A Greener Agriculture for a Bluer Baltic Sea 2013

- Visions for nutrient management

Report from conference in Scandic Marina Congress Center, Helsinki, Finland, 27-28 August

BALTIC MANURE
BUSINESS OPPORTUNITIES

Baltic Deal

Baltic Compact

BERAS implementation
Baltic Ecological Recycling Agriculture and Society

BALTIC IMPULSE

HELCOM

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NJF
Nordic Association of Agricultural Scientists

Baltic Sea Region
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Preface

The Conference A Greener Agriculture for a Bluer Baltic Sea 2013 was arranged in cooperation between five Baltic Sea Region Projects, namely Baltic Compact, Baltic Manure, Baltic Deal, BERAS implementation and Baltic Impulse and WWF Baltic Ecoregion, HELCOM, International Scientific Centre of fertilizers (CIEC) and Nordic Association of Agricultural Scientists.

This year conference attracted 270 participants from 15 countries with various backgrounds – from science to farming, from ministerial level to green NGOs, from advisors to business. All made vital contributions to a very successful conference in Helsinki.

This short conference report is compiled by Agro Business Park with the help from Kaj Granholm and Sofi Sundin from SLU. The report is merely a summary of what was understood by participants during the event, and the presentations can be found for more details on several project websites: www.balticmanure.eu , www.balticcompass.org, www.balticdeal.eu, www.gabbs.eu. Some abstracts received by presenters can be found at www.gabbs.eu.

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Joint statement from organisers Baltic Compact, Baltic Deal, Baltic Manure, Beras Implementation and Baltic Impulse

Agriculture and the food production chain have undergone a radical change from the era of rebuilding post-war Europe to the modern, effective and even industrialized agriculture of today. However, the foundation of agricultural policies has not followed the transition. Key problem today is not the insufficient food production in Europe but eutrophication, loss of biodiversity, dependence on mineral fertilizers and fossil fuels, climate change – and rural degradation.

The animal production units have grown and concentrated geographically, but the cultivated land area has remained the same. This has led to accumulation of plant nutrients beyond the possibility for plants to utilize nutrients and thus to increased leakage from agriculture to the environment. In the dialogue around eutrophication of the Baltic Sea nutrients are commonly still regarded as pollution, and agriculture has been pointed as the biggest polluter. This type of rhetoric and connotation has enabled the current agri-environmental policy to prevail and to rely on regulation and restrictive measures without acknowledging the diverse conditions across the agriculture sector, the drivers for farm level decisions and the narrowing possibilities of the agriculture sector to contain supplying the society with food and other ecosystem goods and services. A vision for comprehensive and sustainable nutrient management for the whole Baltic Sea Region has been missing.

It is about time we acknowledge agriculture as being more the solution than the problem, and that we adapt the legislative and economic steering instruments in a way which promotes tapping into the innovation potential in the rural areas, which allow for context specific solutions and which encourage planning of measures to ensure ecosystem service delivery on the local landscape level while maintain viable food production in the region.

The GABBS 2013 conference address the policy makers at EU level and the HELCOM Ministerial Meeting with the following message from the gathered farmers, advisors, researchers, technology providers and NGO's:

- Agricultural governance should both embrace joint policies and allow flexibility on the farm level.
- The overall use and recirculation of nutrients within the agriculture system should be improved and the outputs to air and waters reduced – implying intensified recirculation between livestock and crop within farms or between cooperating farmers.
- Nutrient management legislation should be refocused on total N and P flows in agriculture.
- Instead of passive and restrictive mitigation measures, measures which improve nutrient recycling should be given priority in advisory systems, environmental legislation and in agri-environmental support systems.
- Better crop rotations, including nitrogen-fixing legumes, should be promoted or required.
- Farming communities should be empowered to take action in their own watershed management through improved knowledge of sustainable resource management and support water protection actions.
- Special attention should be given to already existing multifunctional farms that are both productive in terms of supporting people with food and jobs and successful in diminishing nutrient leakage.

- Innovative solutions should be promoted and supported in order to achieve higher energy efficiency, less emissions and less leaching of nutrients through water flow and nutrient management, biogas production etc.
- It should be ensured that animal production has a possibility to utilize optimally the manure nutrients and manure biomass as a resource for organic fertilizer products and energy.
- An increasing demand for organic food should be recognized also in support systems to ensure that conversion to organic production is a viable alternative for producers.
- Knowledge exchange between countries and between farmers, policy makers and researchers should be promoted.

Through stimulation of the optimal policies, concepts and technologies, Greener Agriculture is a natural part of the Bluer Baltic Sea. Thus agriculture can contribute to the prosperity to the region and at the same time to the health of the Baltic Sea.

www.balticdeal.eu

www.balticmanure.eu

www.beras.eu

www.balticcompass.org/balticcompact

Plenary session: The Baltic Sea and agriculture – perspectives from policy and practice

Opening

Markku Järvenpää, Director, Technology Research, MTT Agrifood Research Finland

Markku Järvenpää expressed on behalf of the organizers a deep thanks to event sponsors, The Baltic Sea Regional Programme for supporting the event through a number of projects. Markku thanked the organizing projects and organisations for their commitment and the organizing committee for pulling all the practical threads.

The floor was given to the two plenary session moderators:
Lotta Samuelson, Baltic Sea 2020
Ottilia Thoreson, WWF Baltic Ecoregion Programme

Nutrient recycling in Finland – State of play

Ville Niinistö, Minister of Environment, Finland

Friends of the Baltic Sea, the Environmental ministers of the HELCOM commission meet in October to improve the environmental conditions of the Baltic Sea. Nutrient recycling is a key to sustainability. However, Green Growth is a necessity for rural development and for developing business opportunities. Global scale: our work and experience in BSR can be used worldwide to combat pollution and conserve fresh waters. Much has already been achieved, but still steps further needs to be taken.
Nothing should be considered a waste; it is all resources that should be recycled. Added value of nutrient recycling is obvious, and dealing with the issue today can save money tomorrow. The Archipelago Sea can become a model region for intelligent solutions, on sewage sludge and manure handling by putting research into actions.
Precision agriculture and P-recovery is on the agenda. Markets have to be developed for the recycled P. A new program is to be launched in Finland.
At the HELCOM meeting in Copenhagen, new goals will be set and this will be coordinated with the rural development programme of the EU, so that the incentives support the same goals, easy and flexible for the farmers. Environmental protection and economic development should go hand in hand.
We need to acknowledge what has already been done in agriculture for the water protection but we also need to admit that there is still work to be done. This conference and the ones held earlier by the same organizers show that a lot of progress can also be made by bringing motivated stakeholders to work together.
I wish you all a successful conference!

Nutrient recycling in Finland - State of play

Risto Artjoki, State secretary, Ministry of Agriculture and Forestry, Finland

Political commitment is very strong in Finland – Finland should be a model country for recycling.

A programme is running to support recycling, including e.g. investment support for manure handling technologies, P recovery etc. More that 80 ideas/proposals were developed.

The coming Finnish Rural Development programme (2014-20) will support

- climate measures,
- biodiversity conservation, Water Framework Directive implementation etc.
- Nutrition balance calculations on the farm level for 60.000 farmers in Finland
- Greening of the CAP
- Environmental investments
- Organic farming should be increased from 9% today to 20% by 2020
- Reduction fishery of bream and roach is a measure to remove nutrients from the waters is supported. In 2012, 1000 tons were caught removing 8 t on P from the Sea.
- Most important measure: incentive to get arable farmers to receive the manure to spread the P among crop farmers.

The Ministry encourages concrete actions that aim at reducing of the nutrient load into the Baltic Sea and improve recycling of nutrients.

