Biosolids Utilization: Facts for Discussion with the Public

Introduction

Information for this talk was summarized from the Sustainable Land Application Conference, Orlando, Florida, 2004.

Articles were published in the Journal of Environmental Quality, 2005.
Introduction cont’d

- Nutrients
- Trace elements
- Pathogens
- Means of communicating this information to clients

What works, what doesn’t
Nutrients

- Biosolids are a good source of both nutrients and organic matter
- Biosolids originate from a range of sources
- Nutrient concentrations with changing sources
Nitrogen is often the primary nutrient of interest.

Carbon-to-Nitrogen ratio (C:N) of the biosolid indicates mineralization (15: to 40:1), or not.

Cabrera et al., 2005
Nutrients-Nitrogen

Nitrogen also controlled by:

- Biosolid and soil pH
- Trace elements (biosolid & soil)
- Iron, Manganese, and/or Aluminum oxides
- Wetting/drying of biosolids
Nutrients - Phosphorus

- P-index may indicate biosolids rate should be based on P loading
- Iron and Aluminum, lime may reduce P solubility
**Trace Elements**

✧ Considerable reduction in trace element concentrations in biosolids in recent years

★ Reduction in industrial sources

★ Biosolids are blended sorbants (Fe and Al oxides, organic matter)

Basta et al., 2005
Pathogens

- **Class A:** treated to reduce pathogens below detection
  - Class A biosolids must be used on plant products that are consumed raw
- **Class B:** treatment reduces pathogens
  - Not favored in future land applications (apply only Class A biosolids)

Gerba and Smith, 2005
Risk

✧ Deterministic risk approach
  ★ Used for current regulations (40 CFR 503 rule, 1993)
  ★ Highly Exposed Individual to a Reasonably Exposed Individual
  ★ Single pathway
  ★ Single-point estimates
  ★ Compounding of conservative assumptions/estimates

Beecher et al., 2005
Risk

✧ Probabilistic risk approach
★ Controls level of conservatism and potential overestimation of exposure
★ Uses and helps to identify a Reasonably Exposed Individual
★ Conclusion for Dioxins in biosolids: EPA indicated no numerical limits required for biosolids in land application

Kester et al., 2005
The Dilemma

No matter how good the science is, the public must support land application of biosolids. Otherwise, we lose this valuable resource, and the public pays a higher price for disposal.
**Things to know**

It turns out that real risk is only a part of the problem!

**Perceived risk = risk + outrage**

Science and Statistics

Feelings and level of understanding

Beecher et al., 2005
Risk Communication

✧ Stages of communication

★ Into the 1980s: ignore the public
★ 1980s: Decide-Announce-Defend (DAD)
★ 1990s: Dialogue
★ To present: Affecting Change

Beecher et al., 2005
Obstacles to Risk Communication

✧ I work with the environment and doing good things. Don’t challenge me.
✧ Experts are logical, set boundaries, and often exhibit low level of emotion
✧ Public: emotional, irrational, diffuse and wandering topics (outrage factor)

Beecher et al., 2005
Obstacles to Risk Communication

✧ **Power and control** (who should be at the table)

✧ **Comfort** level (groan zone)

✧ **Change** through dialogue takes commitment and time

Beecher et al., 2005
Begin the Discussion (Dialogue)

Overall goal is to reduce the number and intensity of the outrage factors

✧ Make risk seem fairer and more voluntary to all (share the perceived risk)

✧ Share knowledge
  ✧ Benefits: renewable; recycling of nutrients
  ✧ Special treatment of industrial wastes  

Beecher et al., 2005
Begin the Discussion (Dialogue)

✧ Show that programs have local control vs. state or federal

✧ Present an objective view
  ★ Include other points of view
  ★ Share information in advance

✧ Avoid experts with a perceived profit motive

Beecher et al., 2005
Begin the Discussion (Dialogue)

✧ Present research credibility
  ★ High level of quality control
  ★ Peer-accepted methods
  ★ Findings flow from data
  ★ Conclusions with described limitations

Beecher et al., 2005
Begin the Discussion (Dialogue)

✧ Present research legitimacy
  ★ Unbiased nature
  ★ Fair to other views/interests

✧ Present salient research
  ★ Useful to stakeholders
  ★ Addresses meaningful questions/concerns

Beecher et al., 2005
Communication regarding biosolids will contribute to the sustainability of this resource for agriculture.

Communication starts with us!
Thanks for the wide ride!