Future of Innovation

OLDS COLLEGE

Waste to Gold

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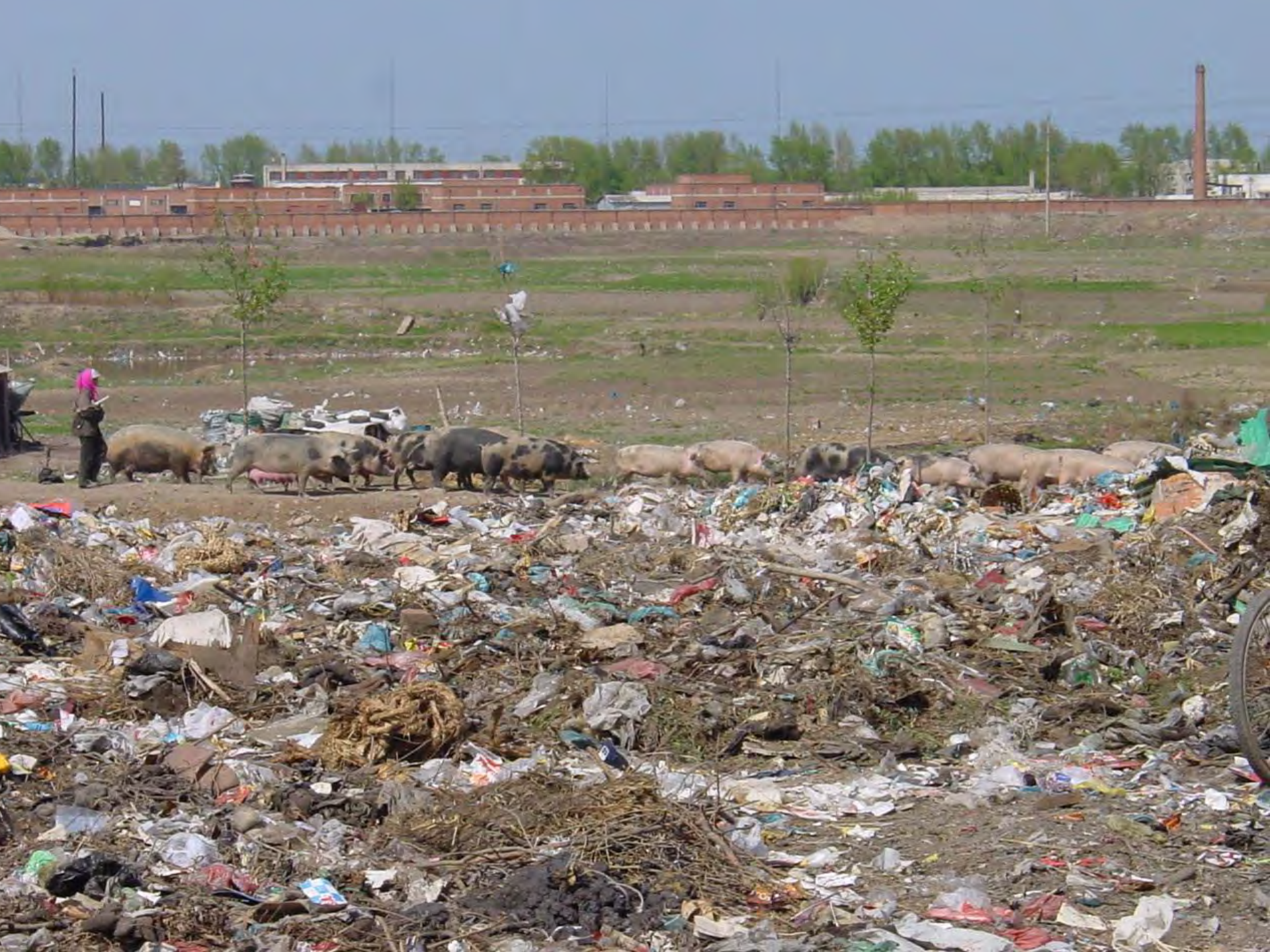
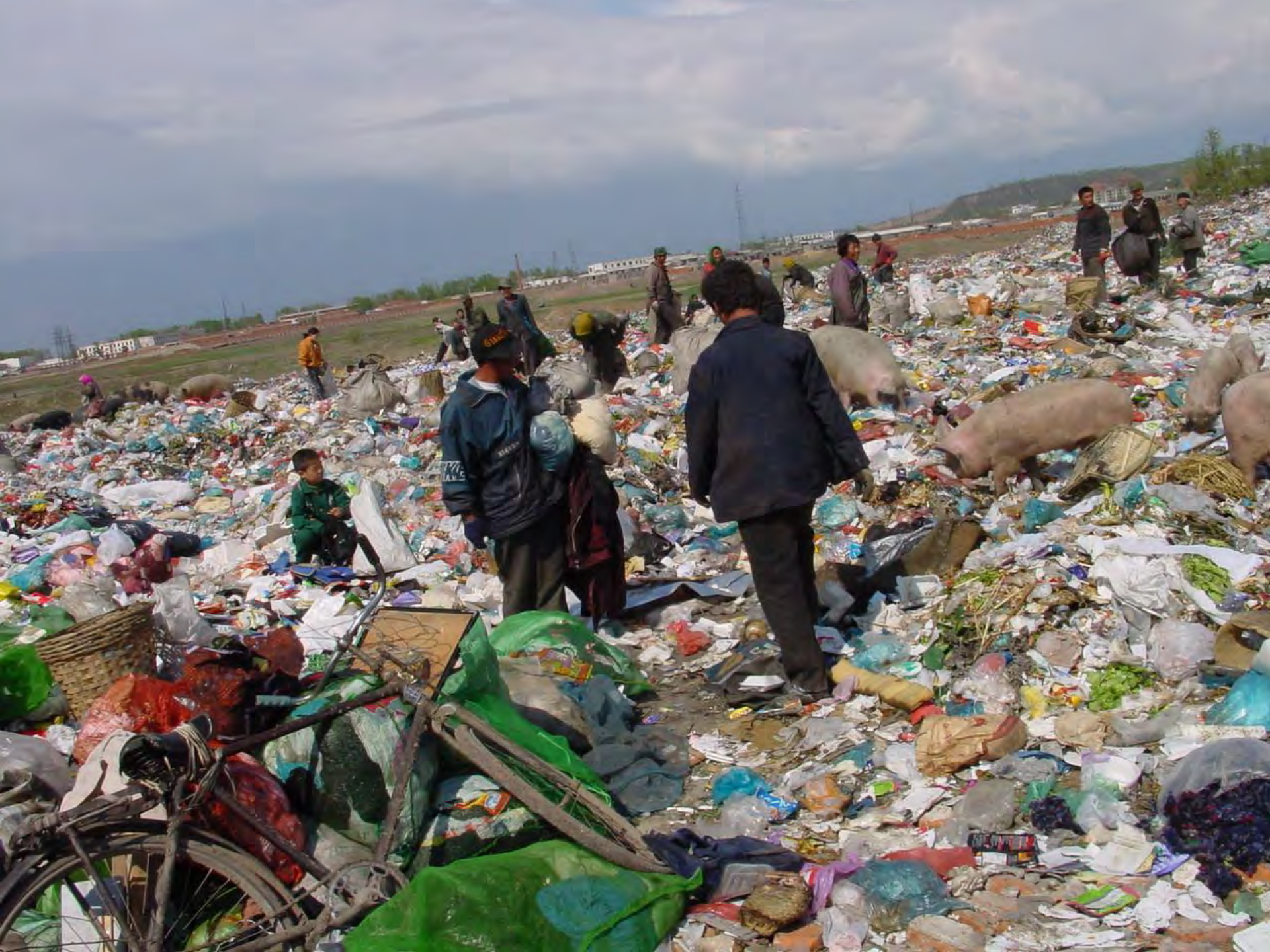
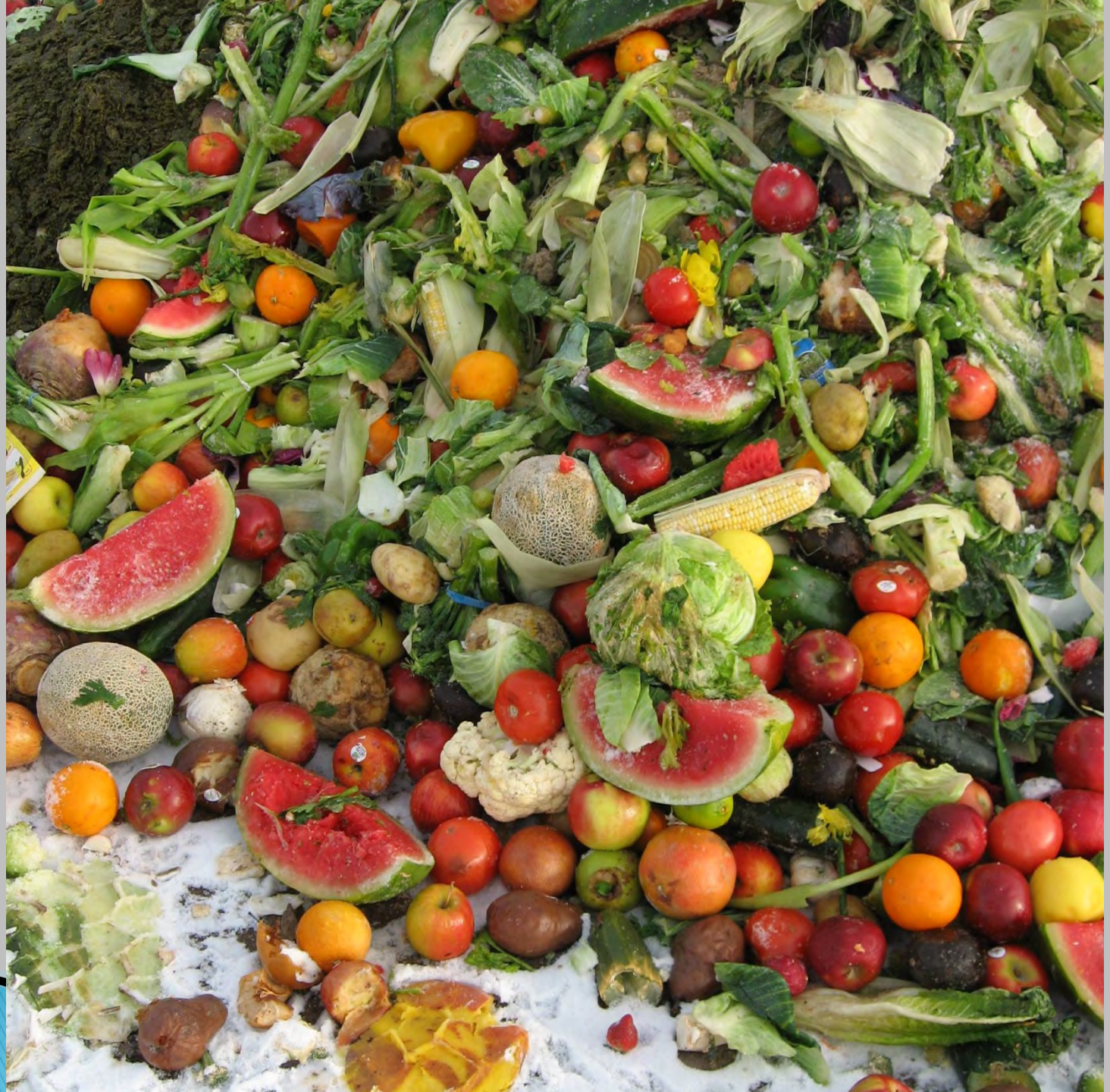
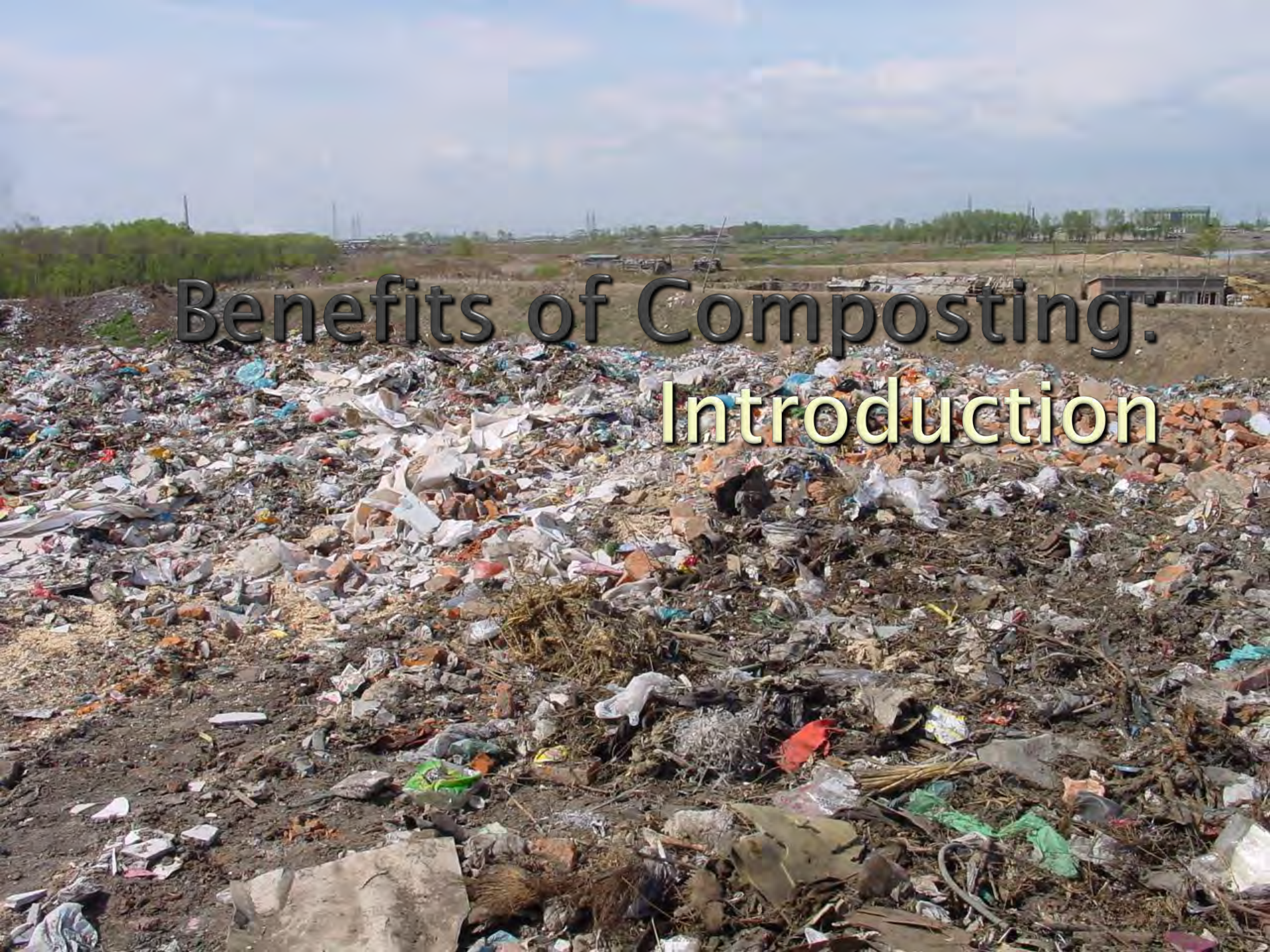








Benefits of Composting:

Introduction

What is Composting?

