

Agriculture – the key sector responsible for Baltic Sea eutrophication



Polish Ecological Club Gliwice Chapter, Global Water Partnership, PI and Coalition Clean Baltic organized a seminar, in Nov 2010, on minimization of nutrients' run-off from agriculture as the main source of Baltic Sea eutrophication.

Seminar objectives

- Put attention on nutrients run-off from agriculture production as the main source of Baltic Sea eutrophication.
- Present environmental friendly and socially appropriate solutions to the eutrophication problem.
- Lobby for the best policies and practices to combat nutrients run-off in the Baltic Sea basin aiming for development of sustainable agriculture.
- Share experiences of minimization of nutrients run-off in the Baltic Sea and the Black Sea regions (Sweden, Germany, Belarus, Hungary, Romania, Poland).
- Present some implemented projects: (BERAS, LIFE EkoRob, GEF) from a scientific and practical point of view. Explain the idea of ecological recycling agriculture (ERA).

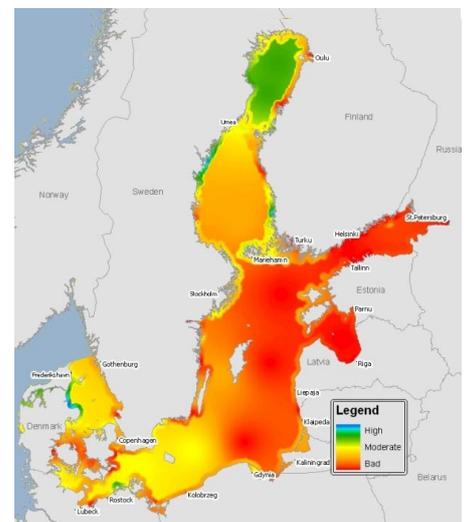
Environmental impact of the industrial farming to Baltic Sea eutrophication by prof. Józef Tyburski, Universidad of Warmia and Mazury, PL

Initially agriculture synergically coexisted with the environment but became the most serious polluter at the end of XX century. It happened due to intensification of conventional agriculture based on the common use of mineral fertilizers and chemical pesticides, as well as the separation of vegetal and animal productions. The widespread problems coming out of intensification of agriculture are as follow: loss of biodiversity, nutrient pollution of water resources, eutrophication of inland and Baltic Sea waters and soil erosion. The other systems of agriculture such as ecological agriculture and the biodiversity protecting agriculture have a positive impact on the environment. Unfortunately, they cover insufficient areas of arable land to counterbalance efficiently the conventional agriculture.

Coalition Clean Baltic

HELCOM Integrated Classification Of Eutrophication Status in the Baltic Sea

Green areas – Areas unaffected by eutrophication
Yellow, orange and red Areas affected by eutrophication



Eutrophication of the Baltic Sea – the unsolved problem? by Gunnar Norén, Exec. Secretary of CCB
What is eutrophication?

Excessive amounts of nutrients, mainly nitrogen (N) and phosphorus (P) but also organic matter (represented by carbon (C)), build up in aquatic ecosystems and cause accelerated growth of algae and plants, often resulting in undesirable effects such as increased sedimentation, oxygen depletion, water turbidity, loss or dominance in benthic/bottom-living animals and fish.

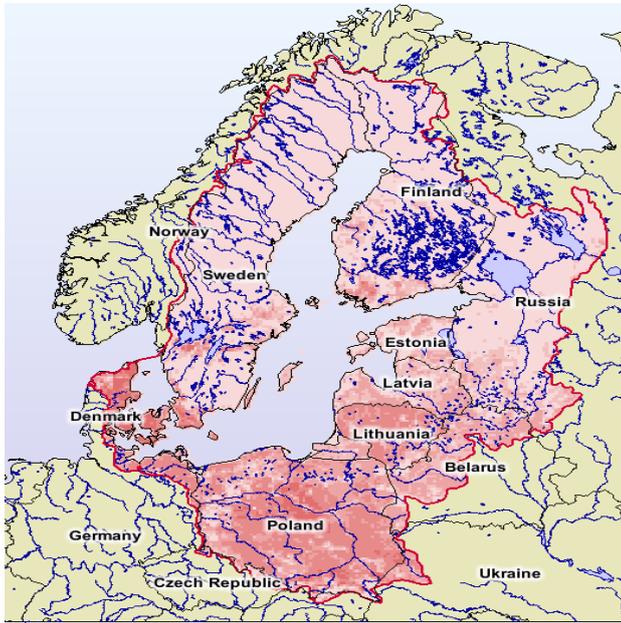
Why is Baltic Sea sensitive to eutrophication?

