea to minimize the impact on the Baltic Sea. Recycling of nutrients from eutrophicated waters to land can also be developed. This also would help to preserve phosphorus resources for the future generations.

Nutrient cycling is a way to manage nutrient flows

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

Nutrient recycling and efficient use aims at creating a systemic approach to optimal use of nutrients in plant production which also minimize loss of nutrients 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 of nutrients from food industry's side products back to the fields, reduction of food waste from the whole food system and proper treatment of the sewage sludge from waste water treatment plants returning the nutrients back to the cycle without risk to the human health and environment.

When nutrients are recycled, less virgin raw materials are needed and large amounts of fossil fuels are saved, contributing also to climate change mitigation. Phosphorus is an unrenewable resource. The global phosphorus resources are limited and situated in geopolitically sensitive areas. This can have significant consequences for national and regional food systems. As for nitrogen, the production of nitrogen fertilizers is an energy intensive process and produces a lot of greenhouse gases. Manure is a key source of nutrients and organic matter, which in many areas accumulates in such a manner that spreading to nearby fields is not an option and more advanced processing solutions are needed. To ensure that manure is not produced in excess in comparison to the amount of arable, there must be a balance between the number of animals on the farm and the amount of land available for spreading manure, expressed as animal density. Active and optimized recycling of nutrients in manure, sewage sludge and industrial organic side products helps the protection of waterways and the soils. This is made possible when these biomasses are processed to be easily used fertilizer products and the safety of these products is guaranteed. There is a need for innovations and new technologies for recycling of nutrients in manure, sewage sludge and to recycle nutrients from eutrophicated waters, which may create also new business opportunities. The development of new technologies in recycling nutrients from eutrophicated waters has to follow the principle not to allow more nutrient loading from land-based sources and to include risk assessments.

HELCOM and nutrient recycling in the Baltic Sea region

The HELCOM Contracting Parties agreed in the Ministerial Meeting in 2013 to enhance the recycling of phosphorus especially in agriculture and waste water treatment and to promote development of appropriate methodology.

HELCOM Agri group has been working to implement the Ministerial Meeting 2013 decisions concerning the development of advanced manure standards and application of nutrient accounting on farm level in the Baltic Sea region. Treating manure, not as a waste, but as a resource, requires taking manure nutrients appropriately into account when fertilizing the crops, and also considering the soil nutrient status. The work of HELCOM Agri group done on manure standards and nutrient accounting has provided first important steps towards nutrient recycling.

HELCOM Pressure group has developed a recommendation on sewage sludge handling. The objective of the recommendation is to ensure maximum utilization of the valuable components contained in the sludge, and simultaneously minimize possible negative environmental impact. It is important that the recycled nutrients should be in such a form that they can be effectively and safely utilized by the crop.

Sustainable practices are dealt also by HELCOM Recommendation on sustainable aquaculture. The document inter alia implies prevention of additional nutrient discharges by optimizing nutritive requirements and encourages the use of regionally sourced products as fish feed ingredients. HELCOM arranged in spring 2017 a workshop on nutrient recycling in the Baltic Sea countries together with the European Union Strategy for the Baltic Sea Region to find suggestions for HELCOM to promote nutrient recycling in the region while preventing the spreading of hazardous substances, and ensuring a good environmental status of the Baltic Sea.

A joint strategy on nutrient recycling could help to prevent nutrient losses to the sea and boost more effective management of nutrients

As the next step towards improved and more systematic management of nutrient flows, a HELCOM strategy of nutrient recycling is proposed. The objective of the strategy could be to strengthen the work done in HELCOM countries to reduce nutrient losses to waters by better managing nutrient flows. Many activities are ongoing and new knowledge and practical experiences accumulate quickly. The lessons learned should be shared between all HELCOM countries to secure the best knowledge and capacity to all its Contracting Parties moving towards cleaner Baltic Sea. The strategy would help HELCOM Contracting Parties to be more effective in reaching the goals of the Baltic Sea Action Plan by:

- o harvesting results from the latest research projects or networks (EU-projects, PA Nutri, BONUS, etc.), sharing knowledge and lessons learned,
- o identifying applicability and added value for the Baltic, for a cooperative whole-Baltic approach,
- o identifying gaps, risks or obstacles linked to nutrient recycling, to be prevented or overcome, and by

- o forming coherent strategies or common views in the region both as regards existing nutrient-related topics, and upcoming ones (stemming from development of new technologies).

The strategy would develop a common vision and set out objectives for nutrient recycling taking into account the difference in prevailing condition among HELCOM Contracting Parties. It could also lay out a basis for common and Contracting Parties' measures to improve nutrient recycling.

To confront the challenges of nutrient recycling we need to share the examples, knowhow and best practices. We also need to increase research and co-operation on the practical level. The new developments in digitalization e.g. precision farming open up new possibilities for nutrient circulation and resource efficiency. Agro-ecological symbiosis that aim at increasing the nutrient and energy self-sufficiency in agriculture by integration of different but connected operations/actors represent a new interesting food production system. Development of digital technologies makes it possible to design new options to build cost efficient logistical systems that can promote nutrient recycling. Nutrient-rich waste and side streams generated in various processes should be able to be safely recycled. Improved soil and nutrient management will also improve the production potential. Solutions related to the efficient use, recycling, restoration and processing of nutrients could provide commercially viable added value.

References:

European Commission, 2013. Consultative Communication on the Sustainable Use of Phosphorus COM (2013) 517 final.

Koljonen Marja, 2016. Nutrient Cycling at the Core of Circular Economy. Baltic Sea Action Group.