

Factsheet

Nutrient loading in Poland and the European Union



Website: www.soils2sea.eu
E-mail: info@soils2sea.eu

About Soils2Sea

Current levels of nutrient loading pose risks for water quality and ecosystem health in the Baltic Sea. Soils2Sea studies the retention of nitrogen and phosphorous between the soils/sewage outlets and the coast, including transport pathways such as overland flow and flows in macropores, subsurface tile drains, shallow and deep groundwater, rivers, wetlands and lakes.

Soils2Sea will run from 2014-2017. It brings together eight organisations from Denmark, Germany, Poland, Russia and Sweden. The project is funded by BONUS, the joint Baltic Sea research and development programme and national funding institutions.



Soils2Sea objectives

Soils2Seas has the following goals:

- New methodologies for the planning of differentiated regulations based on new knowledge of nutrient transport and retention processes between soils/sewage outlets and the coast.
- Evaluation of how differentiated regulation can offer more cost efficient solutions towards reducing the nutrient loads to the Baltic Sea.
- Analysis of how changes in land use and climate may affect the nutrient load to the Baltic Sea as well as the optimal location of measures aiming at reducing the load.
- A high-resolution model for the entire Baltic Sea Basin with improved process descriptions of nutrient retention in groundwater and surface water tailored to make detailed simulations of management regulations differentiated in space.
- New knowledge based governance and monitoring concepts that acknowledge the relevant aspects of EU directives and at the same time are tailored towards decentralised decision making. The proposed spatially differentiated regulations will aim for incorporation of local knowledge to optimally design solutions.

Case studies

Soils2Sea will perform detailed studies in four case study catchment areas, as well as on the entire Baltic Sea basin. The case studies are:

- Norsminde, Denmark
- Tullstorp, Sweden
- Kocinka, Poland
- Pregolya, Russia



For more information on the Soils2Sea project, including the latest research results, visit: www.soils2sea.eu

Soils2Sea has received funding from BONUS (Art 185) funded jointly from the European Union's Seventh Programme for research, technological development and demonstration, and from Baltic Sea national funding bodies.

Nutrient loading in the EU

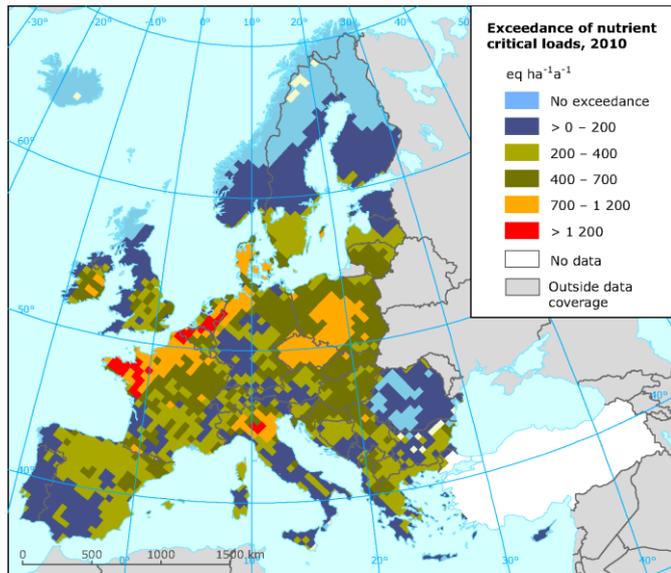


Figure 1: Exceedances of critical loads for eutrophication due to the deposition of nutrient nitrogen in 2010. Source: European Environment Agency, 2010.

The EU regulatory framework

Within the EU there are several regulatory frameworks and initiatives addressed directly or indirectly to the issue of eutrophication. These frameworks, accompanied by non-binding initiatives, have an effect on all case studies. General information is provided here.

Water Framework Directive (2000)

Summary: The Water Framework Directive (WFD) sets the objectives for water protection in the EU. The directive aims to achieve a 'good status' for all ground and surface waters by 2015. It is complemented by the Groundwater Directive (2006) which sets a concentration limit of 50 mg/l Nitrate.

