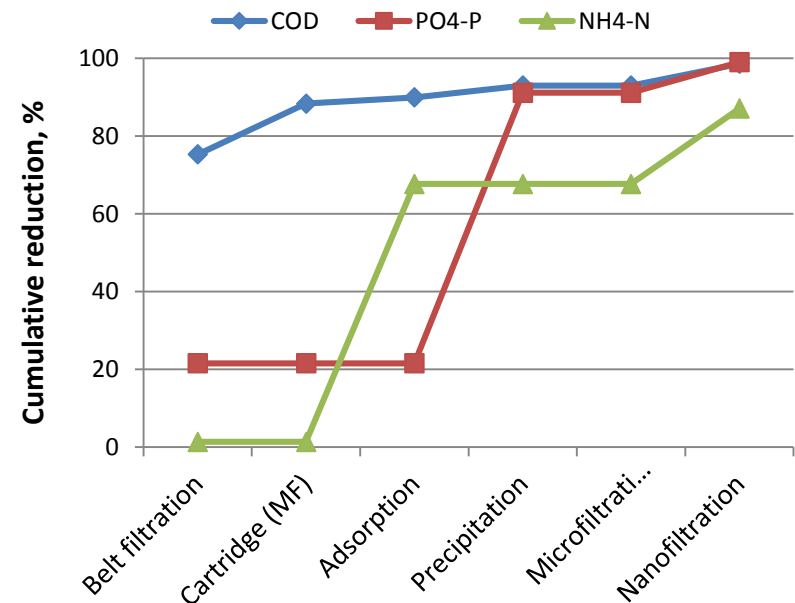
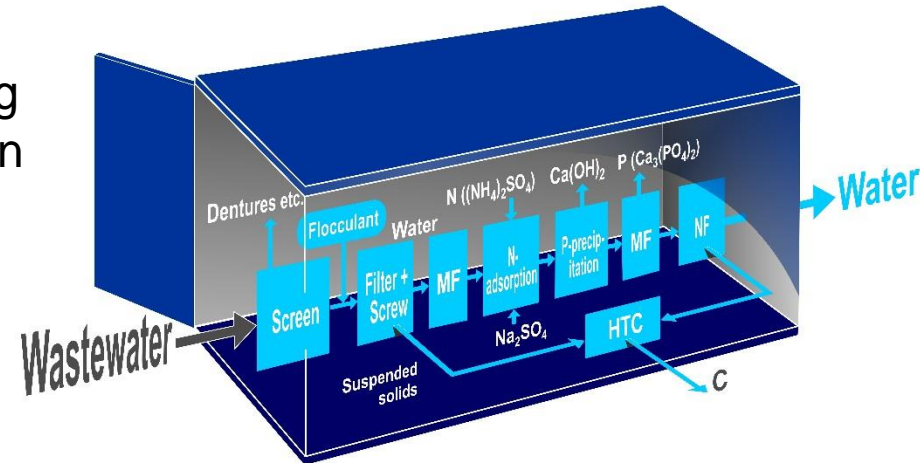


Decentralised wastewater treatment with full resource recovery

- Target
 - Preserve the aquatic ecosystem by recovering products from wastewater using a combination of physico-chemical units applicable for varying wastewater loads and temperatures
- Results
 - Good recovery results: suspended solids, COD and phosphorous reduction 99%, nitrogen reduction 87%
 - Products: nutrients as inorganic fertilizers, carbon as biochar and reusable water
 - Production of N, P -fertilizers worthwhile when recovering high concentrations from water
 - Suspended solids are low in weight, preferable transported to centralized treatment

→ The Plug-and-play resource container to be upscaled and implemented locally or as seasonal solutions in the industry or municipalities



2016 - 2018

www.phosave.com



INNOVATIVE SOLUTION FOR
PHOSPHATE RECOVERY
FROM EXHAUSTED
EXTINGUISHING POWDERS

Results

- *Raw materials* for the production of *microgranular fertilizers* (about 100.000 tons at EU level);
- *Reduction* of *heavy metals* using *organic and inorganic sorbents* (e.i. peats, olive stones, shells, zeolites, clays);
- *Environmental benefits* in terms of reduced greenhouse gas emissions (*Life Cycle Assessment study*).



