Composting as a Business

Abimbola Abiola Ph.D.
WEBINAR

Composting as a Business

📅 9 July ⏰ 12:00 p.m. (Eastern time)

Speakers:

Dr. Abimbola Abiola
Technical Specialist, Environmental Remediation and Reclamation in IICA’s Climate Change, Natural Resources and Productive Risk Management Program.

Hon. Michael Clifton Pintard
Minister of Agriculture and Marine Resources of The Bahamas.

Shacara Lightbourne
Acting Country Representative/Technical Specialist IICA Delegation in The Bahamas

Presenter:

Moderator:

Live transmission on FB @IICANoticias
Outline

• Background to the webinar
• Challenges to composting in the Caribbean
• What is a good compost?
• Uses and users of compost
• Compost Quality Standards and Guidelines
• Siting Considerations
• Site Management Issues
• Conclusions and Recommendations
Introduction: Previous Workshops

✓ Composting as part of an Integrated Waste Management System
✓ Benefits of composting – why compost?
  ✓ Environmental, waste diversión, agronomic, health, economic,
✓ How to compost
  ✓ Arts and Science of Composting
    ✓ Optimun conditions for composting
    ✓ Compost récipe making
✓ Composting systems
✓ Monitoring and process management
Going from Waste to Resource
BEST PRACTICES FOR OPERATING AN AERATED WINDROW COMPOSTING FACILITY

Prepared by
The Compost Council of Canada
for the
Government of Manitoba
Conservation and Water Stewardship

2016

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www.compost.org
Challenges to the use of compost in the Caribbean

• Commercial quantities are not available
• Compost quality is not guaranteed
• No quality guidelines and standards
• Lack of infrastructure for large scale production and use
• Lack of knowledge dissemination and management
• Lack of market ???
Starting a Composting Business

Business Plan

• What are the startup and ongoing costs?
  • Land, site development,
  • Equipment, analytical,
  • Salaries, registrations, insurance etc.
• Who is your target market? How much?
  • How will you make money or how long it will take you to break even?

• Permits and Licensing
• Brand your product
Compost Feedstock in the Caribbean

- Municipal waste – garbage
Table 1. Municipal Solid Waste (MSW) generation in the IICA’s member States in the Caribbean (World Bank 2018).

<table>
<thead>
<tr>
<th>Country</th>
<th>Total MSW generated (ton/yr)</th>
<th>Organic waste tons/year</th>
<th>Organic waste kg/person/day</th>
<th>Composition of food organic waste</th>
<th>Composition of plastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominican Republic</td>
<td>4,063,910</td>
<td>2,072,594</td>
<td>1.06</td>
<td>51%</td>
<td>10%</td>
</tr>
<tr>
<td>Haiti</td>
<td>2,309,852</td>
<td>1,415,940</td>
<td>0.58</td>
<td>61%</td>
<td>13%</td>
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<tr>
<td>Jamaica</td>
<td>1,051,695</td>
<td>654,364</td>
<td>1.00</td>
<td>62%</td>
<td>12%</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>727,874</td>
<td>197,618</td>
<td>1.50</td>
<td>27%</td>
<td>19%</td>
</tr>
<tr>
<td>The Bahamas</td>
<td>264,000</td>
<td>121,440</td>
<td>1.87</td>
<td>46%</td>
<td>13%</td>
</tr>
<tr>
<td>Guyana</td>
<td>179,252</td>
<td>89,805</td>
<td>0.66</td>
<td>50%</td>
<td>14%</td>
</tr>
<tr>
<td>Barbados</td>
<td>174,815</td>
<td>31,991</td>
<td>1.71</td>
<td>18%</td>
<td>17%</td>
</tr>
<tr>
<td>Belize</td>
<td>101,379</td>
<td>47,648</td>
<td>0.77</td>
<td>47%</td>
<td>19%</td>
</tr>
<tr>
<td>Suriname</td>
<td>78,620</td>
<td>44,813</td>
<td>0.41</td>
<td>57%</td>
<td>11%</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>77,616</td>
<td>34,927</td>
<td>1.20</td>
<td>45%</td>
<td>22%</td>
</tr>
<tr>
<td>St. Kitts and Nevis</td>
<td>32,892</td>
<td>8,947</td>
<td>1.66</td>
<td>27%</td>
<td>23%</td>
</tr>
<tr>
<td>St. Vincent and the Grenadines</td>
<td>31,561</td>
<td>15,654</td>
<td>0.79</td>
<td>50%</td>
<td>84%</td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>30,585</td>
<td>14,069</td>
<td>0.87</td>
<td>46%</td>
<td>13%</td>
</tr>
<tr>
<td>Grenada</td>
<td>29,536</td>
<td>8,004</td>
<td>0.77</td>
<td>27%</td>
<td>16%</td>
</tr>
<tr>
<td>Dominica</td>
<td>13,176</td>
<td>5,929</td>
<td>0.50</td>
<td>45%</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>611,118</strong></td>
<td><strong>317,583</strong></td>
<td><strong>1.0</strong></td>
<td><strong>44%</strong></td>
<td><strong>20%</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,166,763</strong></td>
<td><strong>4,763,744</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Compost Feedstock in the Caribbean

