

REPORT ON INDUSTRIAL SWINE AND CATTLE FARMING IN THE BALTIC SEA CATCHMENT AREA

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1. INTRODUCTION (Jakub Skorupski)

Intensive animal farming causes a number of hazards, which may have a negative impact on the Baltic Sea Region environmental conditions. The possible impact concerns all components of the environment: air, soil and – what is most important for the Baltic Sea – water (surface water, subsoil water, rainwater). The most troublesome sources of pollution are large commercial rearing farms with several thousand animals, which can be defined as “industrial”. Animal farms without bedding, most often used in pig production, usually create more nutrient pollution to water bodies¹. The impact therefore depends on the amount of animal production and the way of handling manure. Liquid manure is more concentrated than dung, which contains large amounts of solid matter and is produced by farms with bedding. Dung is, due to the lower concentration, considered to be more environmentally friendly. Industrial pig rearing farms with non-bedding production systems, produces large amounts of liquid manure which is a highly concentrated natural fertilizer with high level of mineralization and also contain microbiological pollution, which can lead to serious environmental risks in its raw form, mainly in the stages of storage, management and utilization².

The negative impact of (mainly pig) industrial rearing comprises³:

- **water pollution** – main danger related to agricultural usage of liquid manure is leakage of the nutrition microelements (like nitrogen and phosphorus) to the ground water and surfaces water, which causes **eutrophication** – of inland waters and sea water⁴;
- **microbiological pollution** – *Staphylococcus sp.*, fecal streptococci, *Escherichia coli*, rubella bacilli, tubercle bacilli, foot-and-mouth disease viruses, various fungi and parasites are microbes connected to the liquid manure produced by pig farming⁵; this kind of microbiological water pollution constitutes a sanitary danger;
- **air pollution** – the anoxic (without oxygen) fermentation of manure, produces such gases as ammoniac, hydrogen sulfide, carbonyl compounds, amines, mercaptans, dinitrogen monoxide etc. These gases causes offensive odours, danger for human health (e.g. pernicious effect on air-stream mechanism transformation of haemoglobin into hematine, plugged nose, lacrimation, headache, stress⁶);
- indirect and secondary effect that contributes to formation of **acid rain** and increased **greenhouse effect**.

Nowadays non-bedding industrial farming, usually one of the most harmful production types when it comes to the impact on the environment and human health, is being reduced and limited by numerous regulations aiming at minimizing their negative impact. Good examples of such regulations are *Council Directive 91/676/EEC of 12th December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (Nitrates Directive)*, *Council Directive 96/61/EC of 24th September 1996 concerning integrated pollution prevention and control (IPPC Directive)*, *BS EN 13725:2003 Air quality. Determination of odour concentration by dynamic olfaktometry* (standard of odour air quality of European Committee of Standardization) and also **Helsinki Convention** decisions and recommendations and **Baltic Agenda 21**. agricultural sector activities.

According to those legal acts, the minimization of manure damaging impact on the environment (its safe management), is conducted by following rules:

- periods when the land application of fertilizers is prohibited (the winter time),
- ban on application of fertilizer to steeply sloping ground, to water-saturated, flooded, frozen or snow-covered ground, near watercourses, water intake protection zones, water reservoirs, seaside resorts,

¹ Wojewódzki Inspektorat Ochrony Środowiska w Szczecinie. Analiza oddziaływania rolnictwa na środowisko wodne w województwie zachodniopomorskim. Potencjalne ograniczenia w rozwoju produkcji zwierzęcej. Szczecin 2005

Lysko A., Phd, Cyglicki R.. Report on agricultural pollution from industrial hog Rising farms In Poland. Szczecin 2004

² Wojewódzki Inspektorat Ochrony Środowiska w Szczecinie. Analiza oddziaływania rolnictwa na środowisko wodne w województwie zachodniopomorskim. Potencjalne ograniczenia w rozwoju produkcji zwierzęcej. Szczecin 2005

Lysko A., Phd, Cyglicki R.. Report on agricultural pollution from industrial hog Rising farms In Poland. Szczecin 2004

³ Lysko A., Phd, Cyglicki R.. Report on agricultural pollution from industrial hog Rising farms In Poland. Szczecin 2004

⁴ A Strategy for Ending Eutrophication of Seas and Coasts. Swedish Environmental Advisory Council Memorandum 2005:1. Stockholm 2005

Antonowicz A.. Report on polish industrial farming as a source of pollutions for the Baltic Sea. Szczecin 2006

⁵ Lysko A., Phd, Cyglicki R.. Report on agricultural pollution from industrial hog Rising farms In Poland. Szczecin 2004

⁶ <http://www.halat.pl/meatfactory.html> , Steinheider B. Environmental odours and somatic complaints. Zentralblatt für Hygiene und Umweltmedizin 202. 1999, Nimmermark S. Odour influence on well-being and health with specific focus on animal production emissions. Annals of agricultural and environmental medicine.11. 2004

- required of minimum capacity of manure storage constructions (6 months storage capacity) and its containment,
- procedures for the land application, including recommendations concerning soil conditions, nutrient content and type and slope, climatic conditions and irrigation, land use and agricultural practices, including crop rotation systems,
- the maximum amount of nitrogen in manure/fertilizers spread on fields during one year (170kg N per hectare per year), which ensure a balance between the amount of animals on the farm and the amount of land available for spreading manure (could be also expressed as animal density),
- the maintenance of a minimum quantity of fertilizer field's vegetation cover during rainy periods,
- requirement of incorporated manure as soon as possible after application on bare soil,
- the establishment of fertilization plans (information about the fertilization system and procedures used in particular farm),
- special regulations, related to reduction of water pollution from nitrogen compounds in nitrate vulnerable zones,
- elaboration of **Good Agricultural Practice Code**, which will include aforementioned requirements,
- taking into account **Best Environment Practice** (BEP) and **Best Available Techniques** (BAT), including techniques of manure fertilization, which reduce odour emission.

Nevertheless there is still a problem with transposition of those legal acts into the EU countries legislation and the lack of such regulations in non-EU-members in the Baltic catchment area.

There are also some general agricultural rules, which indicate biotechnological methods of manure utilization and refinement, having an effect in reduction of odour emission, mineralization of organic substance, methane (biogas) production, biological disinfection, purification by biological sewage treatment plant, etc. (by controlled fermentation, beneficial and effective microorganisms technology)⁷.

This Report is based on information collected in Belarus, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, Sweden and northwestern Ukraine. Each country charter is divided into five sections: statistical data (concerning data on big industrial pig (>2000 pigs) and cattle farms, and farms with 200 – 2000 pigs), management of fertilizer (information about manure utilization and storage, fertilization plans), transparency of integrated permit procedures, social, environmental and legal problems connected with industrial animal farming and pork trade data.

2. SITUATION OF INDUSTRIAL FARMING IN THE COUNTRIES OF THE BALTIC SEA CATCHMENT AREA

2.1. BELARUS (Eugeniy Lobanov)

2.1.1. Statistical data

2.1.1.1. Industrial pig farms

There are 107 large-scale industrial pig farms in Belarus (although not all of them are located in the Baltic catchment area⁸), including the following:

- 3 very large scale industrial pig farms – each on 108 000 places (Borisovskiy, Sozh, Belovezhskiy),
- 9 large scale industrial pig farms – each on 54 000 places,
- 43 large scale industrial pig farms – each on 24 000 – 27 000 places,
- 52 large scale industrial pig farms – each on 12 000 places.

⁷ Szymański M. Wykorzystanie fermentacji beztlenowej do unieszkodliwiania gnojowicy przed jej rolniczym wykorzystaniem. Warszawa 1998
Engler C.R., Jordan E.R., McFarland M.J., Lacewell R.D. Economics and Environmental Impact of Biogas Production as a Manure Management Strategy. Dallas 1997

Chantsavang S., Sinratchatanun C., Ayuwat K., Sirirote P. Application of Effective Microorganisms for Swine Waste Treatment Bangkok 1991

⁸ The Ministry of Foreign Affairs of the Republic of Belarus <http://www.mfa.gov.by/eng/publications/collection/guide/1024/5.htm>

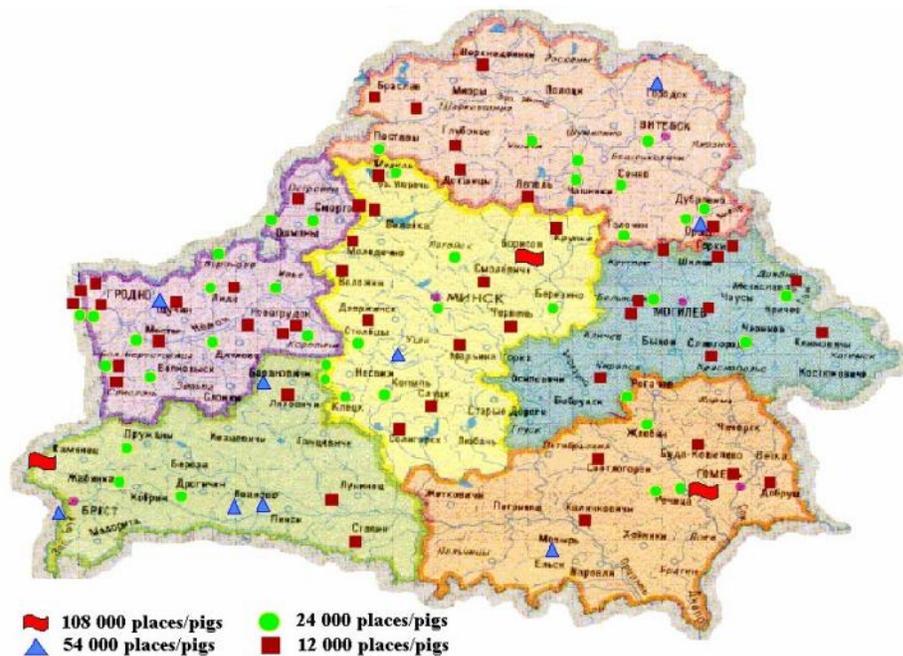


Fig. 1. Location of industrial large-scale pig farms in Belarus.

Industrial pig farms are responsible for 82% of all pigs in the country⁹. In 2003, the total livestock was about 3 322 300 pigs, of which 2 165 600 were to be found on pig farms. The same figures can be estimated for 2006¹⁰.

The total acreage of fertilization fields belonging to big farms (108 000 places and 54 000 places) is about 19 000ha¹¹.

National authorities, e.g. Ministry of Agriculture and Food keep the register of such plants, but there is no integrated permit system applied in Belarus. Nevertheless, pig farms are obliged to have permits for water consumption – every pig farm has to renew such permit on annual basis.

2.1.1.2. Pig farms with 200 – 2 000 animals

In 1990 there were 1 776 farms with 200 – 2 000 pigs in Belarus¹². In 2007 – according to some data – the number is 720¹³. The problem with smaller farms is that they are almost out of environmental control, as a result they constitute a significant source of water pollution.

There are no ecological pig farms in Belarus. However, some big farms are in the process of ISO 14000 certification.