Common goals to reach the Baltic Sea in a good environmental status – Working together with the agriculture

Mikhail Durkin, HELCOM

HELCOM is part of organizing committee - partly due to the HELCOM Ministerial meeting in Copenhagen in October 2013 and agricultural aspects will be a major part of that work.

Baltic Sea is dynamic region for economic growth, offshore industry, agriculture, fishery tourism, city development and yet the dead sea bottom is still there. It is not yet a sea in balance.

An overview of the status is presented: eutrophication, Biodiversity and Hazardous substances.

The HELCOM Baltic Sea Action Plan will tackle many of these challenges before 2021. Targets are set for eutrophication, i.e. maximal allowable inputs of N & P in the various sub-basins and thereby needed reductions can be calculated for different sections of the Baltic Sea. Generally there is a trend of decreasing loads, but yet a road to go. Major reductions are needed especially in Baltic Proper and Gulf of Finland, and Kattegat to achieve the good environmental conditions.

Baltic Sea Action Plan on Eutrophication has focus on point ad diffuse sources as well as airborne Nitrogen: many ideas and solutions from BSR projects are 'harvested' for the BSAP.
Studies indicate that the investments in reducing the pollution will be profitable in the long run.
Question: Recommendations, examples. Reply: most important is to persuade the commission of the need of tailor made regulations for different regions.

Success stories about farming in the Baltic Sea Region

Toni Haapakoski, Dairy farmer, Koivurinne Farm, Saarijärvi, central Finland
Family farm sine 1905, 4. generation, 188 ha, only 50 ha owned - in addition 157 ha of forestry. One full time worker, 70 milking cows (robot), and an established local machine network. Closed new barn built recently with milking robot, (down to minus 35 degrees in winter).
Conditions are difficult: many small fields, long distances, lakes and forests., difficult logistics, e.g. for manure spreading.
Toni Haapakoski is former Farmer of the Year award winner because of modern manure handling, taking care of soils, composting, buffer zones, wetlands, woody and grain trash for energy, network of experts, and several new innovations in agriculture: Low-cost manure and silage storages, field navigators, small steps forward, e.g. the use of fiberclay for temporary manure storage lagoon.
The future: biomass factory to animals, my own fertilizer factory, - and a question to the competent audience: "Can wetland springtime inundations be used for fodder production"??
We should learn from organic farming, and give possibility for higher nutrients levels to increase the yields. Administration should be open minded to new ideas (e.g. for the fiberclay). Environmentally farming can be and MUST be profitable.
Estimate-> calculate-> measure-> results! Even Batman can become a farmer -with new innovations!

Discussion: Do farmers get the support they need; economically and advise-wise? Answer: farmers have to be proactive themselves and ask for the right support. There is a long way from research to farming!


Haapakoski family
Yara's Solutions for a Bluer Baltic Sea

Plenary session - Seeing the bigger picture - different visions for the future BSR agriculture

From pollutant to resource - EU action on nutrients in the Baltic

Paul Speight, DG Environment, European Commission (by videolink):

There is no doubt that the Baltic Sea is in trouble. Effective actions are to be taken in a cooperative way. All should comply with the same regulations not to distort the competition between farmers to product markets.

Nitrates, Water Framework and Marine directives have the same overall goals. Reduction of nutrient loads with fair shares, we can reduce the eutrophication. Nitrates directive: Vulnerable zones - whole territory approach is used in Denmark, Germany, Lithuania and Finland. Designated vulnerable Zones are used in Sweden, Estonia, Latvia and Poland.

From pollutant to resource -

- More efficient agriculture - less waste
- Better recycling of nutrients - resource efficiency
- Concept of nutrient cycles (Sustainable P Consultative Communication)

P as an example: Study the P flows, to produce a resource and use it where needed globally. Surplus in some regions, deficit in others. A challenge is to get the scientific results applied in the fields (precision farming, enzymes in feedstuff, biotechnology, crop rotation etc.)

CAP negotiations have completed, cross compliance remains for Nitrates Directive, but unfortunately the Water Framework Directive is not included. Greening of first pillar, such as ecological focus areas, buffer strips, catch crops etc. can work in the environmental direction.

Recycling: Manure procession, redistribution to deficit areas/fields, should be agronomically predictable. Waste water P removal can be improved, precipitation and recycling of P. Food wastes for composting. Move the nutrients from saturated to deficit areas: processing is needed!

European P-platform has been initiated: academia, farmers/Industry and government should work together. Suggestions for Policy makers: A strategy that focuses on dealing with the problem and bring nutrient load to manageable level to comply with directives.EU funding is available - should encourage integrated approach (EU, national, regional, local money)

Discussion:

Cooperation is always welcome and regional funding should be combined with other funding.

Should animal densities be regulated? Rather manure processing and redistribution, e.g. of struvite.

Balancing global needs, intensive agriculture and the environment

Niels Peter Nørring, Director of Environment & Energy, Danish Agriculture and Food Council

Great challenges:

- Increasing demand for food (growing population), increasing protein consumption, biomass demand for energy, jobs and export.
- Environmental challenges and biodiversity

How to deal with these challenges?

Agricultural production can be increased and reducing the environmental impact at the same time (in DK production 20% up and nitrogen surplus has been reduced by 50%, and no longer P surplus). More with less. We should shift from general regulations to targeted/tailor-made regulations using the carrots rather

than the whip. All stress factors should be included (nitrogen, fishing, mussel harvesting etc. in marine environment)
Localize the source (where do the nutrients leach??), implement measures where they make a difference, avoid over-implementation - waste of money.

- Recipient water measures: Reef reestablishment, plant eelgrass, mussel beds
- Farmland edge measures: create wetlands, bufferstrips
- Arable land measures: use waste products for biofuels, improve feeding efficiency and manure handling, catch crops etc.

The way forward could be: Pig city - cradle to cradle production, recycling nutrient by combining pig and tomato production, using biogas for manure handling and energy requirement.
We can minimize, but never avoid human influence. We should aim for

- Intensive agriculture and provide both food and healthy environments
- Consider all stress factors and target measures
- Measures should be targeted at 1) the recipient and catchment, 2: The edge of the arable land and 3: arable land

Systemic change needed in the food system to obtain sustainability

Carlo Leifert, Newcastle University

Global challenges, I am less optimistic about more for less. We see exponential growth - believe is only for madmen and economists!
Food security challenges: Can we feed 9 billion people sustainably? Cereal production has increased, but the curves have flattened since 2000, even with increased inputs of N, P, pesticides and water.
Factors limiting crop yields: We have not become much more efficient (N-efficiency in cereal production.
Crop limit yields: Nitrogen (due to energy input), mineral P, water in other areas. 1 kg of N-fertilizer requires 1 l of fuel, 100 ha of cereals requires 20.000 l of fuel for the nitrogen. Nutrients are becoming more expensive, due to expected increased energy prices.
P is a bottleneck (30-100 years left, the mining industry says 300 years). P-use will increase to feed 9 billion people. We are close to the P peak curve, prices are rising. Morocco, China and South Africa and Jordan have most reserves. We will be fighting for resources.
Future strategies: Mineral NPK fertilizer input is not sustainable, but still too cheap. When P is depleated, yields of conventional farming will decline by more than 50%

- Use organic fertilizers, and domestic /communal organic wastes
- Use legume crops to supply with nitrogen
- More efficient recycling of NPK (all wastes, nothing land filled)
- Reduce losses of fertilizers from soil
- Breeding/selection of more nutrient efficient crops
- Reduce meat and dairy consumption, although ruminants have their place making 'undigestible' biomass sources available for humans.

There is great potential to increase yields in organic farming systems by optimizing/increasing organic fertilizer inputs regimes.