This project has received funding from the EU's Horizon 2020 research and innovation programme under Grant Agreement No - 724586

PROPHOS[®]
CHEMICALS



ARSONUS
DIGITAL



BioTechnologie BT

ENGENUS
S4B
CONSULTING

NPHARVEST

Solution for converting wastewater nutrients into eco-friendly fertilizer

Technical path

- Membrane reactor optimization
- Pretreatment development
- End-product optimization
- End-product quality tests
- On-site piloting
- Large-scale piloting

Commercial path

- Market potential of different waste streams
- End-product value chain studies
- Business model development

An improved *nitrogen and phosphorus recovery process* for different concentrated liquid waste streams

Emphasis on the *end-product quality and resource optimization* during recovery process

Project time: 2017 – 2020 npharvest.aalto.fi

Markku Ollikainen, University of Helsinki

Gypsum amendment: a cost-effective measure for the protection of the Baltic Sea

Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)

4 tons per hectare

makes a visible difference



Improves soil structure

Prevents erosion: PP and DRP

Sulfates: peaks small, no harm

Suits well farm practice

Farmers regards gypsum positively

Cost: 70€/kg P reduced

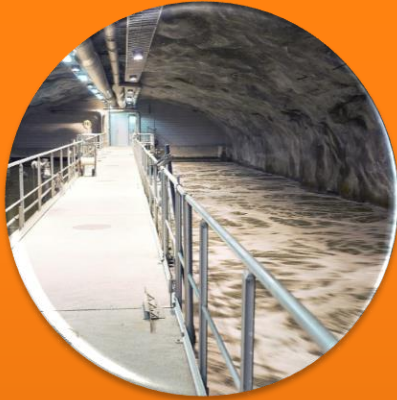
P reduction: 50%/ha

Finland: reduction 200-300 t

Baltic Sea: reduction 1500-2000 t

The best known measure!

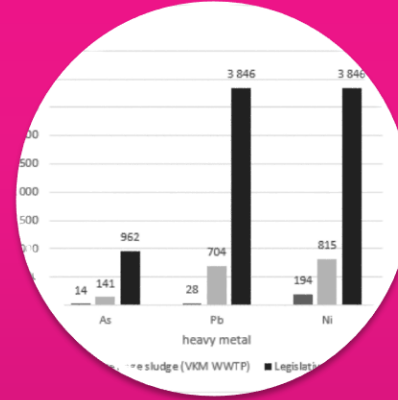
RAVITA- thinking outside the recovery box