2.1.1.3. Industrial cattle farms

There are 109 big industrial cattle farms, the number of cows per farm are ranging widely from 400 to 30 000¹⁴. The number of cows per 100ha of farmland is 50¹⁵. Cows are mainly reared in the northern and southern regions of Belarus, while pigs are mainly reared in central part of the country¹⁶.

2.1.2. The management of fertilizer

2.1.2.1. The manure utilization

The main method of manure management is spreading on agricultural lands as fertilizers. Annual quantity of manure drainage from big farms is about 35 000 000 – 40 000 000m³¹⁷. The manure is not sold to other farmers since there is no demand on the market – there is too much manure being produced. In Belarus there are no regulations on the quantity of manure spread annually; no requirements on weather conditions for the time of spreading, no requirements on storage capacity; nor are there any requirements on green cover on fertilized fields during wintertime¹⁸.

There are several examples of alternative solutions, which can be seen as pilot projects:

⁹ State Programme of Rural Revival and Development, Minsk 2006

¹⁰ Veterinary-sanitary arrangements for selection-hybrid centers and pig-breeding complexes. Ministry of Agriculture and Food, Minsk - 2003

¹¹ Teikin V.V. Pig-breeding in Belarus. The history of development. Minsk, 2003

¹² Teikin V.V. Pig-breeding in Belarus. The history of development. Minsk, 2003. p. 76

¹³ Kavgarenja A.N., Niedziółka I., Tanaś W. Research of resources savings a way of recycling of manure drains, http://www.pimr.poznan.pl/biul/2005_1_12KNT.pdf

¹⁴ State Programme of Rural Revival and Development, Minsk 2006

¹⁵ Magazyn Ogólnopolski Zagroda. Rolnictwo – chow bydła http://www.zagroda.atomnet.pl/arch/31/31_05.html

¹⁶ Magazyn Ogólnopolski Zagroda. Rolnictwo – chow bydła http://www.zagroda.atomnet.pl/arch/31/31_05.html

¹⁷ Tivo P.P., Environmental problems of big cattle breeding farms. News of Academy of Agricultural Sciences of Belarus, 4, 1994, pp. 60-65

¹⁸ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

- method of piscicultural-biological ponds (“Zapadniy” pig farm, 54 000 places) – the method presents a consecutive system of ponds with algae and fish which are further used for animals breeding;
- biogas production (“Zapadniy”) – the technology of methane production;
- production of grass-flour – the technology is quite expensive as it requires high energy consumption;
- bioengineering constructions (pig farm “Severnyi”) – the method involves water reservoirs with water plants which, after the vegetation period, are used as a local fuel.

2.1.2.2. Storage of the manure

The first step of manure storing is quarantine for 6 days to discover and treat possible infectious pathogens. Biological disinfections of the liquid fraction of the manure are organized by storing in open storage ponds for the period of 6 months – for spring-summer period (3.5 months for the solid fraction) or 9 months – for autumn period.

The country legislation obliges industrial pig farms to prevent burial of ammonia into water objects (*Instructions of Ministry of Natural Resources and Protection of the Environment, Water Codex of the Republic of Belarus*). The maximum permissible level of ammonium nitrogen is 2 mg/l (water objects with drinking water) and 0.5 mg/l (fish-farm water objects). There are no measures taken in order to minimize the ammonia emissions into the air.

2.1.2.3. The fertilization plans

Each big industrial pig farm has a fertilization plan. There are several methods of bringing manure onto agricultural land depending on: chemical composition of manure, soil-melioration and climate conditions of the given territory, hydro-geological condition and mechanical possibilities.

General information about the fertilization technology can be quite easily found. Detailed information about procedures used in particular farms is more difficult to obtain and can be obtained only upon permission of senior management of the farm.

National legislation does not require a reduction ammonia emissions. The situation is that land users have maximum permissible levels for ammonia and they have to comply with these levels, e.g. to limit the quantity and concentration of manure.

Spreading of the manure is allowed during all weather conditions. It is not recommended to spread manure during wintertime; however, some farms do, as it is more convenient from practical point of view. Generally, there are no obligatory provisions, only technical recommendations.

2.1.3. Social, environmental and legal problems

There are some problems faced by local people near industrial pig farms (pollution of the environment, stench). There is some data proving a link between industrial pork production and certain illness.

Based on the location of some industrial farms in relation to water objects, their influence on the environment can be estimated, e.g. the pig farm “Yuzhnyi” in Pinsk district (54 000 places) is located close to food-plain territories.

2.1.4. Pork and beef trade

In 2005, Belarusian farmers produced 345 247 tons of pig meat and 247 013 tons of cattle meat¹⁹. 14 517 tones of pork and 43 795 tones of beef are exported from Belarus, while 28 133 tones of pig meat are imported to the country²⁰. All countries around the Baltic Sea are trade partners, but mainly Russia, Poland, Lithuania, Latvia, and Estonia²¹.

2.2. DENMARK (Jakub Skorupski)

2.2.1. Statistical data

13 000 pork farms are currently operating in Denmark (7% of all farms)²². The specialisation in animal production follows an East-West division of Denmark, with the biggest density of pig farms in the

¹⁹ FAO The Statistic Divison <http://www.fao.org/es/ess/>

²⁰ FAO The Statistic Divison <http://www.fao.org/es/ess/>

²¹ BelGazeta, 39, 02.10.2006 <http://www.belgazeta.by/20061002.39/040200091>

²² <http://www.eurofound.europa.eu/eiro/2005/09/study/tn0509101s.html>

The Ministry of Science, Technology and Innovation <http://www.workindenmark.dk/Denmark/0/4/0>

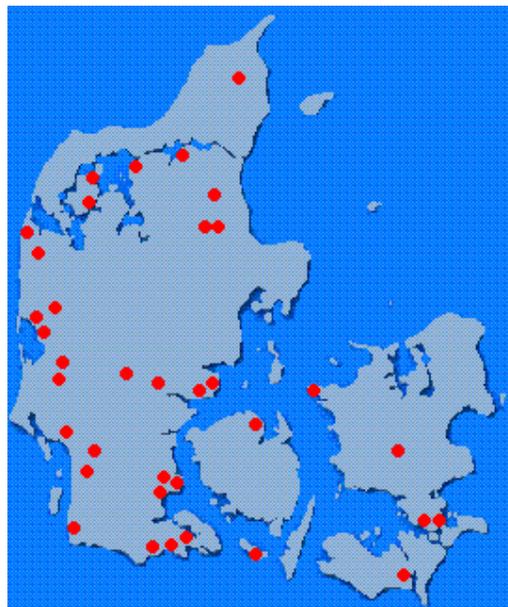
eastern part of the country (Zealand, Lolland, Falster, Funen), and northern part of Jutland Peninsula (the County of North Jutland, county of Aarhus, the county of Viborg – where there are 17 930 farms²³), whereas the biggest cattle and dairy farms are to be found in the main and western part of Jutland. The total livestock of pigs is 25 500 000²⁴.

This is not good news for the Baltic Sea bordering the Danish coastlines. The Baltic Sea becomes a drainage area for the surplus of nutrient from intensive pig farming at increasingly bigger farms, primarily based in the eastern part of Denmark.

The European Pollutant Emission Register (EPER) include 36 industrial swine farms located in Denmark²⁵.

In 2002, Denmark counted 364 organic pig farms, representing 23.2% of all Danish farms²⁶.

Fig. 2. Location of industrial pig farms in Denmark (red dots).



2.2.2. The management of fertilizer

2.2.2.1. The manure utilization

The manure is mainly spread on the fields. The *Harmony Rules* limits the amount of manure that can be worked into the soil and regulates the maximum number of livestock units allowed per hectare (for pigs 1.4). Solid manure can be spread all year around while liquid manure cannot be spread from the time of harvest until February 1st. There are also regulations on the minimum percentage of green cover in the winter period²⁷.

Environmental rules set limits to the number of pigs that can be produced by an individual herd. A balance between the number of animals and the land available on which to spread natural fertilizers is required. The local authorities must approve any expansion of pig production²⁸.

An *Action Plan for Reducing Ammonia Volatilization from Agriculture* has been published in Denmark in 2001. According to this document the reduction of ammonia emissions should be conducted by covers on stores of solid manure that were not in daily use, covers on slurry containers on livestock holdings, a ban on surface spreading, a reduction in the time that applied manure was allowed to remain on the ground surface, a ban on ammonia treatment of straw and limiting local ammonia volatilization from livestock in the vicinity of vulnerable natural habitat types²⁹.

The production of biogas is a well-established technological practice – there are 20 centralised biogas plants and over 35 farm-scale biogas plants in Denmark³⁰.

Industrial farming is not necessarily the biggest enemy of the environment. With the application of the latest technology and agricultural innovation they may move towards a production where it is possible to have nutrient input and output as much under control as in other branches of industrial production.

2.2.2.2. Storage of the manure

According to the *Harmony Rules*, the manure storage capacity should normally be at least 9 months, however less capacity is accepted for grazing animals³¹.

²³ EUROSTAT <http://forum.europa.eu.int/irc/dsis/regportraits/info/data/en/index.htm>

²⁴ Rolnictwo i przemysł rolno-spożywczy w Danii. Polish Ministry of Economy <http://www.eksporter.gov.pl/ppe/informacje/podglad?akcja=wyswietl&idWersjiJęzykowej=31979>

²⁵ European Pollutant Emission Register (EPER) <http://eper.ec.europa.eu/eper/>

²⁶ Danish Plant Directorate, 2002 http://www.sinab.it/sezioni/sint/allegati_sint/22/StatsDK2.pdf

²⁷ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

Danske Slagterier, the Danish Bacon & Meat Council (DBMC) http://www.danskeslagterier.dk/smcms/Danske_Slagterier_UK/The_Danish_Pigmeat/22_9_mill_pigs/Index.htm?ID=3390

²⁸ Danske Slagterier, the Danish Bacon & Meat Council (DBMC) http://www.danskeslagterier.dk/smcms/Danske_Slagterier_UK/The_Danish_Pigmeat/22_9_mill_pigs/Index.htm?ID=3390

²⁹ DRAFT 2006 REVIEW OF STRATEGIES AND POLICIES FOR AIR POLLUTION ABATEMENT. United Nations Economic Commission for Europe. Geneva 2006

³⁰ Raven R.P.J.M., Gregersen K.H. Biogas plants in Denmark: successes and setbacks. *Renewable and Sustainable Energy Reviews*. 11. 2007

Denmark had established codes of agricultural practice aimed at reducing ammonia emissions. The slurry systems with a pen with a partly slatted floor (BREF 4.6.3.4) have been applied and have caused a reduction in ammonia emissions by 34%³².

2.2.2.3. The fertilization plans

The fertilization plan must be prepared for all farms over 10 ha prior to the start of the next harvest year. It must be kept for 5 years and approved by the Danish Plant Directorate. Farmers have to calculate the amount of nitrogen in fertilizers used on the farm (the regulations also effect phosphorus application)³³

2.2.3. Transparency of integrated permit procedures

According to the *Aarhus Convention*, the *Environmental Impact Assessment Directive* and the *IPPC Directive* public authorities are obliged to enable citizens and environmental organizations to comment on, proposals for projects affecting the environment, including submitted application and IPPC permits³⁴.