Systemic change needed in the food system to obtain sustainability

Mats Johansson – Ecoloop, www.ecoloop.se

Sustainable development versus sustainable nutrient management, different definitions and views are discussed as introduction. Complicated flows require communication skills to get to the policy level.
Our Nutrient World - A Global partnership on nutrient management - describe five nutrient threats:

- Greenhouse balance, water quality, water quality, ecosystems and biodiversity.
- 10 key actions to produce more food with less pollution
- Intergovernmental partnership should be strengthened

Joint Research Center report: we should start implementing a global strategy for NPK use, and we need practical and applicable alternatives tested.
Nutrient flows – A conceptual model by Ecoloop. Flows of P in Sweden: Lack of strategy for recycling of household/societal wastes - largest 'output' of the model. A farmer can buy P for 2 euro, but the cost of waste is 15-20 Euro /kg.This should be seen in one calculation/nutrient management strategy.
Three policy recommendations:

- Create a platform on national level to discuss sustainable nutrient management
- Develop models to describe nutrient flow and nutrient economy
- Define efficient policy activities and new instruments at municipal, national and international levels,

Discussion: Who should be the initiators? Farmers/industry, NGOs, government bodies, researchers.

From words to actions – catalyzing change

Ilkka Herlin/Paula Biveson; BSAG

BSAG is a Finnish independent foundation. The global problem with strong algae blooms is found in Yellow Sea, Gulf of Mexico, Black Sea – and Baltic Sea. Radical decrease of nutrient runoff can revive the sea as it has happened in the Black Sea.
The BSAG Vision is: recycling of nutrients. BSAG is a catalyst towards concrete actions.
Commitments can be direct with business, matter and issues that can have direct or indirect impact on the recovery of the Baltic Sea.
This could be responsible farming in Latvia, Biovakka (Nutrient recovery from the liquid fraction from anaerobic digestion) and many other projects.
State commitments: Finnish commitment – plan to become model region in nutrient recycling. Russian commitment: plans to invest in closing the Krasnyi bor landfill that leaks hazardous substances and several other projects in Leningrad Oblast. BSAG works with the whole nutrient cycling cycle in the food production chain.

EU is slowly awakening; nutrients are a strategic issue. Nutrients are a political and societal issue. Global challenge and joint solutions are needed. The commitments are at all levels from 'floor level' to ministerial level, with different results. E.g. Ship wastes to be treated in ports rather than dumped in the Sea.
Don't ask what EU can do for you, but what YOU can do for the Baltic Sea.

Plenary panel discussion

Participants: **Niels Peter Nørring, Toni Hapakoski, Mats Johansson, Paula Biveson**

Niels Peter: we should not reduce meat production in Denmark/BSR, rather we should increase the production -one of the most efficient and environmental production systems in the world.
Mats: rather easy to say 'sustainable nutrient management' - implementing is not a quick fix
Paula: Implementation of EU directives differs, different approaches should inspire
Tony: started to dream of 'Cow City' and 20t wheat/hectare in the future. Thought provoking that input P costs only 2 €, and waste P treatment cost 15-20 €
Question: how can you make nutrient book-keeping implemented in all countries?

- **Niels Peter**: Every farmer knows what the losses are, but suboptimal fertilization has been the result (too low production). We need to know which nutrients leave the root zone.
- **Tony** has started bookkeeping, need to know, to optimize farming system.
- **Mats**: bookkeeping is essential. Maybe even a regional nutrient balance is needed.

Question: Education and advisory service has not been mentioned,

- **all agree** that education and advice is essential, based on and linked to research. WWF Farmer of the Year award is a good example for exchange of experiences and awareness.

Comment: we should spread the nutrients, but let us do is showing the best available techniques. Manure quality should be known and certified.

Question: how do we change the diet of people and promote truly sustainable food production?

- **Mats**: hope for the consumers choice is not enough, change public consumption (hospitals etc);
- **Niels Peter**: a global problem, consumers demand is driving the production.
- **Tony**: the consumer is the key.

Question. What is the interaction between agriculture and forestry?

- **Tony**: Peat production area, few fields left/available

Parallel Session Making the most out of manure

What to do with manure in the BSR – an overview

Markku Järvenpää, MTT Finland:

Agriculture is multi-policy issue: Climate, Environment, Agriculture

Manure nutrient value in BSR is 1540 mio €. We do not have a surplus of nutrients in the BSR - import of feed requires export of food. An example: Animal production in Leningrad Oblast, feed production from the Black Sea. Nutrient balance is not just a farm issue, but a regional issue.

Example of what to do: Pellon separation technology: 147 ha is needed for 1000 fattening pigs slurry, after separation only 20 ha is needed for nitrogen rich part, and 20 ha for P rich part (every 3 year).

Next Step is to expand the nutrient recirculation from manure to all recyclable nutrient resources.

The P- resource resource, status and opportunities for agriculture

Lars Stouman Jensen, University of Copenhagen:

Optimist! - But of course we need to work on solutions. The Hubbert curve of P depletion is not the 'truth'- it is merely a prediction! Is Peak P valid??? 30, 100 or 400 years of P reserves???

An ethical paradox of inequality is at stake: Africa produces much P, but uses very little.

Increased population and changed menus world wide! The middle class eat more meat. This requires more agricultural production and biofuels are exploding worldwide. P is moving around the world, bound in proteins. P-reserves are a geopolitical issue. Existing knowledge increased Morocco P resource 10 times in

2010 in a recent report. China extracts 46% of P to the world market, although the only possess 6% of know reserves.
Global climate change will alter the production systems as well. Crop yields will decline in large regions, but increase in BSR. Data is changing, but ethical considerations should be taken into account. The mining industry is gearing up, P-price is decreasing. P efficiency should be increased and Cadmium content should be taken into account.
Real threats geopolitical and environmental - mining and agriculture. However, animal production cannot be removed - we should transport the nutrients
Danish example figures: 52.000 t. P in agriculture (fully recycled but low efficiency), households 10.000 t P (only partly recycled today).
The solution is: use less - more efficiently, recycle more, cooperate more (energy, nitrogen, wastewater)
Farmers and waste entrepreneurs:

- Balance inputs,
- increase efficiency,
- improve manure management

Policy and decision makers

- Create incentives for nutrient recycling developments
- Remove regulatory barriers for innovation
- Ensure creation of market for recycled P products

Discussion/comments:
Why do we not have manure based biogas all over? Can composting ever outcompete biogas, environmentally?

Biogas energy and nutrient solutions

Sari Luostarinen, MTT AgriFood Research, Finland
Biogas can make use of microbiological degradation of organic materials, such as manure, in anaerobic, closed digesters. Un-degraded organic matter in manure can be turned into biogas, the manure nutrients are preserved, and nitrogen is becoming more volatile and more plant available. To achieve all these benefits the whole manure handling chain must be optimized. This includes quick collection from housing, long retention time in digester, post-digestion, covered storage, optimal timing, method and doses for digestate spreading.
However, different manure types have different energy content and therefore energy yields of manure based biogas can be increased with suitable co-substrates. Technically, much of the energy potential is in solid manure and requiring costly pretreatment.
Agriculture produces around 186 mio. tonnes of manure total in BSR - about half is available for biogas (> 100 Livestock Units). At present only 4 mio. tonnes are used for biogas (excluding the two German Länder, with no manure biogas data). The Techno-economical biogas potential is 17-34 TWH/a (61-122 PJ).
Manure as a biogas substrate is valued differently in different countries.

- EXAMPLE 1: the target in Denmark is to have 50% of manure in energy production (=biogas) by 2020 – subsidies available / planned to promote manure based biogas in particular
- EXAMPLE 2: the feed-in tariff for biogas electricity in Finland is not available for plants with less than 100 kVA of efficiency – rules out all smaller, manure based biogas plants.

Many bottlenecks are present – but not the same in all countries: Heavy permission procedure, lack of knowledge, changing legislation, challenging profitability etc. may be national constraints.