• Municipal waste – garbage
• Cruise ship waste
• Yard waste
• Seaweed e.g Sargassum – More than 30 million tonnes in 2018
Compost Feedstock in the Caribbean

• Municipal waste – garbage
• Cruise ship waste
• Yard waste
• Seaweed
• Fishery waste
• Coconut waste
• Baggage
• Wood wastes
Sources of Income

- Tipping fees
- Product(s) sale
Indoor compost curing in Calgary. Photo courtesy of the City of Calgary.

Reducing Compost Production Cost

• Tipping fees
• Use of locally available feedstock
  • reduces transportation cost
• Use technology to your advantage
  • Composting and monitoring system
  • Marketing
Increasing income from sale of product(s)

- Increasing quantity
- Product quality
- Value-add product(s)
- Market guarantee
- Develop new markets
Determinants of Compost Product Quality

• Quality of feedstock
• Process control
  • Composting system
  • Monitoring
  • Curing
• Screening
• Storage
• Quality analysis
  • Sampling, analysis and reporting
What Is A Good Compost?

- Consistency
- No odor
- No weed seeds
- No sharps
- Nutrients

- Water holding Capacity
- Porosity
- Supresses diseases
- No toxins - Phytotoxicity
Uses

- Organic production
  - e.g. Banana
- Fruit and vegetable crops
- Container Mix or Potting soil
- Nursery beds
- Erosion Control
- Backfill for trees and shrubs
- Turf establishment
- Reclamation of impacted environments e.g. mine sites
Users

- Homeowners
- Vegetable farmers
- Greenhouses
- Landscapers
- Nurseries
- Greenhouses
- Construction companies
- Local and state governments
Value Added Products

• Screening – Consistency in product quality
  • e.g. 0.5”, 1” and overs

• Enhancement of disease suppression
  • Selection of appropriate feedstock
  • Addition of essential microbes
    • *Trichoderma sp.* and *Bacillus thuringenses*

• Horticulture media blends
  • Topsoil, Peat Moss, Vermiculite Sand +

• Pelletization

• Branding

• Bagging
Bagging

Example: 1000 tonnes/year facility
Bulk Sale: $50/tonne
1000 tonnes/yr = $50,000

25L bag = 10 kg @ $5/ bag
1 tonne = 100 bags = $500/tonne
1000 tonnes/yr = $500,000
Identifying Disease Suppressive Compost

• Not all composts suppress soil-borne plant disease
• Consistency has been a problem
• Approaches to identifying disease suppressive compost
  • utilize compost from different sources and look for suppression
  • identify specific pathogen antagonists
    • attempt to “spike” compost with antagonists
e.g. Trichoderma sp.
### Specific Biocontrol Organisms in Compost

<table>
<thead>
<tr>
<th>Pathogens</th>
<th>Beneficial Organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Fusarium</em> spp</td>
<td>Non-pathogenic strains of <em>Fusarium oxysporum</em>; fluorescent <em>Pseudomonas</em> spp.; <em>Bacillus subtilis</em>; <em>Trichoderma</em> and <em>Flavobacterum</em></td>
</tr>
<tr>
<td><em>Phytophthora</em></td>
<td><em>Pseudomonas</em> spp.; <em>Pantoea</em> spp (formerly <em>Enterobacter</em> spp); <em>Penicillium</em> and <em>Aspergillus</em> spp.; actinomycetes and <em>Trichoderma</em> spp.</td>
</tr>
<tr>
<td><em>Pythium</em></td>
<td><em>Pseudomonas</em> spp. and <em>Pantoea</em> spp</td>
</tr>
<tr>
<td><em>Rhizoctonia</em></td>
<td><em>Penicillium</em> spp; <em>Pseudomonas</em> spp; <em>Bacillus cereus</em></td>
</tr>
<tr>
<td><em>Xanthomonas</em></td>
<td><em>Bacillus</em> spp</td>
</tr>
<tr>
<td><em>Alternaria solani, A. porri</em></td>
<td><em>Bacillus</em> sp. <em>Trichoderma</em> <em>&quot;</em></td>
</tr>
</tbody>
</table>