Key Requirements: Nitrate and phosphate are identified as main contributors to eutrophication. In this context, Member States must establish national River Basin Management Plans (RBMP) with concrete programmes. The Directive is complemented by other, more specific, EU laws e.g. the Groundwater or Nitrate Directive (see below).

Nitrates Directive (1991)

Summary: The Nitrates Directive has the goal of reducing and preventing water pollution from nitrates from agricultural sources. It primarily focuses on livestock manure and other fertilisers that could pollute ground and surface waters, and . The Nitrates Directive is an important component of the Water Framework Directive.

Key Requirements: Nitrate pollution is defined as 50 mg/l. Member States must identify surface or groundwater that is polluted or vulnerable to pollution and designate vulnerable zones where stricter

monitoring is implemented. Member States must implement Action Programmes, including the following mandatory measures:

- Rules for fertilizer application must be implemented that are in accordance with Good Agricultural Practices
- A maximum fertilizer allowance of 170 kg/ha/yr of nitrogen from livestock manure for each farm or livestock unit (with 210 kg/ha allowance in the first 4 years and possibilities of adjustment of the maximum allowance according to objective criteria).
 - This indirectly regulates phosphorous to 25 kg/ha/yr (depending on type of manure).

Baltic Sea Action Plan (2007)

Summary: HELCOM Baltic Sea Action Plan (BSAP) is a programme to restore the good ecological status of the Baltic marine environment by 2021. The BSAP was adopted by all the coastal states and the EU in 2007.

Key Requirements:

- Maximum Allowable Inputs to the Baltic Sea ~ 21,000t P and 600,000t N:
- Country Allocated Reduction Targets (CARTs): to reduce the nutrient load from waterborne and airborne inputs by 2016 aiming at reaching good ecological and environmental status by 2021

Recommendation:

- "Criteria and measures concerning the prevention of pollution from land based sources": max. livestock manure application of 170 kg/ha nitrogen and 25 kg/ha phosphorus.
- Usage of Best Environmental Practice (BEP) and Best Available Technology (BAT).

Outreach: The BSAP lists examples for measures reducing phosphorus and nitrogen losses from agriculture on animal feeding, fertilizer and manure management and soil management e.g. through plant cover in winter, wet feed and fermentation. It also lists Hot Spots of intensive rearing of cattle, poultry and pigs not fulfilling the convention requirements (Annex III).
Non-binding initiatives:

Good Agricultural and Environmental Conditions:

- E.g. through protection and management of water, combating soil erosion, managing soil organic matter and structure (2m buffer zones, no heavy machinery on very wet soils to keep soil structure, crop rotation, fallows (keeping slopes under plant cover or as a terraces).
- EU cross compliance– direct payments or through Rural Development Programme

Nutrient loading in Poland

The following graphs present the recent trends for nutrient loading in Poland over the past 20 years. Of these totals, roughly 44% of N and 32% of P comes from agricultural sources (based on 2012).

