



## Promise and performance of **agricultural nutrient management** in the Baltic Sea countries

To improve the environmental state of the Baltic Sea there is a need for reducing agricultural nutrient losses. All countries around the Baltic Sea, except Russia, have adopted basic standards for nutrient management; however, there are shortcomings in the national implementation of the Baltic Sea Action Plan in most countries, particularly in relation to P application limitations, manure storage capacity and cover of manure storage facilities. Furthermore, a range of challenges are not yet addressed, including widespread use of ineffective technologies for manure spreading as well as the absence of standards for mineral fertilizer use, nutrient bookkeeping and the balancing of fertilizer use with crop needs.



# BONUS

SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION

| **BONUS TOOLS2SEA** | Policy tools for Baltic Sea nutrient management

Our policy briefs are summaries of scientific knowledge produced in TOOLS2SEA, connected to current management and policy actions concerning the Baltic Sea. The briefs engage in and respond to important issues that support long-term sustainability of ecosystem goods and services of the Baltic Sea.

## The state of the Baltic Sea

Despite almost 50 years of international collaboration to reduce pollution, the Baltic Sea fails to meet ambitions outlined in the Baltic Sea Action Plan, primarily due to eutrophication. According to the recent holistic assessment published by HELCOM, about 97 percent was assessed as eutrophic during the 2011–2016 period and most of the Baltic Sea region fails to meet the targets set in EUs' Water Framework Directive. Diffuse losses from agriculture is the most important source of nutrient emissions to the Baltic Sea and a reduction of these are required to improve the environmental state.

### Policy measures in place for nutrient management

Stringent measures for agricultural nutrient management were agreed by the littoral countries in 1998 in an update of the Helsinki Convention, but their implementation is uneven across countries:

- **Manure application standards:** The ceiling of 170 kg N/ha/year is implemented in all EU countries, but not in Russia, while the ceiling for manure phosphorus-applications at 25 kg P/ha/year is implemented in Sweden and Estonia only. In addition, application rates for synthetic fertilizer application differ (see table).
- **Embargo periods on manure application during winter months:** Defined in all countries, except Russia, but the exact embargo period differs across countries.
- **Minimum 6 month covered manure storage:** National requirements differ considerably, ranging from 6-12 months for liquid manure to only 2-12 months for solid manure, while no storage cover is required in Poland, Germany and Latvia. Furthermore, in most countries standards for manure storage only apply to farms larger than 10 livestock units whereby many farms fall below, despite the Convention having no such threshold.
- **Technology used for manure treatment and spreading:** Most countries require manure incorporation within 24 hours after application, except when applied to a growing crop. Advanced manure treatment technologies, like acidification and digestion or application technologies like injection are rarely used, except in Denmark and parts of Sweden and Germany, despite offering a substantial reduction potential.
- **Nutrient bookkeeping:** Each country has developed its own unique national standards for bookkeeping, N balances and monitoring, preventing comparability across the Baltic Sea region.

Measures beyond basic fertilizer and manure management tend to require a certain degree of farmer voluntariness and economic incentives are often provided. A range of **Agri-Environmental Schemes** are offered across the region, including effective measures like buffer zones, catch crops, wetland restoration, set-aside and forestation. In Denmark, Sweden and Finland these schemes constitute important elements of national nutrient management programs, however, such schemes are rarely available in the Baltic states and Poland, except as an opportunity for fulfilling compulsory EU requirements for 5% Ecological Focus Area.

Wetland restoration is recommended by the Convention. While Nordic countries have wetland restoration programs, the eastern countries with many natural wetlands, provide payments from EU Rural Development Funds for the draining of these. Individual farmers have a crucial role in improving nutrient use efficiency, but **shortfalls in agronomic competencies** constitute an important hindrance to policy acceptance and implementation within large parts of the region and many farmers frequently do not know the impacts of their practices, the prevailing policies or the need for changes in practices.

