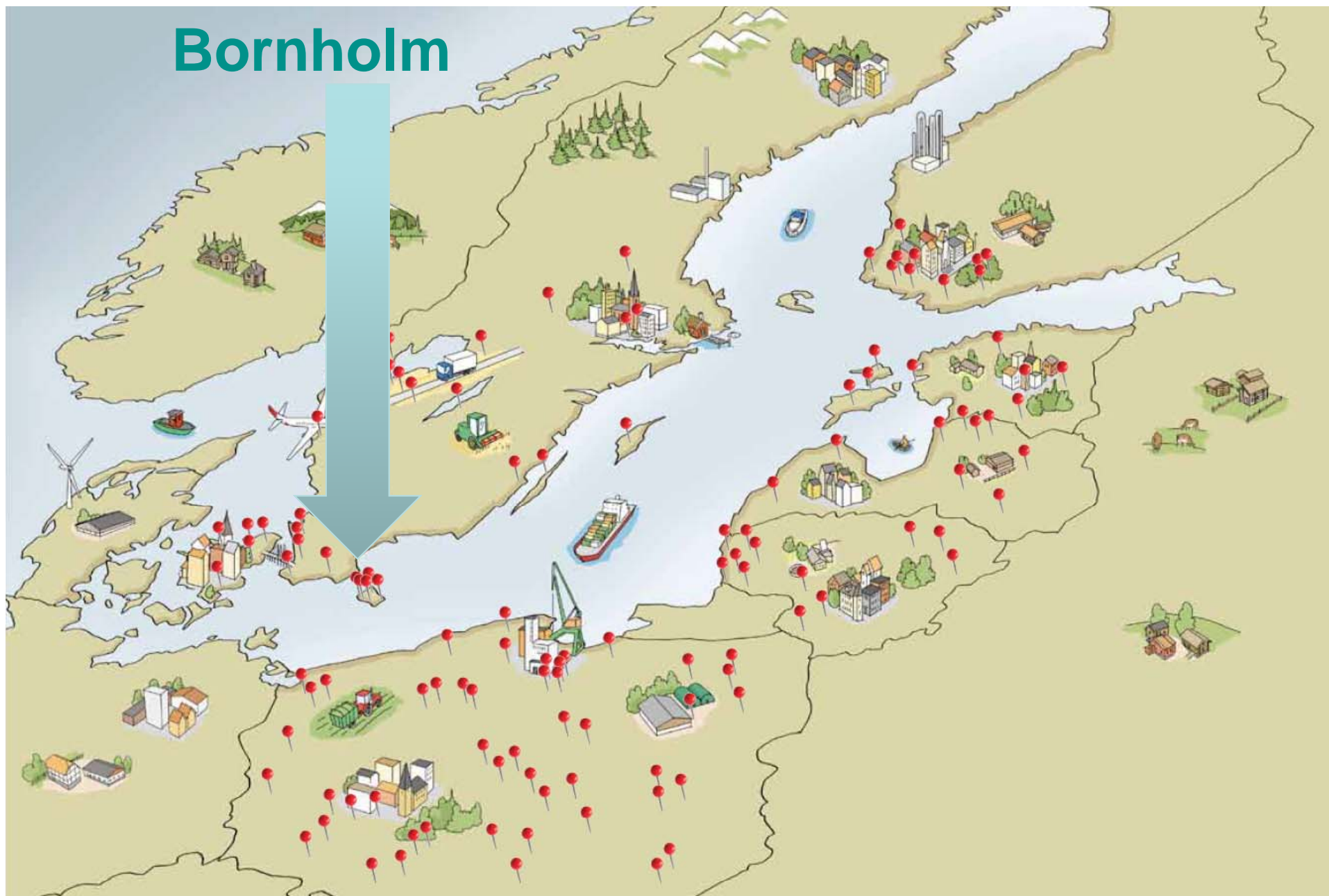


How to organize a mobile separator – case Bornholm

**Agro-Environmental Advisor Elisabeth Falk,
Agriculture of Bornholm**

August 27th-28th, 2013, Helsinki

Bornholm



Intensive animal production on Bornholm

- important for economy and employment
- among the highest density of husbandry in Denmark



Biogas plant BIOKRAFT

- Booming
- Husbandry expanding
- 35.000 euro pr hectare
-
- Gate fee and businees in biogas
- Established 2005



Economic crisis 2008

- Price drop -50% pr hectare land
- Technical problems at biogasplant
- Farmers terminates agreement
- No expanding
- Biokraft hit hard



2010-2013 Baltic Deal Bornholm



More biomass to the biogas plant Biokraft

- Solid fraction from pig slurry by separation



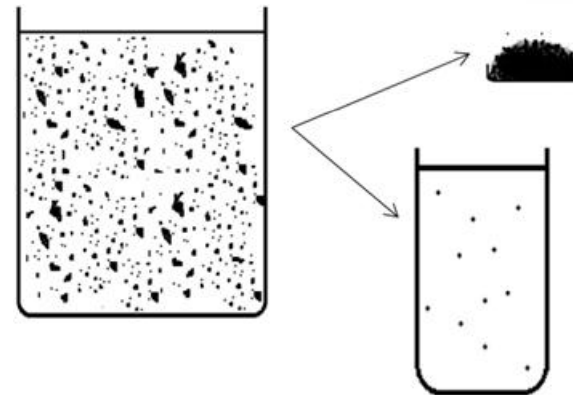
What is slurry separation?