- Controlled biological process which leads to the production of compost from organic material.
  - similar to soil humus
- aerobic process accelerates the decomposition of organic matter
- different groups of microorganisms involved in ecological succession

Historical Perspective

Art of Composting

Generally slow, not controlled

- Biblical reference
- Chinese for thousands of years

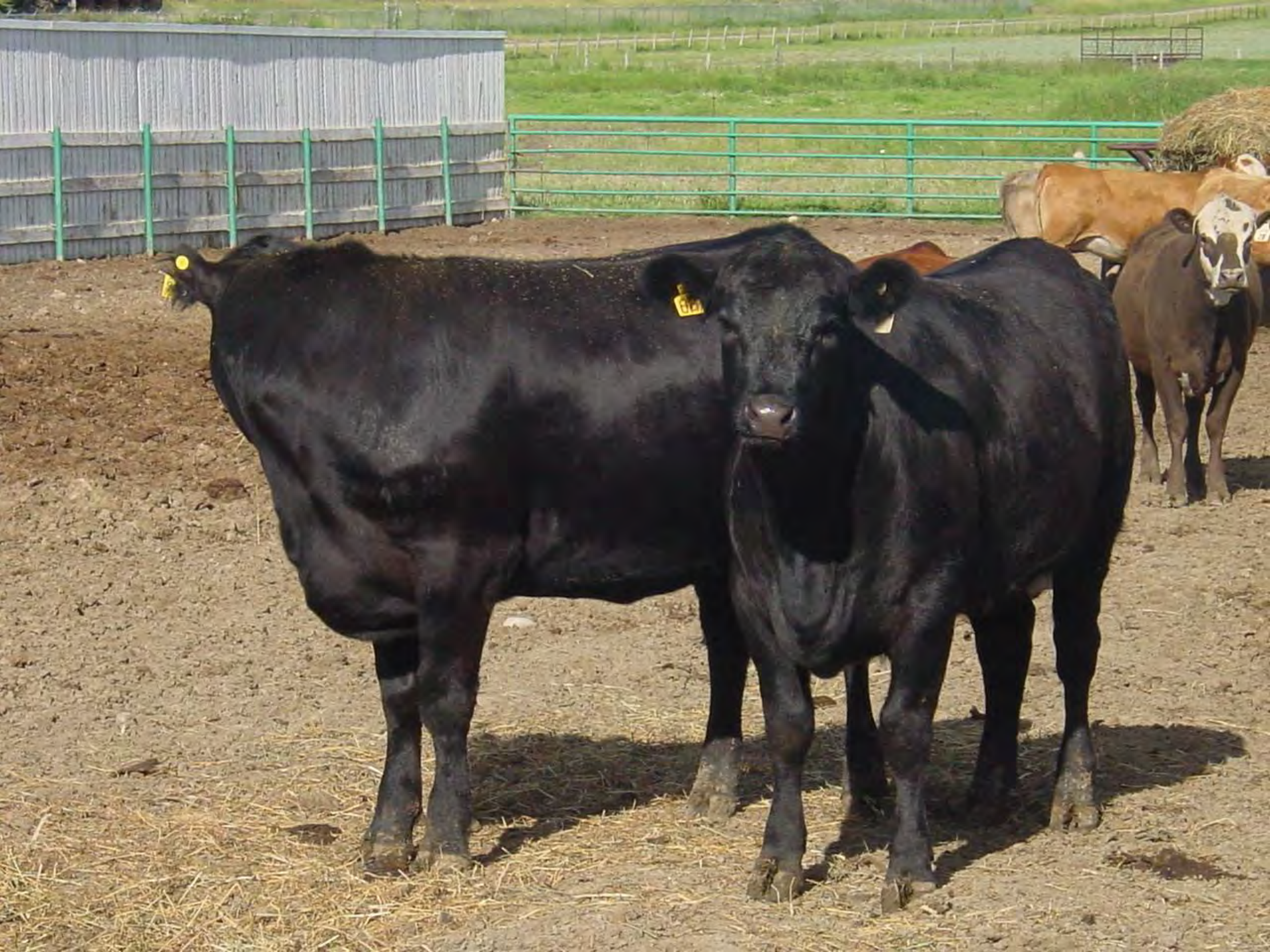
Science of Composting

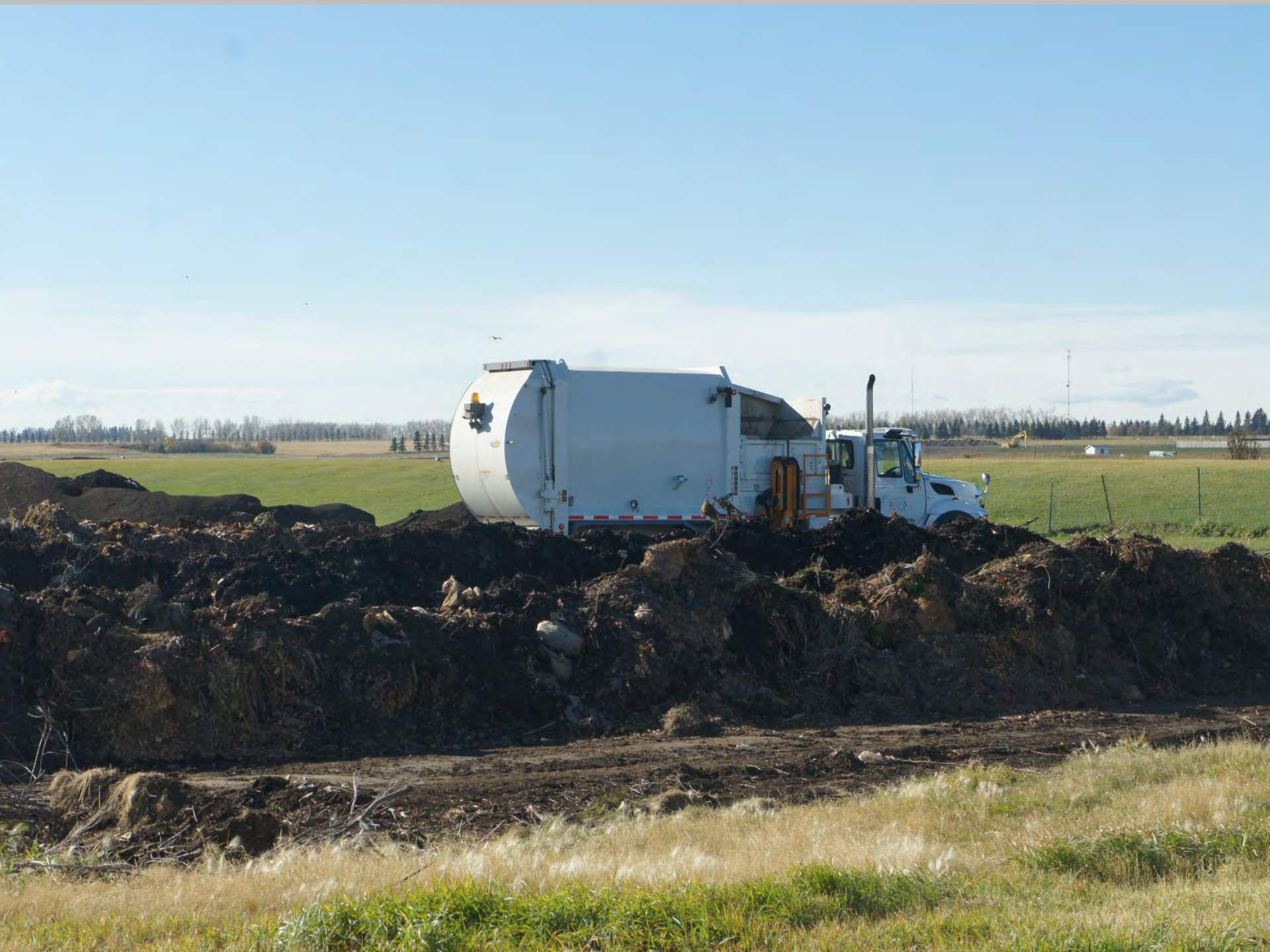
High speed, predictable, controllable

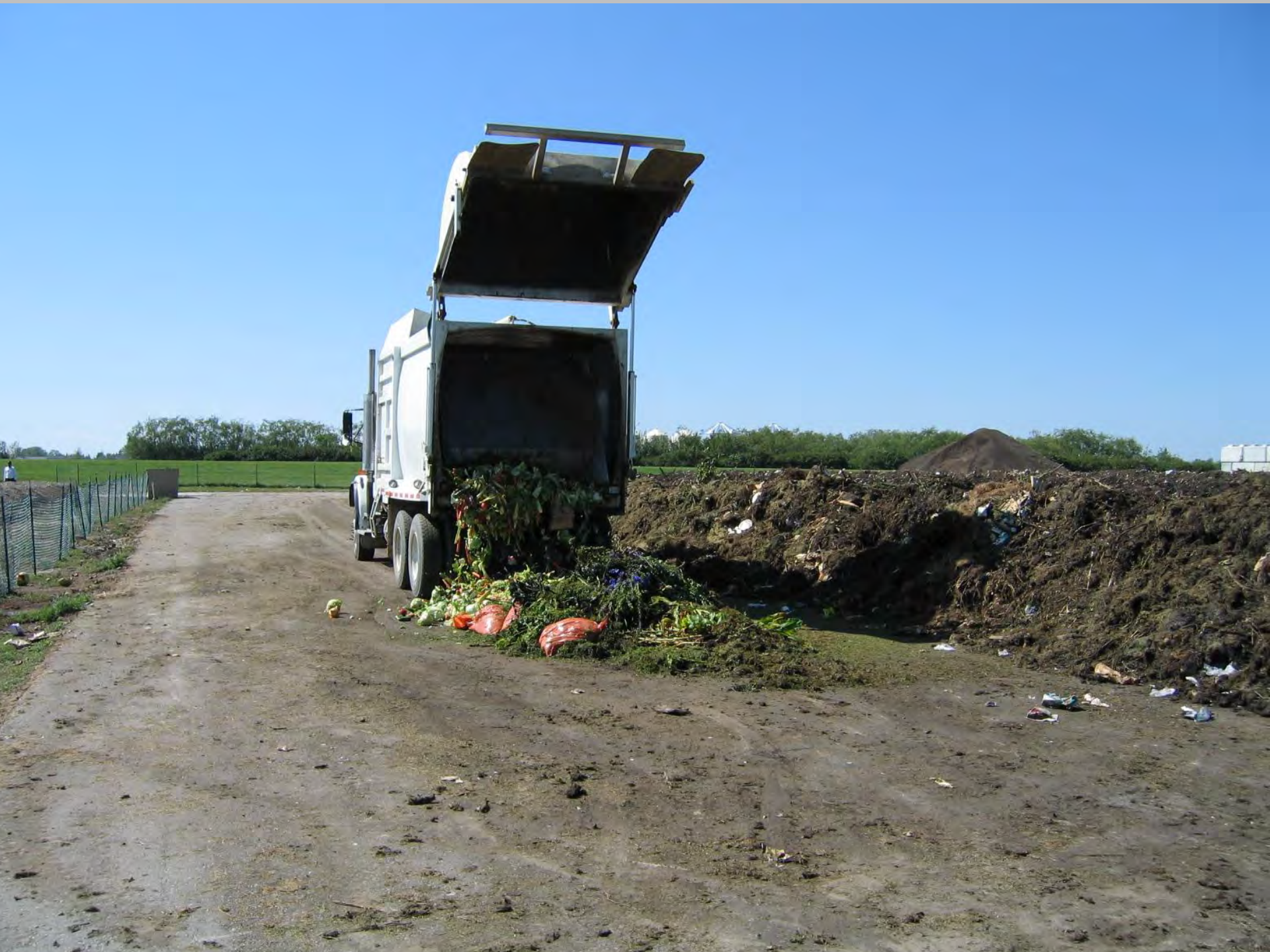
- A century old
- Waste treatment (vs. disposal)
- Applicability to different waste stream
- Product quality

