

Manure makes money

...through technology innovation and marketing.

Baltic Manure is a broker of new technologies and latest research insights for companies and scientists. The business section of the website gives opportunities for business contacts and contracts. Baltic Manure has stimulated that new environmentally optimal technologies are promoted on the market.

Baltic Manure has co-organized manure match making in Poland in 2011, in Jönköping, Sweden, May 2012 and AgroMatch Manure in November 2012 at Agromek, Denmark, revealing the winner of the Manure Handling Award 2012.

At the Business Forum, new technologies are described; news and contacts can be found. Systems to

stimulate business innovation in the BSR countries will be presented with policy recommendations.

Baltic Manure has co-organized the conference A Greener Agriculture for a Bluer Baltic Sea near Stockholm in 2011 and in Copenhagen 2012.

Baltic Manure will in 2013 continue to work analyzing barriers and pinpoint enablers for the technologies on the market through sustainable value chain analysis of manure to fertilizer and manure to energy. This is to inspire policy makers, to stimulate business development and communicate the results to all stakeholders.

Anne-Luise Skov Jensen from Agro Business Park, Denmark, is leading the business innovation work.



KNOWLEDGE

Baltic Manure is a Flagship Project in the Action Plan of the EU Strategy for the Baltic Sea Region adopted by member states in 2009.

It involves 18 project partners from 8 countries with MTT – Agrifood Research as lead partner. The total project budget is € 3.7 million and it is partly financed by the European Union (European Regional Development Fund).



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www.balticmanure.eu

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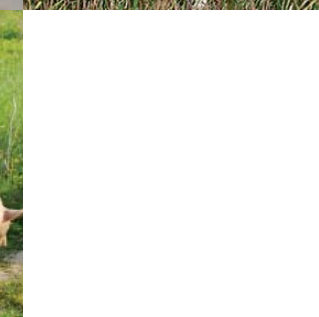
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Baltic Forum for Innovative Technologies for Sustainable Manure Management



Manure is a challenge of today – and an opportunity for tomorrow.

Baltic Manure will change the perception of manure from a waste to a resource product with business opportunities. Highlights of our work in progress are found in this folder...

- Strategies for efficient and profitable use of manure
- Best practices for feeding regimes, as well as fertilizer and manure management
- Energy potentials in manure
- Life Cycle Analyses of manure handling chains
- Brokerage of new technologies and latest research insights for companies and scientists



Manure is not just shit ...

...the quality depends on animal feeding, manure handling practices and innovative technologies for livestock housing, storage and processing manure.

Baltic Manure has conducted surveys on 30 large-scale farms in six Baltic Sea countries to analyze the entire on-farm manure handling chain, from feeding and housing to processing, storage and spreading of manure. Both good and bad examples of manure handling techniques were found on surveyed farms, although few applications of manure processing technologies.

Many bottlenecks for the farmers are analyzed:

- High costs for good storage facilities,
- Logistical costs for transporting and spreading liquid manure
- Potential damage from soil compaction

Farmers must deal with these challenges to fully utilize the nutrient

Lena Rodhe and Erik Sindhøj, Swedish Institute of Agricultural and Environmental Engineering in Uppsala are leading this work.

Manure is fertilizer

...and has to be applied according to soil and crop needs.

Baltic Manure develops new strategies for an efficient and profitable use of manure as a fertilizer. Special emphasis is put on phosphorus since this essential nutrient is a limited, non-renewable resource and high concentrations of P in surface waters are one major contributor to the periodical eutrophication of the Baltic Sea.

Due to spatial variability, the concentration of plant available nutrients in soils can vary significantly which leads to a discrepancy between the site specific nutrient demand on agricultural fields and uniform fertilizer rates. To reduce those surpluses, algorithms and rules for a spatially variable management of manure and recycled fertilizer products will be defined within the framework of the flagship project.

Silvia Haneklaus and Judith Schick, Institute of Soil Science at Julius Kühn Institut, Braunschweig, are leading this work on manure for fertilizer.