P recovery
directly from
wastewater



Products:
 H_3PO_4
&
MAP/DAP



Low
concentration
of MPs

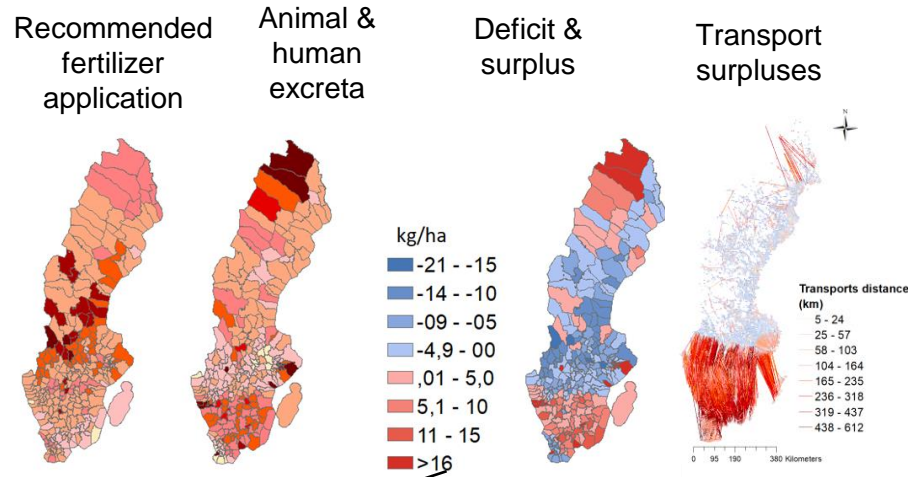
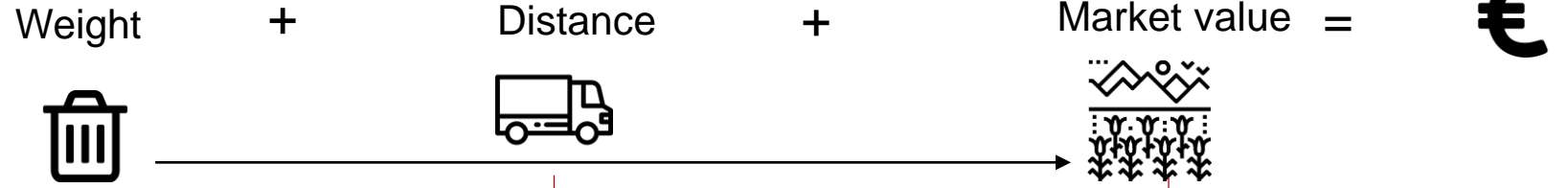


Demo plant at
Viikinmäki
WWTP
(1000 PE)

**GOVERNMENT
KEY PROJECT**

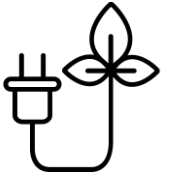
Optimizing P recycling through biogas production in Sweden