How to organize a mobile separator – case Bornholm

Elisabeth Falk, Agriculture of Bornholm

An Intensive animal production is found on Bornholm. A larger biogas plant is found – Biokraft, established in 2005, but was hit hard by the economic crisis. Baltic Deal had an opportunity to increase the biomass input to BioKraft by investing in a mobile slurry separator. Six pig farmers decided to invest 100.000€ in a cooperative mobile separator to keep the investment low, to reduce smell, to reduce transport of water, to add fibers in the biogas plant. This was a cooperation achievement by Baltic Deal and Baltic Compass, which provided 75% investment support.

In profitability calculations the utilization rate of raw slurry and separated slurry differs significantly. The repayment period is defined as the number of years it will be before the investment will breakeven, and at a difference of 30% in utilization rate, this makes the repayment period 3.78 years. The repayment period is, with a difference of 15% in utilization, 15.13 years.

Investments in slurry separation can be a good, but also a very bad decision at a farm, as shown in the examples. Therefore, calculation has to be made with the economic parameters from the actual farm in the actual country. It shows, that cost – benefit analyses, profitability and repayment period are important key factors in agro environmental decision making.

However, other factors may influence the decision, such as reduced smell for neighbors, more “secure” and harmonized manure and the desire to contribute to keep the biogas plant running on Bornholm.

Manure production and handling techniques on large-scale farms in the Baltic Sea Region

Erik Sindhøj and Lena Rohde, JTI, Uppsala

Manure handling chains on large-scale (IPPC) farms in BSR (poultry, pigs and Cattle) have bee studied: Housing, storage, processing and field application. Five farms pr country were included, 2 dairy, 2 pig, 1 poultry, in 6 countries. The farms had a total of around 110.000 Livestock Units. High livestock densities (livestock Unit/hectare) were found on pig and poultry farms. Pigs have slurry systems, poultry mainly solid manure and cattle may have both systems.

Pig and cattle farms are mucking out daily/frequently, whereas poultry is once per brood. 29% of the farms have manure processing (biogas, separation etc.). Uncovered manure storage is still far too common, many have stable crust, few covers have roofs. Storage capacity average 7 months for dairy farms, and 9 months for pig farms.

Bandspreading of manure the most common technique, broadcast can still be seen. 20-40 tons manure pr hectare is a common level, but depending on the crops. Most manure is spread in April and Maj and some late summer spreading for winter crops.

Manure processing on the farms were screw press and decanter centrifuge, acidification, drum composting, slurry cooling and biogas. P amount in the feed reflects the P coming out of the animal - and to some extent out of the stables, but more factors affect this.

Conclusions:

- Most of manure is slurry,

- Large variation in manure produced per LU – even for similar livestock types
- examples of manure handling techniques are found in all countries
- Cost is the greatest barrier for implementing innovative handling and processing technologies

Innovative manure handling technologies – Agrotechnology Atlas

Henning Lyngsø Foged, Agro Business Park, Denmark

Agrotechnology atlas is based on data input from Baltic Compact, and other projects. The purpose is to make a wider use of the best available agro-environmental technologies. The atlas is science-based, verified and impartial - as 2/3 of customers do not believe in company information. Verification is expensive (50-100.000 €), and the info should be covering more countries (the potential market). The atlas will make such information available.

The technologies are related to Nitrates, WFD and IPPC directives, a total of 58 technologies are found in the atlas (11 categories). Many organic materials and biomasses can be found, e.g. 14 categories of livestock manure and 130 scientific datasets, including references on the characteristics of the biomasses. The atlas contains various tools for e.g. mixing organic materials and biomass, for ammonia emission calculations, for nutrient cycle optimization etc. the example of mineral fertilizer consumption in Denmark has been halfed over 30 years, maintaining the same productivity - increased efficiency.

A paradigm shift is expected, going from indirect to direct regulation or from relative to absolute pollution. The future question is not how much manure nutrients a pig produce, but how effective
the nutrients are recycled recycled on the pig farm. Each farmer will have a quota for emission of ammonia, GHG, odour etc. and the farmer should just comply to the quota.

The technology atlas was illustrated by examples: Mobile separator at Bornholm, Air cleaning unit, roof on slurry tanks, acidification of slurry, biogas production etc.

The current challenge for the ATLAS is to expand and further share the recognition and use.

Holistic perspective on manure management

Lorie Hamelin and Henrik Wenzel, University of Southern Denmark

Three main points are discussed to define the environmental ideal, now and in the future.

- Address the whole manure chain
- Include all substances affected
- Address interactions with adjoining system

The methodology is an explorative approach for the future, a range of scenarios. These could be more people, more meat, animal welfare, bioenergy, yield increase, P decline, climate change etc. For this approach, systems integration is needed: the land system, the energy system, and (organic) waste system.

- The demand for biomass/food is increasing faster than production increase land is a limiting factor
- Food/feed cultivation versus energy crop is a basis for LCA.
- Fodder production is the 'hot spot' of BSR manure chain

Hydrogen production by renewable energy sources can be used to upgrade a syngas (from biomass) through hydrogenation – this is a way to have less biomass production. The surplus H_2 can also be used to produce fertilizer and amino acids reducing feeding impact.

Methane gas has the potential for storage of renewable electricity in periods of surplus wind power. The precious biomass can be used when no wind electricity is produced resulting in a flexible energy system. Biogas - based on manure – is ideal for nutrient and carbon cycling. Organic materials without feed value should be prioritized for biogas. Biogas is a key link to future system integration – and thereby the environmentally sustainable solution.

Baltic Manure Project recommendations

Knud Tybirk, Agro Business Park, Denmark, Sari Luostarinen and Johanna Logrén, MTT Agrifood Research, Finland

Baltic manure has been focus on research and business, but also promised policy recommendations, and we have worked on these preliminary recommendations for discussion.

Overall we recommend that we should

- Improve the use and recirculation of nutrients
- Increase in-depth knowledge of manure nutrient content and
- Communicate manure technologies to advisors and farmers

More specifically, the project recommends that locally produced fodder proteins and synthetic amino acids should be encouraged to reduce the global impact of livestock production. The animals should be fed according to their life phase and the farmers should reduce the water spillages to produce a manure with less water and high fertilizer value. The manure should be collected quickly and kept cool and covered and farm business plan for technology investments should make it clear what would be profitable at this specific farm. Acidification and/or separation can be recommended where feasible, and manure based biogas is positive, if the digestate is treated properly and the co-substrates are sustainable.

Storage capacity should be sufficient and the best technologies should be used to bring the manure to the crops at the right time, with precision agricultural technologies and at the needed dose according to the crop and soil.

Manure should be utilized in closed nutrient cycles, we should utilize the energy, consider the fertilizer values, stimulate business innovation, offer incentives for cooperation farmer-to-farmers and research-to-business.

Parallel session: Closing nutrient cycles

Nutrient balances as an advisory tool, Case Poland

Marek Krysztoforski, AAC Poland

For balancing nutrients and manure management, several approaches could be relevant:

- field balance vs. farm gate balance (the whole farm)
- there is a large variation between farms of how their nutrient balance is produced: on organic farms legumes and on conventional farms fertilizes and feed are a large part of the balance

Examples of nutrient balances are presented for dairy farm, pig farm, sheep farm, crop farm, mixed farms.

- Nutrient balances is a good tool for advisory service

- farmers are motivated to improve the use of nutrients
- farmers perceive amount of components dispersed to the environment

Still, the approach requires further work and unifying methodology. In Poland, routine fertilization is common, but not recommendable. Good soil analysis is needed.

Policy recommendations for Poland: fertilizer recommendations should be altered, focus on full time farmers, improve manure handling

Discussion: cover crops used also in Poland, it is always good to improve the methodology of nutrient balance calculation.