2.2.4. Social, environmental and legal problems

There are some social problems connected with offensive odour from intensive breeding farms, and there has also been protests concerning animal welfare on such farms.

2.2.5. Pork and beef trade

In 2005 Danish farmers produced 1 869 000 tons of pork. Three-quarters of this production was exported (7% of Denmark's total annual export), which makes Denmark the world's largest exporter of pig meat³⁵. In last few years there has also been a significant increase in export of live pigs (piglets mainly)³⁶.

151 000 tones of beef and 4 600 000 tons of cow milk were produced in Denmark in 2005, which prove that milk production is the best developed part of Danish cattle production sector³⁷.

In 2004 1 173 341 tons of pork, 2 495 938 pigs and 39 161 tons of beef were exported from Denmark. In the same year Denmark imported 43 722 tones of pig ment and 41 609 tons of beef³⁸.

The main trading partners for Danish export of pork in the Baltic Sea Region are Germany and Russia³⁹.

2.3. ESTONIA (Maret Merisaar)

2.3.1. Statistical data

2.3.1.1. Industrial pig farms

There are 346 500 pigs in Estonia, including 16 600 sows and hogs in productivity control⁴⁰. Information and Technology Center at the Ministry of Environment keeps the database of IPPC licenses and information on industrial pig farms can be found there. There are two farms with registered IPPC licenses in the database – Põlva Peekon OÜ, Tsooru Pig Farm in Võru County, with 54 000 piglets and 4 500 pigs per year; and Linnamäe Peekon OÜ, Sigala in Lääne County with 192 places for sows with pig-

³¹ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

³² Standard Farming Installation Rules and Guidance for Pig Rearing Environment and Heritage Service Industrial Pollution and Radiochemical Inspectorate. Belfast 2006

³³ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

³⁴ Basse E. M., PhD. "Comparative Metropolitan Growth Management Law – European and Danish law" a course at Georgia State University. Aarhus 2005

³⁵ Danish Agricultural Council <http://www.landbrugsraadet.dk/view.asp?ID=853>

The Danish Pigmeat Industry http://www.danskeslagterier.dk/smcms/Danske_Slagterier_UK/The_Danish_Pigmeat/Index.htm?ID=1080

FAO The Statistic Divison <http://www.fao.org/es/ess/>

³⁶ http://www.nipress.com.pl/index.php?option=com_content&task=view&id=26&Itemid=30&limit=1&limitstart=1

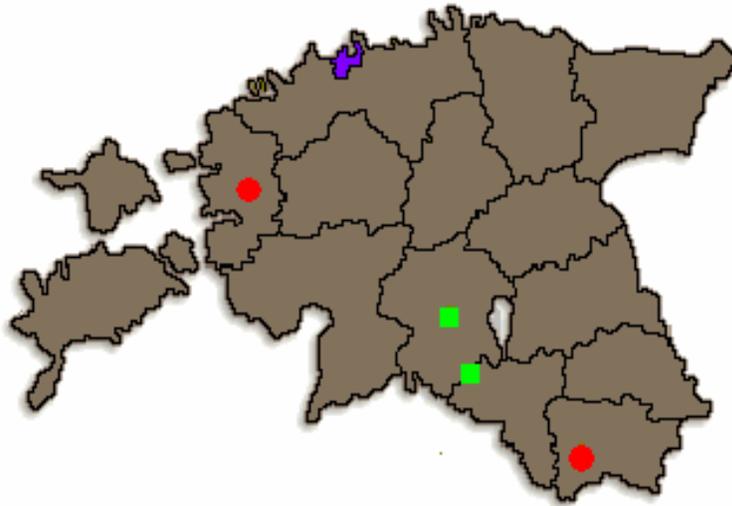
³⁷ FAO The Statistic Divison <http://www.fao.org/es/ess/>

Pierwszy Portal Rolny. Rynek wolowy, 2003 <http://www.ppr.pl/artykul.php?id=50676>

³⁸ FAO The Statistic Divison <http://www.fao.org/es/ess/>

³⁹ The Danish Pigmeat Industry http://www.danskeslagterier.dk/smcms/Danske_Slagterier_UK/The_Danish_Pigmeat/Index.htm?ID=1080

⁴⁰ Estonian Official Statistical Database



lets, 48 places for pregnant sows, 2 050 weaning piglets and 3 970 fattening pigs (in European Pollutant Emission Register there are two others Estonian swine farms)⁴¹.

Fig. 3. Location of industrial large-scale pig farms in Estonia (red dots – national register, green dots – EPER register).

2.3.1.2. Industrial cattle farms

The total number of cattle is 265 200, including 113 100 dairy cows (669 800 tons of milk produced in 2005)⁴². Estonia has voluntarily taken an obligation to apply the *IPPC Directive* also on

cattle farms with more than 300 AU. These IPPC licences cannot be found on the database today (deadline for implementing the *IPPC Directive* is October 2007).

2.3.2. The management of fertilizer

2.3.2.1. The manure utilization

Slurry from industrial farms is used as fertilizer on arable lands. There have been attempts to produce biogas from the slurry (an Estonian Danish joint venture in Viljandi County, Viiratsi) and today there is a case on Island Saaremaa, where the slurry is to be treated until it meets the requirements of purified wastewater. The latter case is not successful in practice although the official data (registered parameters) show that everything is in order. Estonian law regulates the maximum number of livestock units allowed per hectare – 2.0 (1.5 in vulnerable zones). There is also a ban on winter manure spreading⁴³. In Estonia, *Governmental Order No 57 from 27 February 2004: "Requirements for water protection from handling and storage of silage, manure and fertilizers"* is in force. Main notices of this legal act says that manure storage must comply with environmental protection standards by the end of 2008 in Nitrate Vulnerable Zone (NVZ), and by the end of 2009 in all other areas (NVZ covers 160 000ha of arable land or 10% of Estonian territory). There are also some subsidies for constructing the manure storages, which are based on AU⁴⁴.

2.3.2.2. Storage of the manure

Manure is stored in large tanks that are covered to protect the volatilization of ammonia. The required storage capacity is 8 months in case the farm has more than 10 AU.

2.3.2.3. The fertilization plans

Industrial farms possess fertilization plans and this information is a part of the IPPC license.

2.3.3. Transparency of integrated permit procedures

The legal background following the *Arhus Convention* allow the general public and the NGOs to participate in the licensing of industrial pig farms is being obeyed. Authorities do announce opening of permitting procedures and the documentation is available. It is also possible to go to court in case one considers his or her public rights for a clean environment (air without smell) to be violated. In practice, no pig farms have been left without a permit because of a court case. One certain court case can be mentioned – in Viiratsi. It was initiated by local village inhabitants as the Green Movement did not want to interfere. Estonian Fund for Nature has been more helpful in similar cases (pig farms) as they have a unit providing free legal environmental advice for the public.

All information regarding IPPC-plants is public, including the fertilization plans.

⁴¹ http://klis.envir.ee/klis/per/view_doc?doc_id=37564

European Pollutant Emission Register (EPER) <http://eper.ec.europa.eu/eper/>

⁴² Estonian Official Statistical Database

⁴³ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

⁴⁴ Merisaar M. Industrial farms in Estonia. Estonian Green Movement. CCB Water Policy Officer. Tallinn 2006

2.3.4. Social, environmental and legal problems

The most important social problems, connected with industrial farming in Estonia, are related to odour pollution. There are also problems with poultry farms (Tamsalu Veskid) and cattle farms (OÜ Estonia) with more than 300 AU, located in the Nitrate Vulnerable Zone.

2.3.5. Pork and beef trade

Production of pork is the second most important branch of livestock husbandry after milk production in Estonia. Pork production increased by 1.9% and the average price paid for it was 22.6 EEK in the second half of the year 2006 in Estonia. The market situation for pork has been stable due to private storing and limitations to import from outside EU. The total number of pigs has decreased with 9 400 animals in 6 months (the number of pigs in end of June 2006 was 344 900), the amount of pork produced in 2005 was equal to 42 813 tons⁴⁵. In 2004 10 778 tons of pig meat, and 37 071 live pigs, were exported. 11 355 tons of pork were imported⁴⁶. Export of pig meat products is growing⁴⁷. The trade partners for pork and live pigs for fattening are Russia, Lithuania and Poland.

2.4. FINLAND (Jaana Marttila)



2.4.1. Statistical data

2.4.1.1. Industrial pig farms

Industrial pig rearing is not well developed in Finland. According to European Pollutant Emission Register there are 18 Finnish Industrial pig farms⁴⁸.

There are 58 farms rearing more than 999 pigs (min. 50kg) which produce almost 79 000 pigs (min. 50kg) per year. On average each farm has 1 360 places for pigs. There are also 21 farms with more than 799 places for sows. The total number of sows equal 23 000 giving 1 079 pigs per farm on average (2005)⁴⁹.

2.4.1.2. Pig farms with 200 – 2 000 animals

There are 744 farms in Finland rearing 199 up to more than 1 000 pigs over 50kg⁵⁰. The total number of pigs was 1 401 100 in 2005⁵¹. The density of livestock is different in different parts of Finland – although it is highest in the south-western and western parts (pigs, chicken, dairy cows, fur animals).

Fig. 4. Location of large-scale swine farms in Finland (black dots).

2.4.2. The management of fertilizer

2.4.2.1. The manure utilization

Usually manure is spread on the fields. The maximum allowed amount of manure per hectare per year is 30 tones⁵². The average area of arable land in 2005 was 55.05ha per pig farm (pig husbandry)⁵³. The information about average area of arable land for large-scale pig farms is not publicly available.

⁴⁵ FAO The Statistic Divison <http://www.fao.org/es/ess/>

⁴⁶ FAO The Statistic Divison <http://www.fao.org/es/ess/>

⁴⁷ Martin Pretko. Bureau on Market Analyses of the Ministry of Agriculture. Overview on Meat Industry in 2006. (in Estonia) www.agri.ee/index.php/1510

⁴⁸ European Pollutant Emission Register (EPER) <http://eper.ec.europa.eu/eper/>

⁴⁹ Yearbook of Farm Statistics 2006

⁵⁰ Yearbook of Farm Statistics 2006

⁵¹ Yearbook of Farm Statistics 2006

⁵² Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

⁵³ Yearbook of Farm Statistics 2006

There are recommendations on the spreading of manure in order to reduce ammonia emissions. If the manure is spread in the soil surface, it should be worked (by ploughing, for example) into the soil within 4 hours (according to the nitrate decree, which is based on the *Nitrates Directive*). Manure spreading is not usually allowed between 15th October and 15th April. Dry field spreading is allowed until 15th November and from 1st April⁵⁴.

Selling or giving away the manure is allowed. The biogas production and energy production are in use, however it is not popular.

Best Available Techniques document is available in Internet⁵⁵ and upon request from Ministry of Agriculture and Forestry and Ministry of the Environment in both Finnish and Swedish languages.

2.4.2.2. Storage of the manure

Manure must be stored in storage with closed bottom. The minimum level for storing capacity is 12 months. The legislation in Finland does not oblige farms' owners to reduce ammonia emissions. Emissions reducing measures are only recommended.