Transportation costs are an obstacle to P recycling



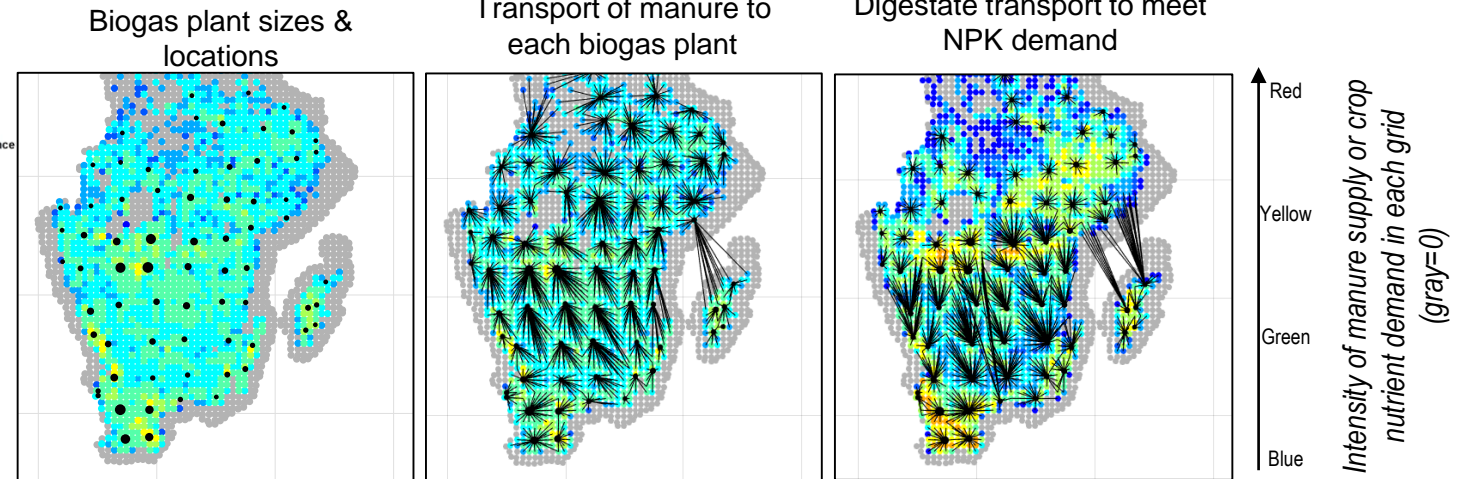
Optimize transport

Co-benefit valuation
-Energy
-N, K, OM



52 % of crop needs can be met within 5x5km grids

37 % require transport



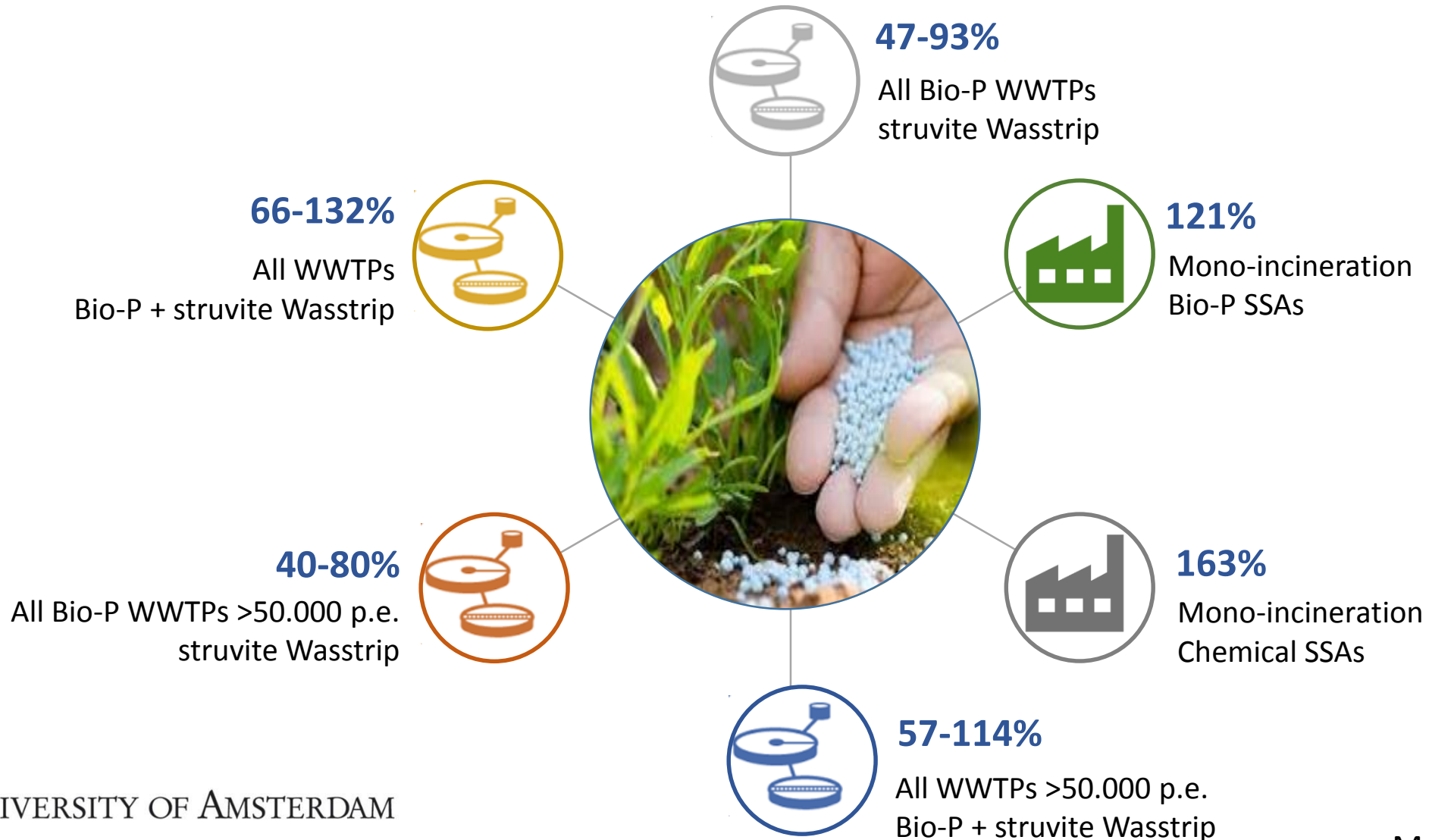
Liu team



Geneviève S. Metson

Assistant Professor, IFM, Linköping University | genevieve.metson@liu.se

P recovery potential from Dutch urban mines



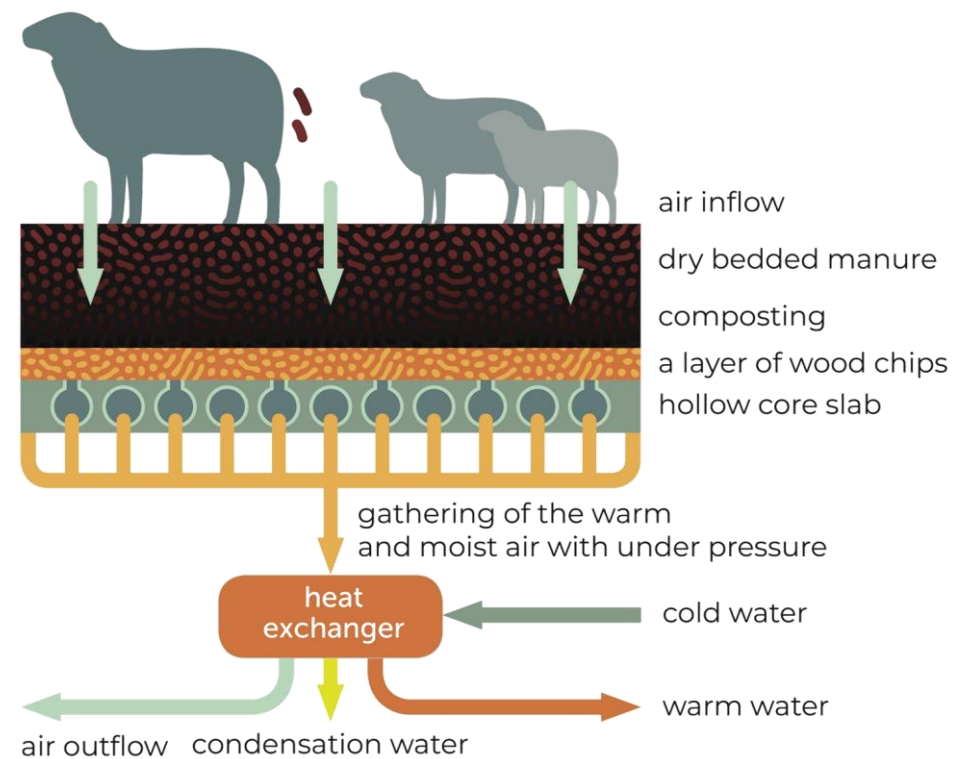


Pasrea Oy - Heat and ammonia recovery from composting

- R&D project 03/2017 – 08/2018

Objectives & expected results:

- **On-site composting**, manure is processed where it drops
- **Under pressure aeration**, enhances the composting process
- **Heat and ammonia reclamation**, reduces losses, increases value



Recycling nutrients from pilot production to farms and fields

Increase the use and production of recycling-derived fertiliser products in North-West Europe to 9% of total fertiliser use in 2030

1. Improve the quality to meet agronomic needs: **tailor-made products**

2. Increase the **awareness, acceptance** and **application** by farmers.

3. Enhance the **transnational trade** and **transport** from **surplus** regions to **demand** regions.



Interreg 
North-West Europe
ReNu2Farm
European Regional Development Fund



Legal framework recycling-derived fertiliser products

Complex - Confusing - Conflicting



EU level:



a big step forward... some issues to be solved!

National level:

We need more transparency!