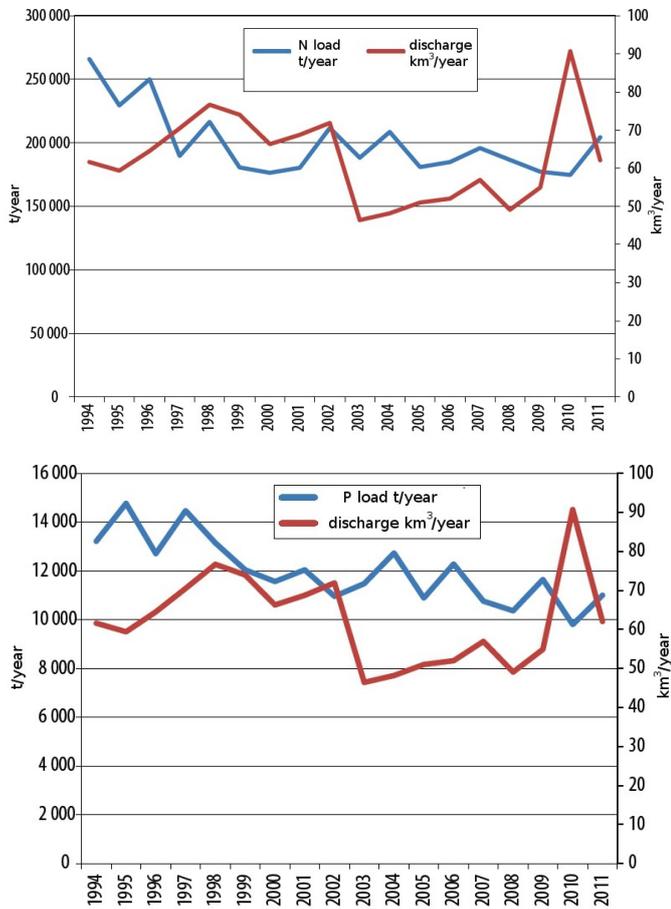


Figure 3: Trends in loads of N and P transported by Polish rivers to the Baltic Sea.

Use of N in mineral fertilisers per hectare

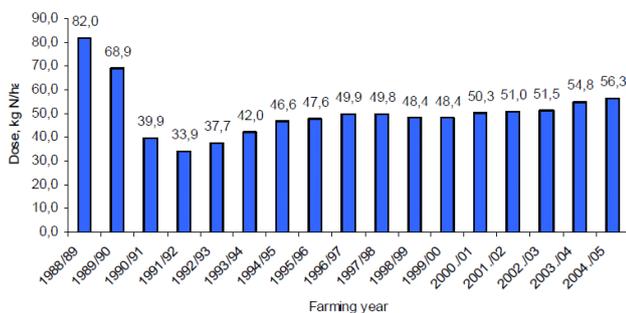


Figure 4: Use of mineral fertilizers. In 2010/2011: 70.7 Kg N/ha

Decrease of nutrient loads from municipal wastewater

In recent years, the percentage of the population served by waste treatment facilities has steadily increased:

1988: 30% 1998: 47% 2011: 66%

Kocinka catchment

The Kocinka catchment (surface area of 258 km²) is located in the south of Poland in the Oder river catchment. The 40.2 km long Kocinka river discharges into the Liswarta river. The average outflow and the baseflow at the gauging station were 218 mm/yr and 158 mm/yr, respectively, for the period 1974 - 1983. The catchment is mostly agricultural (55% of the land) with pine forests dominating in the lower reach. Kocinka lies outside a Nitrate Vulnerable Zone (NVZ).

Within the Kocinka catchment, key sources of N and P relate to the increasing use of fertilisers, as well as waste water effluence from sources like Czestochowa city.

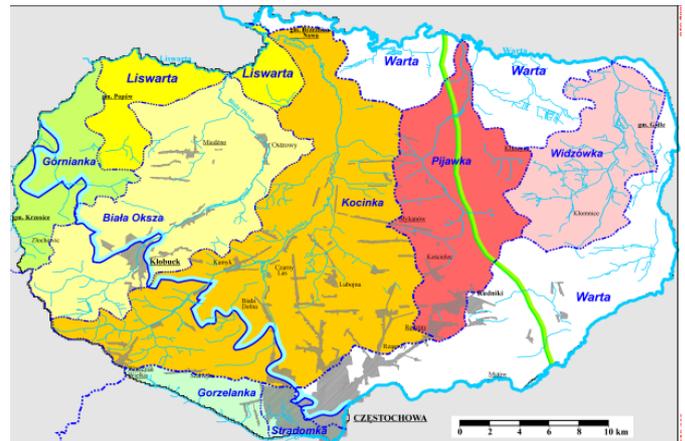


Figure 5: River network of the Kocinka and the neighbouring catchments.