*"* indicates potential antagonism but may require further investigation.
Using Compost

- Use depends on type and quality of composts
How much compost do you need?
Responses to Compost

- Control
- Treatment 2 (5%)
- Treatment 2 (10%)
- Treatment 2 (20%)
- Treatment 2 (25%)

Composting as a Business
Mode of Application

• Land application
  • Not more than 25% by weight (20-25%) in the top 15 cm
  • Useful as a soil amendment and a soil conditioner
  • For the control of soil borne pathogens
  • Mix with media for horticultural and container gardening use
  • Apply as a band around the plant especially during mound formation
  • Initial application rate of 60 – 100 m²/ha is recommended
  • For maintenance, 5 – 20 tonne/ha per year is recommended
  • Till in - reduces N loss
  • Top-dressing for turf
Examples of Horticultural & Remediation Uses

- **Container medium**: 1 part of compost with 3 parts of topsoil and/or peat moss
- **Top dressing for lawns**: ¼" thick of finely screened compost
- **Annuals and Perennials**: 1 - 2" thick. You want to avoid applying too thickly in the fall, as it could promote diseases and rodent activity.
- **Trees and Shrubs**: 2" thick of overs or coarse compost allowing some distance from the trunks.
- **Erosion Control**: 3-4" thick of compost overs as mulch. is best. Compost Tubes mat also be used and anchored across the slope.
- **Remediation of impacted soils**: 2” thick of unscreened compost rotor-tilled into to the top 6” of soil. It may be necessary to add other amendment to adjust pH.
Regulatory Compliance
Product Quality Guidelines
Guidelines
Specification for the Use of Quality Compost in Growing Media
European Quality Assurance Scheme ECN-QAS
Part D

European Compost Network ECN e.V.
www.compostnetwork.info
Code of Practice for Compost Facilities

Made under the Environmental Protection and Enhancement Act, RSA 2000, cE-12
Why Guidelines?

- Protect the public
- Protect the environment
- Food system
- Consistency across the country/region
- Create confidence in the industry
Compost Quality Guidelines

Example: Canada
Product Guidelines

- Nutrient values
  - N, P, K
- Bulk density
- pH
- Soluble salts - EC
- Organic matter
- Moisture content
- Foreign matter – physical contamination
- Weed seeds
- Stability
- Maturity

- Heavy metals – limit
  - As
  - Cd
  - Cu
  - Cr
  - Hg
  - Mo
  - Ni
  - Pb
  - Se
  - Zn

- Pathogens
  - Salmonella
  - E. coli
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Optimal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk density (Kg/m³)</td>
<td>300-450</td>
</tr>
<tr>
<td>Moisture (%)</td>
<td>30-50</td>
</tr>
<tr>
<td>Organic matter (%)</td>
<td>40-60</td>
</tr>
<tr>
<td>Particle size</td>
<td>98% less than 1”</td>
</tr>
<tr>
<td>Physical contaminants (%)</td>
<td>&gt;2</td>
</tr>
<tr>
<td>pH</td>
<td>5.0 – 8.0</td>
</tr>
<tr>
<td>EC (mmho/cm)</td>
<td>&lt;6</td>
</tr>
<tr>
<td>Stability</td>
<td>&lt; 400mg of O₂ per kg of organic matter per hour</td>
</tr>
<tr>
<td></td>
<td>&lt; 4mg of C as CO₂ per g of organic matter/day</td>
</tr>
<tr>
<td></td>
<td>Temp rise in less than 8°C above ambient</td>
</tr>
<tr>
<td>Solvita Maturity</td>
<td>&gt;6</td>
</tr>
</tbody>
</table>
### Optimal Ranges for Compost Parameters (cont)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Optimal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>C:N Ratio</td>
<td>10-25</td>
</tr>
<tr>
<td>Nitrogen (%)</td>
<td>0.5 – 6.0</td>
</tr>
<tr>
<td>Phosphorus (%)</td>
<td>0.2 - 3.0</td>
</tr>
<tr>
<td>Potassium (%)</td>
<td>0.10 - 35</td>
</tr>
<tr>
<td>Muturity (Cress Test)</td>
<td>90% emergence/50% biomass</td>
</tr>
<tr>
<td>Weed Seeds</td>
<td>No weed seeds</td>
</tr>
<tr>
<td>Pathogens</td>
<td>Meet or exceed guideline</td>
</tr>
<tr>
<td>Fecal coliforms (MPN/g total solids)*</td>
<td>&lt;1000</td>
</tr>
<tr>
<td>Salmonella (MPN/4g)*</td>
<td>&lt;3</td>
</tr>
</tbody>
</table>
Phytotoxicity
Responses to Compost

