

Biomass on contaminated land

Brecht Annicaert

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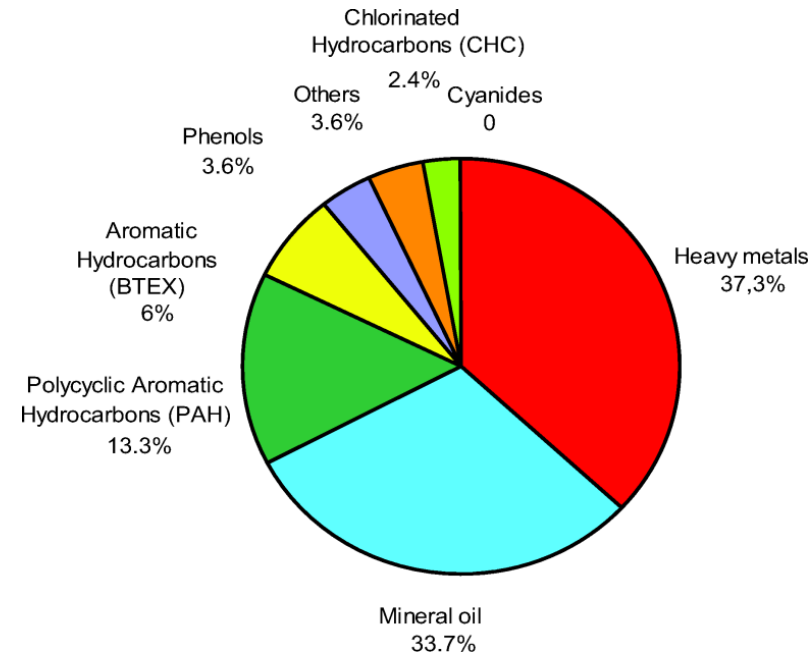
Contaminated land

- **Soil contamination in the EU:**

- 2,5 million potentially contaminated sites

- **Conventional remediation methods fail:**

- Disperse contamination
 - low land prices
- => Fallow lands

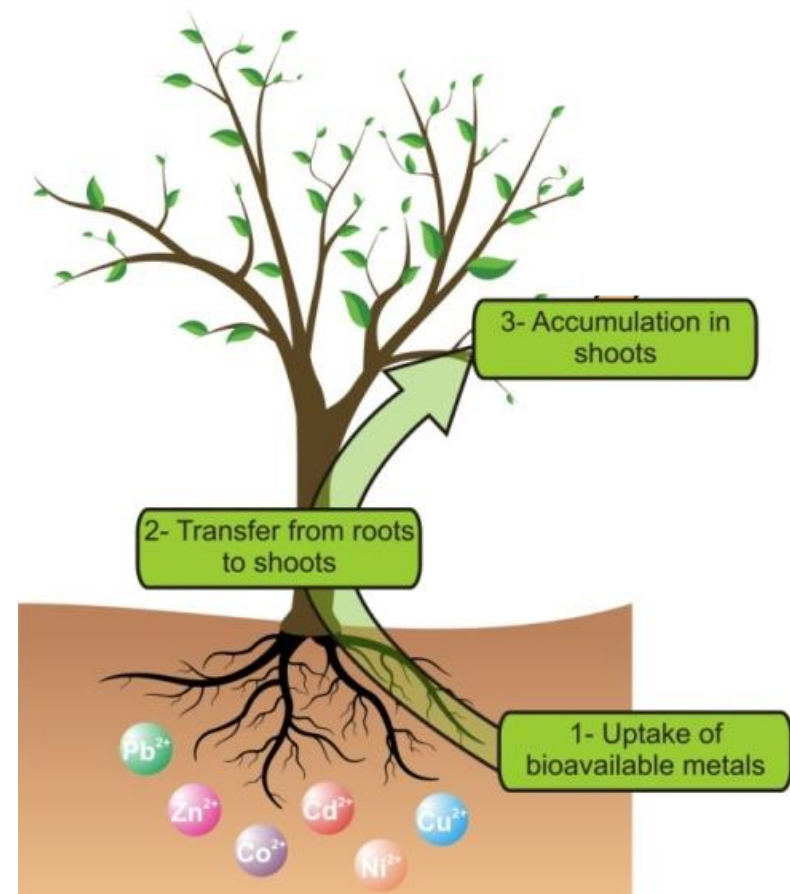
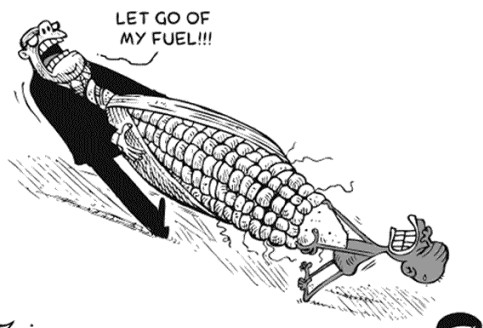


