Challenges to the Use of Human Excreta Derived Fertilisers in Horticultural Export Farms

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Presentation outline

- Does FS compost application to soil introduce contaminants?
- The case of horticultural exports in Kenya: what are the barriers to FS compost use in this sector?
- The value of assurance schemes for increasing customer confidence.
Challenges to creating value and recovering costs from FS treatment

- Soil amendments from FS help reverse the trend of cities as nutrient sinks and improve soil health.
- FS compost producers often face barriers for selling compost at a large scale.
- How to increase FS compost use and its commercially viability?
Testing the effect of FS compost on soils: Research Methodology

Soil samples from 6 farms using FS compost: samples collected from field sections that used FS compost and sections that had never received FS compost

Soil samples analysed for:

- The presence of *C. perfringens* (ISO7937), taken as indicator of faecal contamination
- Presence of heavy metals (ISO11466)
Testing the effect of FS compost on soils: Results

- No *Clostridium perfringens* detected in any soil sample

- Heavy metals in soils:

<table>
<thead>
<tr>
<th>Heavy metal</th>
<th>Concentration in soil without FS compost (ppm)</th>
<th>Concentration in soil treated with FS compost (ppm)</th>
<th>p value from t-test</th>
<th>EU concentration limits in soil (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>1.58</td>
<td>1.63</td>
<td>0.92</td>
<td>5</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.83</td>
<td>0.80</td>
<td>0.50</td>
<td>1</td>
</tr>
<tr>
<td>Copper</td>
<td>9.76</td>
<td>9.92</td>
<td>0.91</td>
<td>100</td>
</tr>
<tr>
<td>Nickel</td>
<td>11.75</td>
<td>12.40</td>
<td>0.52</td>
<td>50</td>
</tr>
<tr>
<td>Lead</td>
<td>14.62</td>
<td>14.27</td>
<td>0.84</td>
<td>60</td>
</tr>
<tr>
<td>Zinc</td>
<td>100.17</td>
<td>93.87</td>
<td>0.61</td>
<td>200</td>
</tr>
</tbody>
</table>

Table 1 Heavy metal concentration in soils tested compared with regulatory limits
(a) limits taken from the Finnish ministry of environment, representing mean values of European limits
Who will pay for compost?

- Smallholder farmers have limited purchase power
- Most likely customers for compost?
  - NGOs or municipalities, mainly for landscaping or reforestation
  - Larger farms generally have higher investment capacity
- Exporting farmers are an attractive customer segment for FS compost
Key players in the horticultural export chain

- Horticultural exports in Kenya make up 70% of the country’s horticultural earnings
Farmers’ needs and perceptions

- Challenges to increased productivity:
  - Climate change (reduced water availability, increasing pests)
  - Produce waste at farm level due to cosmetic standards
  - Decaying soil health
  - Increasing price of farm inputs but no increase of produce value

- Produce grown for export often not easily absorbed into the local market

- Passing Global GAP inspections is key

- All interviewed producers willing to try FS compost but wouldn’t take the risk unless Global GAP approves it
Global GAP standard and FS-derived products

- Global GAP standard:
  - a prerequisite for food export markets, developed by a consortium of supermarket chains
  - specifies fertiliser and pesticide practices in detail

- “No human sewage sludge can be used on accredited fields” (Global GAP, 2011)

- Perception that not enough is known about the effect of FS compost on crops and soil
The need for quality assurance of FS compost

• Market requirements for larger producers: certifications and standards

• Assurance schemes exist for biosolids in many countries:
  – Biosolids Assurance Scheme (BAS) in the UK
  – ReVAQ in Sweden
  – National Biosolids Partnership (NBP) in the USA
  – Australasian Biosolids Partnership (ABP) in Australia and New Zealand

• Next, a scheme for compost from On-Site Sanitation systems?
Final thoughts and conclusions

- Safe compost can be made from FS but assurance schemes are needed to increase customers and regulators’ confidence in this type of fertiliser.

- Policy and regulation play a key role in enabling or creating a barrier to the commercialisation of novel bioproducts: supporting policies and incentives needed to create viable FS valorisation streams.
Thank you!

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