Focus within Soils2Sea

- Identification of nutrient pollution sources,
- Characterisation of spatial and temporal variations of nutrient levels and fluxes in the Kocinka,
- Retention of nutrients in the groundwater and in the river.
- Interactions between groundwater and surface water in the catchment with respect to the fluxes of nutrients exchanged between these two compartments and exported from the catchment,
- Time lags in responses of river water quality to the measures undertaken with respect to agricultural activities and land-use.



Regulatory framework for actions at different levels:

Water Act, 18 July 2001:

The Polish Ministry of Environment is responsible for national water management, and coordinates through six **Regional Water Management Boards**. There are 21 NVZs designated in Poland (2004, 2% of the total area) with the following restrictions based on the Nitrate Directive:

- Stricter periods when fertilizers application is forbidden or not recommended
- Principles for applying fertilizers on slopes and in the vicinity of streams and water reservoirs
- Ban on fertilizer application on soil soaked or covered with water, frozen or covered by snow
- Required storage capacity for manure and slurry: 6 months
- The recommendation for sustainable nutrients management must be followed, records kept on fertilizer application
- Agricultural land is structured in line with GAP, taking into consideration crop rotation on arable land and good management practices on grassland

The Voievodship Agricultural Advisory Centres provided mandatory training (2006-2008), including: advice on management of natural fertilisers, proper operation of silage piles, use of appropriate crop rotation systems, rational fertilisation, drawing up the balance of nitrogen, development of the fertilising elements, and preparation of fields and documentation. Also, in the first and fourth year of the action program, the centres surveyed farms as a basis for monitoring the state of agriculture in the NVZs.

Poland also has obligations to build, to enlarge and/or to modernize municipal sewage treatment plants and community sewage systems in agglomerations > 2000 equivalent number of inhabitants, as well as to reduce 75% of the total nitrogen and phosphorus charges in municipal sewage coming from whole state's territory in order to protect surface waters, including seawaters, against eutrophication. The deadline for this is 31 December 2015.

Nitrate Directive:

The Nitrates Directive was implemented in legislation in 2004 alongside Poland becoming an EU member. Vulnerable zones were designated with action programmes

The aim is to limit nitrogen outflow from the agricultural sector, with a maximum allowance for organic fertiliser of **170 kg nitrogen/ha**. This corresponds to 45 kg of phosphorus in manure per hectare (Poland has no maximum phosphorus application rates or other P restrictions). Other requirements include:

- No limits on the use of mineral P
- Manure spreading is allowed from the beginning of March until the end of November, but not if soil is waterlogged, flooded, frozen or covered by snow
- No sewage fertilization on allowed on slopes more than 10°
- Required storage capacity for manure and slurry: 4 months
- Large animal production farms (more than 40 000 poultry or 2 000 pigs or 750 sows) must:
 - Submit fertilization plans to local authorities
 - Use 70% of their fertilizer with option to sell 30% (buyer needs to submit fertilisation plan within 30 days and be checked by Regional Agro Chemical Stations)

HELCOM (2013)

Country Allocated Reduction Target: 43.610 t nitrogen and 7.480 t phosphorous (At this **point** in time Poland accepts the Polish CART as indicative due to the ongoing national consultations, and confirms their efforts to finalize these consultations as soon as possible.) Ratification ongoing. Obstacles: manure storage capacity in NVZ (6 months) and permits for smaller animal production farms.

Rural Development Program (non binding):

Since 2010, 64 538 farmers have participated in the program. The total area under program packages is 714 195 ha, with 256.9 km of buffer strips along water courses. Some key elements include:

- Most farmers choose package 3. Extensive meadows and pastures (35 258 farmers)
- The second most was package 8. Soil and water protection (by sowing catch crops) (29 139 farmers)
- Others are organic farming (15 677) and balanced farming (13 342).

Under Good Agricultural and Environmental Conditions, the standards for Cross Compliance Subsidies include:

- 2m buffer zones, soil structure (no heavy machinery on very wet soils), crop rotation (protection of organic matter – no cereals monoculture longer than 3 years), fallows (keeping slopes under plant cover or as a terraces).