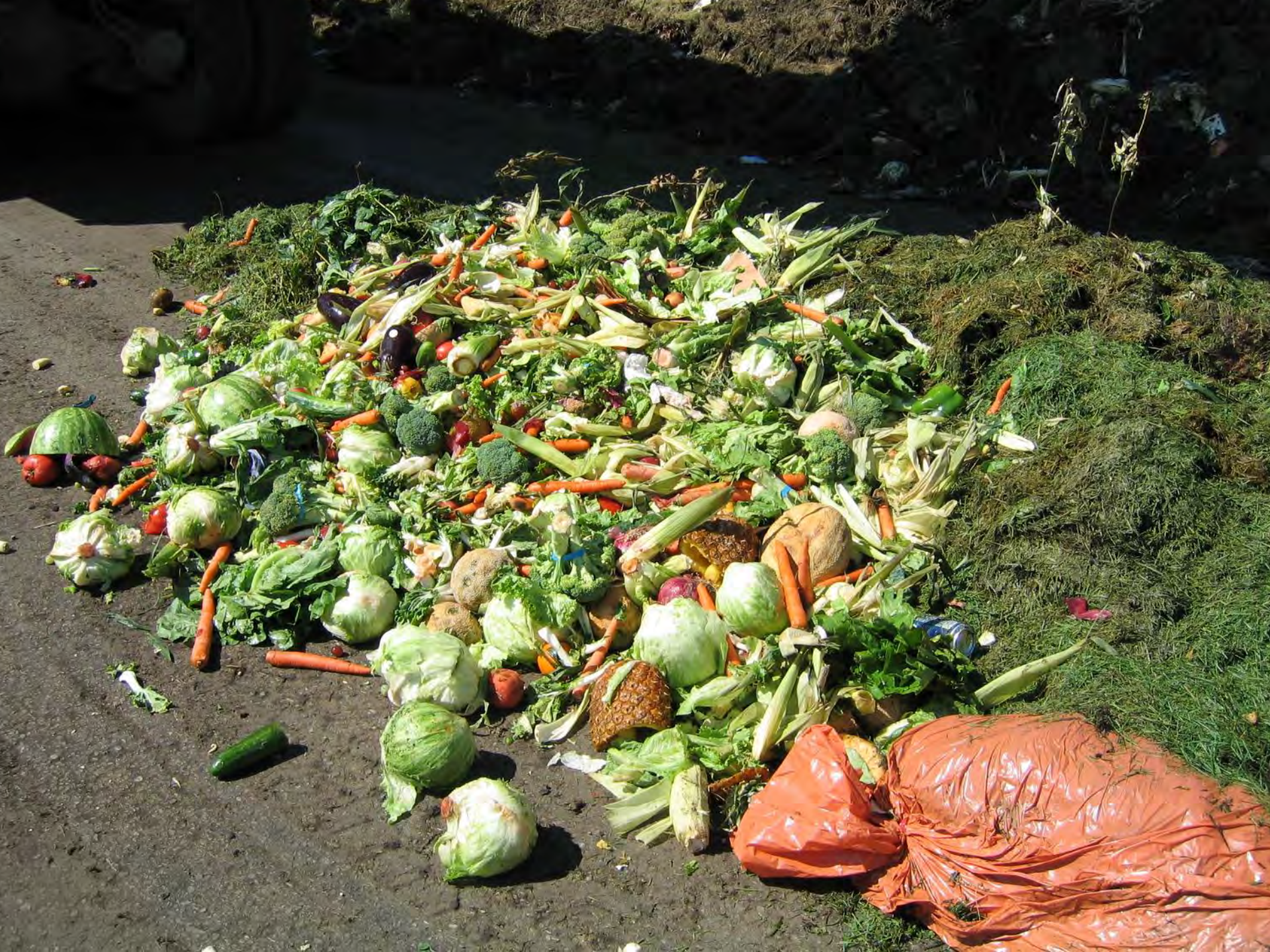
Benefits to Society

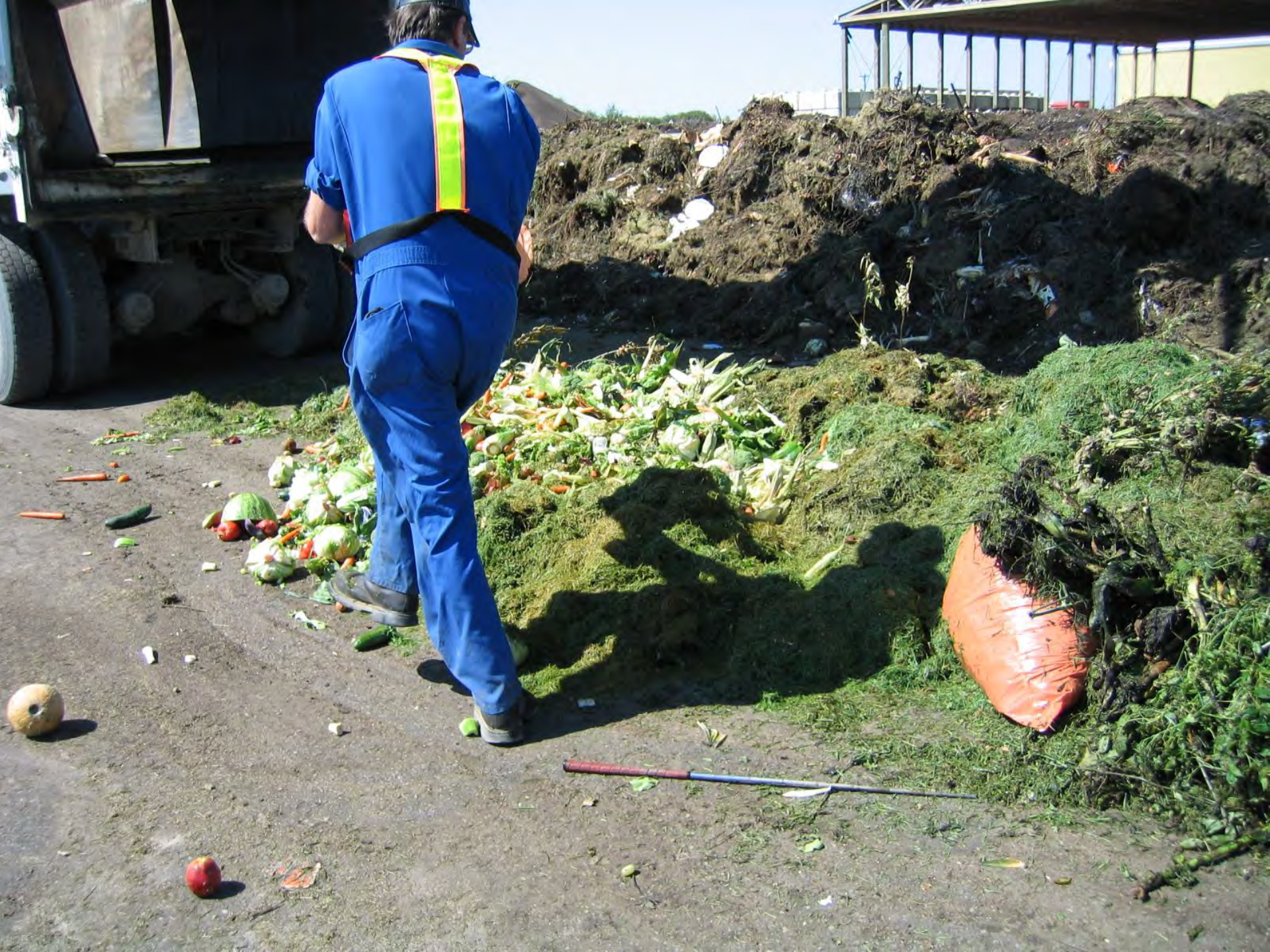
- can benefit **environment** by:
  - reducing, recycling and reusing waste
  - reducing organic waste going into landfills
  - aiding environmental remediation
  - recycling nutrients- crop production
  - reducing pollution- air, water and soil





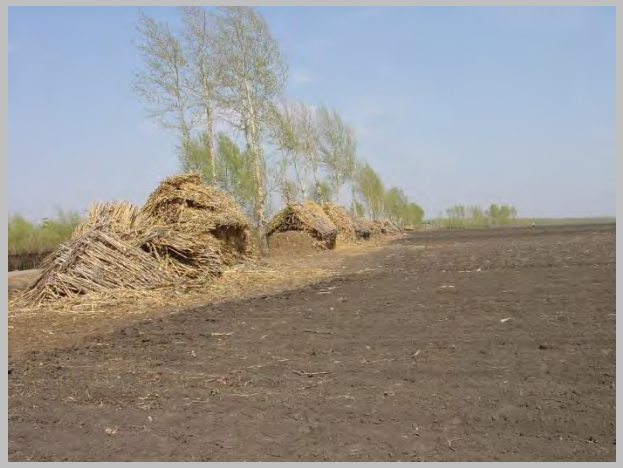






Benefits of Composting

- can benefit **agriculture, horticulture, oil and gas and forestry** by:
  - improving soil physical, chemical and biological properties
  - killing weed seeds in raw manure
  - reducing erosion
  - promoting vegetation establishment (in reclamation projects)
  - media for horticulture
  - disease suppression

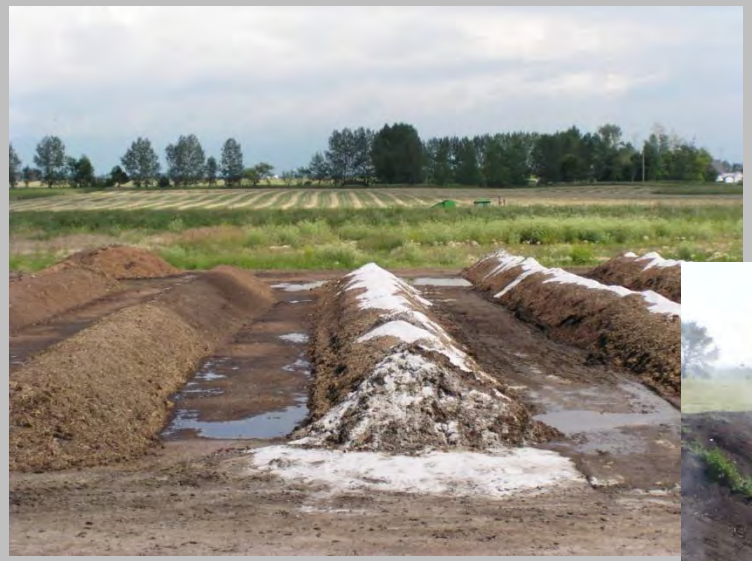


Potential Worldwide Impact

- adding compost to soil can improve crop productivity by:
  - supplying nutrients and organic matter
  - improving water retention in soil
  - suppressing soil borne diseases


Cynthia Kentucky
Bluegrass
Poa pratensis
0% Compost
Cynthia Kentucky
Bluegrass
Poa pratensis
10% Compost
Cynthia Kentucky
Bluegrass
Poa pratensis
20% Compost
Cynthia Kentucky
Bluegrass
Poa pratensis
50% Compost

Greenhouse Gas Mitigation Project



Benefits of Composting

- can benefit **public health** by:
  - reducing air and water pollution
  - providing biological control of disease agents
  - removing refuge areas for rodents
  - Developing countries- water pollution, rodents attacking crops, spread of disease, limited crop production

Benefits of Composting

- Can be an **economic** benefit by:
  - reducing disposal costs (i.e. feedlot manure)
  - producing a salable product
  - converting waste into beneficial product
  - tipping fees
  - Intellectual property and patents
- **non-tangible** benefits
  - improving public relations

Summary

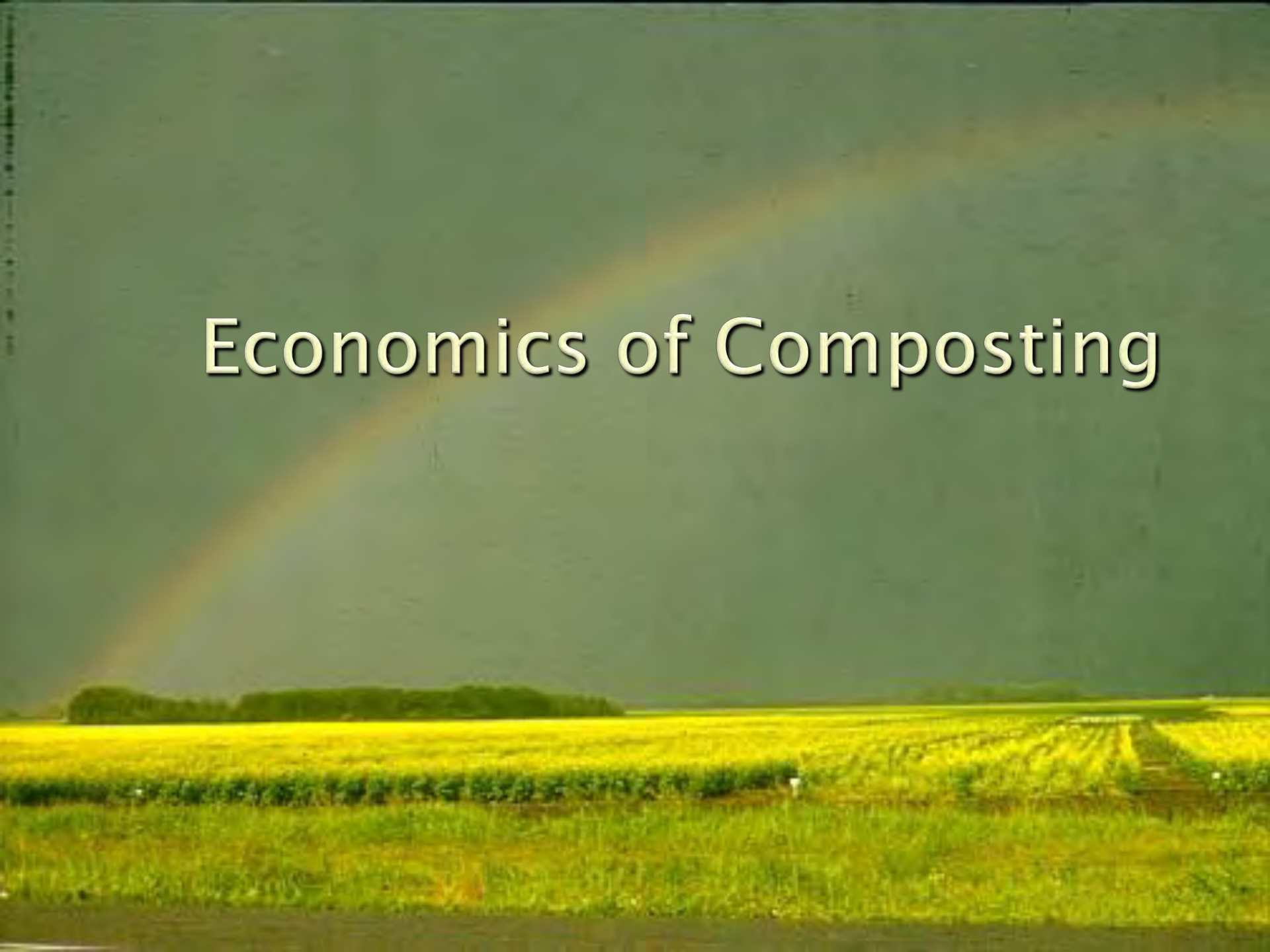
- Composting provides **environmental, economic** and **public health** benefits and has numerous applications:
  - Municipal waste
  - Industrial Waste
  - Agricultural and Forestry Residues
  - Livestock Manure
  - Remediation/Reclamation
  - Horticulture industry

Benefits of Compost as a Soil Amendment

- improve soil fertility (chemical characteristics- nutrients, OM)
- improve physical characteristics of soil
  - water holding capacity, CEC, structure
- improve biological characteristics
  - increased microbial population
- reduce pollution
- control erosion
- mulch to suppress weed growth

Control of Weed Seeds

- weed seeds commonly present in cattle manure
- spreading raw manure ultimately increases weed control costs
- marketability of composted manure influenced by presence of viable seeds
- thermophilic temperatures (together with biological activity) can kill weed seeds