- nearly enclosed brackish-water area,
- poor seawater renewal through narrow Danish Straits and Sound (retention time 30 years!)
- vertical salinity stratification of the water masses (halocline) prevents vertical mixing of the water, and prevents ventilation and oxygenation

AGRICULTURE and EUTROPHICATION

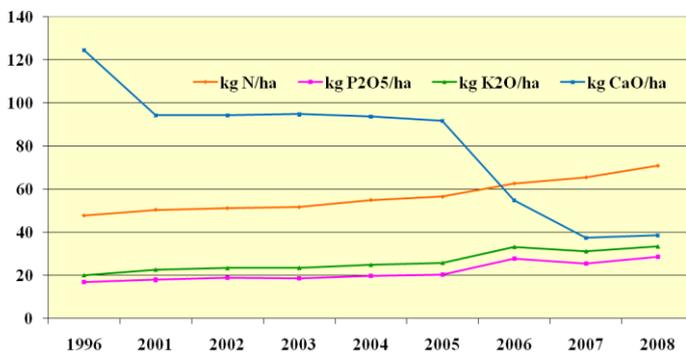
Baltic Sea Region agriculture contributes to approximately 50 % of the nutrients load (Nitrogen & Phosphorus)

The Common Agriculture Policy instruments for nutrients' minimization and their utilization in Poland by W. Podyma from Ministry of Agriculture, PL



Rural areas cover 93,4% of the Polish territory.
Rural inhabitants: 14,8 Million (38,9 % of the total population)
Arable land: 60,7% of the territory of Poland. Including farmyards 38,7 %, meadows and pastures 10,1 % and forests 30,4 %.
In Poland the pressure on the environment is caused by application of mineral nitric fertilizers with upward trend of their utilization. This is reversal to the majority tendencies in EU countries, where decrease or stabilization of fertilizers' doses are observed. However relative losses of nutrients are among the lowest: 3,7 kg N/inhabitant and 4,6 kg N/1 ha of total area of Poland.

Below Application of fertilizers by agriculture in 1996 – 2008



Common Agriculture Policy actions in 2007 – 2013 within 2nd pillar – *Rural Development Program* are listed in 4 Axes:
Axis 1 Enhance of competitiveness of agriculture and forestry
Axis 2 Improvement of rural environment
Axis 3 Quality of life in rural areas
Axis 4 LEADER

To minimize nutrients' disposal from arable land farmers can utilize the program "Modernization of farmstead" within Axis I of Agro-environmental Program, and take advantage of the Axis II packages: sustainable agriculture, environmental agriculture, soil and water protection, and buffer zones.

The budget of RDP 2007 – 2013

Total amount: **17.2 billion €**, out of which 13.2 billion € from EU and 4 billion € from national budget. Over 30% of the total budget (5.4 billion €) is planned to be used for support of the actions in Axis 2.

Good agricultural practice – fertilizer application in Germany in the scope of HELCOM recommendations by Dr Dietrich Schulz, Federal Environmental Agency, Germany

The HELCOM Convention specifies 6 recommended "regulations" in fighting the environmental pollution from agriculture. Basic principles are Best Environmental Practice (BEP) and Best Available Technology (BAT). **The entire territory of Germany is regarded as a nitrate vulnerable zone in the sense of the Nitrates Directive i.e. good agricultural practice is compulsory over the whole territory.**

Compliance with the regulations which is being monitored and strictly controlled in Germany refers to:

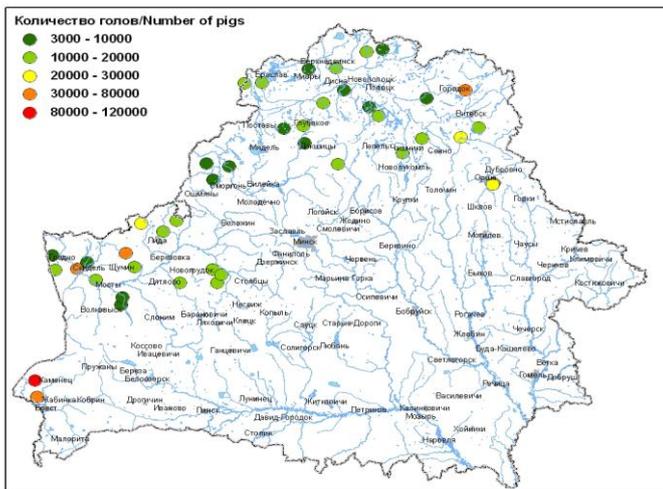
- Obligatory standards of application for natural and mineral fertilizers (max annual dose **170kg N/ha**).
- Compulsory book-keeping of nutrients and balance calculations.
- Tolerable N surplus (3 years average; surface balance; annual maximum 60 kg N/ha).
- Tolerable P₂O₅ surplus (6 years average, annual max 20 kg/ha).
- Animal density (N, P from manure per ha is limited)
- Construction of manure storage tanks – the capacity for **at least 6 months'** storage
- Winter crop cover (at least **40%** of a farmland must be covered with plants during the winter)
- Environmental permits for large cattle farms
- Education, information and extension service

Despite a significant reduction of both nitrogen and phosphorus input to surface waters during the last 20 years in Germany, good environmental status of all surface water bodies will not be reached by 2015.

Further efforts are needed in the field of greening agriculture to implement the motto „public money for public goods” in respect of both direct payments and rural development measures in the new CAP. Integration of environmental aspects and agricultural everyday practice should be CAP targets for 2013 – 19.

Industrial pig farms in Belarus – nutrients’ share in Baltic Sea catchment by Eugeniy Lobanov, Centre of Environmental Solutions, BL

Pork production is one of the most important fields of agriculture in Belarus. Annually, around 2.7 millions of pigs are bred in Belarus, and around 400 000 tonnes of pork were produced in 2008 with “the by-product” of 20–22 ml t of wastewater and manure.



Location of large-scale industrial pig farms

There are 56 large scale pig farms located in the Baltic Sea catchment part of Belarus ranging from 3000 to 108 000 of pigs (Brest, Grodno, and Vitebsk regions) There are only several large scale pig-farms (e.g. “Zapadnyi, “Severnyi”) which have effective systems of manure management and utilization, including biogas reactors. Most pig farms have significant negative environmental impact on the environment and water resources in the Baltic Sea catchment. They can be characterised as non-satisfactory, and require urgent attention from relevant governmental bodies. Manure treatment systems at majority of the plants are outdated and require repairing and modernization. Environmental monitoring systems for control are necessary.

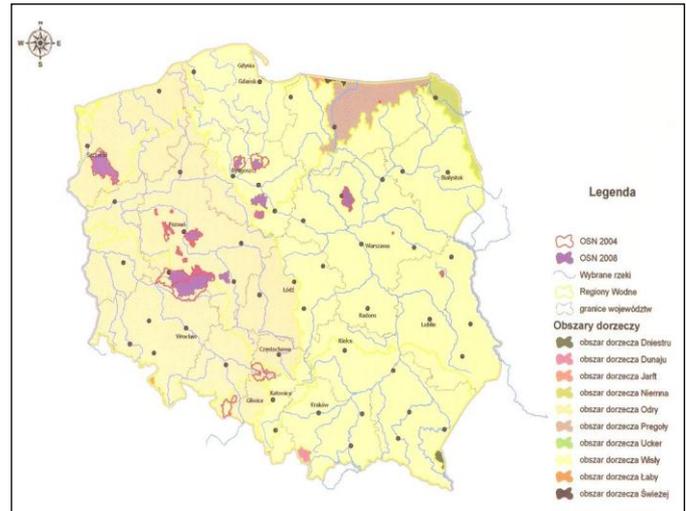


Transportation of liquid manure to the field, Vitebsk region

No exact data on actual nutrients run-off from pig farms are available in Belarus.

Managing agricultural farms in Nutrients Vulnerable Zones – limitations by K. Pastuszczak Regional Water Management Board in Wroclaw, PL
The so called “Nitrate Directive” 91/676/EWG oblige EU countries to list threatened waters and Nitrate Vulnerable Zones (NVZ) endangered by nitrates surplus from agricultural production.