(European environment agency. Progress in management of contaminated sites (CSI 015) 2007)

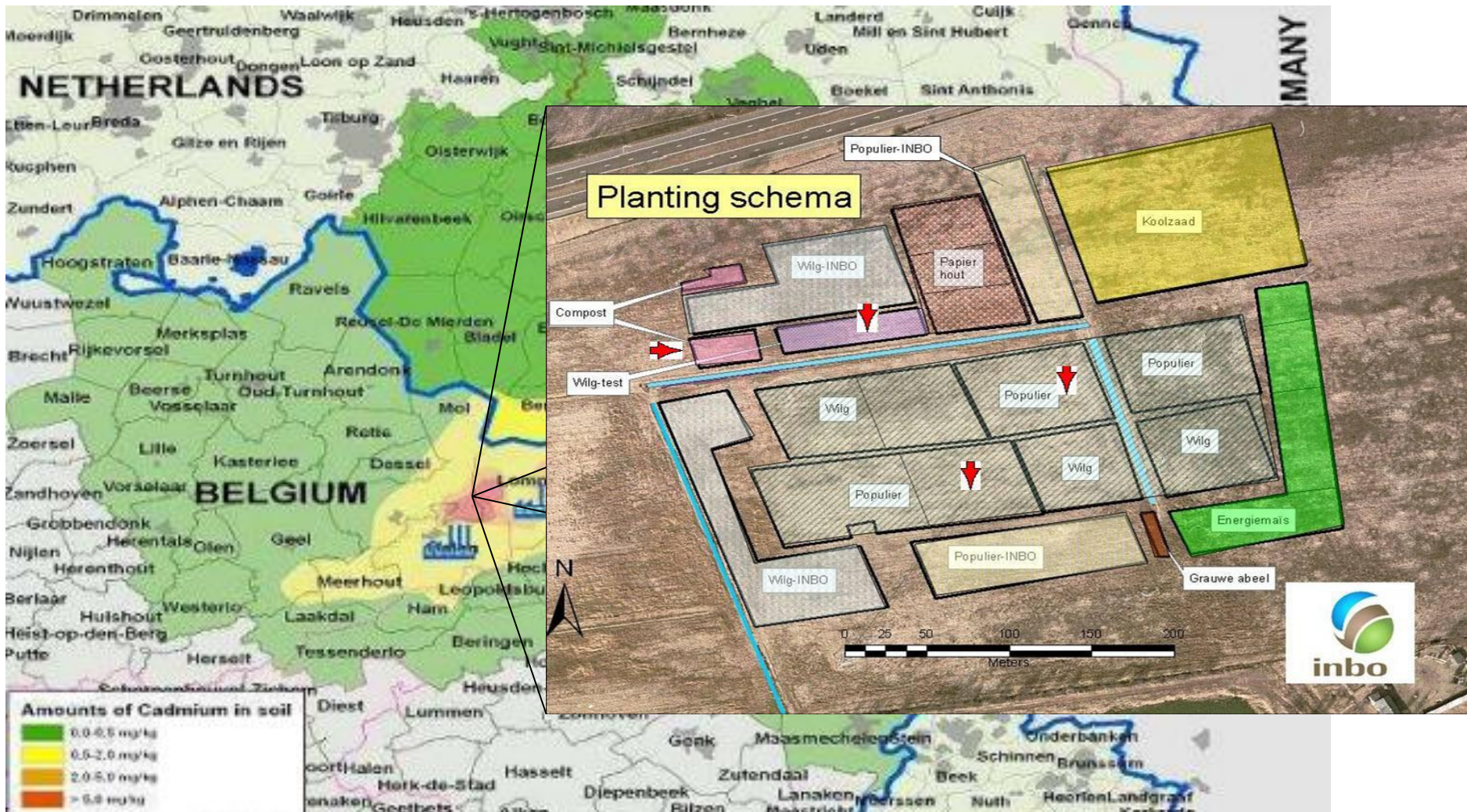
Biomass on contaminated land

- Low energy input
- Low investment cost
- Aesthetical
- Preserve soil fertility