Economics of Composting

Tipping Fees

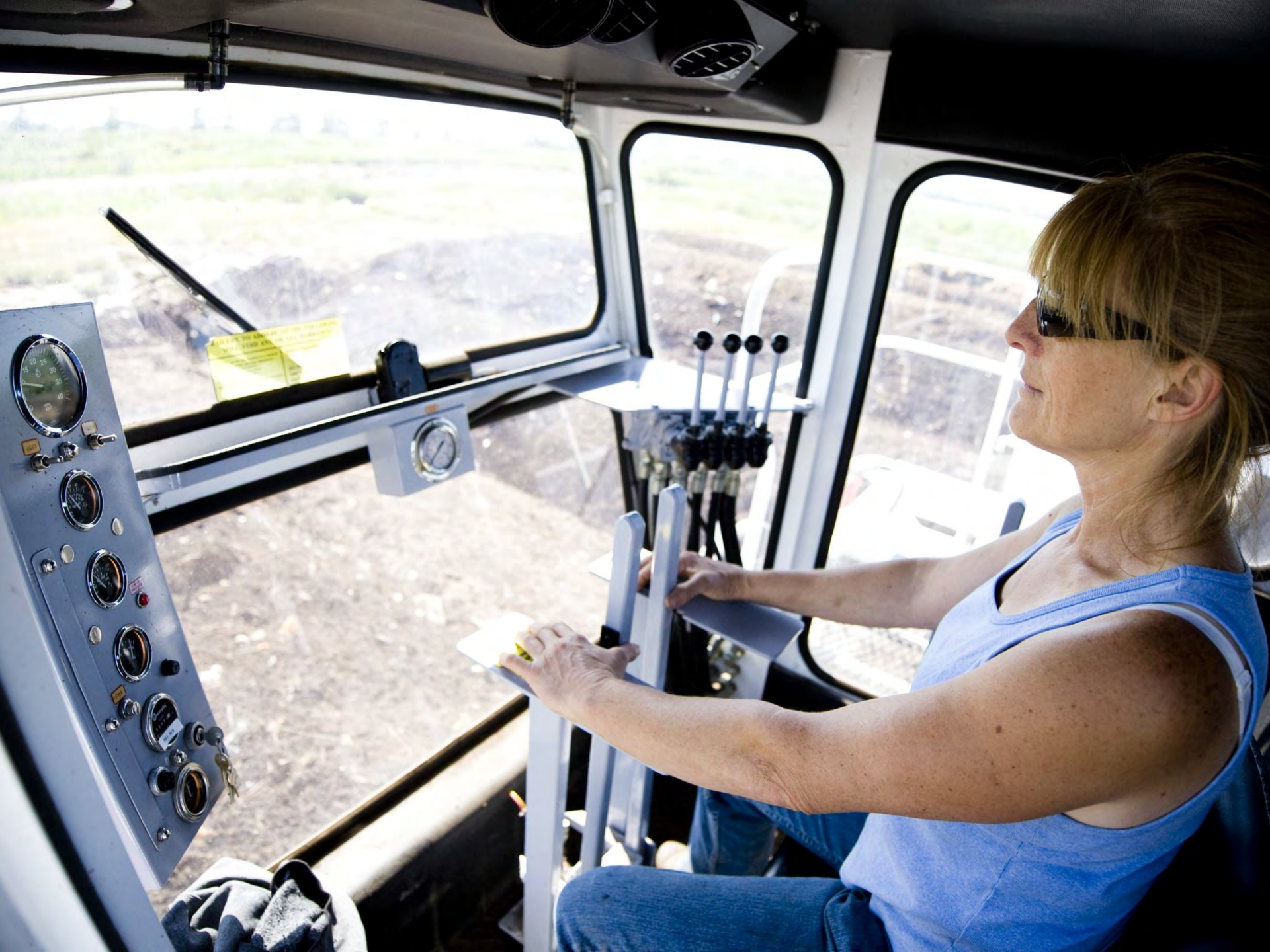
- a fee charged for dropping off waste
- often charged in recycling facilities, landfills and composting facilities
  - contribute to operational costs
- tipping fees vary widely across the country
  - may be 2x higher in Ontario than in Alberta
- Rocky Mountain House landfill charges $80/tonne of waste

Tipping Fees and Composting Facilities

- typical tipping fee for a composting facility is $30/tonne
- tipping fees and sale of compost are 2 main sources of revenue for composting facilities

Costs

- Start-up costs- capital for purchase of equipment, property, permitting costs, building construction
- Operational Costs- worker salary, equipment maintenance, utilities
- Note: Operational costs do not increase proportionately with volume treated. Larger volumes have lower op. cost per unit of compost produced

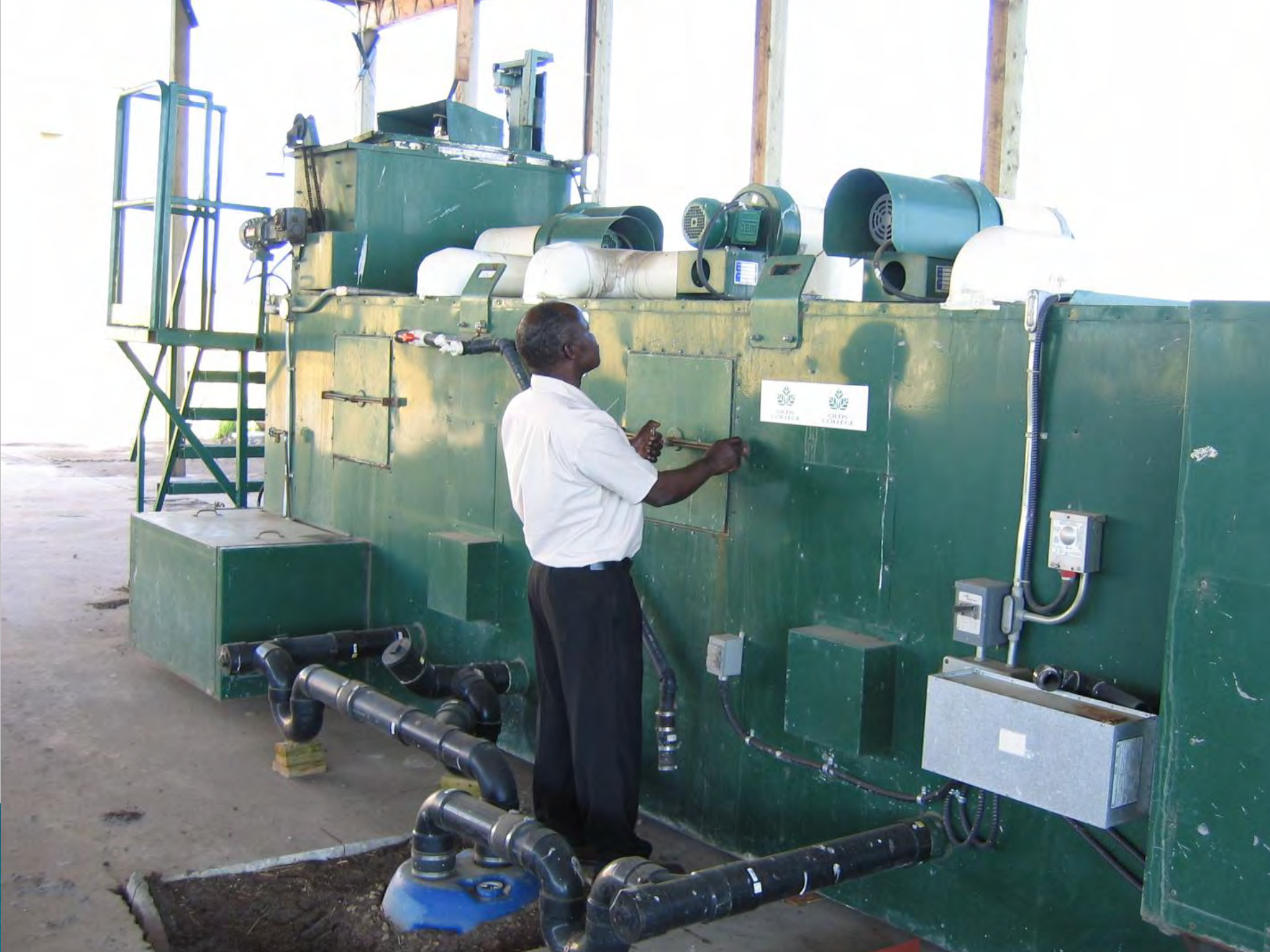


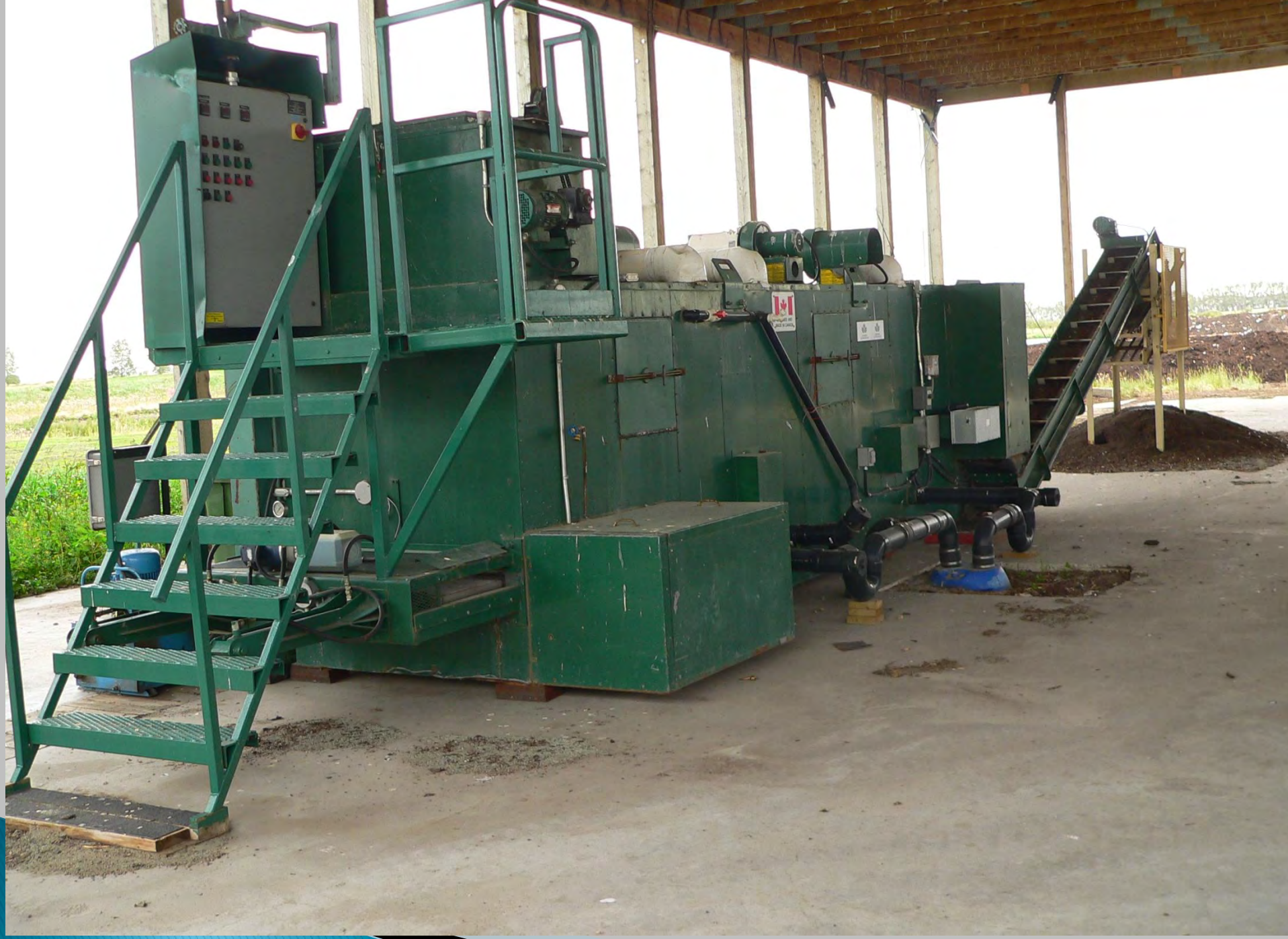
Manure Composting Cost Analysis Amortized Over a 5 Yr Period[1]

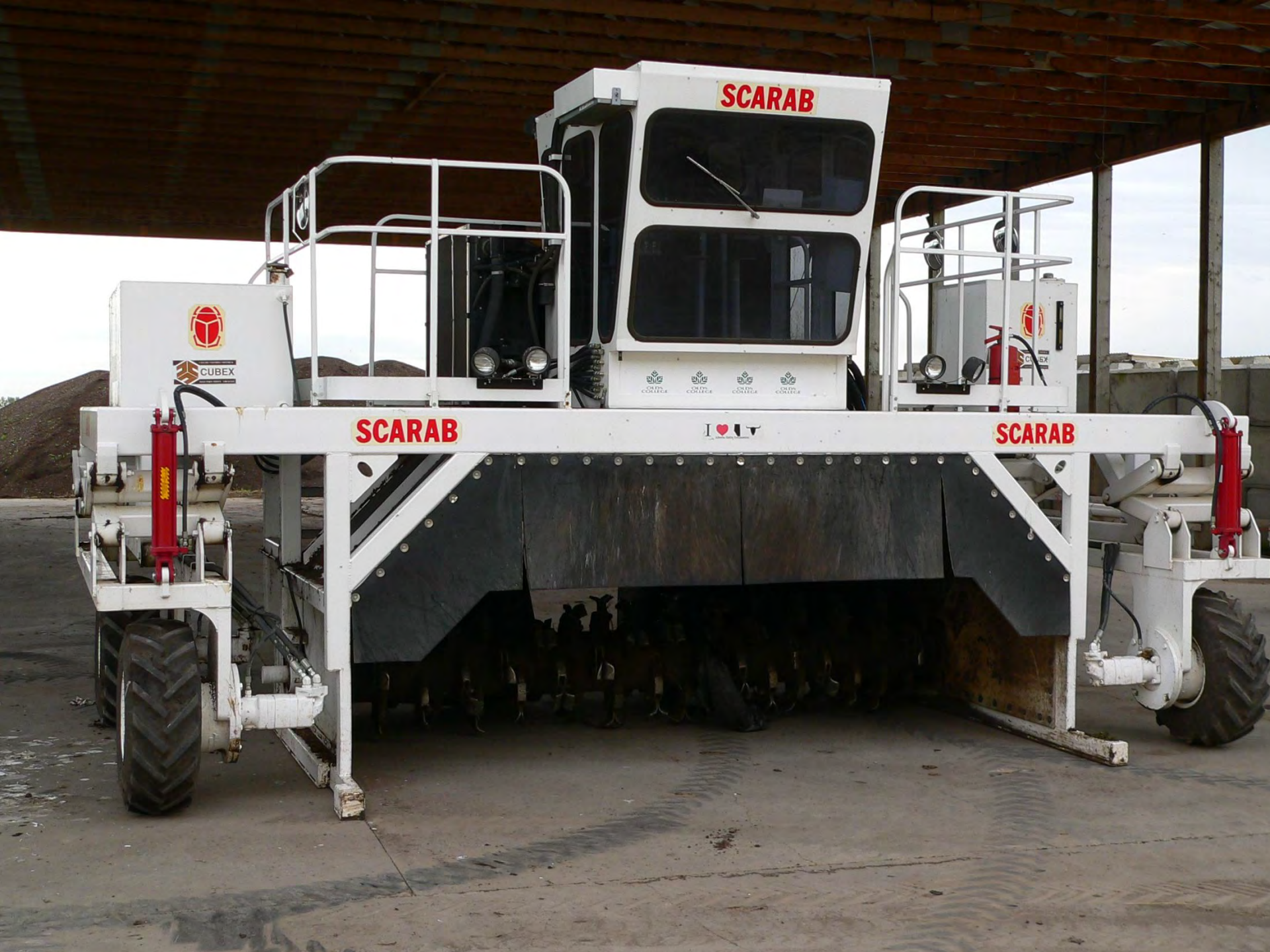
- Assumptions
  - volume = 50,000 cy/yr x 5 years =250,000 cy
  - Max Gross sales x 70% = 175,000 cy
  - Cost $/cy = $2.70
  - includes site development, material, production and management
- Sale up to **$40 /cy**