Slurry =

water (88-97 %)

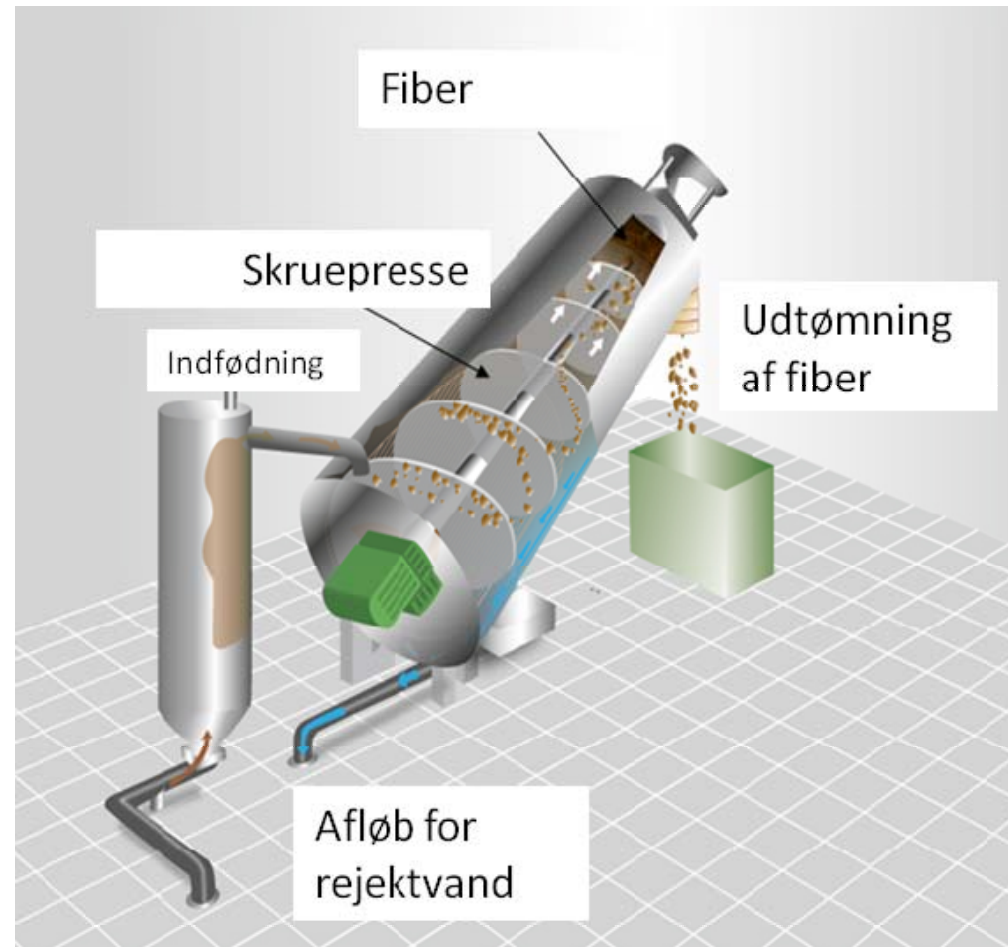
+ fibres (3-12 %)

Separation of slurry
in fibres and rejectwater



Mechanical separation of raw slurry into separated fibre and a separated liquid

The solid fraction will be treated in a biogas plant



What's in mobile separation for the farmers ?

- ✓ Can be used on more than one farm – less investment
- ✓ Better N-utilization – less loss of N
- ✓ Less smell when spread
- ✓ Less transport
- ✓ N:P in rejectwater meet crops need
- ✓ Less investment in agricultural land
- ✓ Fibres used for biogas



Baltic Deal farmers start testing



Samples, analyzes and calculations

OK Laboratorium for jordbrug
Ærøvej 1E 8800 Viborg
tlf 86 60 08 60 fax 86 62 10 19

Analyseattest Husdyrgødning

Indsender: AL-2 Agro A/S, Preben Nissen, Krøgebækvej 25, 6682 Hovborg

Ejer:

Modtaget: 21-06-2011

Prøve nr: 786650

Fiber

Tørstof %	Tot N kg/ton	Ammonium-N kg/ton	Phosphor kg/ton	Kalium kg/ton	Glødetab %
10,78	3,74	1,76	1,28	1,33	88,8