The map below shows location of 19 NVZs in Poland



Nitrate Vulnerable Zones cover only 1.47% of Poland.

Farms located at NVZ are obliged to follow the rules:

- Observing the doses and methods of fertilization max. annual dose – 170 kg/ha (mineral and manure)
- Proper usage of land and agricultural practice improvements (setting-aside, catch crops)
- Proper storage of manure and green fodders (at least 6 months storage, manure plates)
- Farm records keeping (annual fertilizing plans, sale/purchase contracts for manure surplus)

Regional Inspectors for Environmental Protection carry out inspections of farms at NVZ (5% a year) and extension service specialists monitor the status of the farms.

The idea of nutrients’ recycling on farm level. The BERAS project experience by prof. Arthur Granstedt Biodynamic Research Institute in Järna, SE

The status of agriculture in Baltic Sea basement

South East BSR EU states characterised by:

- Nutrient extensive low load agriculture
- Small-scale diversified farms (partly Poland)
- Large unused areas (Latvia)
- Hotspots of large scale industrial farms (BL)



North West BSR EU states characterised by:

- Specialised high load agriculture
- Regions with specialised animal production (South Sweden, Denmark and Central – West Finland) based on imported fodder
- Regions with specialised crop production based on artificial fertilisers and use of pesticides

Warning:

- When the new EU states: Estonia, Latvia, Lithuania and Poland reach the same levels of nutrient surplus as Sweden, Finland and Denmark the total load to the Baltic Sea would increase by more than 50%, according to several studies (A.Granstedt).
- The existing serious environmental situation and the high risk for further deterioration have resulted in a comprehensive action program – BERAS.

BERAS Project

Baltic Ecological Recycling Agriculture and Society

The aim of the BERAS project was to build up a knowledge base and competence for a more sustainable life style within the whole agriculture and food sector.

The main conclusions from the BERAS actions 2003 -2006

- The main reason for the increased load of nitrogen and phosphorus from agriculture to the Baltic Sea is the specialization of agriculture with its separation of crop and animal production.
- Agriculture based on the principles of ecological recycling would, according to the results in the BERAS project, lead to a decrease in the calculated nitrogen leaching by half as well as a significant reduction in the loss of phosphorus. ERA farms strive to be self-sufficient in fodder production which in turn limits animal density.
- Local production, processing and distribution of food products from ecological recycling agriculture could diminish primary energy consumption and green house gas emissions compared to the current conventional food system.
- More vegetarian food consumption (75% less meat and 100% more vegetables) could decrease energy

consumption by 60% and green house gas emissions by 40 %.

- Economic studies at the farm level show higher production costs and consumption by 25% when environmental costs are included.

CONFERENCE

CONCLUSIONS AND RECOMMENDATIONS

1. Intensive conventional agriculture and large scale animal farms in particular, pose a most severe threat both for ground and surface waters, including Baltic Sea waters.
2. Introduce in all Baltic Sea Region mandatory regulations so all farms in the Baltic Sea catchment must develop Nutrient-Balanced fertilization plans on an annual basis (HELCOM requirement in Annex III – Pollution Prevention from Agriculture).
3. Limit over fertilization on all agricultural land in Baltic Sea catchment to a max. annual surplus of 60 kg N/ha.
4. Separation of crop and animal production on one hand generates the excessive amount of natural fertilizers and lack of possibilities of their utilization, and on the other hand – a need to use mineral fertilizers for plant production. In both cases the nutrient surpluses are leached out into surface waters.
5. Economic analyses at the farm level and agriculture sector should include both social and environmental costs (eutrophication and pesticide pollution, impoverished countryside, loss of biodiversity).
6. There are instruments within Common Agriculture Policy, (2nd Pillar *Rural Development Program* in particular) which contribute to nutrients' run-off minimization. (see page 2)
7. Designation of significant % of arable land as Nitrate Vulnerable Zones (NVZ) in the sense of the Nitrates Directive would minimize the pollution of water resources. All BSR countries should designate all its territories as NVZ to secure a good control of nitrogen leakages to waters.
8. Ecological Recycling Agriculture is based on the principles of nutrients' recycling balances of N and P. This system of agriculture seems to be the most effective so far as the limitation of water pollution is concerned. The principle of nutrient balanced fertilization should also be implemented within conventional farming in BSR.

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