[1]Data supplied by P and B Morrison

Rotating Drum Composter



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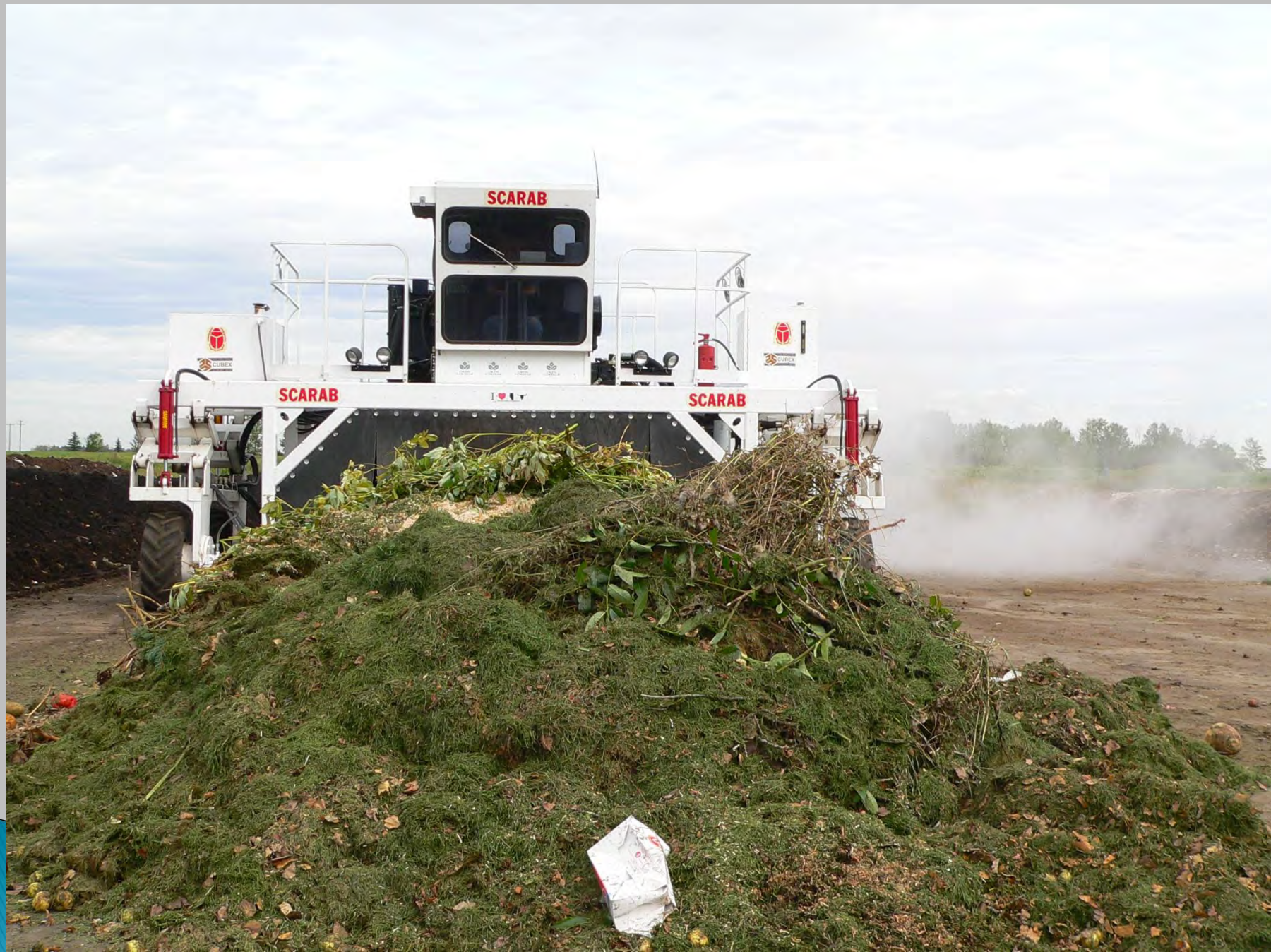
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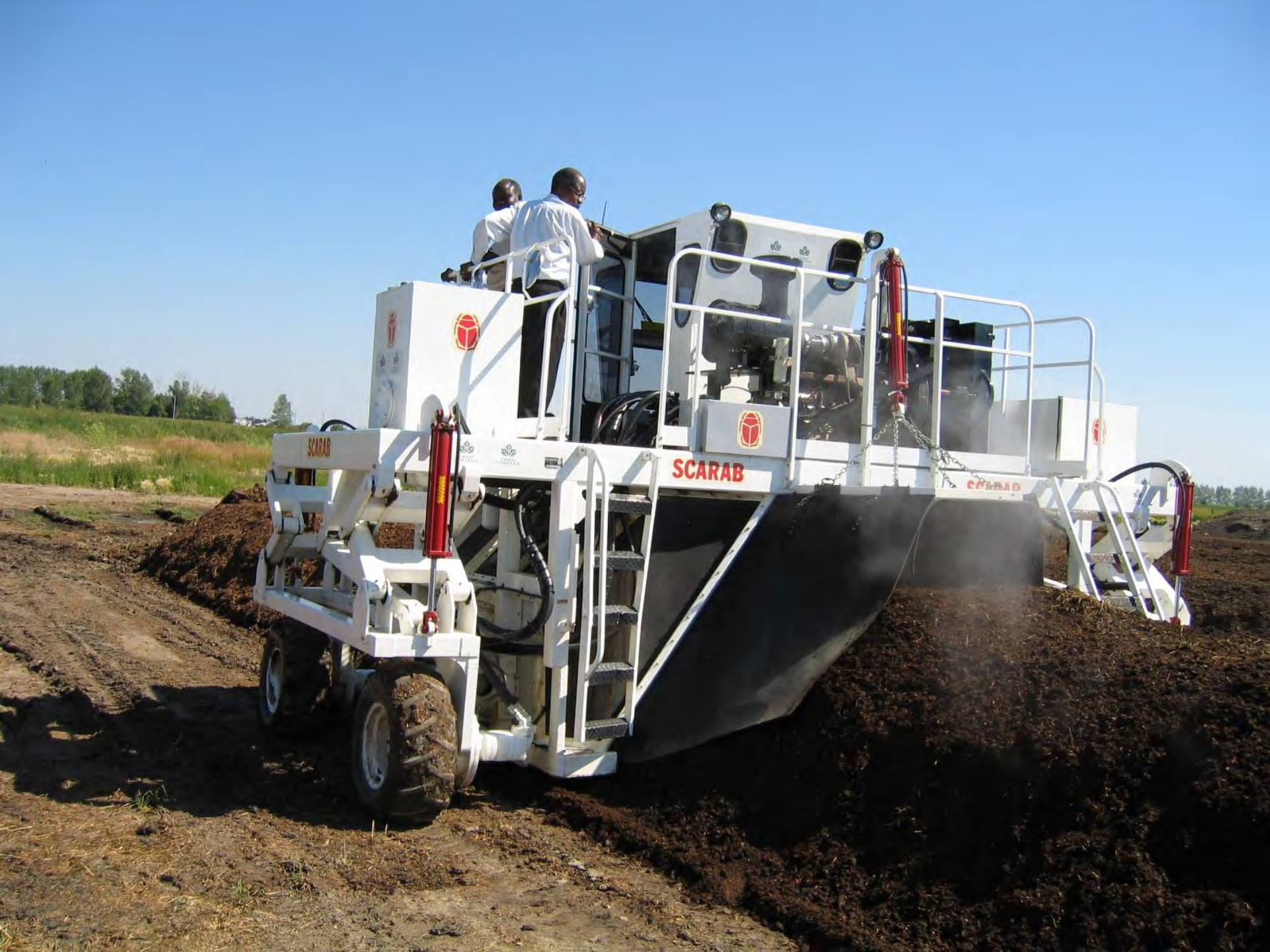
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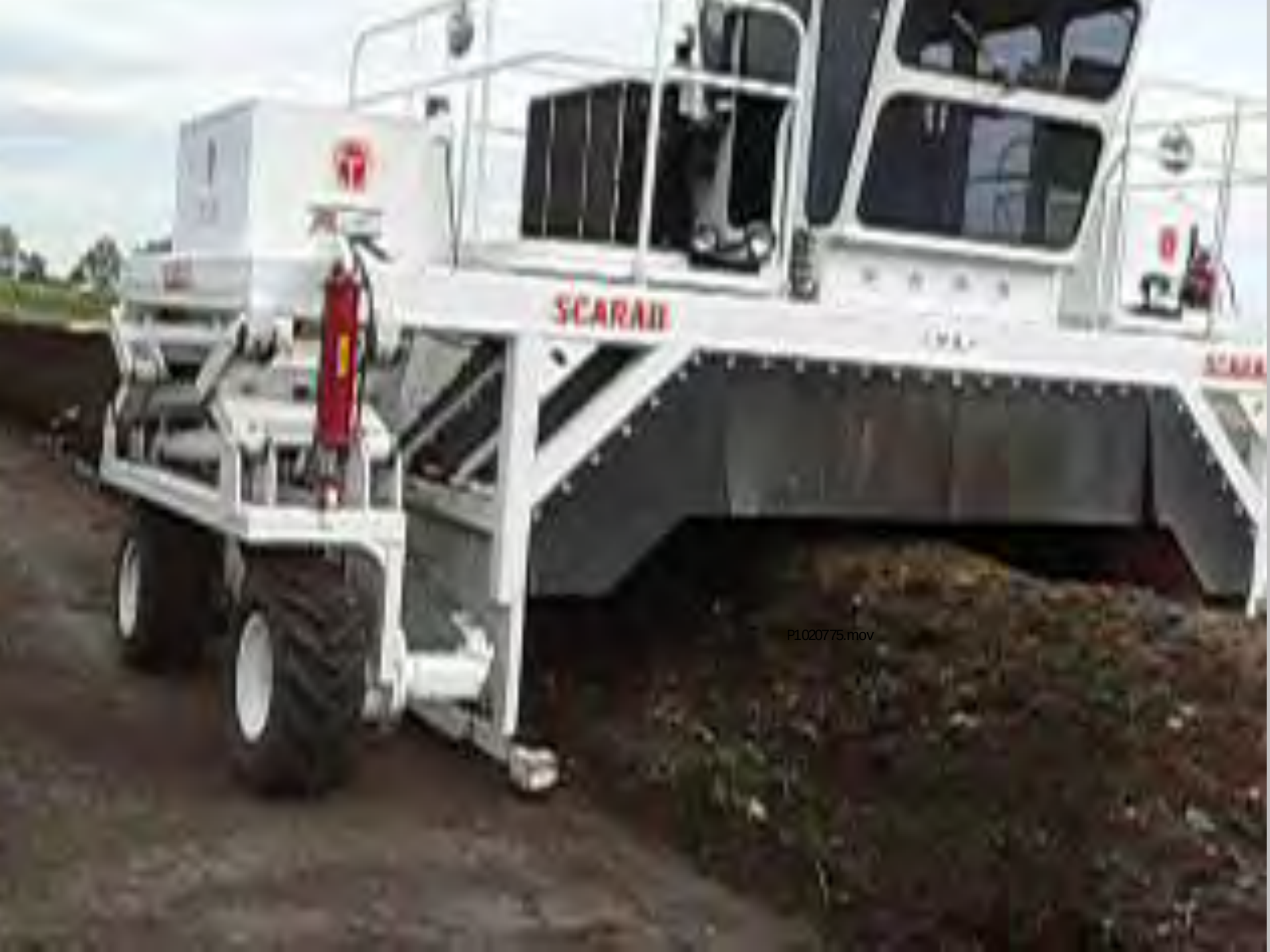
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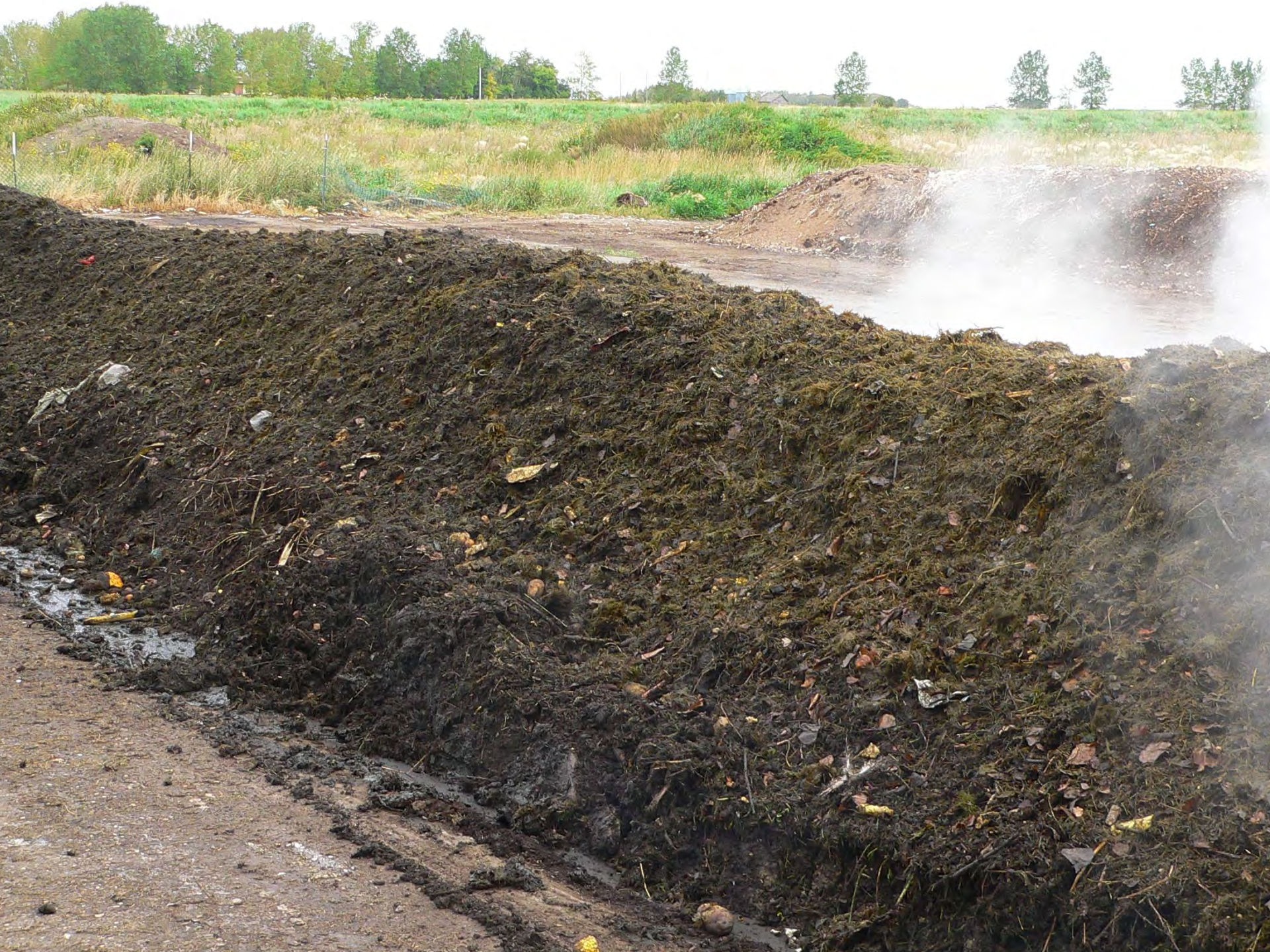