- Reduced leaching
- Biomass production

■ no Food vs Energy



Pilot on contaminated land



Source (abdk)

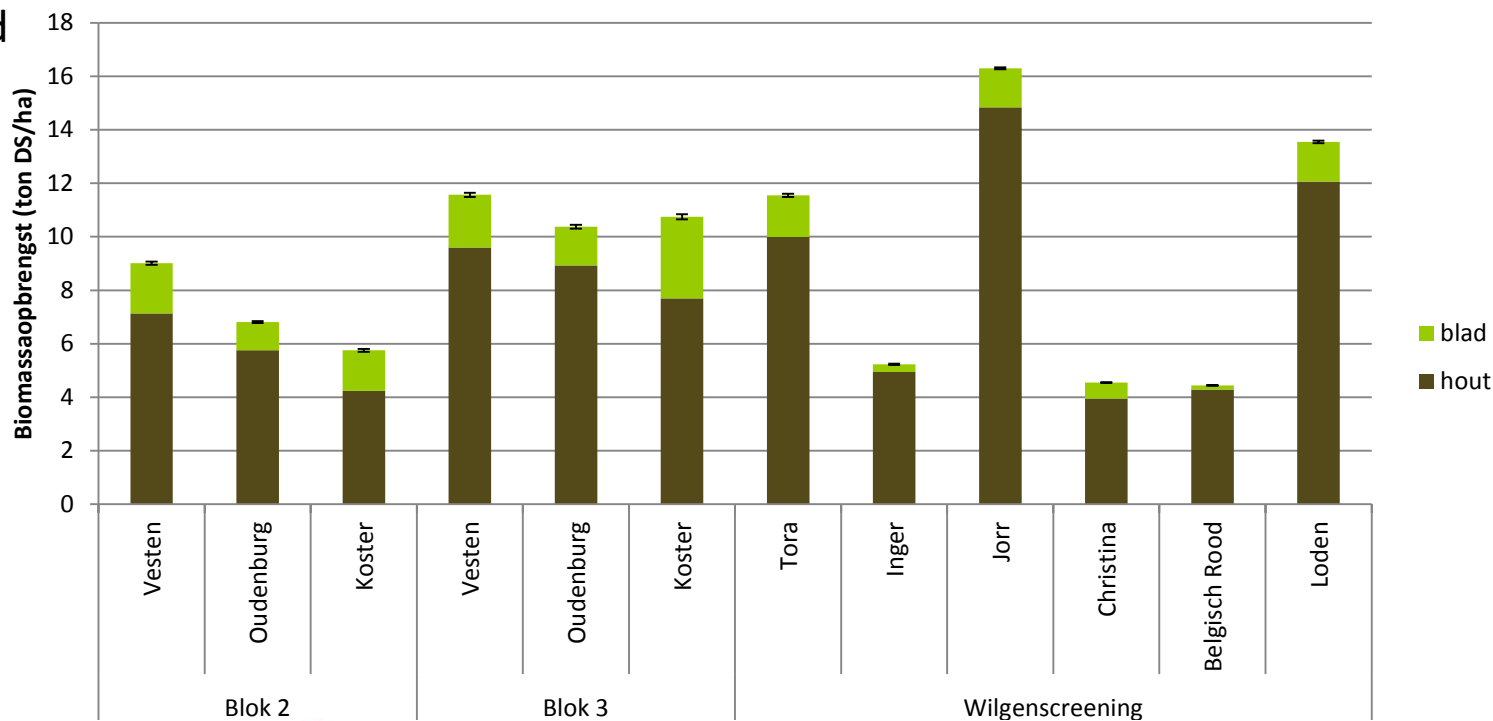


Short rotation coppice: 6 year evaluation

- Selection of poplar or willow clone is very important:

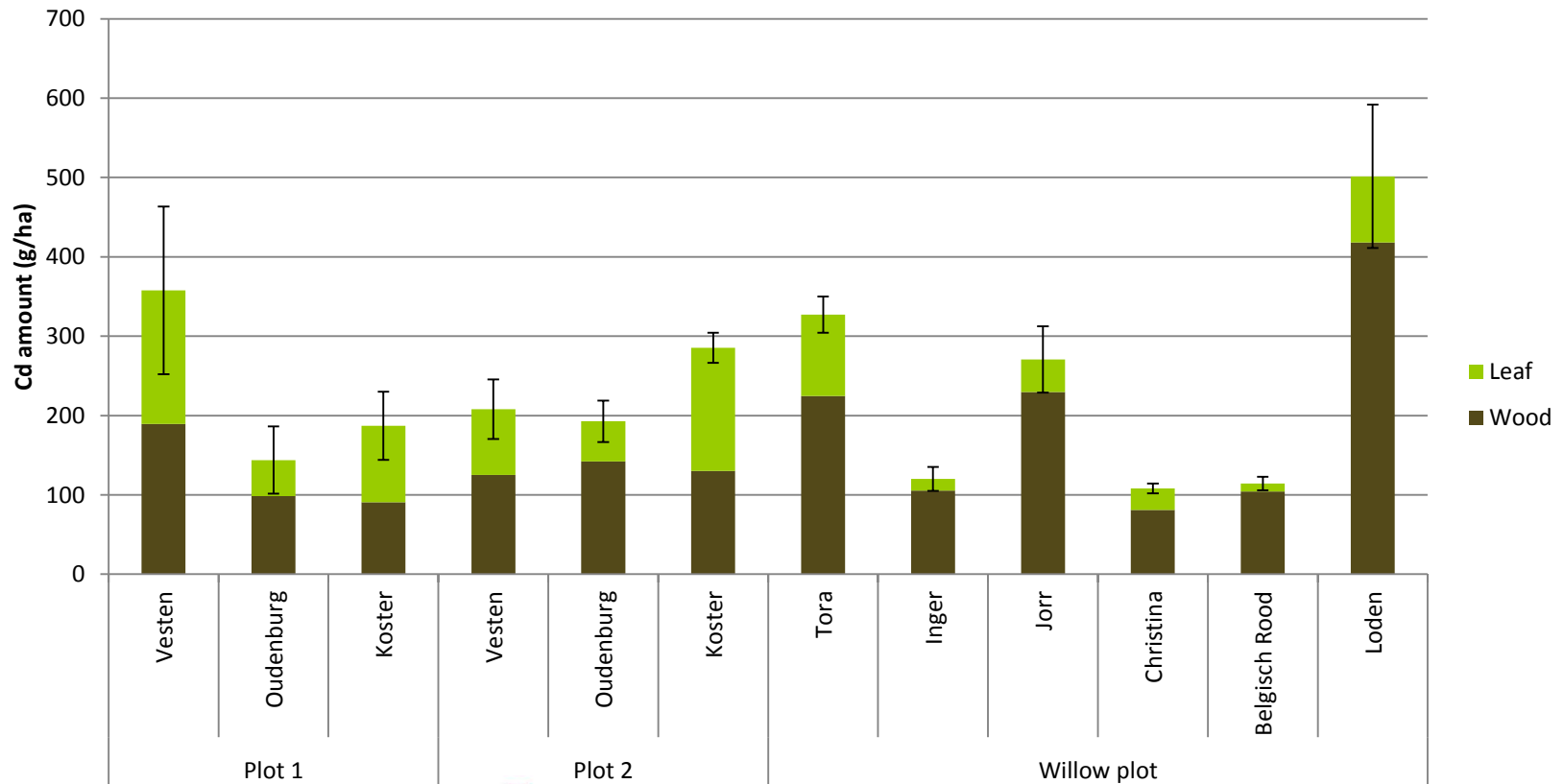
- Mortality percentage of more than 50 % (Muur, Grimminge, Zwarte driebast, Alba)