Ecological recycling agriculture: Integrating animal and crop production

Artur Granstedt, Södertörn University, Sweden

N-surplus in Baltic Sea Region is increasing in line with animal density. In Sweden, from 1950 to 1980 the average use of artificial nitrogen fertilizers increased from 20 kg to 80 kg per ha and year. The animal production is concentrated in certain parts of countries. The long term goal is that there should be connection between animal and plant production; implying cooperation of plant and animal farms, e.g. between central and southern Sweden.

Ecological recycling is needed for the soil, food, sea and climate ERA can reduce the nitrogen surplus of agriculture compared to contemporary agriculture. A common agricultural conversion program to realize ecological recycling program to realize ecological recycling agriculture based on renewable resources.

Discussion: is own feed production necessary for closed nutrient cycle and reduced nutrient leaching? 20% nitrogen content would be okay, in certain parts of Sweden the N-balance is higher than others.

The perfect match – P fertilizer demand and fertilizer rates

Silvia Haneklaus and Ewald Schnug, Institute for Crop and Soil Science, Julius Kühn-Institut (JKI) Braunschweig, Germany

Worldwide P reserves are finite so that a sustainable use of P is imperative on a global scale. However, the P intake with food products doubled since the 1990s.

P resources need to be used effectively in agriculture. We waste too much food and eat so much meat that P use is increasing. In intensive German livestock farms manure 170 kg N is topped with mineral fertilizers and the result is increasing soil P levels.

Options for increased P efficiency are: more P efficient plants, targeted feeding, site specific P management and safe recycled P fertilizers. The ultimate target is a closed P cycle on farms. Spatial variation of P in the field can be huge and if there is no deficit of P in the soil, P application should according to the off-take of the plants. All of P in manure will be available for plants eventually (not on the first year)

We should aim at geocoded soil samples: nutrients, organic matter, biological activity etc. Norms of recycled fertilizer products are needed (P availability to plants, hygiene etc.)

Recommendations to farmers; own farm experimentation, demand full declaration for fertilizer materials, treat soils as unique heritage.

Recommendations to policymakers: Mandatory recordings of manure whereabouts is needed, balanced fertilization, declaration for fertilizer materials.

Discussion: is it too much for all farms to make experiments? Demofarms where farmers can see experiments, all the tools are ready, it is only up to farmers to take them

Closing nutrient cycle with farm cooperation

Arja Peltomäki, farmer, Finland

- The cooperative area has increased within the last years, written agreements with two farms, distances 1-20 km
- all the cereals for feed are bought from neighbouring farms + peas etc.
- manure is the only fertilizer for the farm
- always the question about who is paying for the transport
- reasons for cooperation: no need to invest in all, saves time, crops sold

Discussion: needs to be win-win to all cooperating farms,

Session Discussion:

How to get farmers to count the balances? 48 Baltic Deal demofarms are involved, also focus on nutrients, necessary to product food and not just extensive agriculture.

How can conventional farms cooperate? Example from Finland: farms with animal production want to have bigger units but they don't have the field area to spread the manure and want to concentrate to animals, for crop farms manure is good fertilizer with fiber etc. especially dry manure. A matter of psychology: trust! Also other farmer needs to win in the cooperation.

How can precision farming work with P when N/P ratio is fixed? The farmers who make a profit will apply precision tech for liming. For other application the algorithms are available. Farm specific N/P combinations can be made. With manure: the amount should be based on P demand, but you cannot get rid of the manure this way so you need to cooperate or use technologies.

Nitrogen is the main limiting factor especially in organic farming.

How to retrieve nutrients from organic wastes

Judith Schick, Silvia Haneklaus, Ewald Schnug, Institute for Crop and Soil Science, Julius Kühn-Institut (JKI) Braunschweig, Germany.

The challenges for nutrient recovery are: heavy metals, organic pollutants, pharmaceuticals, pathogens, chemical and physical composition. A possible solution is to design new process to produce NPK – or PK from recycled materials. A market is needed.

Among the present technologies for recovery from waste water or sewage sludge, urine, slurry, meat and bone meal; all have some problems still.

In conclusion, nutrient-recycling with focus on P is essential.
Recommendations:

- Threshold values for heavy metals,
- mandatory mixing of recycled P with rock phosphate P,
- charges/taxes on Cd and U in mineral P-fertilisers,
- support to the technology development

Discussion: most potential in sewage sludge ash and manure separation

Safety of recycled fertilizer products

Sanna Marttinen, MTT AgriFood Research, Finland

Wastes are a remarkable source of nutrients but three safety aspects to take into account: phytotoxicity, pathogens, organic chemicals, (hazardous metals).
Studies were done in biogas plants: pasteurization reduced the amount of pathogens, hazardous chemicals are regularly present in biogas digestate, but resulted in no immediate hazard to food safety. Digestates did not unfold significant phytotoxic effects when rates were applied to satisfy the nutrient demand of the crop. Digestate seemed to offer additional advantages to plant growth that cannot be obtained by using mineral fertilizer alone.
In general, evaluation of the quality of organic fertilizer products requires several methods - both chemical and biological - or the use of a test battery composed of several complementary assays in order to avoid false results.
Hazardous organic chemicals are regularly present in biogas plant digestate, but for most of the compounds, the calculated specific load pr. ha was similar to the atmospheric deposition. Agricultural use of digestate is unlikely to cause immediate hazard to food safety from most of the compound groups studied.
Conclusions

- we should reduce chemical loads to the environment
- we should develop methods to remove hazardous substances from biogas digestate

Lejre ecological municipality – a vision for 100% ecological community

Henning Hervik, Ecoadvice, Denmark

A vision 'The ecological municipality' was born in January 2011, and dialogue meeting with local farmers was held in April 2011 and 12 12 local farmers and formed "Organic matrixfarm". The focus is on

cooperation between producers; farmers, private gardens, municipality farmland and church farmland, but also farmers and consumers (Biogas), and public kitchens and distribution.
The goal is that the municipality will be 100 % organic. Focus areas are meetings and advisory, cooperation between producers, private gardens, municipality farmland, ecological food in municipality, young people, private consumers to achieve the goals.

Transition towards sustainable nutrient economy

Helena Kahiluoto, Principal Research Scientist, MTT Agrifood Research, Finland
In current agriculture system the limits of the planetary boundaries are exceeded and the problem cannot be solved only in the fields. Critical for oceans is especially the quantity of nitrogen conversion to reactive form in fertilizer manufacture, biological nitrogen fixation and combustion of fossil fuels. Regarding phosphorus, the global carrying capacity is first at the edge of becoming crossed from the viewpoint of oceans. For phosphorus, critical is the continuous flow from the virgin resources through fields, waste water plants and from sewage further to watercourses. Altogether, most of the nutrients are managed in agrifood systems.
In the NUTS project, we have posed the question, how big a transition in the agrifood system would be needed to return to within the safe space in nutrient use, what kind of optional transitions would lead to the right direction, and how such a transition could be supported. It has turned out that to reach that goal, three fourths of the current conversion of nitrogen to reactive form, as well as 90% of phosphorus flows to waters, have to be avoided

An important part of the process is the on-going interaction and in-depth interviews with stakeholders to identify the key frictions and possible solutions and thus determine the optional transition pathways.

Parallel session: Slow the flow to the sea

Session opened by Kaj Granholm: the water regime in the BSR has changed over the last century. Water is flowing faster and the agriculture is intensified. The natural retention time has decreased. This was also pointed out by some of the speakers.