2.4.2.3. The fertilization plans

Large-scale farms are obligated to possess the fertilization plans. If the fertilization plans are included to the integrated permit's applications, the information is available. Yet the information about the fertilization systems and amounts of fertilization are not always accessible.

2.4.3. Transparency of integrated permit procedures

In Finland all industrial farms have environmental permits/licenses. The environmental permits are issued for the farms rearing more than 60 sows or 210 pigs.

Individuals, NGOs, neighbours and other interested parties can take part in environmental permit/licence process. However it is difficult to find information about particular "environmental permit" administrative procedure.

2.4.4. Social, environmental and legal problems

The most significant problem connected with industrial farming is unpleasant odor and the eutrophication of waters

2.4.5. Pork and beef trade

In 2005, Finland produced 198 400 tones of pork and 93 280 of cattle meat⁵⁶. According to the Yearbook of Farm Statistics 2006, the import of pork was 9 929 000kg in 2005, and export – 36 257 000kg. In 2004, 6 474 tones of beef were imported⁵⁷. The main trade partners are EU countries and Russia.

2.5. GERMANY – Schleswig-Holstein and Mecklenburg-Vorpommern

(Jakub Skorupski)

2.5.1. Statistical data

Germany is the leading European country in respect to the number of breeding pigs – 26 858 000 (2 542 000 breeding sows and 10 664 000 fattening pigs). In 2005, the total livestock of cattle was 13 035 000 heads (4 236 000 dairy cows)⁵⁸. The livestock density is equal to 90 heads of cattle and 150 pigs per 100ha of farmland⁵⁹. There are 88 700 pig farms, and 183 400 cattle farms⁶⁰. 4.1% of the cattle,

⁵⁴ *Nitrates Directive* and nitrate decree of Finland

⁵⁵ www.mmm.fi, www.ymparisto.fi

⁵⁶ FAO The Statistic Division <http://www.fao.org/es/ess/>

⁵⁷ FAO The Statistic Division <http://www.fao.org/es/ess/>

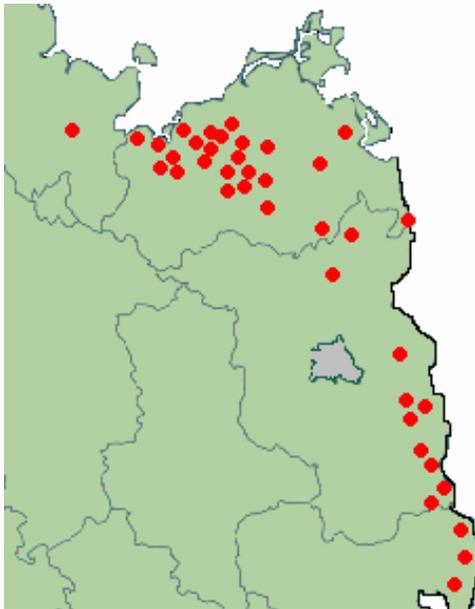
⁵⁸ Industrial relations in agriculture <http://www.eurofound.europa.eu/eiro/2005/09/study/tm0509101s.html>

Farming and Forestries in Germany. Federal Ministry of Food, Agriculture and Consumer Protection. Berlin 2006

⁵⁹ Magazyn Ogólnopolski Zagroda. Rolnictwo – chow bydła http://www.zagroda.atomnet.pl/arch/31/31_05.html

Wojewódzki Inspektorat Ochrony Środowiska w Szczecinie. Analiza oddziaływania rolnictwa na środowisko wodne w województwie zachodniopomorskim. Potencjalne ograniczenia w rozwoju produkcji zwierzęcej. Szczecin 2005

⁶⁰ Farming and Forestries in Germany. Federal Ministry of Food, Agriculture and Consumer Protection. Berlin 2006



and 2.6% of the pigs, are located in Mecklenburg-Vorpommern. The region account for 4.8% of the national milk production, and 1.8% of the meat production⁶¹.

In the Baltic Sea river basin area, there are about 39 large-scale pig farms (25 farms in Mecklenburg-Vorpommern, 1 in Schleswig-Holstein, 10 in Brandenburg and 3 in Sachsen)⁶².

In Schleswig-Holstein Federal State there are 466 organic farms with 31 423ha of fields, and in Mecklenburg-Vorpommern Federal State there are 662 farms⁶³.

Fig. 5. Location of industrial large-scale pig farms in North-East Germany (red dots).

2.5.2. The management of fertilizer

The manure is normally spread on fields as fertilizers. According to the *Ordinance on Fertilizing (Düngeverordnung)*, fertilizer balances must be prepared and fertilizers must be applied according to the plant requirements. The upper limit for average manure application is 170kg nitrogen per ha, except on grassland where 230kg nitrogen per ha is allowed under certain conditions⁶⁴. Spreading of manure in winter is prohibited, but there are no requirements on green cover of fields during winter-time⁶⁵.

The *Ordinance on Fertilization* includes regulations concerning BAT (*Best Available Techniques*), storage facilities and equipment for spreading animal manure, reduction of ammonia volatilisation from dungy furls, maximum amount of nitrogen contained in manure to be spread on farmlands, maximum quantity of nutrients to be applied according to the crop requirements and nutrient availability and restrictions on fertilization depending on time of the year.

Germany has also established *Code of Good Agricultural Practice for the Reduction of Ammonia Emissions*. The Common programme for the improvement of the agricultural structure (GAK), which is a part of the German Implementation of the *Council Regulation No 1257/1999*, and the *Strategy for Sustainable Development*, promotes the reduction of nutrient losses from agricultural sources⁶⁶.

The first biogas plants for the digestion of animal manure were constructed in Germany in the middle-eighties last century⁶⁷. Nowadays there are about 4 500 agricultural biogas plants⁶⁸.

2.5.3. Transparency of integrated permit procedures

The IPPC application must describe the characteristics of the project, including production and pollution data, environmental sensitivity, the possible environmental effects. The permit procedure is simplified for smaller farms⁶⁹.

The society and NGOs can participate in integrated permits procedure.

At the federal level, the *Environmental Information Act* gives the public access to environmental data kept by federal authorities. However access to environmental emission data is more difficult in Germany than in countries with a centralised system of government, because of the split of responsibilities between different authorities and the separate sets of legislation between Länder. The Federal Environmental Agency collects/compiles environmental pollution data from the different Länder registers⁷⁰.

⁶¹ EUROSTAT http://forum.europa.eu.int/irc/dsis/regportraits/info/data/en/de8_eco.htm

⁶² Startseite des Pollutant Release and Transfer Register (PRTR) <http://www.eper.de/>

⁶³ Organic Agriculture in Germany in 2005. Federal Ministry of Food, Agriculture and Consumer Protection http://www.bmelv.de/cln_044/nm_749980/EN/05-Agriculture/OrganicFarming2005Table1.html__nnn=true

⁶⁴ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

⁶⁵ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

⁶⁶ More specific targets for reduction of nutrient pollution load from Germany to the Baltic Sea. Helsinki Commission. Riga 2003

⁶⁷ Farm-scale biogas plants. Krieg & Fisher Ingenieure GmbH. Goettingen

⁶⁸ Farm biogas systems in Germany <http://www.manuremanagement.cornell.edu/Docs/Farm%20Biogas%20Systems%20in%20Germany.pdf>

⁶⁹ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

⁷⁰ Altenschmidt S., Viatte M. A. Pollution registers. The Scottish Parliament. The Information Centre. Edinburgh 2002

According to *Regulation No 166/2006 concerning the establishment of a European Pollutant Release and Transfer Register* Germany has published suitable data on the Internet⁷¹. This system ensures public access to environmental data.

2.5.3. Social, environmental and legal problems

In Germany there are still many complaints from the public, connected to odour emissions from farms. In the *Guideline on Odour in Ambient Air*, which is an odour regulation in Germany, there are limitations on odour frequency per year. Odour air quality standards are based on investigations of the relationship between odour load and community annoyance reaction⁷².

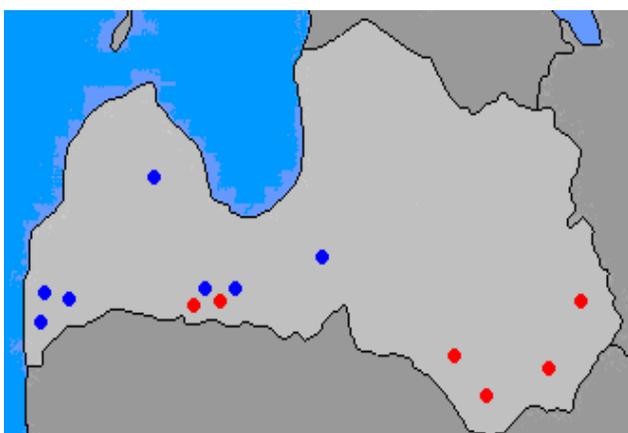
2.5.4. Pork and beef trade

Germany produced 4 275 000 tons of pork in 2005, and are one of the biggest pork exporter in Europe (22% of EU pork production). In the same year German farmers produced 1 230 000 of cattle meat⁷³.

In 2004, 623 045 tons of pig meat and 374 116 tons of beef, were exported. 842 465 tones of pig meat and 119 607 tones of beef were imported⁷⁴.

Live pigs are mainly imported from Denmark while German pork is mainly exported to Poland⁷⁵.

2.6. LATVIA (Aiva Balcere)



2.6.1. Statistical data

2.6.1.1. Industrial pig farms

Pigs are one of the main types of livestock in Latvia.

There are 5 big industrial IPPC-farms in the official database of Latvian Environment State Bureau⁷⁶, and 7 farms with places for 2 800 to 25 000 pigs. These farms produces from 12 000 to 82 000 pigs per year, and are subject to the Environmental Impact Assessment (EIA) process⁷⁷. National authorities keep database of such installations.

Fig. 6. Location of “EIA” (blue dots) and “IPPC” (red dots) large-scale pig farms in Latvia.

2.6.1.2. Pig farms with 200 – 2 000 animals

In 2005 there were 427 918 pigs in Latvia. 47 426 animals were bred on 98 farms with places for 200 – 1 999 places⁷⁸. In 2002 24 farms had more than 1 000 pigs but 99% of farms had less than 50 pigs per farm⁷⁹.

⁷¹ <http://www.eper.de/>, Greater transparency about industrial pollutant emissions in the EU. Federal Environment Agency. <http://www.umweltbundesamt.de/uba-info-presse-e/2006/pe06-010.htm>

⁷² Sucker K., Both R., Winneke G. Adverse effects of environmental odours: reviewing studies on annoyance responses and symptom reporting. *Water science and technology*. 44. 2001

Both R., Sucker K., Winneke G., Koch E. Odour intensity and hedonic tone--important parameters to describe odour annoyance to residents? *Water science and technology*. 50. 2004

⁷³ Portal informacyjny o Niemczech http://213.77.105.135/winfonyemcy/2_gosp/3_struk_gosp/01_branze_gosp/3_rolnictwo.asp?navid=112

FAO The Statistic Divison <http://www.fao.org/es/ess/>

⁷⁴ FAO The Statistic Divison <http://www.fao.org/es/ess/>

⁷⁵ EU Livestock and Products Semi-Annual 2005 <http://www.thepigsite.com/articles/7/markets-and-economics/1291/eu-livestock-and-products-semiannual-2005>

⁷⁶ <http://www.vidm.gov.lv/ivnvb/ivnvbe.htm#ippc>

⁷⁷ http://209.85.135.104/search?q=cache:W5xD1J8dggAJ:www.ccb.se/seminars/documents/intensive_farms_Latvia.ppt+Ltd.+NYGAARD+INTERNATIONAL+latvia&hl=pl&ct=clnk&cd=1&gl=pl

⁷⁸ Agriculture and Rural Area of Latvia. Ministry of Agriculture Republic of Latvia. Riga 2006

⁷⁹ “Water For Food and Environment” National Dialogue Report, Latvia, 2002 http://www.vvi.gov.lv/gwp/doc/wat_f_f_env_s.html

There are no organic pig farms in Latvia, as there are no certified slaughterhouses for pigs.

