Biomass on contaminated land

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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)
**Selection of poplar or willow clone is very important:**

- Mortality percentage of more than 50% (Muur, Grimminge, Zwarte driebast, Alba)
- Biomass yield
Extraction rate: Cd is limiting element

- Plot 1
- Plot 2
- Willow plot
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*)
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

Maize Winterrye

Water with heavy metals

Hydrothermal conversion

Biochar

digestate

CH₄

Electricity

Heat

Education for a changing world

Maize Winterrye

Water with heavy metals

Hydrothermal conversion

Biochar

Ch4

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Questions

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