Design and location of constructed wetlands for optimal phosphorus retention

Pia Kynkäänniemi, Dep. of Soil and Environment, Swedish University of Agricultural Sciences
Storage capacity of soils has decreased, and water velocity has increased, along with intensified agriculture & use of fertilizers. Construction of wetlands has started to increase sedimentation - most important to reduce phosphorus (P). Most sedimentation by the inlet bound to soil particles. The most important factors when planning a P wetland are placement in the landscape, size, depth, and water residences time. The lower in the catchment, the larger wetland is needed. The highest specific retention occurs when P concentration is high and the water flow is low.
Recommendations to farmers: use small wetlands – if they are placed close to the P source, the amount of water passing is smaller and the area needed for the wetland decreases. P in sediment can be recycled back to the fields.
Recommendations to policy makers: Increase subsidies to farmers building P wetlands. Provide subsidies also for maintenance. Divide payments for subsidies since the process of building a wetland is long and the construction may be expensive.

Controlled drainage and other SCIEN drainage technologies – results from Hofmansgave pilot project

ABP film and introduction by Kaj Granholm, Swedish University of Agricultural Sciences:

Half the farm land in the BSR is drained. Controlled drainage can be used to store water and retain nutrients in the field (by keeping the water from discharging). Controlled drainage can be very efficient in reducing N leaching and should also be an efficient measure for reducing P. Specific conditions: clay content and slope. In Denmark about 10 % of the agricultural area is suitable for the measure. The measure is probably not profitable by itself but is together with wetlands and riparian buffer strips a good measure for nitrogen (N) removal. The measure may be profitable as an alternative to the compulsory catch crops in Denmark.

Applications of SCIEN drainage technologies – examples from Germany

Uwe Rammert, State Agency of Agriculture, Environment and Rural Areas of the German Federal State Schleswig-Holstein (LLUR), Germany):

Bottom-up starting point/ problem based approach. Aiming to change the fact that crop growing on higher elevation was withering at the same time as lower parts of the field were still saturated with water. Another aim is to end up with healthy crops, to reduce of nutrient losses, to comply with WFD and other directives, and in the same time saving time and money. The process ended (after data collection, analyses and discussions) in a set of solutions:

- controlled drainage,
- collecting ponds,
- collecting ponds with micro algae that can be harvested and used as fertilizers or other products, the harvesting technology needs to be developed.

The problem based approach is time consuming, but generates many ideas. However, these need some shaping (analyses and discussions with different stakeholders and experts) in order to become “solutions”.

Environmentally preferable 2-stage channels: Results from the Ritobäcken Brook

Kaisa Västilä, Aalto University, School of Engineering, Finland

Brooks and wetlands have been modified for agricultural purposes.

To improve habitat diversity and water quality and also to create a more self-sustaining channel, a 2-stage channel was created in an area that was often flooded. A 2-stage channel includes a main channel and a flood plain with vegetation (natural grass vegetation or planted willows) that traps nutrients and decrease the water velocity. Development of floodplain vegetation increased the flow resistance and decreased the mean velocity. The floodplain vegetation should be mowed regularly to prevent nutrient leaching from decaying vegetation.

The result was improved drainage of the field, decreased water velocity and trapped nutrients and the farmers were positive to the result.

Recommendations to farmers: consider 2-stage channels instead of normal ditches, and if implementing – facilitate monitoring.

Recommendations to policy makers: consider using part of the funding for research of 2-stage channels, support both basic and applied research, and foster a holistic thinking about agricultural water bodies.

Making it happen – recommended actions from policy and society

National experience and expectations for meeting multiple agri-environment objectives by water retention measures,

Ville Keskisarja, Ministry of Agriculture and Forestry, Finland.

There are aims to implement water retention measures to reach the requirements of the Water Framework Directive. The measures can be implemented on different scales (field – landscape).

Water retention measures supported by the Rural Development Programme are controlled drainage, environmental engineering and restoration of streams and rivers (2-stage channels, re-meandering), wetlands, buffer zones, floodplains.

However, the uptake rate of measures is low. In Finland 600 000 ha are suitable for controlled drainage, only 50 000 implemented since 1995; there are 50 000 sites where wetlands are suitable, only 500 exist.

The impact of Natural water retention Measures on the runoff to the Baltic Sea is non-existent. In both EU 2020 strategy and CAP 2020 sustainability, climate and water protections are properly acknowledged in the main objectives. The question is how to increase the uptake rate – is the answer to increase the support or are there other and more effective better solutions? Are the measures too complicated?

Drainage – a water and land use issue

Tomas Johansson, Water Management Division, Swedish Board of Agriculture.

In order to take care of nutrients and other input invested in the crop, to ensure a good yield, drainage is needed in our climate (precipitation larger than evapotranspiration).

We need to consider the value of land both as basis for food production and as natural habitat or area for flood prevention measures. Land suited for agriculture should be well drained. Land that is not suited for agriculture should be used for other purposes.

In Sweden there is now a growing interest for drainage – we should take advantage of this. Drained land is a prerequisite for sustainable agriculture with maximum benefit of added nutrients and other inputs.

Recommendations: Good soil structure is needed to maintain drainage. Drainage systems should be kept in good condition. Legislation must benefit both agriculture and water. Knowledge, understanding and cooperation are needed.

Drainage systems and national plans – agro-environmental and production perspective

Jūlija Travina, Ministry of Agriculture of Latvia

The drainage systems are in need of renovation within the next decade. Both forest and agricultural land suffers from excess moist. Today 30 % yield loss is expected to be due to degraded drains. Monitoring of Latvia's surface water quality is carried out by the Latvian Centre of Environment Geology and Meteorology. Several measures are available, but there is lack of funding and also a lack of interest in hydro technical education among young people. The measure «Investments into material assets» of the draft Program contains an activity «Infrastructure linked to the development of agriculture and forestry» under which the support will be provided for reconstruction and renovation of amelioration systems.

The average age among hydro technical experts are 62 years. There is a need for young experts, information and funds. If the situation is not changed urgently, only a small part of inherited amelioration systems will be functioning in the future.

How to integrate technology and policy in international cooperation on the BSR level?

Mikhail Durkin, HELCOM

Agri-environmental cooperation takes place in different levels. There is a variety of stakeholder interests and strategic as well as practical topics to come to terms with.

Policies can be developed in different ways: top –down or bottom – up; a balance between the two approaches is preferable. In the Baltic Sea Region the top – down approach is better established than the bottom – up approach where a natural body/forum on the highest level, above the macro region (EUSBSR), is missing.

HELCOM has its basis in science. A palette of agri-environment measures has been put together to transform scientific knowledge into recommendations that are applicable in reality. The palette will be updated and added on to, when new knowledge is gained.

Poster and mingling Session, Awards

During this session the Baltic Manure Handling Award was revealed by Anne-Luise Skov-Jensen from Agro Business Park, Denmark. The winner in 2013 was the German company **Weltec Biopower** with an innovative pre-treatment of deep litter and other sustainable co-substrates for manure based biogas. In addition, a special mention of **BioVakka OY** from Finland was given to their innovative work on separation and handling the digestate into marketable fertilizer products.

More info can be found here:

http://www.balticmanure.eu/en/news/solid_manure_can_replace_maize_for_biogas.htm

Before the conference dinner, WWF announced their Baltic Farmer of the Year Award. Many farmers take innovative measures to help reduce nutrient runoff to the Baltic Sea and achieve sustainable farming. With the Baltic Farmer of the Year Award, WWF aims to highlight how important their work is and showcase their good examples across the region. The regional winner of 2013 was Juhan Särgava from Estonia, who says "It is necessary to form, develop and boost positive attitudes towards environmentally friendly and organic production."
More can be found here:
http://awsassets.panda.org/downloads/wwf_balticfarmeroftheyearaward2013_final_lr.pdf

Plenary session

Ewald Schnug, CIEC; International Scientific Centre of fertilizers

CIEC is acknowledging the broad group of stakeholders present at GABBS from farmers to business, ministers and researchers. That is a great Forum to discuss the agriculture and Baltic Sea relations: Stick and carrot should be taken into account, and we should keep up the pressure: Let us stick together to keep up the pressure.