2.6.1.3. Industrial cattle farms

The total livestock of cattle is 291 600 (110 400 dairy cows)⁸⁰, and there are 26 industrial cattle farms (>250 AU) in Latvia⁸¹.

2.6.2. The management of fertilizer

Manure is usually spread on land. In the vulnerable zones 6 months storage capacity is required for farmyard manure, and 7 months for slurry. Manure may not be spread from November 15th to March 1st. The maximum livestock density is 1.7 AU per hectare in vulnerable zones (2.1ha until 2008)⁸². The ban on manure spreading during wintertime is obligatory only in Nitrogen Vulnerable Zones⁸³. There are 4 large farms, with 250 AU, located within the water body area. 3 of them (Riga district) are obliged to comply with the Nitrates Directive regulations (minimum AU density per 1ha of available agricultural land, minimum construction requirements to manure storage facilities, the conditions of *Good Agricultural Practice Code*)⁸⁴.

Latvia has adopted the *Cabinet of Ministers Regulations On the Protection of Water and Soil Against Pollution Caused by Nitrates from Agricultural Sources* in order to implement the requirements of *Nitrates Directive*.

2.6.3. Transparency of integrated permit procedures

According to *Cabinet of Ministers Regulations "Regulations on the procedure for the notification of category A, B and C polluting activities and issuing category A and B permits"* (no 294 09.07.2002.) the authorities announce opening the integrated permit procedure. There is also possibility of comment on submitted applications. The permits are also available⁸⁵.

2.6.4. Social, environmental and legal problems

The main social problem connected with industrial pig farming concerns unpleasant odour emitted from farms. There is also problem with pig and cattle industrial farms located in Nitrate Vulnerable Zones⁸⁶.

2.6.5. Pork and beef trade

34 238 tones of pork and 20 811 tones of beef were produced in Latvia in 2005. One year earlier 14 832 tones of pig meat were imported to the country⁸⁷.

The main trade partners (export and import of pork and pigs) in the Baltic Sea Region are Lithuania, Poland and Belarus.

2.7. LITHUANIA (Renaldas Rimavicius)

2.7.1. Statistical data

There are 16 industrial pig farms in Lithuania according to the European Pollutants Emission Register (EPER). There are 80 farms with more than 2 000 pigs, rearing around 500 000 pigs per year.⁸⁸ In 2003 there were 98 farms with 200 – 1 000 pigs. The total livestock of cattle is 838 800⁸⁹.

⁸⁰ Berke D. Cattle, pig and sheep breeding in Latvia <http://www.fao.org/DOCREP/006/AD250E/ad250e0d.htm>

⁸¹ The Baltic Agricultural Run-off Action Programme http://images.google.pl/imgres?imgurl=http://www.baap.lt/nitrate/latvia/lat_fig04.gif&imgrefurl=http://www.baap.lt/nitrate/latvia/chap_3.htm&h=368&w=572&sz=74&chl=pl&start=5&tbnid=b-Qih_Kz4cldGM:&tbnh=86&tbnw=134&prev=/images%3Fq%3Dlatvia%2Bintensive%2Bpig%2Bfarms%26gbv%3D2%26svnum%3D10%26hl%3Dpl%26sa%3DG

⁸² Henriksson A., Miljökonsulter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

⁸³ Henriksson A., Miljökonsulter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

⁸⁴ "Water For Food and Environment" National Dialogue Report, Latvia, 2002 http://www.vvi.gov.lv/gwp/doc/wat_f_f_env_s.html

⁸⁵ Environment State Buremu <http://www.vidm.gov.lv/ivnvb/Eippe.htm>

⁸⁶ The Baltic Agricultural Run-off Action Programme http://images.google.pl/imgres?imgurl=http://www.baap.lt/nitrate/latvia/lat_fig04.gif&imgrefurl=http://www.baap.lt/nitrate/latvia/chap_3.htm&h=368&w=572&sz=74&chl=pl&start=5&tbnid=b-Qih_Kz4cldGM:&tbnh=86&tbnw=134&prev=/images%3Fq%3Dlatvia%2Bintensive%2Bpig%2Bfarms%26gbv%3D2%26svnum%3D10%26hl%3Dpl%26sa%3DG

⁸⁷ FAO The Statistic Divison <http://www.fao.org/es/ess/>

⁸⁸ Lithuanian Pig Producers Association (http://www.kiaules.lt/main.php?page_id=2)

⁸⁹ Lithuanian Department of Statistics, 2007 <http://www.stat.gov.lt/en/pages/view/?id=1450&PHPSESSID=b240be7452096cffe2600ebd5de94d0>

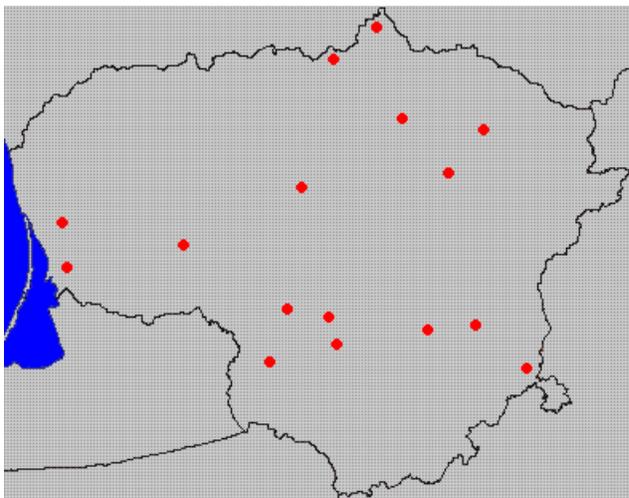


Fig. 7. Localization of Lithuanian pig farms registered in EPER (red dots).

2.7.2. The management of fertilizer

2.7.2.1. The manure utilization

The manure is usually spread on land. Only one farm (in Lekeciai) has biogas production. The animal density is regulated and cannot exceed 10 sows per 4.5 ha, or 10 porkers per 0.95ha. Manure fertilization is allowed between 1st of April until 1st of December. It is not allowed to fertilize in case the fields soggy, frozen, or covered with snow. Liquid manure shall be worked into the soil within 12 hours after application⁹⁰. Farms keeping more than 200 AU, using liquid manure for watering of crop fields, are obliged to monitor drainage and surface water⁹¹.

2.7.2.2. Storage of the manure

The storage capacity must allow for 8 months storing, and 10 months if the storage containers are located in the coastal zone.

2.7.2.3. The fertilization plans

The large-scale farms are obligated to establish fertilization plans. The plans are included into the EIA reports and are subject to social consultations.

2.7.3. Transparency of integrated permit procedures

Environmental permits are compulsory for animal farms that use more than 10m³ water per day, and monitoring of the environment is compulsory on farms where annual production exceeds 500 AU.⁹²

The Environmental Impact Assessment procedure is subject to social consultations. The society and NGO's are allowed to give reasonable suggestions. Usually public comments are treated as "motiveless" and are thereby dismissed. The EIA is carried out with the participation of the experts employed by the farm owner, which tend to cause results positive for the investor.

The EIA procedure is announced in the local newspapers and on information boards. However the authority does not inform the local inhabitants actively and NGOs still have no right to appeal the authority decision to defend public interest. It is expected that the law will soon be changed in this respect.

2.7.4. Social, environmental and legal problems

Industrial farming is a huge problem for ecological farming and the development of tourism. The concentration of hog rearing installations in Pakruojis district constitutes a threat to the main source of water in the Siauliai region. In the Tytuvėnai regional park (Kelme district) Sysa River, Neman River and Curonian lagoon, have recently been polluted by liquid manure from hog rearing farm.

Examples of ignorance of national law can also be found. Danish "Saerimner" is a notorious law-breaker. The company has been running illegal constructions in "Mūša", and pig rearing installations in Pakruojis and Pasvalys districts⁹³.

There has also been two interesting court cases connected to industrial farming – pig companies took action against local people and local politicians (Pakruojis district and Mazeikiai district)⁹⁴.

2.7.5. Pork and beef trade

In 2005, 109 626 tones of pig meat and 63 437 tones of cattle meat, was produced in Lithuania. In 2004, 7 329 tones of beef was exported and 20 184 tones of pig meat was imported⁹⁵. In 2006, the trade

⁹⁰ Environmental requirements for manure and sewage handling on livestock-farms (LAND 33 – 99, Vilnius 1999)

⁹¹ LITHUANIAN PROPOSAL FOR DELETION OF AGRICULTURAL HOT SPOTS. HELCOM Working Group on Agriculture. Kiel 2002

⁹² LITHUANIAN PROPOSAL FOR DELETION OF AGRICULTURAL HOT SPOTS. HELCOM Working Group on Agriculture. Kiel 2002

⁹³ Rimavicius R. Overview off industrial farming in Lithuania. Tallinn 2006

⁹⁴ Rimavicius R. Overview off industrial farming in Lithuania. Tallinn 2006

with EU countries was estimated as: export – 73 231 pigs, import – 47 352 pigs. 26 348 pigs was exported to Russia⁹⁶. The main trade partners are Latvia, Poland, and Russia⁹⁷.

2.8. POLAND (Jakub Skorupski)

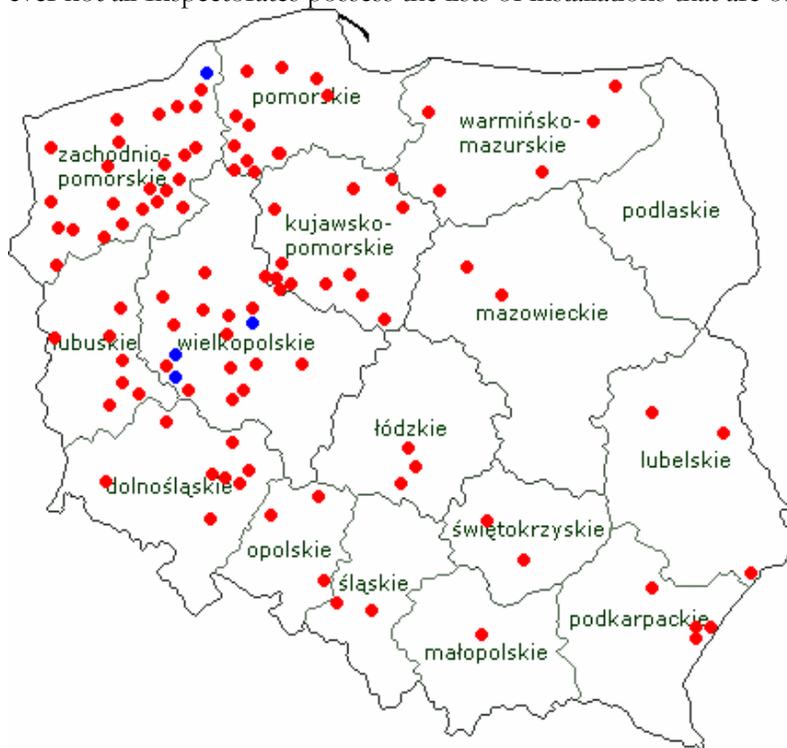
2.8.1. Statistical data

2.8.1.1. Industrial pig farms

There are 18 812 200 pigs in Poland (November 2006)⁹⁸ and the livestock density is equivalent to 100 pigs per 100ha of farmland⁹⁹. The restructuring process in Polish agriculture caused the collapse of many individual farms breeding small numbers of pigs and an increase in the number of large-scale animal farms¹⁰⁰.