- Biomass yield



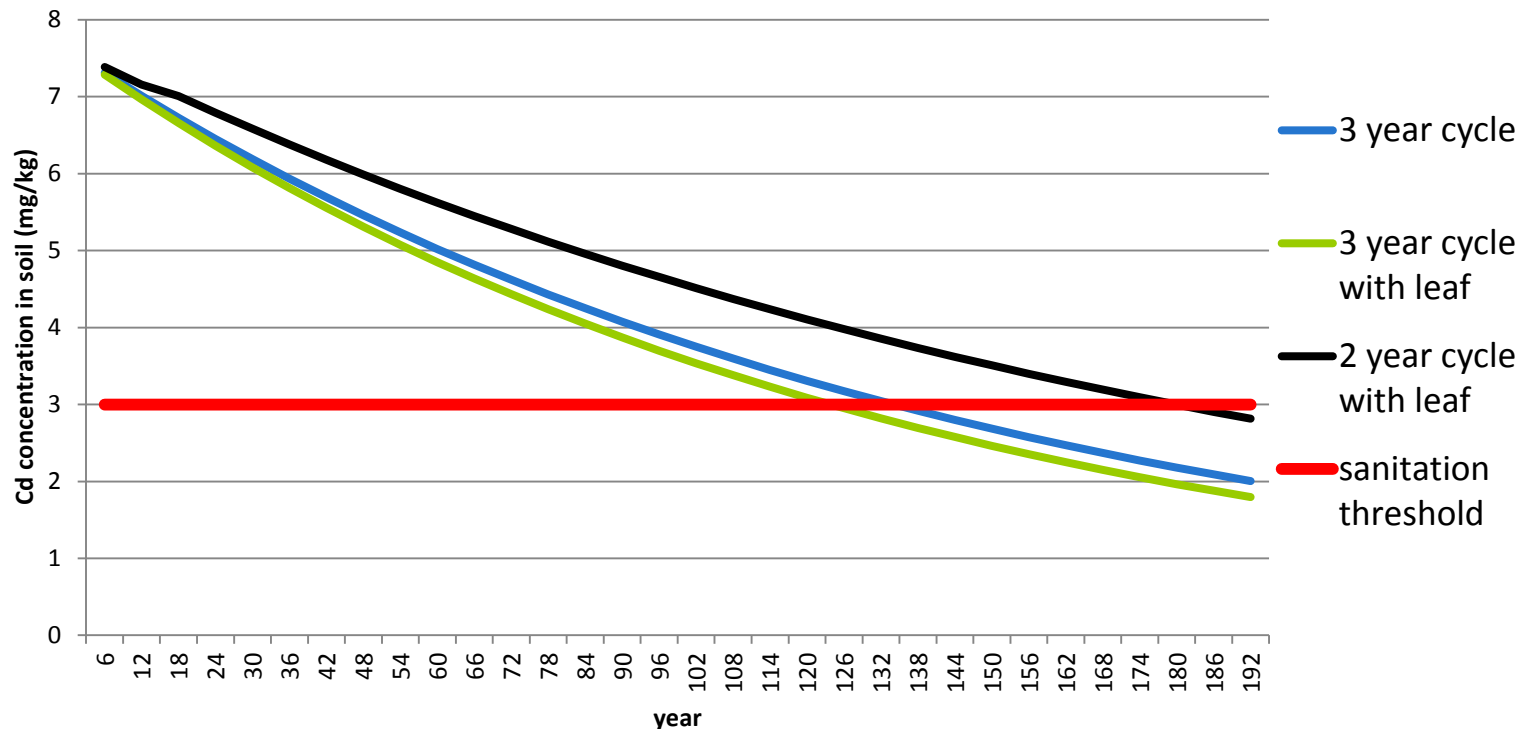
Short rotation coppice: 6 year evaluation