Elena Kolosova, Joint Technical Secretariat, Baltic Sea Regional Programme.

Four BSR projects have contributed with focus on agriculture and environment - Agri-environmental solutions. Beras, Baltic Manure, Baltic Compass, Baltic Compact and Baltic Deal – plus the Baltic Impulse Cluster.

The cooperation of the projects is excellent during this GABBS conference. It is a developing and true platform for discussions and crossing opinions. Joint messages can reach more stakeholders (EU, Helcom, national ministries). A new brochure is now ready for stakeholders.

Discussion:

Sustainability is not only agriculture and environment, but also economic development and social interactions between the stakeholders.

Innovation, cooperation, communication and integrative solutions are the answers on how to achieve a Greener Agriculture and Bluer Baltic Sea.

Policy comment – how to proceed?

Andrzej Jagusiewicz, Chief Inspector for Environmental Protection, Poland

This is a very timely event - for the Helcom meeting. Ministerial declarations, we influence our ministers. We started with policy statements from Finnish ministers. We should connect HELCOM to ministries and BSAP. This work deserves a footprint in the Helcom declaration.

Progress can be done through pilot projects and demofarms. Cooperation between projects and programmes is the way forward. Multitudes of stakeholders meet and discuss. Let the snowball roll.

Nutrient is a keyword. Nutrients are not pollutants as such, it should be considered a resource for food production. The limits of 170 kg N and 25 kg P pr. hectares should be implemented on all fields, taking into account input-output balances.

All consumers are responsible for the status of the Baltic Sea: Detergents, meat consumption produce manure etc. Vision of the Healthy Baltic Sea: good ecological status and human activity producing the needed food. Sustainable food security is what we should strive for. Wastes are by-products or side-products - it is precious resources, the nutrients should be recycled into the food production system. More for less. Slow the flow is an important aspect: not technology, just common sense.
Wind of change is blowing to the farmers and all stakeholders around the Baltic Sea. Balance, solidarity and shed burdens are keywords. We need to reduce N and P losses by 50%, Helcom will fight for final targets for nutrient loads. When we close the nutrient cycles, we can have a clear and clean Baltic Sea.

Next GABBS conference could be in Poland, we will approach the ministers for financial support.

Closing

Markku Järvenpää, MTT, Finland, on behalf of the organizing committee.
Thanks to moderators, all organizers, sponsors and participants.
Ringing the final bell, hopefully next time we'll meet in Poland!

Annex 1 Programme

Programme Day 1: Tuesday 27 August 2013

08:00 - 09:00	Registration
The Baltic Sea and agriculture – perspectives from policy and practice	
09:00 - 09:05	Opening and welcome *Markku Järvenpää, Director, Technology Research, MTT Agrifood Research Finland*
09:05- 09:25	Nutrient recycling in Finland – State of play *Ville Niinistö, Minister of the Environment, Finland and Risto Artjoki, State Secretary, Ministry of Agriculture and Forestry, Finland*
09:25 - 09:45	Common goals to reach the Baltic Sea in a good environmental status – working together with the agricultural sector *Mikhail Durkin, Professional Secretary, HELCOM*
09:45 - 10:15	Success stories about farming in the Baltic Sea Region *Toni Haapalainen, farmer, Finland*
10:15 - 10:40	Break
Seeing the bigger picture - different visions for the future BSR agriculture	
10:40 - 11:00	From pollutant to resource - EU action on nutrients in the Baltic *Paul Speight, Head of Unit, Enforcement, Cohesion Policy and European Semester, European Commission*
11:00 - 11:20	Balancing global needs, intensive agriculture and the environment *Niels Peter Nøhring, Director of Environment and Energy, Danish Agriculture & Food Council*
11:20 - 11:40	Systemic change needed in the food system to obtain sustainability *Colin Leifert, professor, Newcastle University, UK*
11:40 - 13:10	Lunch
13:10 - 13:30	The bigger picture – systems perspective into nutrient management *Mats Johansson, Ecoloop Sweden*
13:30 - 13:50	From words to actions – catalysing change *Ilkka Herlin, Chairman of the Board, BSAG*
13:50 - 14:20	Discussion
14:20 - 14:30	Introduction to parallel sessions *Knud Tybirk, Biomass Manager, Agro Business Park, Denmark*
14:30 - 15:00	Coffee

Parallel sessions: Solutions for farms – practices and technologies

	1 Making the most of manure	2 Closing nutrient cycles	3 Slow the flow to the sea
15:00 - 15:20	What to do with manure in the BSR (Overview) *Markku Järvenpää, Director, Technology Research, MTT Agrifood Research Finland*	Nutrient balance as an advisory tool - Case Poland *Marek Krystoforski, Main specialist in plant production and agri-environmental programmes, Agricultural Advisory Center CDR, Poland*	Design and location of constructed wetlands for optimal phosphorus retention – considerations of planning within the drainage network *Per Ryrkäänniemi, Swedish University of Agricultural Sciences*
15:20 - 15:40	The P- resource, status and opportunities for agriculture *Lars Stoumann Jensen, Professor, University of Copenhagen, Denmark*	Ecological recycling agriculture: integrating animal and crop production *Artur Granstedt, Associate Professor, Södertörn University, Sweden*	Controlled drainage and other SCIEN drainage technologies – results from Hofmansgave pilot project *Søren Kolind Hvid, Knowledge Centre for Agriculture, Denmark*
15:40 - 16:00	Biogas – energy and nutrient solutions *Sari Luostarinen, Principal Research Scientist, MTT Agrifood Research Finland*	The perfect match – P fertilizer demand and fertilizer rates *Silvia Haneklaus, Dr. & Prof. Dr., Julius Kühn-Institut JKI, Germany*	Applications of SCIEN drainage technologies – examples from Germany *Uwe Ramonat, State Agency of Agriculture, Environment and Rural Areas of the German Federal State Schleswig-Holstein (LLUR), Germany*
16:00 - 16:20	How to organize a mobile separator - Case Bornholm, Denmark *Elisabeth Falk, Agricultural and Environmental Advisor, Bornholms Landbrug, Denmark*	Closing the nutrient cycle with farm co-operation *Arja Peltomäki, farmer, Finland*	Environmentally preferable 2-stage channels: Results from the Ritobäcken Brook *Kaisa Västilä, Aalto University, Finland*
16:20 - 16:50	Discussion	Discussion	Discussion

Poster presentations and mingling session	
17:00 - 18:30	Posters and stands The Baltic Manure Handling Award Ceremony Drinks and snacks
Conference banquet	**Dinner Menu: Land & Sea**
18:30 - 19:15	The Baltic Farmer of the Year ceremony
19:15 - 00:00	Dinner and live music

Crayfish and vegetable cake with saffron mayonnaise
Lamb sirloin, well-cooked lamb shoulder, red wine sauce and vegetables of the season
Chocolate-praline cake

Programme Day 2: Wednesday 28 August 2013

Parallel sessions: Making it happen - recommended actions from policy and society