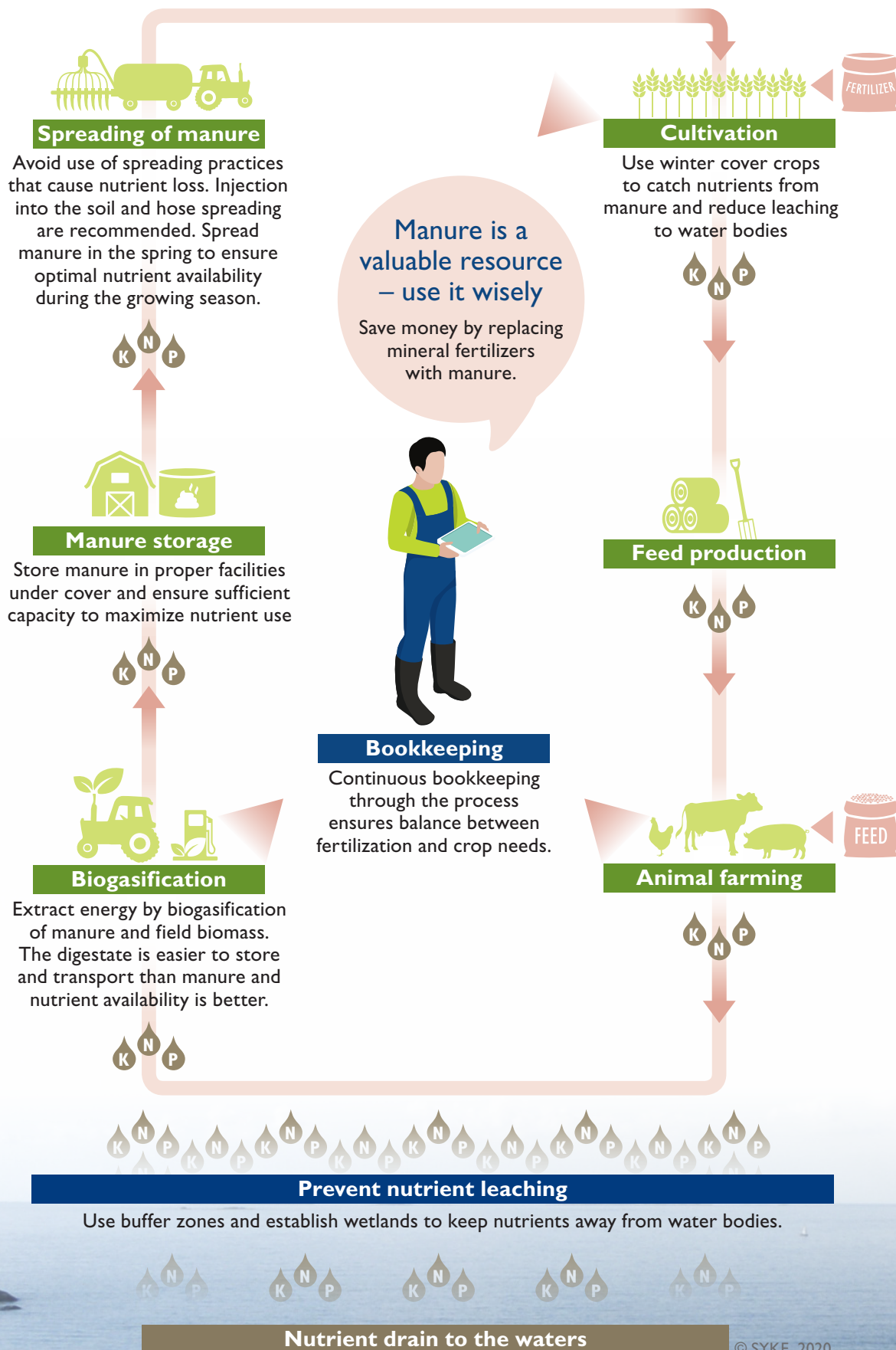
## Fertilization standards in the BSR

|                  | Fertilizer standards   | Embargo periods  | Manure storage  |
|------------------|--|--|---|
| <b>Germany</b>   | <b>170 kg N/ha</b> from manure. Max surplus <b>20 kg P/ha</b> (in 6 years). High P level in the soil: no surplus. Post harvest distribution only on fields with a crop, max 60 kg. N or 30 kg ammonia. | <b>1/11 - 31/1</b> , grass open until 10/11. Post harvest distribution only on fields with a crop, <b>total max 60 kg N or 30 kg ammonia/ha</b> .  | > 10 LSU, <b>6 months</b> storage. Solid manure 2 month. No cover required.   |
| <b>Denmark</b>   | <b>170 kg N/ha</b> from manure ( <b>230 kg N/ha</b> if cattle manure and 80% of the farm acreage is covered with grass, beets or catch crops), <b>P 30-43 kg/ha</b> . Statutory fertilizer norms.      | No liquid manure <b>crop harvest until 1/2</b> , except on grass and winter rape, open until 1/10, seed grass open until 15/10. Solid manure 15/2 until 1/2.   | > 10 LSU, <b>9 (6) month</b> , cover required   |
| <b>Sweden</b>    | <b>170 kg N/ha</b> from manure in NVZ. Fertilization only according to crop needs based on soil tests and guidelines.<br><br><b>22 kg P/ha</b> from manure countrywide. Both in 5 year average.        | In NVZ, no manure from <b>1/11 until 20/2</b> , in addition, no manure from 1/8 until 31/10 unless to planted fields or prior to catch crops in 3 regions and on fields with a clay content below 15%. | Farms > 2 LSU <b>6-10 months</b> depending on type and area, cover requirement in some areas                            |
| <b>Finland</b>   | <b>170 kg N/ha</b> from manure; P ceiling depends on soil P. Up to <b>325 kg soluble P/ha</b> per 5 years (in horticulture <b>560 kg soluble P/ha</b> per 5 years).                                    | <b>1/11 until 1/4</b> . Application after 15/8 require incorporation into soil unless prior to growing new crop.   | <b>12 months</b> apply to all farms, cover required   |
| <b>Estonia</b>   | <b>170 kg N/ha</b> (150 kgN/ha in NVZ) and <b>25 kg P/ ha</b> (5 year average)   | No mineral fertilisers from <b>15/10 until 20/3</b> , no liquid manure <b>1/11 until 20/3</b> .  | > 10 LSU, <b>8 month</b> storage, cover required  |
| <b>Latvia</b>    | <b>170 kg N/ha</b> . No P ceiling  | No general ban. In NVZ: No livestock manure <b>20/10 until 15/3</b> , except on grass, which is open until 5/11. No mineral fertilizer 15/10 until 15/3.   | > 10 LSU (5 LSU in NVZ), <b>8 months</b> (for new constructions only)   |
| <b>Lithuania</b> | <b>170 kg N/ha</b> of livestock manure. No P ceiling   | No manure from <b>15/11 until 1/4t</b> . Except for fertilization of fallows, meadows, pastures and areas where winter crops will be grown.  | > 10 LSU <b>6 month</b> storage, cover required   |
| <b>Poland</b>    | <b>170 kg N/ha</b> ; No P ceiling  | Generally ban on manure application from <b>30/11 until 30/3</b> .   | New rules: > 10 LSU. Liquid <b>6 month</b> ; solid <b>5 month</b> , cover required (fully implemented in 2021 or 2024). |
