Sludge quality and quality criteria for agricultural use in the context of sustainable soil protection goals

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sustainable soil protection

- Protection an preservation of a **finite**, **scarce** and **non-renewable** resource with varying biological, chemical and physical properties
- Maintenance of ecological **functions** and functions related to human health, human activity, groundwater protection and food production

main soil functions

ecological

- production of biomass
- filter, buffer and transformation
- biological habitat, gene reserve

socio-economical

- source of raw materials
- infrastructural basis
- geogenic and cultural heritage

criteria for sustainable soil use

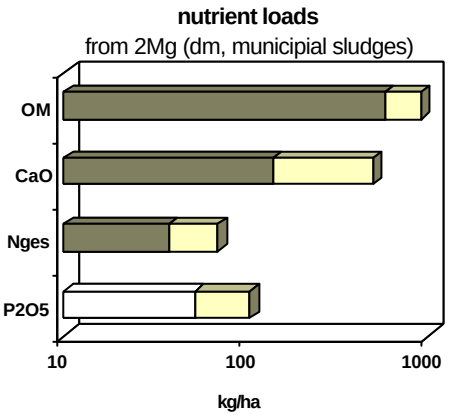
- Prevention of irreversible soil loss and soil degradation
- consideration of site-related soil potentials
- use of best available technologies and practice

criteria for agricultural use of organic waste
(sewage sludge, compost ...)

- quality criteria:
  - agricultural benefits
  - ecological improvement
- quality insurance and improvement
  - periodical determination of nutrients and PTEs
  - monitoring of PTEs (type and limit-values) to the state of knowledge
  - source-orientated minimization concepts

agricultural benefits

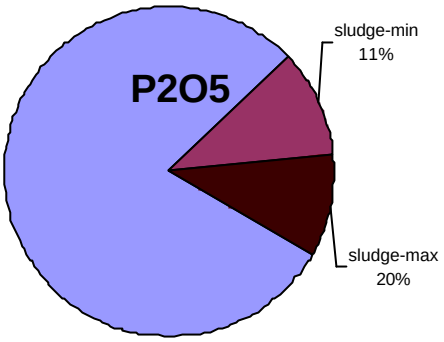
- fertilizing effects (P,N)
- soil improvement (CaO, OM)



ecological improvement

(example: use of P-fertilizers in Austria)

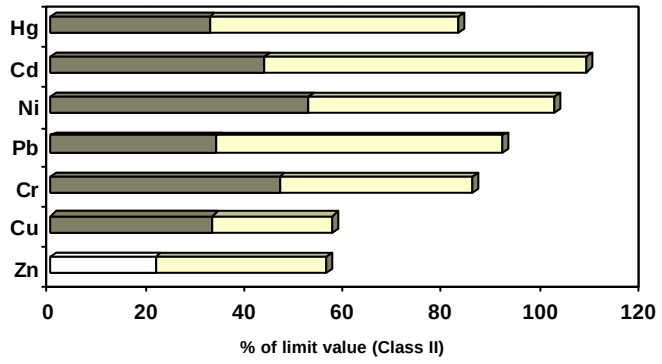
- 48.000 Mg P_2O_5 ≅ 1,2 Mg Cd - Import
- Average Cd-content of mineral P-fertilizers ≅ 25mg/kg P_2O_5
- 25 to 75% percentile of municipial sewage sludge: 23 - 51mg/kg P_2O_5



quality insurance

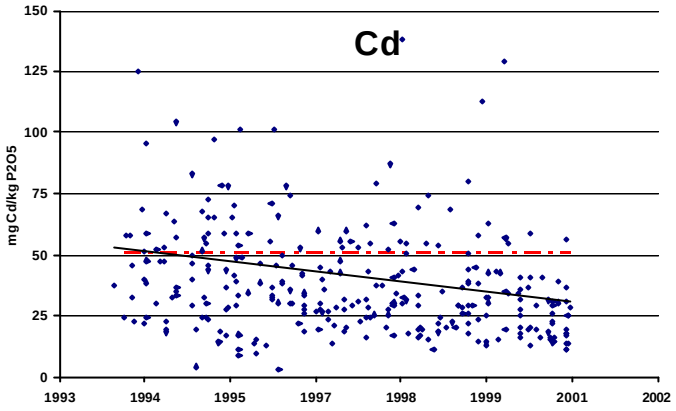
1994 - 2000

(concentrations related to %P_2O_5)*



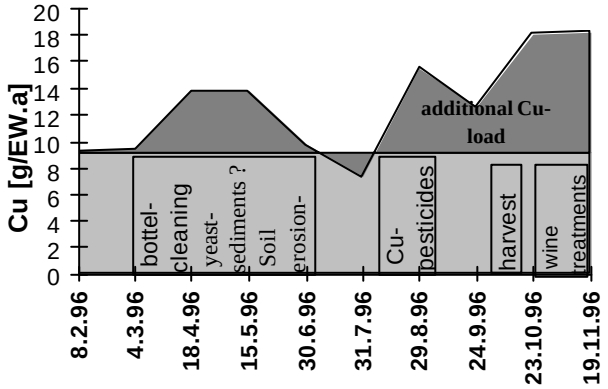
*data from waste water treatment plant Amstetten, Lower Austria

quality improvement



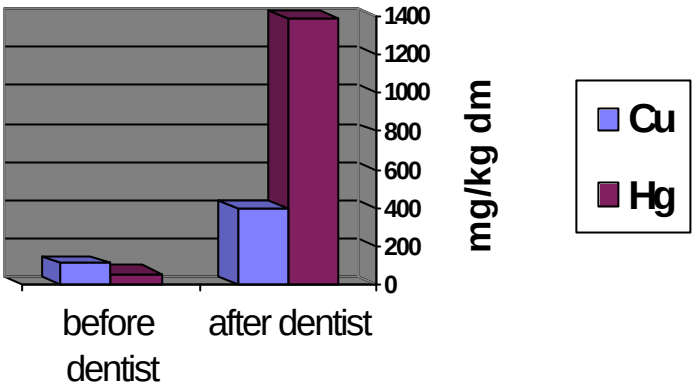
300 sludge analyses from 58 treatment plants1995 - 2000, Lower Austria

source orientated concepts



Data from waste water treatment plant Wagram West, Lower Austria

source orientated concepts



monitoring of PTEs

- Organic pollutants like PCDD/Fs or PCB range within background
- evaluation of toxicological significance of detergent-residues (LAS, NP) and plasticizers (DEHP)

summary

- agricultural use of sludge suitable only for best qualities with special regard to:
  - site conditions
  - varying composition
  - nutrient-oriented loads
- reuse of organic wastes via soils requires
  - application standards and best available technologies
  - continous monitoring
  - further quality improvement