- Extraction rate: Cd is limiting element



Short rotation coppice: 6 year evaluation

■ Remediation time modelling with clone Loden



■ So long remediation time required => phytoattenuation



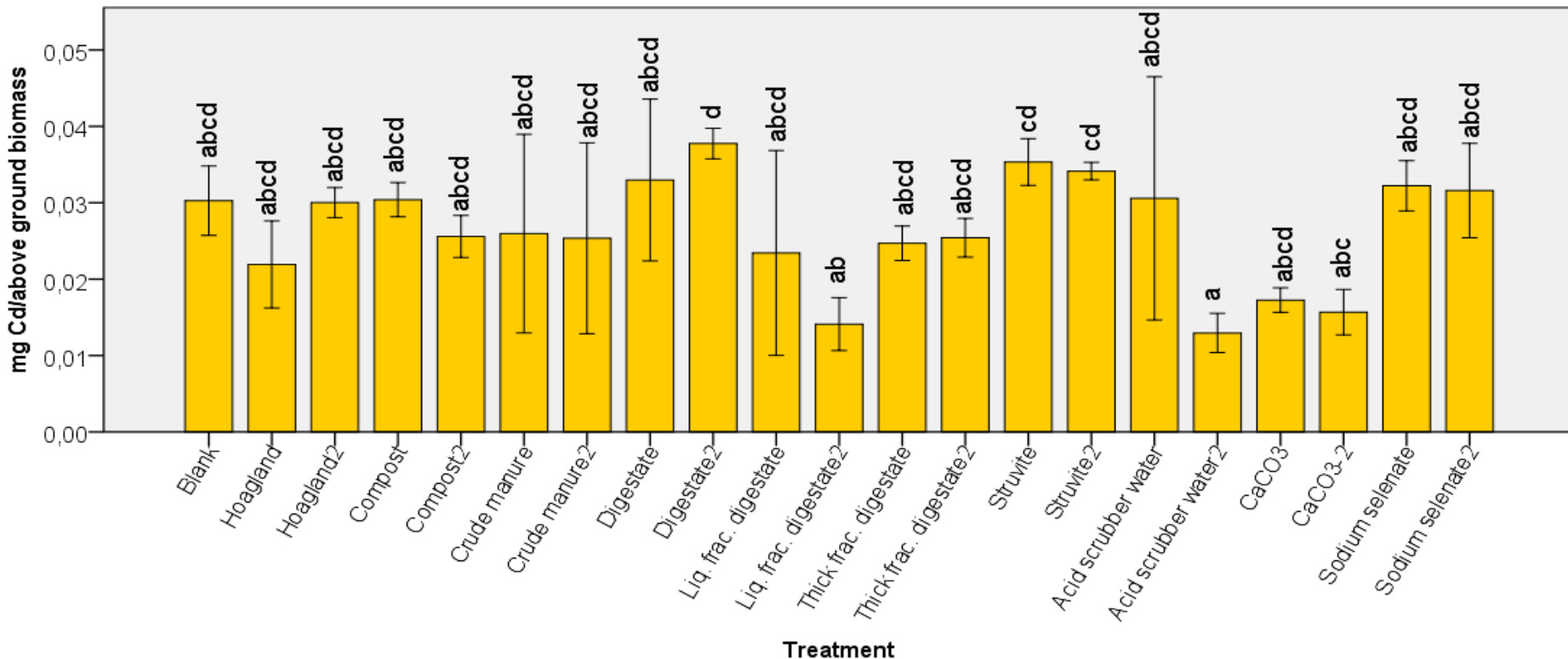
Fate of heavy metals

- Persistent in environment
- Cd, non-essential micro element = toxic
- Zn, essential micro element = plant nutrient
- Safe storage for Cd?
 - In by-product from biomass processing
 - In soil via sequestration