| <b>Russia</b>    | <b>200 kg N/ha</b> from manure. No P ceiling.  | No ban, but manure spreading is not allowed on flooded, frozen or snow covered ground.   | No required storage capacity.   |

NVZ: Nitrate Vulnerable Zone

## Nutrient recycling

With careful use of different management measures, you can reduce both the leaching of nutrients into water bodies and your need of costly mineral fertilizers. **It is a win-win situation for the farmer and the environment.**



# Shortcomings in implementing agreed Helsinki Convention measures undermine the Baltic Sea Action Plan



## Shortcomings in current nutrient management

There are considerable differences across the littoral countries with regard to the share of Convention measures transposed into national legislation, with omissions and shortcomings in every single country. Besides Russia, these shortcomings are most pronounced in Poland and Germany, followed by Latvia, Denmark, Finland and Lithuania, and least pronounced in Sweden and Estonia. This concerns introducing the phosphorus application ceiling of 25 kgP/ha/year, having sufficient storage capacity (particularly for solid manure) and proper cover of storage facilities. The shortcomings identified in implementing Convention prescribed measures for agriculture are unfortunately undermining the likelihood of achieving Baltic Sea Action Plan targets.

A range of challenges remain to be addressed in the Baltic Sea Action Plan, including the widespread use of ineffective technologies, such as broadcast manure spreading that imply high nutrient losses. Recent increases in the nitrogen surplus of Poland should be of concern, considering its dominant share of the Baltic Sea catchment, as well as the continued high absolute surpluses in Denmark, Germany and Russia.

## Recommendations

- Fully implement the most effective basic measures, particularly the phosphorus application ceiling, manure storage capacity (including for solid manure) and proper cover of storage facilities.
- Avoid ineffective technologies for manure spreading, such as broadcast manure spreading.
- Standards for nutrient bookkeeping, N balances and monitoring should be comparable across countries.
- Continue engagement with relevant authorities in Russia in meeting commitments made

**BONUS TOOLS2SEA** is a synthesis project of the **BONUS** research program.

It will summarize research results and insights from a broader array of studies, projects and publications available in the international literature, as well as in national languages of the Baltic Sea region.

It will synthesize potentials and practical experiences with specific policy instruments designated for nutrient management, while placing and analysing these in context of the domestic and regional governance institutions in place in Baltic Sea countries and beyond.

[projects.au.dk/bonus-tools2sea](https://projects.au.dk/bonus-tools2sea)

## **BONUS TOOLS2SEA | POLICY BRIEF |**

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**FORMAS** 

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