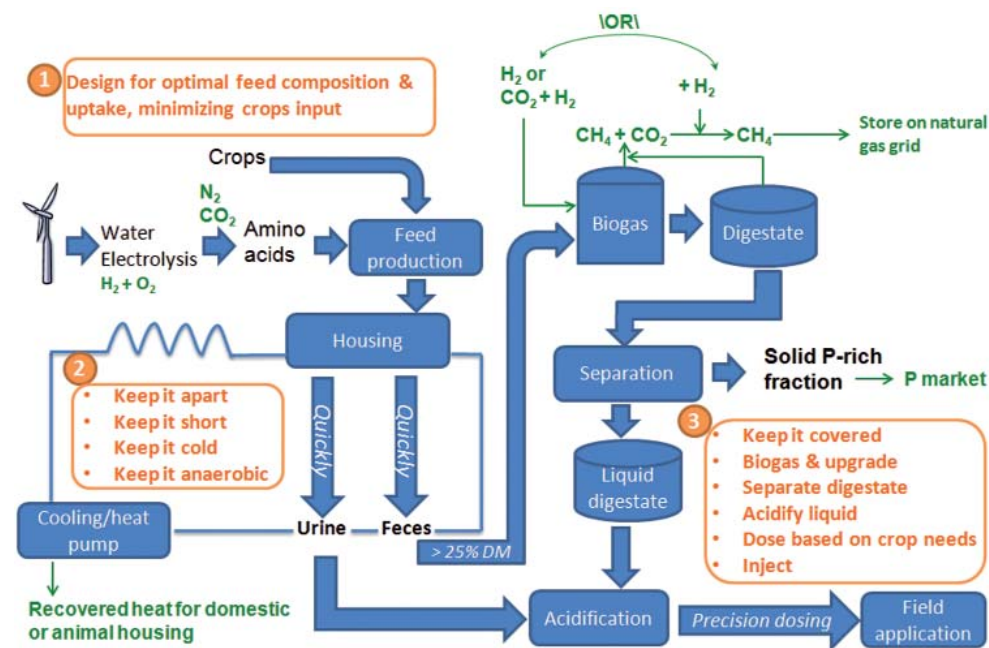
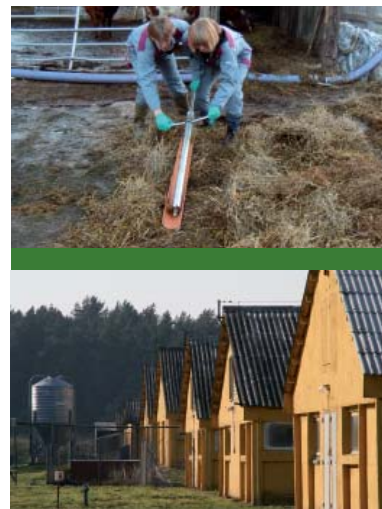
resource potential in liquid manures. Innovative technologies can improve manure resource management and reduce overall costs of manure handling. High investment costs and uncertain returns are major barriers to the implementation of available manure processing technologies.

Some technologies focus on reducing undesirable losses and others focus on separating and concentrating nutrients for easier distribution and possible export. Some technologies are well established and yet not often used, while there seems to be great interest for other technologies that are still in the stage of development and testing.

Animal feeding strategies and diets directly affect manure quality and nutrient content. Therefore, Baltic Manure also examines innovative practices for feeding regimes, including the use synthetic amino acids, mineral P and phytase enzymes to improve the environment and the farms economy.

The processing of manure, e.g. its use as a co-substrate for biogas production has a significant influence on parameters such as the mineral composition and the concentration of plant available P-forms of the product. To be able to compare the fertilizing potential of unprocessed and processed manure, the partners of the project collect various samples in order to set up a data base which provides information about mineral composition and P-availability of the products in relation to the production process.

Baltic Manure has shown that the agricultural use of recycled P-fertilizer products as well as a site-specific and demand driven nutrient management are a valuable contribution towards P-safety in the Baltic Sea Region.



...replacing fossil energy and reducing greenhouse gas emissions drastically.

Baltic Manure calculates energy potentials of manure as a resource in various technologies. Main focus is on biogas technologies, but also thermal gasification and combustion may be a part of the future. The goal is to develop and promote the best practices for energy recovery from manure and to offer tools for implementing manure energy recovery.

Four reports are available on the project website (knowledge forum): Biogas technology, Thermal gasification, Combustion and Examples of good practices in manure energy use. Another report on manure energy potential in the Baltic Sea region and the incentives and barriers for its more efficient implementation is being prepared (autumn 2012). The energy potential will also be tied to manure nutrient

Sari Luostarinen, MTT Agrifood Research Finland, is leading the work on manure energy.

Manure life cycle analysis

...shows the best manure treatments for the environment.

Baltic Manure assesses innovative options for manure in Life Cycle Analyses (LCA). As a first step for this, the reference manure management in selected Baltic Sea Region countries was described. The reference is the way manure is managed when no technologies are implemented.

In total, 18 reference scenarios were built, covering 5 countries (Denmark, Sweden, Finland, Estonia and Poland) and 5 animal production types (dairy, fattening pigs, poultry, bulls and horses). For all these scenarios, a reference manure composition was established, and the flows from and to the environment throughout the whole manure continuum were quantified.

One LCA assessing the environmental consequences of different co-substrates strategies for increased manure-biogas in the Baltic Sea Region has been performed. For ensuring the

Lorie Hamelin and Henrik Wenzel from University of Southern Denmark are leading this work on life cycle analysis.

Manure is energy

content and to the various opportunities to process manure with different co-substrates.

It is already evident that much of manure energy potential lies with solid manure, although housing technologies based on liquid manure are widespread. Technologies and operational solutions to direct more solid manure e.g. into biogas production should be promoted.

Barriers to increase production of manure energy, such as negative perception of manure and its processing, should be actively removed via training and good examples. Similarly, incentives, such as state support systems, should be improved and targeted to the right bits and pieces of the manure processing chain.

Baltic Manure will offer recommendations for policy makers, but also for farmers, to promote the implementation of manure energy.

economical sustainability of manure-biogas, there is a need to boost slurry carbon through the addition of different carbon-rich cosubstrates not already fully used for biogas: energy crops, straw, household biowaste, commercial biowaste, garden waste and source-separated solid manure fraction. The latter means urine and faeces kept separate in the stable systems.

Based on the results of this LCA, this source-separated manure solid fraction is the most environmentally suitable option, followed by garden waste. Energy crops, exemplified by maize silage, is not recommendable, since they give rise to a net greenhouse gas (GHG) emission, due to the indirect land use change it generates.

A Baltic Vision for sustainable manure management has been developed. Separate LCAs representing all 8 technologies included in the vision are being performed.