End Product

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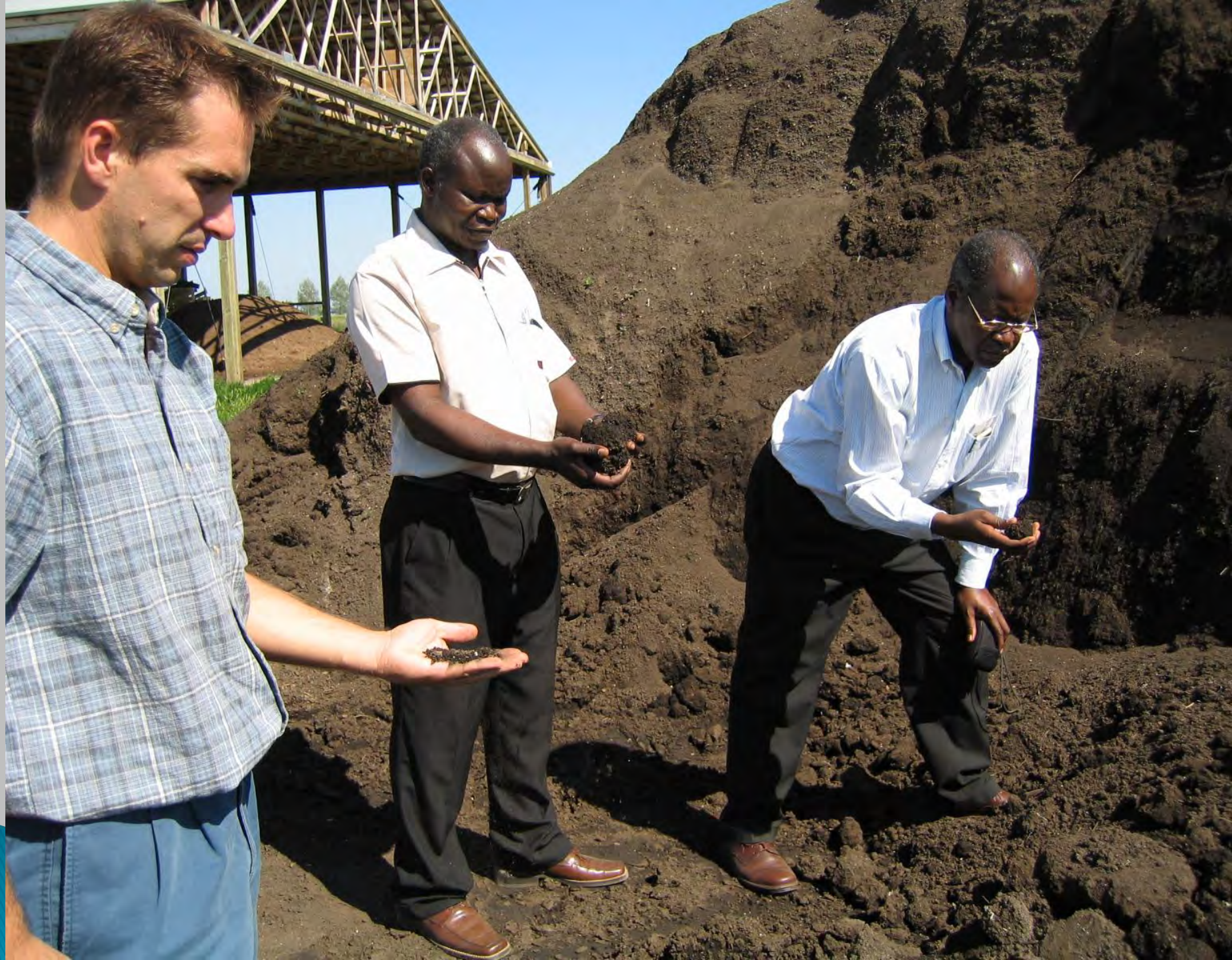