Currently there are 103 industrial pig farms in Poland and only half of them possess integrated permits. 42 administrative procedures are conducted by local authorities concerning integrated permits for pig farms, however about 12 farms did not even apply for it. About 4 new installations are being built.

The Regional Environmental Protection Inspectorates keeps the database of IPPC licenses. However not all Inspectorates possess the lists of installations that are obligatory to obtain such licenses.



According to Environmental Protection Law Act large-scale industrial pig farms are obliged to obtain integrated permits before 30th October 2007.

2.8.1.2. Pig farms with 200 – 2 000 animals

In 2006 there were 8 686 farms with 200 or more pigs. The total number of animals bred on those farms was 3 694 211¹⁰¹.

In 2004, the organic production included 1 169 500 tons of pork, 1 551 sows, 10 453 porkers and 5 914 piglets¹⁰². According to the Centre of Agricultural Consultancy there are 44 organic pig farms accordant with Organic Farming – EC Control System (*Regulation (EEC) No 2092/91*)¹⁰³.

Fig. 8. Location of existing (red dots) and planned (blue dots) industrial large-scale pig farms in Poland.

⁹⁵ FAO The Statistic Divison <http://www.fao.org/es/ess/>

⁹⁶ State Food and Veterinary Service

⁹⁷ Lithuanian Pig Producers Association (http://www.kiaules.lt/main.php?page_id=2)

⁹⁸ Pogłowie trzody chlewnej w dniu 30 listopada 2006 roku. Central Statistical Office. http://www.stat.gov.pl/dane_spol-gosp/rolnic_lesnict_srodowi/poglowie_trzody/2006/30_XI/index.htm

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⁹⁹ Pogłowie trzody chlewnej w dniu 30 listopada 2006 roku. Central Statistical Office. http://www.stat.gov.pl/dane_spol-gosp/rolnic_lesnict_srodowi/poglowie_trzody/2006/30_XI/index.htm

¹⁰⁰ Notatka dotycząca publikacji "Charakterystyka rolniczej przestrzeni produkcyjnej Polski". Central Statistical Office. http://www.stat.gov.pl/dane_spol-gosp/rolnic_lesnict_srodowi/charak_rol_przest_prod/index.htm

¹⁰¹ Charakterystyka gospodarstw rolnych w 2005 r. Central Statistical Office. http://www.stat.gov.pl/dane_spol-gosp/rolnic_lesnict_srodowi/charakterystyka_gosp_roln_2005/index.htm

¹⁰² Rolnictwo ekologiczne w Polsce w 2004 roku. Agricultural and Food Quality Inspection. Warszawa 2005

¹⁰³ <http://eko.radom.com.pl/>

2.8.1.3. Industrial cattle farms

The total number of cattle is 5 200 000¹⁰⁴, and the livestock density of these animals is equal to 33 cows per 100ha of farmland (0.99 – 1.16 AU), whereas in other European countries this index reaches 57¹⁰⁵. Such low value of those ratios shows that the dominant form of cattle production is dairy farming¹⁰⁶. In West Pomerania voivodeship there are, for example, 93 farms with more than 50 AU and 30 with more than 240 AU¹⁰⁷.

2.8.2. The management of fertilizer

2.8.2.1. The manure utilization

The basic form of utilisation of liquid manure is as organic fertilizers. The manure can be sold to other farmers or used to fertilize fish-breeding ponds (*the Fertilizer and Fertilization Act, Dz. U. Nr 89, poz. 991 of July 26th, 2000*). In the past there were few farms with biogas plants. However according to literature data, they have been closed due to the lack of raw material and incompliance with technical regime¹⁰⁸.

The rules of manure application (as natural fertilizer) are defined in the *Fertilizer and Fertilization Act, Good Agricultural Practice Code*, and in *Ministry of Agriculture Decree on application of fertilizers and education in fertilization*. (Dz. U. Nr 60, poz. 616 of June 1st, 2001). According to the legislation spreading of manure is not allowed: between 1st December and 28th February, during poor weather conditions (flooded, frozen, or snow covered ground), near the water intake protection zone, water reservoirs, watercourses or seaside resorts, on slope fields without plant cover, nor directly on crops intended for food and fodder production. There are also specific regulations on fertilization methods, e.g. order of ploughing the fertilized soil after the fertilization, technical solution of manure spreading, etc.

Fertilizing in the Nitrate Vulnerable Zones is restricted through the *Water Law Act* (Dz. U. Nr 115, poz. 1229 of July 18th, 2001); the *Environmental Protection Act* (Dz. U. Nr 62, poz. 627 of April 27th, 2001) and through two Ministry of Environment Decrees regarding Nitrate Vulnerable Zones (Dz. U. Nr 241, poz. 2093 of December 23rd, 2002 and Dz. U. Nr 4, poz. 44 of December 23rd, 2002). The latter two transposes the Nitrates Directive into the Polish legislation. There are 21 such especially vulnerable zones, and some farms are situated in the neighbourhood, or within, these sites¹⁰⁹.

According to official data, Zachodniopomorskie region holds 40 industrial farms rearing 2 000 to 25 000 pigs each (average stock 7 971), which in total is equivalent to 318 843 pigs producing 1 913 060 m³ of liquid manure per year. To utilize such an amount of liquid manure, in a harmless way for people and environment, 60 000ha is needed. Meanwhile, according to non-official data, liquid manure is spread on half the land surface required (671 726ha was the total sown area in Zachodniopomorskie province in 2004)¹¹⁰.

2.8.2.2. Storage of the manure

According to the *Fertilizer and Fertilization Act* the minimum level of capacity for storing of manure should allow for 4 months storing or 6 months in the Nitrate Vulnerable Zones. *Annex III to Helsinki Convention*, concerning the 6 months period of storing manure, is not obeyed. Also *Good Agricultural Practice Code* recommends such storage period.

Polish law requires enclosed reservoirs for manure. *The Good Agricultural Practice Code* contains a number of non-obligatory recommendations for reducing ammonia emission from manure storage.

2.8.2.3. The fertilization plans

Owners of IPPC-farms in Poland are obliged to dispose 70% of produced manure on their fields in accordance with fertilization plans, which have to be approved by Regional Agricultural Station.

¹⁰⁴ Wojewódzki Inspektorat Ochrony Środowiska w Szczecinie. Analiza oddziaływania rolnictwa na środowisko wodne w województwie zachodniopomorskim. Potencjalne ograniczenia w rozwoju produkcji zwierzęcej. Szczecin 2005

¹⁰⁵ http://www.wodr-bratoszewice.agro.pl/rada/2004/Rada5_2004/zootechnik.htm

¹⁰⁶ Lipińska H., Gajda J. Area of farms versus fodder base and cattle population in specialized dairy farms. *Annales Universitatis Mariae Curie-Skłodowska. LXI*. Lublin 2006

¹⁰⁷ Wojewódzki Inspektorat Ochrony Środowiska w Szczecinie. Analiza oddziaływania rolnictwa na środowisko wodne w województwie zachodniopomorskim. Potencjalne ograniczenia w rozwoju produkcji zwierzęcej. Szczecin 2005

¹⁰⁸ Denysiuk W., Phd. Energetyczne wykorzystanie biogazu. *Inżynieria Rolnicza*. 58. Warszawa 2005

¹⁰⁹ Król K., Sokol A. Poskramianie azotu. *Ekoprofit*. 82. Katowice 2006

¹¹⁰ Lysko A. Phd, Cyglicki R.. Report on agricultural pollution from industrial hog Rusing farms In Poland. Szczecin 2004
Statistical Office in Szczecin http://www.stat.gov.pl/urzedy/szczec/publikacje/rocznik_woj/woj_2006_rolnictwo_05.pdf

Research conducted by Green Federation GAJA in co-operation with the Agricultural Academy of Szczecin on the nitrogen loads being put on fertilization fields of industrial pig farms in the West Pomerania region (2005), showed high level of nitrogen pollution.

Fertilization plans are the only document, which can prevent excessive nitrogen input. Unfortunately, they do not contain detailed fertilization programmes nor do they oblige the owner to conduct detailed nitrogen balance twice a year in order to define the current capacity of the soil (the lack of permanent monitoring of the soil quality).

It is noticeable that fertilization plans are not taken into account when issuing integrated permits.

2.8.3. Transparency of integrated permit procedures

Local authorities announce the integrated permit procedure and individuals can comment on submitted (by the farm owner) documents. NGOs can participate in the procedure as a party and appeal the integrated permit to higher instance and to court.

The Polish Ministry of Agriculture refuses public access to information about fertilization plans claiming that this is market sensible, private information. Local communities around big farms have been entirely deprived of the possibility of controlling proper manure management.

Present situation shows that *Aarhus Convention* principles regarding access to environmental information are not followed in Poland.

2.8.4. Social, environmental and legal problems

There is a lack of correspondence between EU law and national law, with regard to the definition of installations. The Polish definition attributes the obligation of possessing integrated permits to the owner of the system, not to the installation itself. The latter is clearly stated in EU *IPPC Directive*.

Poland does not have any regulations concerning air odour quality regulation (the *Limitation of Odour Emission Act* is being discussed in Poland). In this situation there are no legal procedures that can be used if a farm causes odour emissions. The odour from industrial pig farms is often troublesome for local societies.

In the Warminsko-Mazurskie province, farming constitutes a serious problem for the tourism sector due to the location of several large-scale swine farms near spa and recreational areas (e.g. in Goldap borough, where manure caused mass fish death)¹¹¹.

Since the nineties last century there has been several examples of infringements of the law connected to activities of the pig farms belonging to the Smithfield Foods concern (American enterprise) and the Poldanor Company (Danish enterprise)¹¹².

There are also problems with inspection authorization of Regional Environmental Protection Inspectorates and local authorities, which in some cases has powers, but do not make use of it.

Despite the fact that the *Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs* (BREF) is available in Polish language, it is not commonly applied.