Beregninger Peter Sonne				
Type	Rågylle 786 714	Rejekt 786 619	Fiber 786 659	Afviselser
Prøve ID				
Tørstof i %	7,01	2,58	25,35	
Total N i kg/ton	5,28	4,33	7,88	
Nh4n kg/ton	3,06	3,15	2,93	
Fosfor kg/ton	1,57	0,87	3,32	
Kali kg/ton	1,51	1,74	1,72	
Ton.v.100 t. gylle beh.	100,0	80,5	19,5	0,0
Kg. total N v. 100 t. gylle	528,0	348,8	153,3	25,9
total N i %	100	66,1	29,0	4,9
Kg total P v. 100 t. gylle	157	70,1	64,6	22,3
total P i %	100,0	44,6	41,1	14,2
Gløderest % af tørstof	21,9	35,4	11	
kg Glødetab/ton	54,7	16,7	225,6	
m3 Metan/ton	16,42	5,00	67,68	
m3 Metan v. 1 læs	328	100	1015	
1 læs er tons	20	20	15	

Fuldgødskning				
Kg. N/ De	100	120	65	
Antal DE. Pr 100 t. gylle beh.	5,28	2,91	2,37	
Kg N/ DE i Rejekt v. fuldgødskning		158,99		
Kg. N/ DE. I Fiber skal være mindst 40 kg. så hvis den er mindre i beregningen reguleres der i gødningsvandet, dog må kg. N i Rejektet aldrig blive > 120 kg./ De				

Gule felter: Analyseresultater, derfor kan der fremkomme afviselser i beregnede mængder mm.
Konklusioner: Vi separerede frisk gylle direkte fra pumpebrønd og gyllen blev lukket ud efter behov fra stalden
Kapacitet: Svingende alt efter hvad der kom ud fra stalden, men gennemsnitlig ca. 50 m3/h
Blå felt: Landmanden kan oplyse hvor mange kg. N han har pr. DE. i gødningsregnskabet, brug det oplyste tal til at beregne fuldgødskning med.

Association is made

- 6 pig producers from Bornholm
- Ca. 5.000 tons slurry fibres to biogas produktion
- Cooperation = costs are shared + efficiently use
- Investment = 100.000 euro, 75% from Baltic Compass



BÖRGER BIOSELECT BC50 MONTERET PÅ EN TREAKSLET TRAILER MED ISOLERET PRESENNING



FIBEREN LEVERES VIA TRANSPORTBÅND TO TILHØRENDE CONTAINERE GYLLEFIBRE TIL BOKRAFT



Profitability and repayment period of investment in slurry separation I

Demonstration farm Brændegård

- Sows produce 8000 m³ slurry and pigs 11,950 m³ slurry.
-
- 650 ha cultivated under cereal crop rotation.
- slurry lagoons and applied with slurry applicator and pipelines.
- Invested in a screw press, cost 500,000 DKK (67,114 Euro) in 2011.

Utilization % (also called fields effect)

- N effect of manure in the crop (compared to fertilizers)
- By law 75 % for raw pig slurry
- In practice often 65-70% depending of
 - Crop
 - Spring, summer, autumn
 - Injection, hoesetails
 - Weather (+/- 5-10%)
 - + separation (5-30%)
 - Etc.

Example I: Profitability and repayment period with a 30% difference in the nitrogen utilisation

- 60% utilisation of raw slurry (poor utilisation) to 90% utilisation in separated slurry (very good utilisation).
- additional income per ha of 367.20 DKK (50 Euro) compared to separated slurry and raw slurry.
- At Brændegård: $650 \text{ ha} \times 367.20 \text{ DKK} = 238,680 \text{ DKK}$ (32,038 Euro) per year.
- The annual costs are calculated to 182,272 DKK (24,466 Euro) (life span 5 years)
- **The investment profitability will be $238,680 \text{ DKK} - 182,272 \text{ DKK} = 56,408 \text{ DKK}$ (7,572 Euro) per year.**
- **The repayment period = 3.78 years.**

Example II: Profitability and repayment period with a 15% difference in the nitrogen utilisation

- Compare 70% utilisation of raw slurry to 85% in separated slurry.
- Difference of 101.92 DKK (13.68 Euro) per ha in favour of separated slurry. $650 \text{ ha} \times 101.92 \text{ DKK} = 66,248 \text{ DKK}$ (8,892 Euro) per year.
- The annual costs will still be 182,272 DKK (24,466 Euro) at a life expectancy of 5 years.
- **The investment profitability: $66,248 \text{ DKK} - 182,272 \text{ DKK} = -116,024 \text{ DKK}$ (-15,574 Euro) per year.**
- **The repayment period is 15.13 years.**

Calculations must be individual for each farm



But it seems as if:

- Separation can not be paid by better use of N, if the difference in utilization is less than 25-30%
- In practice, the difference is often no more than 15%

Investment decision

“not economic parameters”

- Reduced smell for neighbours
- More “secure” and harmonized manure
- Regional considerations: the desire to contribute to keep the biogas plant on Bornholm
- Political considerations: if the majority of pig slurry in the future has to be treated at a biogas plant, there is good reason to contribute to keep the biogas plant on Bornholm
- Independence of slurry agreements and leasing of land: slurry separation provides a margin of 10-20% harmony area
- Etc.

Recommendations

- **Farmers**

- *Set the agenda*
- *Cooperate*
- *Remember to calculation*
– *Environmental measures can be a good or a bad solution*

- **Politicians and decisionmakers**

- *Be brave – make flexible longterm decisions*
- *Be empathic*
- *Make a short way from decision to action*

Farmers meet farmers – it works