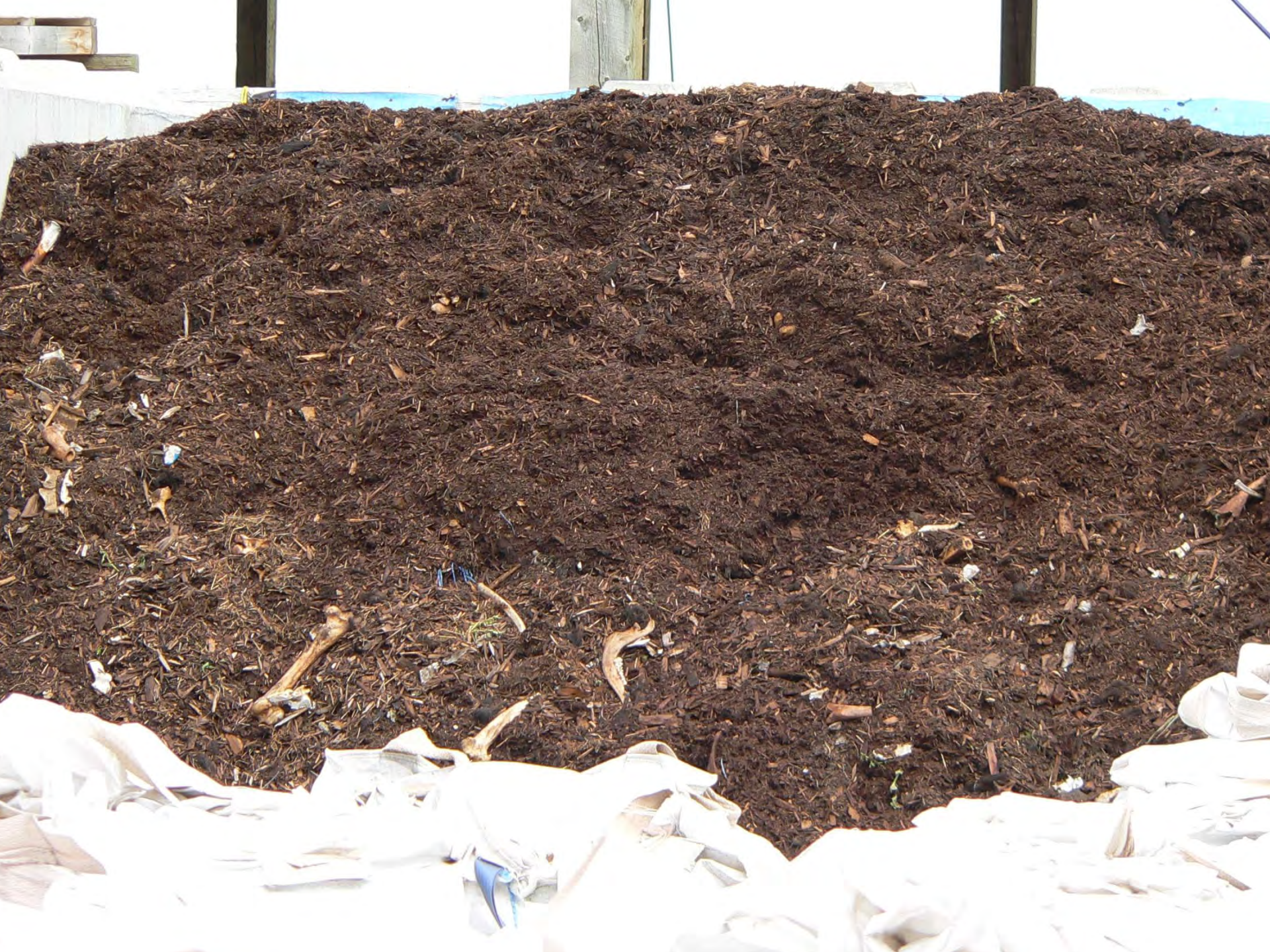

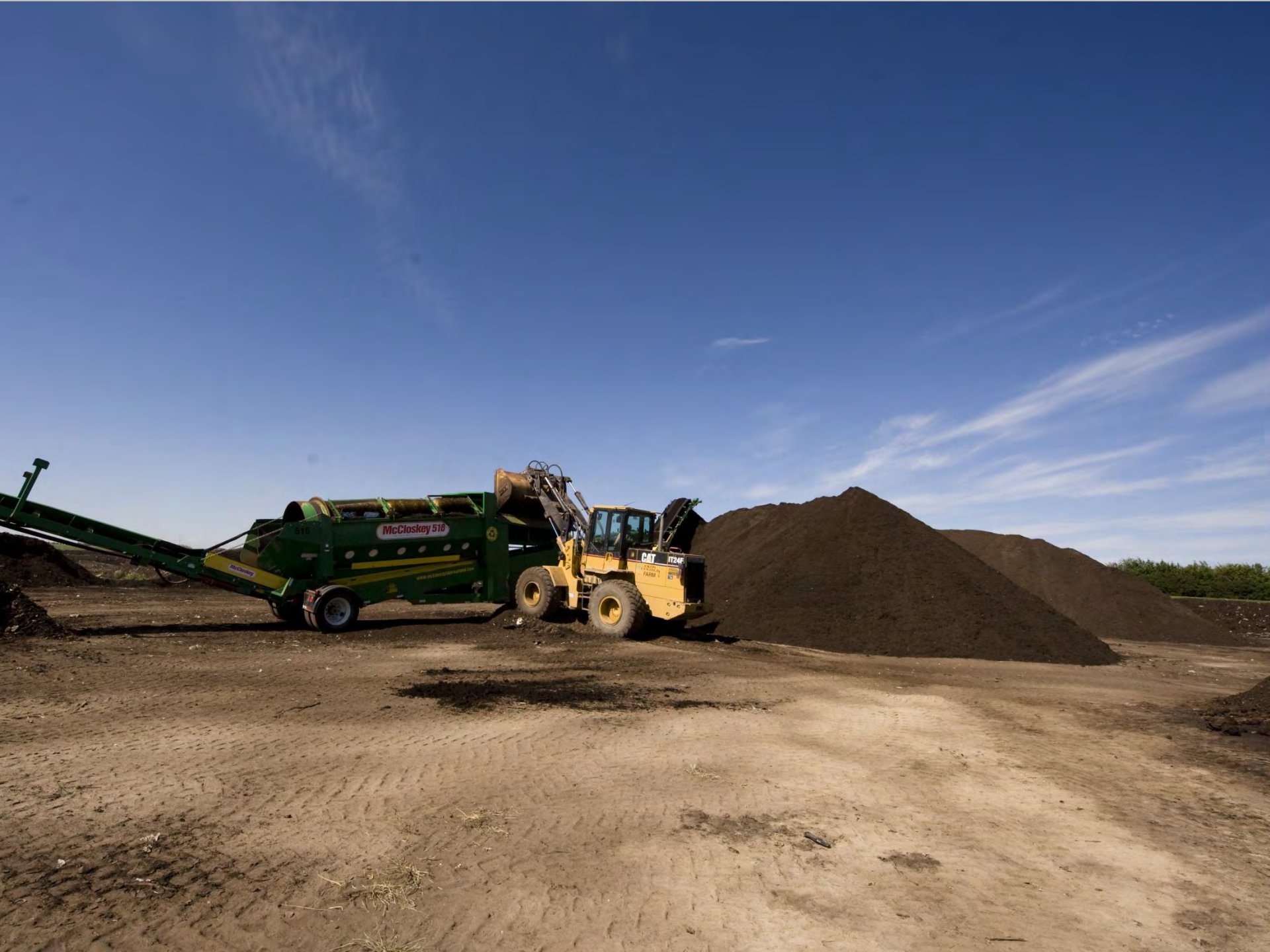
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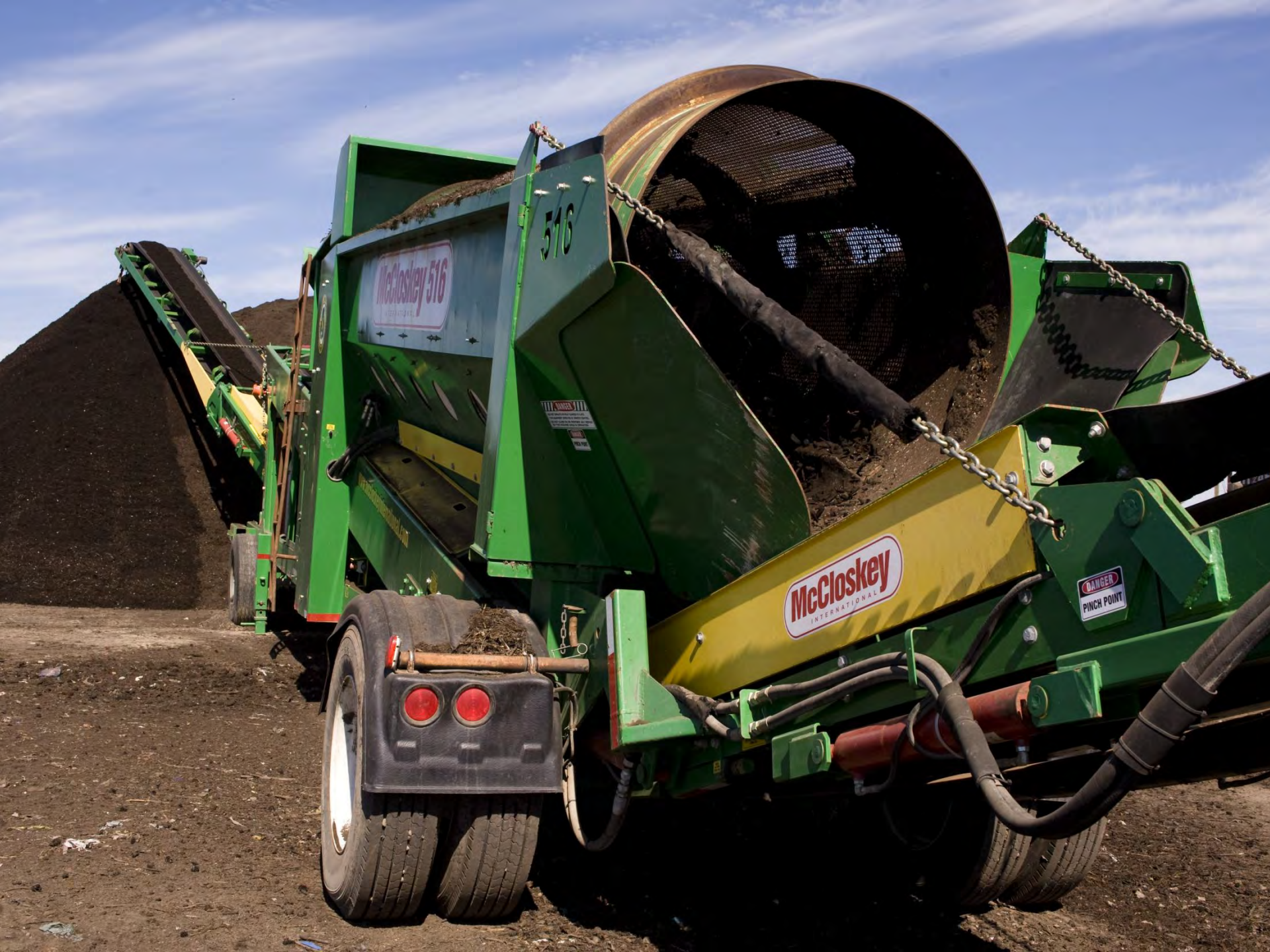
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INTERNATIONAL
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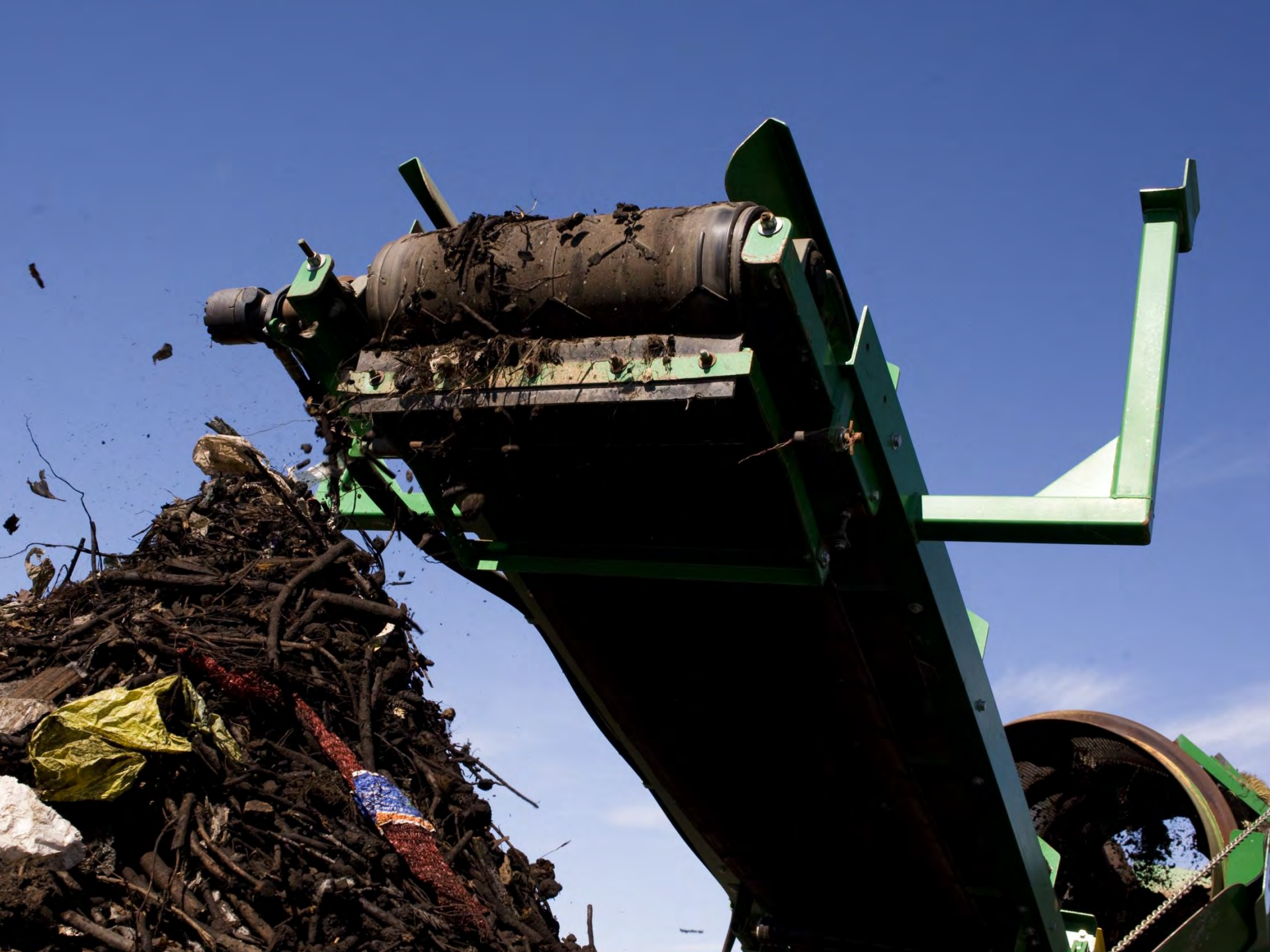
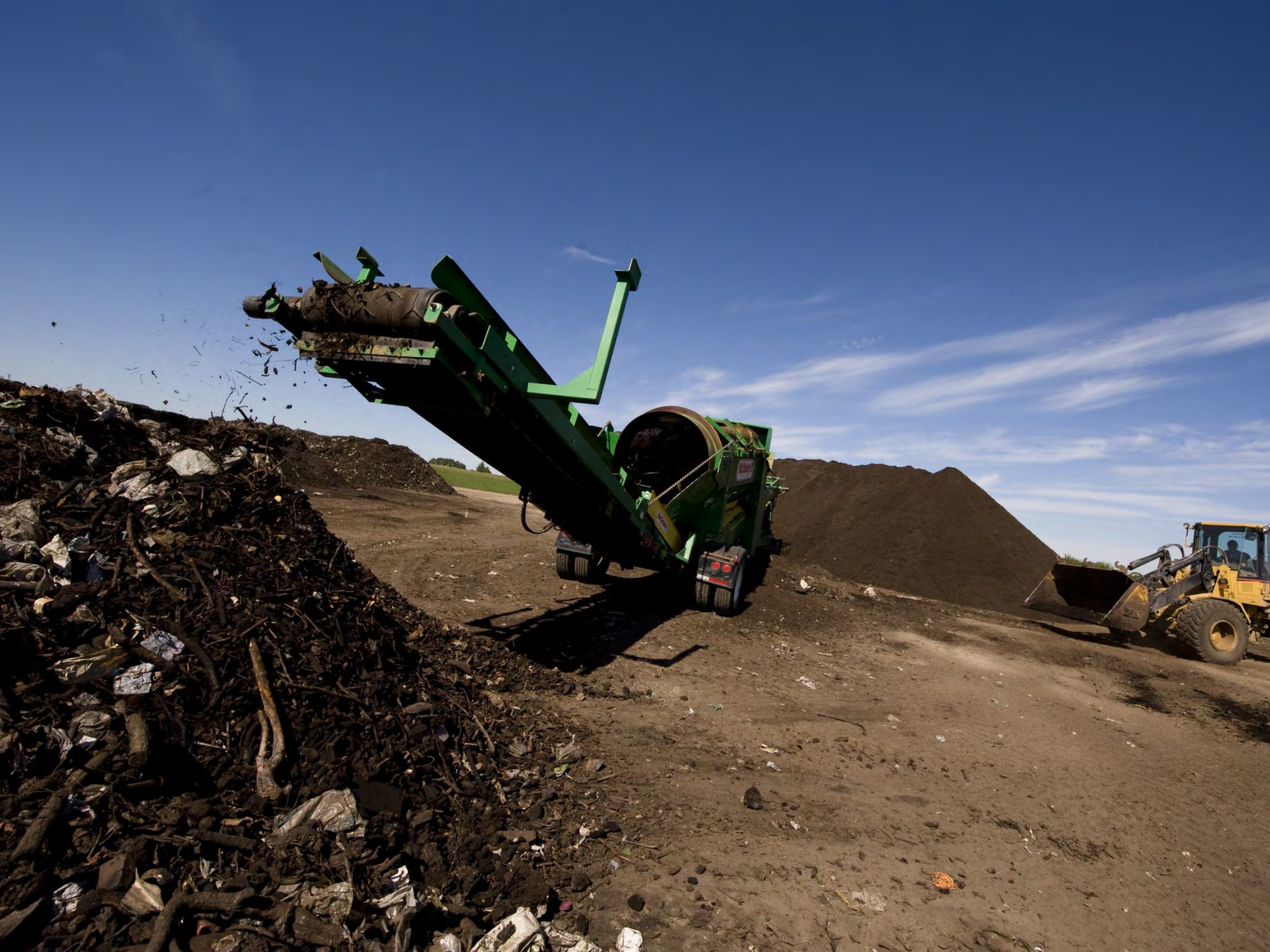
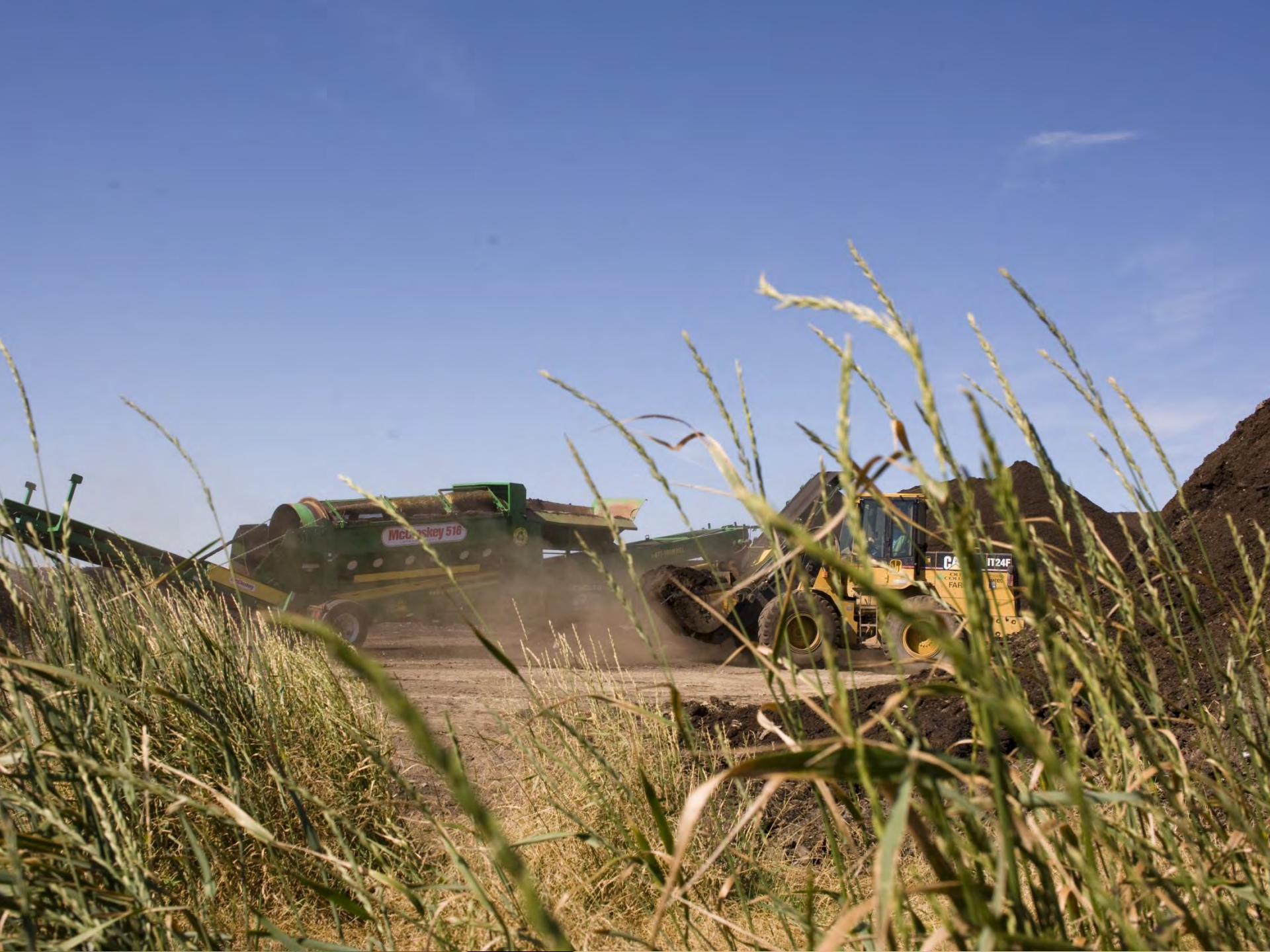
PINCH POINT