2.8.5. Pork and beef trade

In 2005, Polish farmers produced 1 915 000 tones of pig meat and 344 000 tones of beef¹¹³. In 2004, 149 676 tones of pig meat was exported and 59 970 tones of pork was imported. 48 895 tones of beef, and 901 507 heads of cattle, were exported¹¹⁴. In 2005, according to data from the Ministry of Finance the value of live pigs, pork, sausages and other meat products exported from Poland was 416 600 000 € (and 319 100 000 € for imported goods), which corresponds to 237 000 tons¹¹⁵.

The main trade partners around the Baltic Sea are Denmark and Germany concerning imported pork, while for exported pork Lithuania, Belarus and Germany are the main partners. Live pigs are mainly imported from Lithuania, Germany, Latvia, Denmark, and exported to Russia, Lithuania, and Latvia¹¹⁶.

¹¹¹ <http://elk.wm.pl/?&main=17&c=110,3,21317,,>

¹¹² http://www.gajonet.pl/rubrique.php3?id_rubrique=76, <http://www.ppr.pl/arttykul.php?id=120843>

Lysko A. Phd, Cyglicki R.. Report on agricultural pollution from industrial hog Rusing farms In Poland. Szczecin 2004

¹¹³ FAO The Statistic Divison <http://www.fao.org/es/ess/>

¹¹⁴ FAO The Statistic Divison <http://www.fao.org/es/ess/>

¹¹⁵ Ministry of Agriculture and Rural Development. Informacja o sytuacji na rynku trzody chlewnej oraz o możliwościach promocji eksportu wieprzowiny. Warszawa 2006

¹¹⁶ Ministra of Agriculture and Rural Development. Zintegrowany System Rolniczej Informacji Rynkowej – rynek mięsa wieprzowego. 13. Warszawa 2007

2.9. RUSSIA – North-West Region (Jakub Skorupski)

2.9.1. Statistical data

In 2006 there were 13 500 000 pigs and 21 400 000 heads of cattle in the whole Russian Federation¹¹⁷.

In spite of the fact, that among pig breeding complexes about half the weight gain was produced on large complexes (with 108 000 places), in the Russian Baltic catchment area (Kaliningrad Oblast, ST. Petersburg Oblast, Pskov Oblast, Novogrod Oblast and Petrozavodsk Oblast) there is only one pig farm that can be defined as industrial¹¹⁸.

It is difficult to obtain reliable information on industrial animal farms in Baltic Russia. There are probably a number of big animal farms in Leningrad and Kaliningrad oblast, which are important to consider in relation to nutrient run-off from manure to the Baltic Sea.

2.9.2. The management of fertilizer

The dominant method of manure management is to spread it on fields as fertilizer. According to federal legislation spreading is not allowed on flooded, frozen or snow covered ground, or other situations when there is a risk of direct losses to the watercourses from spreading or storage of the manure. Yet there are no required storage capacity on manure, or regulations forbidding spreading manure in winter. The maximum allowed amount of manure per hectare per year is equal to 200kg of nitrogen¹¹⁹. Instructions of Russian Ministry of Agriculture define the rules on storage and management of manure. Russian Agricultural Inspection is responsible for the control of safety use of fertilizers and manure¹²⁰.

2.9.3. Pork and beef trade

Russia produced 1 599 167 tones of pig meat and 1 915 323 tones of cattle meat in 2005. In previous year 395 208 tones of pork and 510 949 tones of beef were imported to this country¹²¹.

Russian pork/pig trade partners, in the Baltic Region, are Denmark, Belarus, Finland, Poland, Estonia and Lithuania.

2.10. SWEDEN (Sara Holmgren) Markera nitratzoner

2.10.1. Statistical data

2.10.1.1. Industrial pig farms

There are 22 industrial pig farms in Sweden according to the European Pollutant Emission Register¹²². The Swedish restrictions on environment and animal welfare have a preventive effect on industrial farming. There are e.g. restrictions on the number of pigs allowed in a barn, 200/400, 1 AU/hectare etc.

2.10.1.2. Pig farms with 200 – 2 000 animals

The statistics of the Swedish Board of Agriculture comprises pig farms rearing animal herds <50 sows or 250 pigs. The numbers of farms that are covered of the compilation according to these criteria are 2 400¹²³. The total livestock of all pig farms is 1 680 500¹²⁴, and 80% of the total production of fattening pigs takes place at 500 – 600 farms.

¹¹⁷ The Federal State Statistics Service of Russian Federation http://www.gks.ru/free_doc/2006/rus06e/15-20.htm

¹¹⁸ Programme Implementation Task Force. Activities of the PG and outcome of the Regional Workshops Helsinki Commission. Stockholm 2002 [http://209.85.135.104/search?q=cache:qPP_R3FGTv4J:sea.helcom.fi/dps/docs/documents/Programme%2520Implementation%2520Task%2520Force%2520\(PITF\)/PITF%252019%2520\(2002\)/4-1.pdf+mecklenburg-vorpommern+ippc+pig+farming&hl=pl&ct=clnk&cd=1&gl=pl](http://209.85.135.104/search?q=cache:qPP_R3FGTv4J:sea.helcom.fi/dps/docs/documents/Programme%2520Implementation%2520Task%2520Force%2520(PITF)/PITF%252019%2520(2002)/4-1.pdf+mecklenburg-vorpommern+ippc+pig+farming&hl=pl&ct=clnk&cd=1&gl=pl)

Blagoveshchenskii G., Popovtsev V., V. Romanenkov. Grassland and Pasture Crops. Russian Federation - Country Pasture/Forage Resource Profiles <http://www.fao.org/ag/AGP/AGPC/doc/Counprof/russia.htm>

¹¹⁹ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

¹²⁰ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

¹²¹ FAO The Statistic Divison <http://www.fao.org/es/ess/>

¹²² European Pollutant Emission Register (EPER)

¹²³ JO 20 SM 0602, www.sjv.se

¹²⁴ JO20SM 0602, www.sjv.se



The average herds for sows and boars are 116, and the average for fattening pigs is 495¹²⁵. In 2003 there were 402 farms with livestock density 1 – 99 pigs for fattening, 431 with 100 – 249 animals, 439 with 250 – 499, 240 with 500 – 749, and 481 farms rearing more than 750 places for pigs. Between the years 2000 – 2005 there was a 17% increase in the livestock density at farms with more than 750 animals. Information about average area of arable land for large-scale pig farms is not publicly available.

The number of ecological pig farms is 60. The average size of the sow herds is 25; the average number of pigs for fattening is 18.2 per sow¹²⁶.

Fig. 9. Location of industrial large-scale pig farms in Sweden (black dots).

2.10.2. The management of fertilizer

2.10.2.1. The manure utilization

The main method of management is spreading the manure as fertilizers on agricultural lands. Detailed rules about the handling of plant nutrients are available in the *Ordinance on environmental concern in agriculture*, and in the *Swedish Regulation on environmental concern in agriculture*. The Swedish Board of Agriculture has published general guidelines concerning storage and spreading of manure in order to help the operators to apply the existing legislation. The guidelines concern all operators that handle manure under the auspices of the farm. There are special precautionary measures applied on the areas identified as vulnerable. In these zones it is not allowed to spread

manure on water-saturated or flooded ground, frozen or snow covered ground, during the period 1st January – 15th February. In the period 1st August – 30th November manure can only be spread on growing crops or before autumn sowing¹²⁷.

The manure and other organic fertilizers that are spread during the period 1st December – 28th February, shall be worked into the soil on the same day. In the counties of Halland, Skåne and Blekinge, however, the corresponding time limit is four hours if the manure is spread on bare soil. This applies during the entire year. The *Swedish Environmental Code* contains the concept of BAT. *Best Available Techniques* should be used at all professional activities in order to reduce the impact on the environment and human health.

The manure can be sold to other farmers (there is an obligation of keeping records over quantity, the total amount of phosphorus that the manure is equivalent to, the date of receipt and from who the manure was submitted, which should be kept available for six years)¹²⁸.

Production of biogas in Sweden is not common. In 2001, only six farms had biogas facilities, whether the manure constitutes the raw material in these plants is not clear.

2.10.2.2. Storage of the manure

The *Ordinance on environmental concern in agriculture* includes rules on manure storage capacity, covering of slurry stores and filling of stores under a cover, in a way that minimizes the risk of contamination of surface and ground water (required capacity of manure is for 6 to 10 months, lack of ban on winter spreading of manure except the Nitrogen Vulnerable Zones)¹²⁹. It also includes minimum shares of land under vegetative cover during autumn or winter (so called green land). All agricultural enterprises with more than ten livestock units, there are requirements regarding manure storage capacity. In the areas identified as vulnerable, storage capacity requirements apply to all enterprises with more than two livestock units. An enterprise shall be able to store manure for at least six to ten months before spreading, depending on which part of the country is concerned and what species the manure comes from.

Rainwater runoff from manure facilities counts as manure or as contaminated water, and must be collected and stored.

¹²⁵ JO 20 SM 0602, p.1, www.sjv.se

¹²⁶ <http://www.ekokott.se/slaktstatistik/Slaktstatistik%202005.pdf>

¹²⁷ www.sjv.se

¹²⁸ SJVFS 2005:74, www.sjv.se

¹²⁹ Henriksson A., Miljökonserter A. Actions against Phosphorus Losses from Agriculture in the Countries surrounding the Baltic Sea. Uppsala 2007

2.10.2.3. The fertilization plans

Since 1998 all farms must have established fertilization plans. If the production is extensive the fertilization plan can be reused for up to 5 years. Besides the requirements surrounding the consumption of manure etc. there are also requirements on soil analysis every 4th or 8th year. The farm must also collect information on the quantity of manure produced each year and where the manure is used. The plan should also contain a description on how the calculations were made, e.g. concerning the biological peculiarities of the plants and soils¹³⁰.

In Sweden 98% of the sow population occupy more than 2ha of arable land per AU, and more than a third of the farms occupy more than 50ha per AU. What governs the allowed animal density is, among other things, the availability of farmland for spreading manure. The present regulation allows 2.2 sows, or 10.5 pigs for fattening, per hectare¹³¹.

Fertilization plans are public information according to the *Principle of public access to information*, which entitles Swedish and foreign nationals to read documents held by public authorities as long as it is official¹³².

2.10.3. Transparency of integrated permit procedures

Possibilities to participate in the consultation process depend on whether it is an integrated permit procedure (as for industrial pig farms) or a notification requirement. However, private persons and NGOs have the possibility to comment on the activity.

Any appeal against a notification should be annotated and submitted to the supervisory authority with a good marginal before the permit becomes legal. Other authorities, organizations and claimants shall in an appropriate manner be provided with an opportunity to comment on the notification.

If the activity is supposed to have considerable environmental impact the consultation procedure is extended to e.g. the municipality and NGOs. The municipal environment protection committee makes a statement of opinion and everyone else who may have an interest have an opportunity to comment the case. The decision is announced in the local newspaper and is possible to appeal to the environmental court up to 3 weeks after the announcement.

2.10.4. Social, environmental and legal problems

About 65% of all arable land in Sweden is located in areas especially endangered – Nitrate Vulnerable Zones. It is reasonable to assume that a number (or most) of the 22 IPPC-farms are located in these zones. The rules on precautionary measures when spreading fertilizers are more far-reaching in the areas identified as vulnerable.