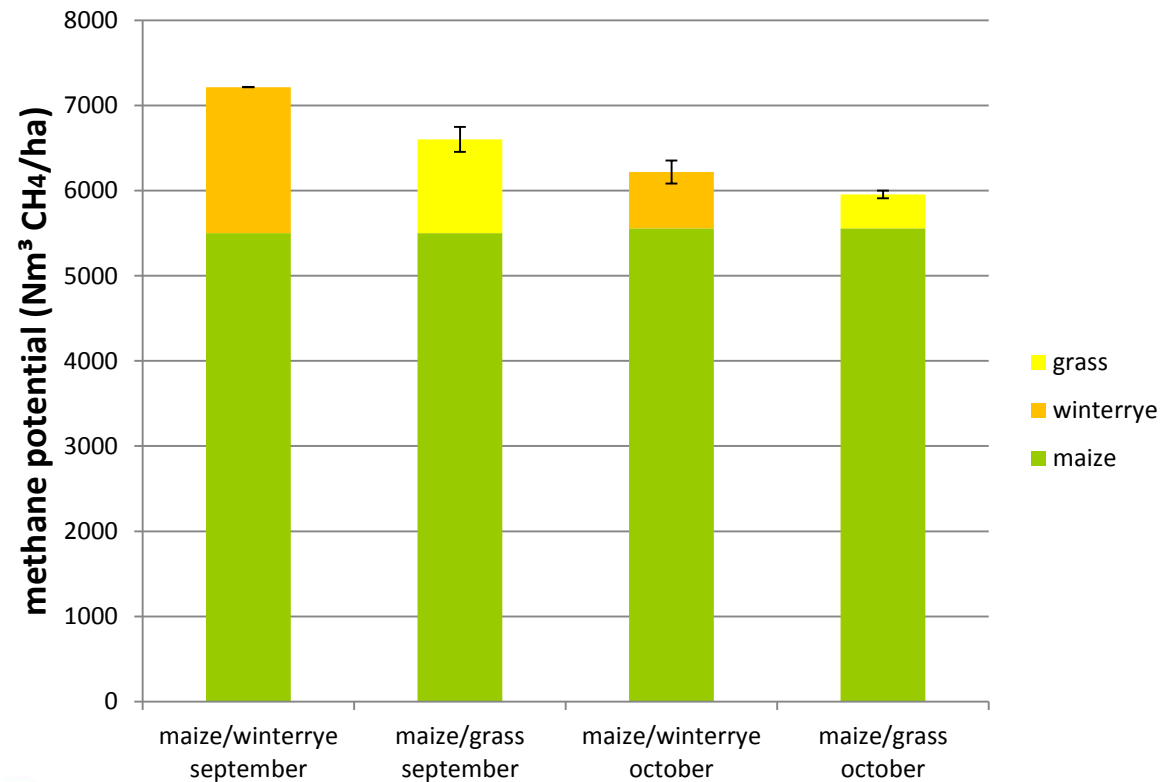
Soil amendments on contaminated soil

- pH and organic matter influence on heavy metals in soil solution and biomass yield (*Brassica napus*)



Phytoattenuatie: Crop rotation on contaminated land

- Crop rotation with maize and grass/winterrye
- Cover crops can increase total energy output (7-24%)
- Cover crops reduce leaching



Crop rotation on contaminated land

Biomass yield (FM/ha):

43 ton maize (30% DM)

15 ton winterrye (35 % DM)



Digester energy output



28 860 kWh (40%)

32 467 kWh (45%)