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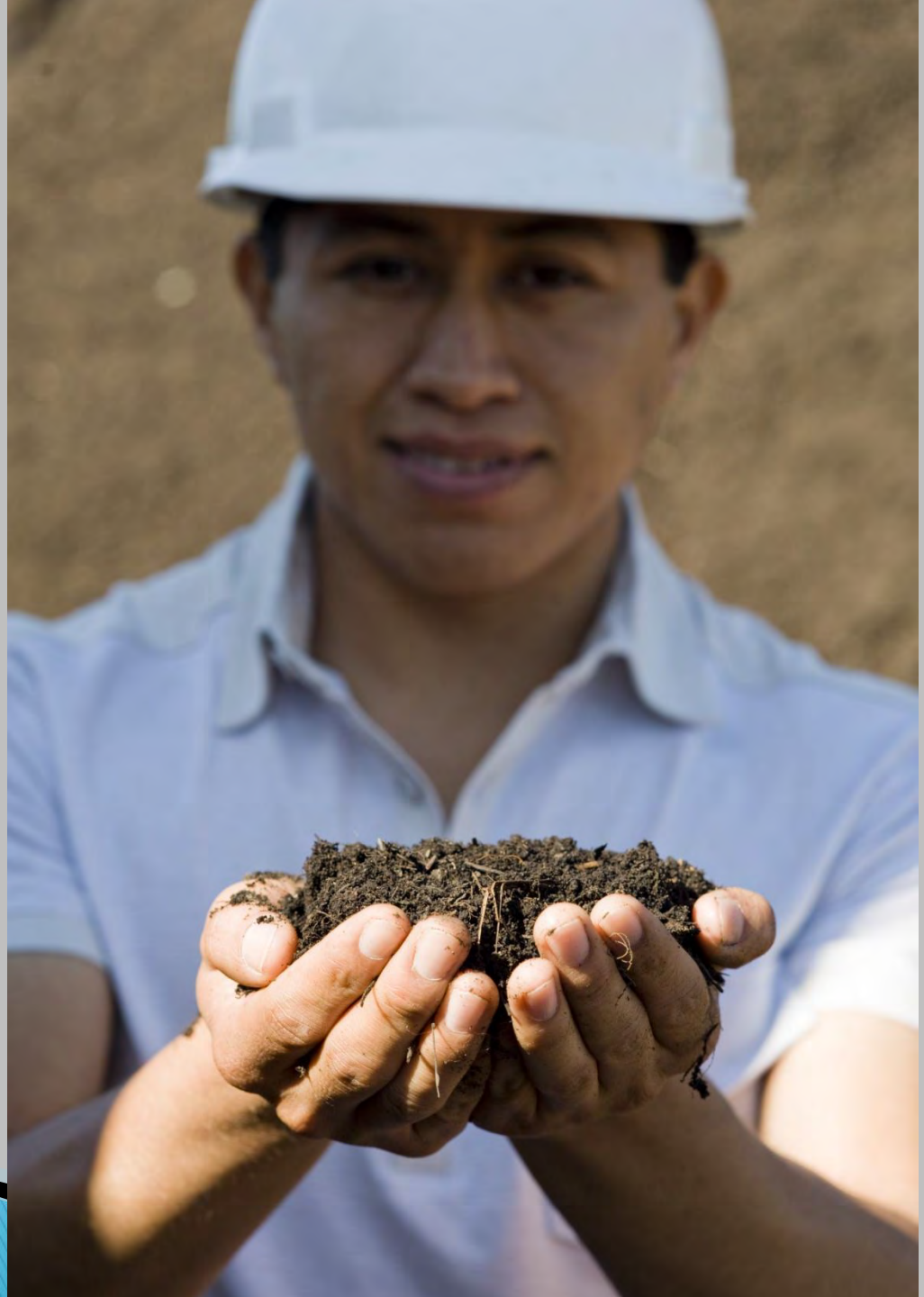
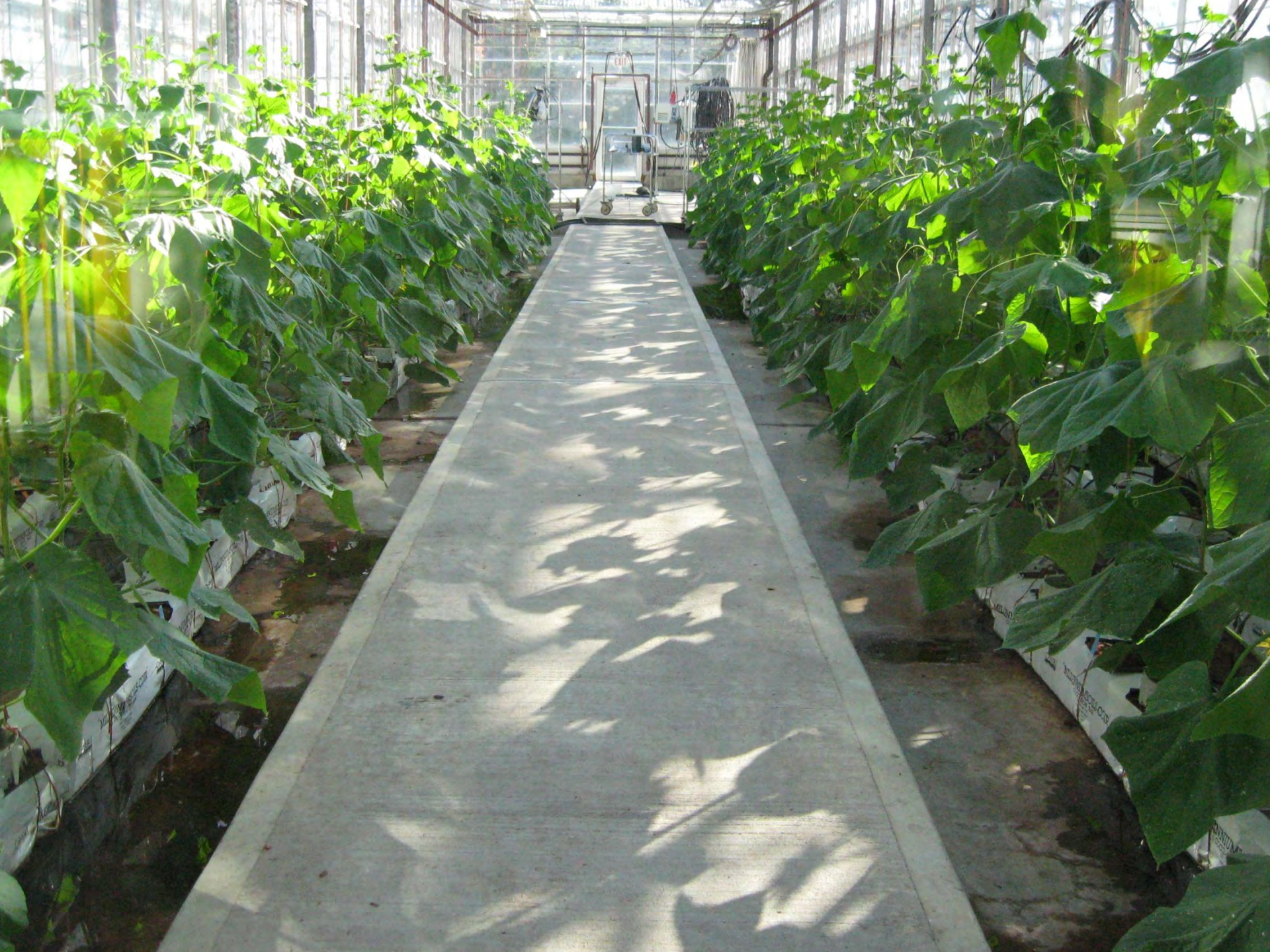
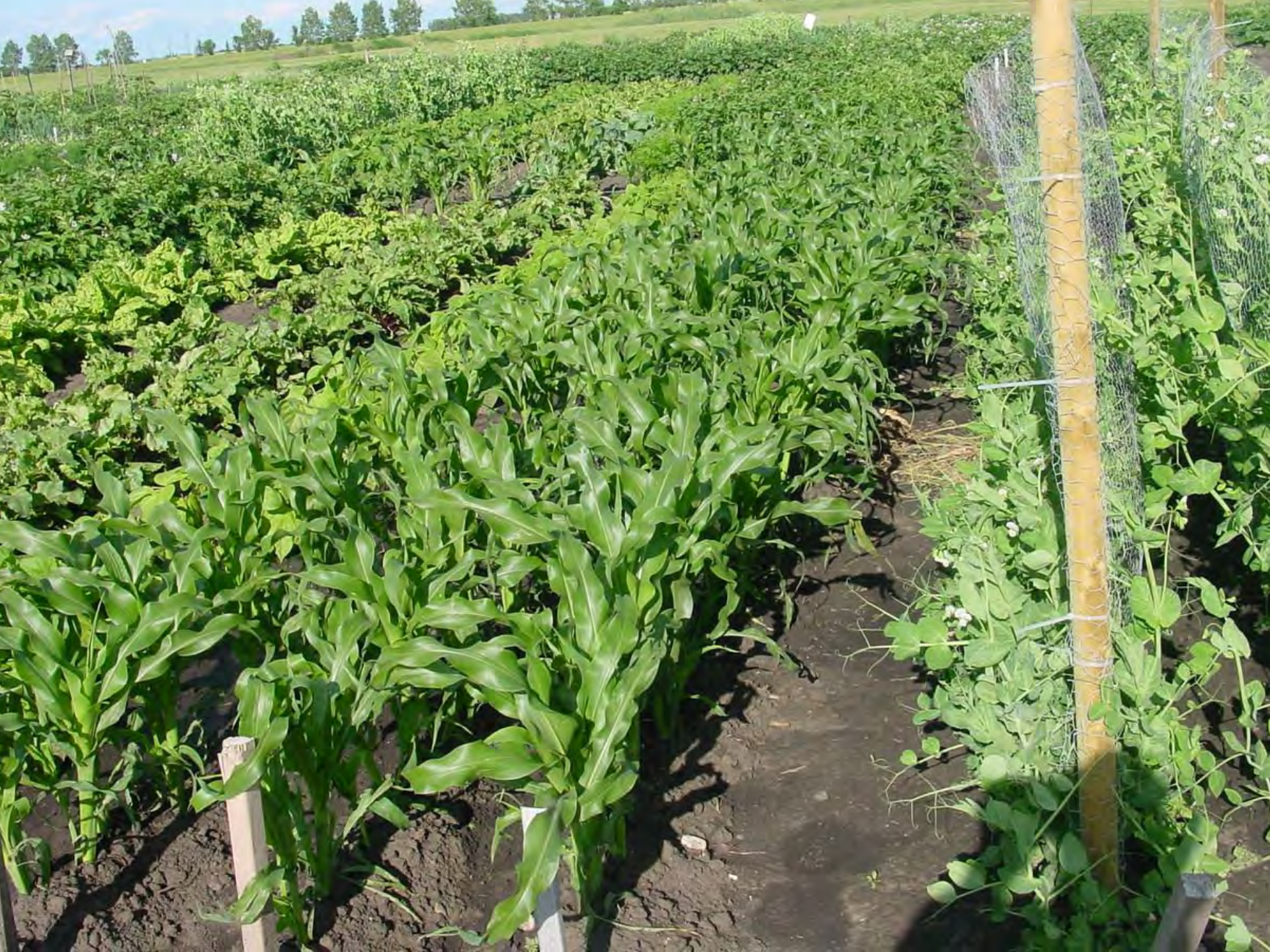
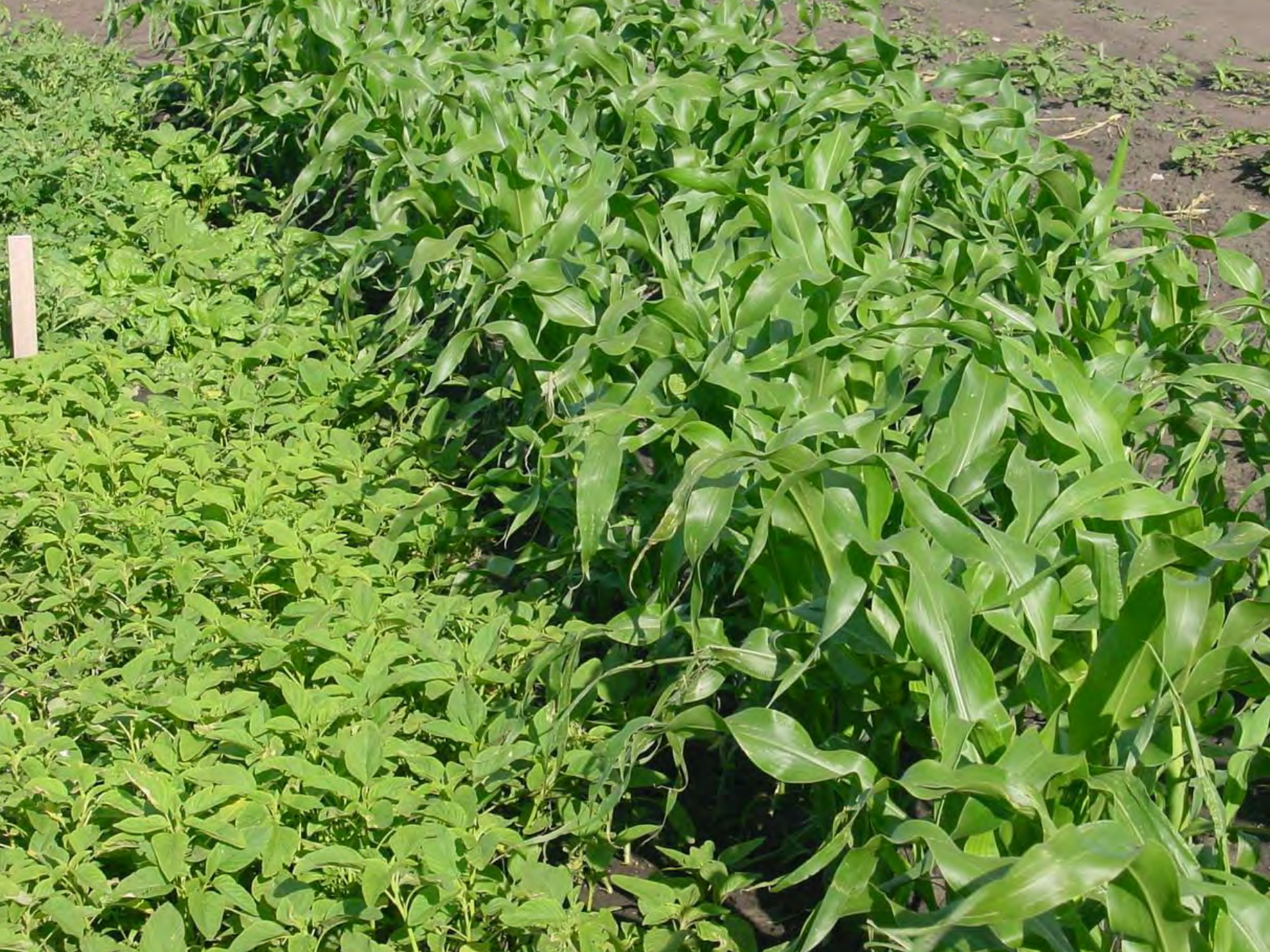
End Uses

- Agriculture
- Reclamation
- Remediation









Thank you !

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