2.10.5. Pork and beef trade

The total amount of pork produced in 2005 was 275 100 tones¹³³. Exports of live pigs in 2005 was 8 896 (number of animals in total) and import of live pigs – 3 356¹³⁴. In 2005 Swedish farmers produced 142 600 tones of beef. In 2004 51 152 tones of beef were imported to Sweden¹³⁵.

Sweden export pig meat to Denmark, Germany, Finland and Estonia. The import of pig meat is mainly from Denmark, Germany and Finland.

2.11. UKRAINE – basin of the Zakhidnyi Buh river in the Baltic Sea catchment (Petro Hrytsyshyn)

2.11.1. Statistical data

There are no industrial pig farms in the basin of Zakhidnyi Buh River (Lviv and Volyn oblast). On the territory of Volyn oblast there is the Shatsk National Park. Within its area there are only small house-

¹³⁰ SJVFS 2004:62, www.sjv.se

¹³¹ SCB, 2000a, www.greppa.nu

¹³² Sveriges Domstolar, http://www.domstol.se/templates/DV_InfoPage____877.aspx

¹³³ <http://www.sjv.se/download/18.1a3366210bfaf325718000387/Industriproduktion+m+m.+sid+241-256pdf.pdf>, Jordbruksstatistisk årsbok 2006

¹³⁴ http://www.sjv.se/webdav/files/SJV/trycksaker/Pdf_rapporter/ra05_23.pdf, Marknadsöversikt -animalier

¹³⁵ FAO The Statistic Division <http://www.fao.org/es/ess/>

hold farms, holding up to 10 pigs. In agricultural plants – the size of the animal herds are up to 100 pigs. Up to 85 % of the total number of pigs are reared on household farms.

The most developed industrial pig farms and cattle farms (more than 1 000 heads) are located in the East of Ukraine (Donetsk, Dnipropetrovsk, Lugansk, Poltava oblast) and in the centre (Zhytomyr, Vinnytsia, Poltava, Sumska oblast) – territories that belong to the Black Sea basin.

According to statistical data held on the website of the Ministry of Agroindustrial policy¹³⁶ of March 1st 2005, there were 34 pig farms possessing permits for industrial production, rearing 129 011 pigs. In the beginning of 2007 the number of pigs in Ukraine was 7 935 000, from which 2 448 000 were reared in pig farms of all types of ownership, while 4 336 000 pigs – in household farms.

In 2006, the number of pigs was 538 900, and the cattle – 642 000, in Lviv and Volyn oblast¹³⁷. There are 9.3 thousand household rearing pigs, and 5.5 thousand household farms rear less than 100 pigs¹³⁸. Such farms are typical for Volyn oblast.

2.11.2. The management of fertilizer

2.11.2.1. The manure utilization

Manure is mainly used as a fertilizer and is spread on fields. The technologies of the usage of manure on industrial pig farms to produce power (biogas) are not used.

Current legislation only in general terms puts obligations on the manure producers to reduce ammonia emission.

2.11.2.2. Storage of the manure

The manure storages are not adjusted to the quantities of manure being produced. Sewage water pollutes surface waters.

2.11.3. Transparency of integrated permit procedures

The Ukraine, as a non-EU country, does not have an integrated permit's system. However there is legal ground for cooperation in the field of environment protection in the *Agreement about Partnership and Cooperation between Ukraine and European Community*.

The Ukrainian *Environment Protection Act* gives the public the right to participate in public environmental impact assessment procedures. *Aarhus Convention* ratification by Ukraine improved the possibilities of the public to participate in decision-making processes concerning construction and operation of such objects.

Information about spreading nutrients from industrial pig farms is not available.

2.11.4. Pork and beef trade

In 2006 more than 100 000 tons of pork were imported to Ukraine. Since 2005 a number of pigs in Ukraine has increased by millions of herd. However it is not enough to satisfy the pork demands of the market. In 2006 pork production increased by 44% comparing to 2005¹³⁹. In 2004 77 557 tones of beef were exported from Ukraine, while 40 522 tones of pig meat were imported to the country¹⁴⁰. For the Western region of Ukraine, Poland is a main pork supplier.

3. SUMMARY OF THE MAIN CONCERNS OF ENVIRONMENTAL IMPACT FROM INDUSTRIAL ANIMAL FARMS IN COUNTRIES OF THE BALTIC CATCHMENT (Jakub Skorupski)

According to the available information (databases of national statistical institutes), the total population of pigs, in the Baltic catchment region, can be estimated to be no less than **50 000 000 pigs** and there is a cattle population of no less than **11 000 000 heads of cattle**. The number of pig industrial rear-

¹³⁶ www.minagro.gov.ua

¹³⁷ State Committee of statistics of Ukraine

¹³⁸ www.kmu.gov.ua

¹³⁹ www.oglyadsch.com/news.-print/2006, Ministry of Economy of Ukraine, Institute of Economic Researches and political consultations

¹⁴⁰ FAO The Statistic Division <http://www.fao.org/es/ess/>

ing-farms located in this area amount to approx. **300**, while the number of cattle battery-farms is much more difficult to define, because of lack of information about them in official national and international databases (e.g. EPER). For the same reason the present number of large-scale pig farms is surely underestimated.

The lack of complete and freely attainable information about the harmful agricultural installations is one of the essential problems that hinder public participation in environmental decision-making. The same situation is valid for the access of fertilization plans and integrated permits, without which it is very troublesome to determine the animal density of particular intensive breeding-farms. Information about livestock density is very important to state if there is a balance between the amount of animals on the farm and the amount of land available for spreading manure.

The lack of transparency and access to environmental information (which take place, for example, in Poland, Ukraine, Finland, Lithuania, Estonia, Latvia, Russia) – like fertilization plans, integrated permits, registers of IPPC-farms – should be considered as an infringement of *Aarhus Convention* principles. The best solution to this situation seems to be the publishing of environmental Hot spots and pollution data on the Internet. This kind of information system ensures public access to environmental data, e.g. in Germany.

The above-mentioned numbers gives an image of the enormous amount of agricultural pollutants (especially manure), which are produced by such livestock number. The manure is mainly spread on the arable land of the Baltic catchment (35 293 600ha¹⁴¹) and a significant part of the manure finally drains (by surface and sub-surface run-off) into the Baltic Sea waters. In 2004 the total load of nitrogen run-off into the Baltic Sea amounted to 502 000 tonnes, and total phosphorus load was 22 500 tonnes – diffuse load, included agriculture, contributed almost 60% of nitrogen inputs and 50% of phosphorus¹⁴².

The Baltic Region can be divided into three agricultural areas:

1. old EU countries (Denmark, Finland, Germany and Sweden),
2. new EU-members (Estonia, Latvia, Lithuania and Poland),
3. non-EU-member countries (Belarus, Ukraine and Russia).

Pig farming in the first area is characterized by very intensive, although not-very-large-scale animal rearing, but also by the high level of environmental legislation standards (legally stipulated maximum livestock density per hectare, requirements of minimum manure storage capacity, ban on winter manure spreading), its effective enforcing and dynamic development of organic agriculture, also on animal farming.

The second area can be described by large-scale animal breeding in some countries, cases of incomplete transparency of EU-environmental legislation into the national regulations and its ineffective enforcing, significant examples of environmental law-breaking by foreign companies (e.g. Danish companies in Poland and Lithuania) and some difficulties connected with public access to environmental information.

For the last area, non-EU members, are typified by very-large-scale animal farms (for example in Belarus 82% of total pig population is rearing on industrial farms), lack of many important environmental regulations (lack of requirements of maximum livestock density, legally required capacity of manure storage and obligations to reduce ammonia emission from storage and utilized manure, big amount of manure allowed per hectare per year, e.g. 200 kg in Russia) and an insufficient environmental information system.

In each of the aforementioned agricultural regions you frequently find social strains connected with functioning of industrial animal (mainly pig) farms, caused by offensive odour. This situation is unfortunately accompanied by a lack of uniform national regulations in this issue.

Increasing number of organic pig farms indicate, that proper management and storage of natural fertilizer, can maintain nutrient losses to water at an acceptable level. In Denmark there are 364 organic swine farms, in Sweden 60, 44 in Poland. The organic farming become more popular and frequent. Such type of animal breeding has mitigated harmful environmental impact, but on the other hand its range is still marginal (for example in Belarus and in Latvia there are no organic pig farms).

¹⁴¹ The Baltic Sea Region GIS, Maps and Statistical Database <http://www.grida.no/baltic/htmls/stat.htm>

¹⁴² Waterborne inputs of nitrogen and phosphorus. HELCOM http://www.helcom.fi/environment2/ifs/ifs2005/en_GB/waterborneNutrientInputs/

4. CCB RECOMMENDATIONS FOR REDUCTION AND CONTROL OF NUTRIENT RUN-OFF FROM INDUSTRIAL ANIMAL FARMS IN THE BALTIC SEA CATCHMENT

- 1) Set up clear requirements for all Industrial Animal Farms (<100 AU to fulfil same standards as Municipal Wastewater Treatment (<90 – 95% BOD- and phosphorus removal, <50% the nitrogen removal) via wastewater treatment or corresponding measures.
- 2) Secure a full implementation of the *IPPC Directive* requirements for industrial animal farms (<2000 pigs over 30kg or 750 sows or 300 AU) (also in Russia, Belarus and Ukraine).
- 3) Monitor and control the implementation of the *IPPC Directive* on industrial farms in the Baltic Sea Region;
 - conduct a survey and report by the end of 2007 estimating to what extent the implementation has de facto prevented nutrient drain-off to waters from the IPPC-farms (<2000 pigs) and how many enterprises not fulfilling the *Directive* have been closed down,
 - oblige industrial farms (<2000 pigs) to always fulfil the nutrient balanced recycling concept and show this in their Fertilization Plans.
- 4) Fertilization plans should be obligatory for all Industrial Animal Farms and publicly available as important environmental information.
- 5) Baltic Sea Region governments should revise the fulfilment of HELCOM recommendation 25/2, on reduction of emissions and discharges from industry by effective use of BAT connected to animal farms, and once again recommend HELCOM Contracting Parties to issue BAT requirements for industrial farms.
- 6) The Baltic Sea Region governments should require, e.g. via HELCOM decision, application of *Best Available Techniques* for small and medium-scale pig rearing farms (less than 2000 places for pigs and 750 for sows), as they also constitute an important source of pollution from agriculture to the Baltic Sea.
- 7) Oblige industrial farms to fulfil the nutrient balanced recycling concept and include such requirements in the permits for Fertilization Plans.
- 8) Recognition of all industrial animal farms (<100 AU) as Pollution Hot Spots; e.g. in the coming *HELCOM Baltic Sea Action Plan*.
- 9) Execution of regular, independent soil monitoring in terms of nitrate contamination for farmland with high load of manure.
- 10) Implementation of odour air quality standard of European Committee of Standardization (*BS EN 13725:2003 Air quality. Determination of odour concentration by dynamic olfactometry*) into EU-member-countries with focus on industrial farms.
- 11) Regular updating of European Pollutant Emission Register (EPER) related to industrial farms. The register is an important and readily available source of environmental public information about industrial rearing-farms.
- 12) Not allow for industrial animal farms in Natura 2000 areas and remove existing industrial animal farms from such areas.