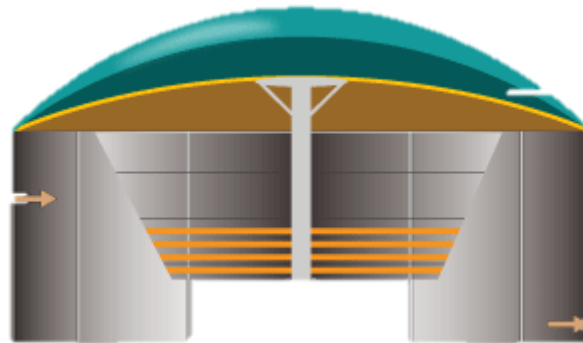


Consumption



7,4 households

2 households

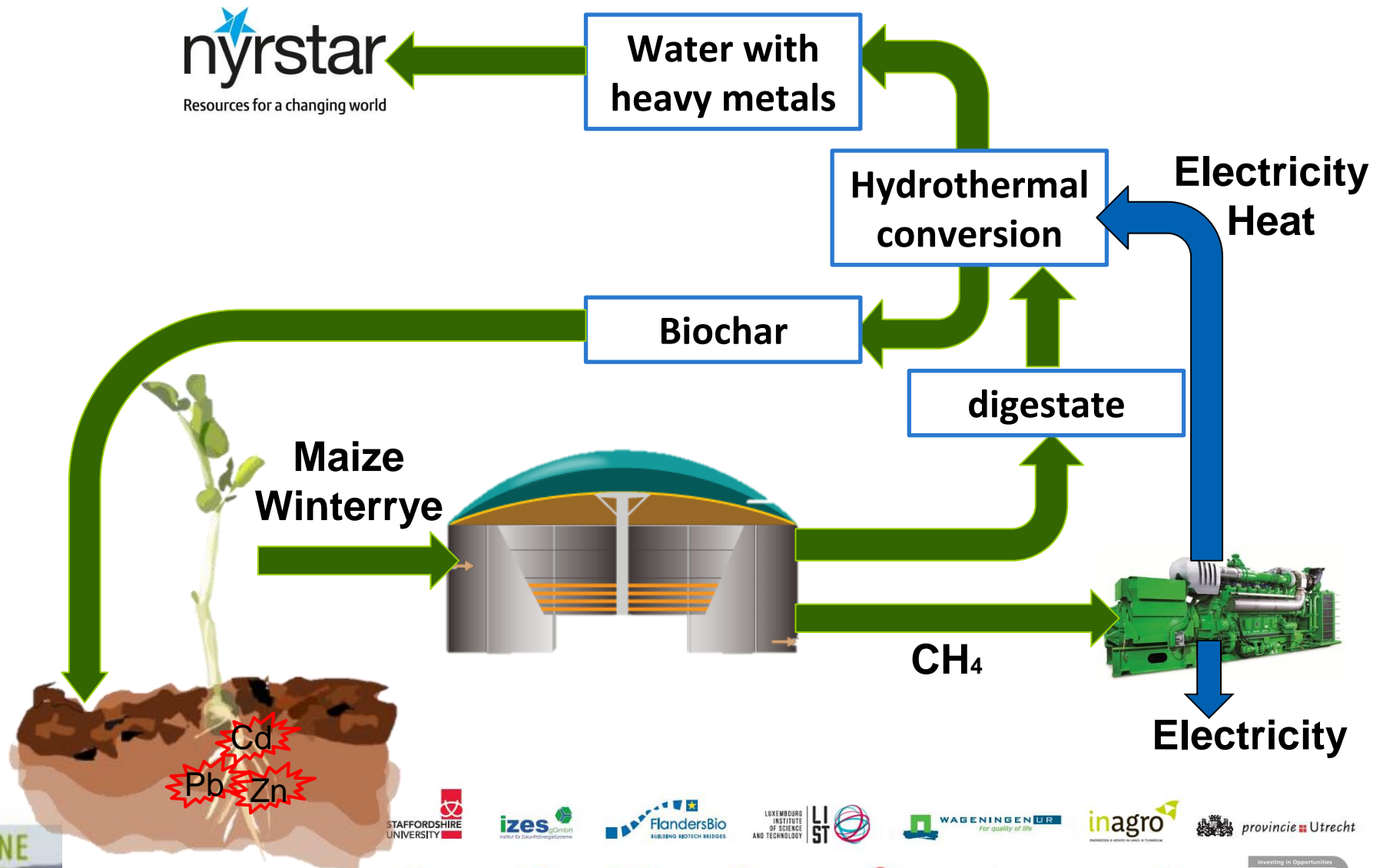


Future of biomass on contaminated land

- **Legal hurdles: waste no waste status (OVAM, European directive)**
- **Processing techniques for contaminated biomass:**
 - Combustion
 - Digestion
 - Biochar (from biomass on contaminated land)
 - Hydrothermal conversion technique
- **Pilots on different contaminated land types: organic, water**



A possible future for contaminated land in Lommel



Questions

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