	1 Making the most of manure	2 Closing nutrient cycles	3 Slow the flow to the sea
08:30 - 08:50	Manure production and handling techniques on large-scale farms in the BSR *Erik Sindhøj, JTI, Sweden*	How to retrieve nutrients from organic wastes *Judith Schick, Scientist, Julius Kühn-Institut (JKI), Germany*	National experience and expectations for meeting multiple agri-environment objectives by water retention measures *Ville Keskiaro, Ministry of Agriculture and Forestry, Finland*
08:50 - 09:10	Innovative manure handling technologies - Agro Technology ATLAS *Henning Lyngsø Feged, Project manager, Agro Business Park, Denmark*	Safety aspects of recycled fertilizer products *Sanna Marttinen, Principal Research Scientist, MTT Agrifood Research Finland*	Drainage - a water or soil issue *Tomas Johansson, the Swedish Board of Agriculture*
09:10 - 09:30	Holistic perspectives on manure management – what is the best way? *Lene Hemelin, Post Doc, University of Southern Denmark*	Societal aspect: Lejre Ecological Municipality. A vision – 100% Ecological *Henning Henrik, Organic Advisor, Ecoadvice, Denmark*	Drainage systems and national plans – agro-environmental and production perspective *Jolija Treimiņa, the Ministry of Agriculture of Latvia*
09:30 - 09:50	Coffee	Coffee	Coffee
09:50 - 10:10	Policy and technical recommendations for manure handling *Knud Tybirk, Biomass manager, Agro Business Park, Denmark*	Transition towards sustainable nutrient economy *Helena Kahiluoto, Principal Research Scientist, MTT Agrifood Research Finland*	How to integrate technology and policy in international cooperation on the BSR level? *Mikhail Durkin, HELCOM*
10:10 - 10:30	Discussion	Discussion	Discussion

Making it happen – all together

10:30 - 11:30	Outcomes and recommendations from parallel sessions of the Baltic projects *Moderators: Lotta Samuelsson and Ottilia Thoresen*
11:30 - 12:00	Policy comment – how to proceed *Andrzej Jagusiewicz, Chief Inspector for Environmental Protection, Poland*
	Closure of the conference
12:00 - 13:00	Farewell lunch

NB. Changes to the programme may occur.

Thank you to our conference sponsors!

BIOvakka
YARA
Field Drainage Association
Honkajoki Oy
Ministry of the Environment

Annex 2 Participant list

List of participants: A Greener Agriculture for a Bluer Baltic Sea 2013. A total of 270 participants attended the conference.

Last Name	First Name	Organisation	Country
Ahtela	Irmeli	Uusimaa ELY Centre	Finland
Alitalo	Anni	MTT Agrifood Research Finland	Finland
Almqvist	Sara	Swedish Institute	Sweden
André	Helena	Ministry for rural affairs (Sweden)	Sweden
Anttila	Leena	Ministry of Agriculture and Forestry	Finland
Appel	Barbara	Finnish Ministry of the Environment	Finland
Arbidans	Dainis	Latvian Rural Advisory and Training Centre	Latvia
Artjoki	Risto	Ministry of Agriculture and Forestry	Finland
Balodis	Oskars	Latvian Rural Advisory and Training Centre	Latvia
Beerbaum	Steffen	German Federal Ministry of Food, Agriculture and Consumer Protection	Germany
Bergman	Niklas	Federation of Swedish Farmers	Sweden
Bergman	Mathias	Baltic Sea Action Group	Finland
Bergström	Stina	Baltic Deal, LRF	Sweden
Biveson	Paula	Baltic Sea Action Group	Finland
Bondgaard	Frank	The Knowledgecentre for Agriculture	Denmark
Bosch	Ulrich	Güter Brook und Christinenfeld SD Land- und Fortstwirtschaft GmbH	Germany
Bosch	Maria-Theresia	Farmer	Germany
Briedis	Andrejs	Latvian Fund for Nature	Latvia
Burmistris	Agris	SIA AgTech	Latvia
Cano Bernal	José Enrique	SYKE	Finland
Carlsson	Jan-Christer	Nackunga gård	Sweden
Carlsson	Jaana	Nackunga gård	Sweden
Charytonowicz	Joanna	Chief Inspectorate of Environmental Protection	Poland
Cimermane	Liga	Latvian Rural Advisory and Training Centre	Latvia
Cirulis	Juris	z/s "MEZACIRULI"	Latvia
De Wilt	Jan	Innovation Network	Netherlands
Doneliene	Margarita	Environmental Policy Research Centre, FU Berlin	Germany
Dukurs	Aldis	Farmers Parliament	Latvia
Durkin	Mikhail	Baltic Marine Environment Protection Commission (Helsinki Commission – HELCOM)	Finland
Dzelzkaleja	Maira	Farmers Parliament	Latvia
Eichler-Löbermann	Bettina	University of Rostock	Germany
Ekholm	Petri	Finnish Environment Institute	Finland

Erkkilä	Elina	WWF Finland	Finland
Erlingson	Mogens	Yara AB	Sweden
Falk	Elisabeth	Bornholms Landbrug	Denmark
Finér	Aki	Raisio Group	Finland
Foged	Henning Lyngsø	Agro Business Park	Denmark
Fokiene	Vitalija	Ministry of Agriculture	Lithuania
Galina	Letiagina	farmer	Russia
Giedrikiene	Renata	Lithuanian agricultural advisory service	Lithuania
Gladh	Lennart	WWF Sweden	Sweden
Granholm	Kaj	Sveriges lantbruksuniversitet	Sweden
Granstedt	Artur	Södertörn University	Sweden
Grudovska	Iveta	Training and research farm of the Latvia University of Agriculture "Vecauce"	Latvia
Grönfors	Outi	Kemira Oyj	Finland
Gröning	Annika	Botanical Institute and Botanical Garden, University of Kiel, German Christian-Albrechts-Universität zu Kiel	Germany
Grönroos	Juha	Finnish Environment Institute SYKE	Finland
Gudaitis	Vytas	LAAS	Lithuania
Haapakoski	Toni	Koivurinne Farm	Finland
Hadynska	Anna	wwf poland	Poland
Hagelberg	Eija	Baltic Sea Action Group	Finland
Hamelin	Lorie	University of Southern Denmark	Denmark
Hammersland	Jorid	Ministry of Environment	Sweden
Haneklaus	Silvia	Julius Kühn-Institut	Germany
Hansen	Cord Hinnerk	WELTEC BIOPOWER GmbH	Germany
Hedlund	Linda	LRF, Lantbrukarnas Riksförbund	Sweden
Heinänen	Pauliina	WWF Finland	Finland
Heiskanen	Jari	SYKLI Environmental School of Finland	Finland
Helkimo	Johanna	Centre of Economic Development, Transport and Environment for Northern Ostrobothnia	Finland
Hellstedt	Maarit	MTT Animal Production Research	Finland
Hemmilä	Tero	Yara Suomi Oy	Finland
Hera	Cristian	Romanian Academy	Romania
Herlin	Ilkka	BSAG	Finland
Hermann	Ludwig	Outotec	Germany
Hervik	Henning	Ecoadvice	Denmark
Hu	Zhengyi	University of Chinese Academy of Science	China
Huzior	Malgorzata	Pomorski Osrodek Doradztwa Rolniczego w Gdańsku	Poland
Hvid	Søren Kolind	Knowledge Centre for Agriculture	Denmark
Hyvönen	Maria	MTT	Finland
Härjämäki	Kimmo	Luonnon- ja riistanhoitosäätiö	Finland
Höll	Andreas	Agrovi	Denmark

Ilsøe	Søren	Knudstrupgaard	Denmark
Isokallio	Kristiina	Ministry of the Environment	Finland
Jadczyszyn	Jan	Institute of Soil Science and Plant Cultivation-State Research Institute	Poland
Jagusiewicz	Andrzej	Chief Inspectorate of Environmental Protection	Poland
Janenas	Mykolas	The Ministry of Agriculture of the Republic of Lithuania	Lithuania
Jarva	Pieta	Baltic Sea Action Group	Finland
Jasius	Saulius	Ministry of Agriculture	Lithuania
Jensen	Anne-Luise Skov	Agro Business Park A/S	Denmark
Jensen	Lars Stoumann	University of Copenhagen, Dept. of Plant & Environmental Sciences	Denmark
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