Mature Compost

Immature Compost - Phytotoxic
Phytotoxicity
## Result of a Phytotoxicity Test

<table>
<thead>
<tr>
<th></th>
<th>Germination (%)</th>
<th>% of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>71</td>
<td>100</td>
</tr>
<tr>
<td>Fresh Compost (Immature)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Aged Compost</td>
<td>88</td>
<td>124</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Weight(g)</th>
<th>% of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>Fresh Compost (Immature)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Aged Compost</td>
<td>15</td>
<td>107</td>
</tr>
</tbody>
</table>
Heavy Metals
Categories of Compost

Category A – Unrestricted Use
• Compost that can be used in any application such as agricultural lands, residential gardens, horticultural operations and other businesses.

Category B – Restricted Use
• Compost that has a restricted use due to higher trace elements content or the presence of sharp foreign metal. Category B compost may require additional control when deemed necessary by a province or territory.
## Concentration/Cumulative Trace Elements (CCME Guidelines)

<table>
<thead>
<tr>
<th>Trace Element</th>
<th>Category A mg/kg</th>
<th>Category B mg/kg</th>
<th>Maximum Cumulative Additions (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic (As)</td>
<td>13</td>
<td>75</td>
<td>15</td>
</tr>
<tr>
<td>Cobalt (Co)</td>
<td>34</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>Chromium (Cr)</td>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molybdenum (Mo)</td>
<td>5</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>62</td>
<td>180</td>
<td>36</td>
</tr>
<tr>
<td>Selenium (Se)</td>
<td>2</td>
<td>14</td>
<td>2.8</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>700</td>
<td>1850</td>
<td>370</td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>3</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>0.8</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>150</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>Element</td>
<td>Canada</td>
<td>USA</td>
<td>UK</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Arsenic (As)</td>
<td>13</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>3</td>
<td>15</td>
<td>1.5</td>
</tr>
<tr>
<td>Cobalt (Co)</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromium (Cr)</td>
<td>210</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>400</td>
<td>450</td>
<td>200</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>150</td>
<td>300</td>
<td>150</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>0.8</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>5</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>62</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Selenium (Se)</td>
<td>2</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>700</td>
<td>700</td>
<td>400</td>
</tr>
</tbody>
</table>
## EU Standards for heavy metals

<table>
<thead>
<tr>
<th>Country</th>
<th>Standard</th>
<th>Cd</th>
<th>Cr</th>
<th>Cu</th>
<th>Hg</th>
<th>Ni</th>
<th>Pb</th>
<th>Zn</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>Compost Ord. Class A</td>
<td>1</td>
<td>70</td>
<td>150</td>
<td>0.7</td>
<td>60</td>
<td>120</td>
<td>500</td>
</tr>
<tr>
<td>BE/FL.</td>
<td>Agricultural Ministry</td>
<td>1.5</td>
<td>70</td>
<td>90</td>
<td>1</td>
<td>20</td>
<td>120</td>
<td>300</td>
</tr>
<tr>
<td>DK</td>
<td>Agricultural Ministry</td>
<td>0.4</td>
<td>-</td>
<td>1000</td>
<td>0.8</td>
<td>30</td>
<td>120</td>
<td>4000</td>
</tr>
<tr>
<td>DE</td>
<td>Biowaste Ord. Type II</td>
<td>1.5</td>
<td>100</td>
<td>100</td>
<td>1</td>
<td>50</td>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td>IRE</td>
<td>Draft</td>
<td>1.5</td>
<td>100</td>
<td>100</td>
<td>1</td>
<td>50</td>
<td>150</td>
<td>350</td>
</tr>
<tr>
<td>LUX</td>
<td>Environmental Ministry</td>
<td>1.5</td>
<td>100</td>
<td>100</td>
<td>1</td>
<td>50</td>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td>NL</td>
<td>Class “Compost”</td>
<td>1</td>
<td>50</td>
<td>60</td>
<td>0.3</td>
<td>20</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>ES/Kat.</td>
<td>Class A (Draft)</td>
<td>2</td>
<td>100</td>
<td>100</td>
<td>1</td>
<td>60</td>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td>SWED</td>
<td>Quality organisation</td>
<td>1</td>
<td>100</td>
<td>100</td>
<td>1</td>
<td>50</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>UK</td>
<td>TCA Certificate</td>
<td>1.5</td>
<td>100</td>
<td>200</td>
<td>1</td>
<td>50</td>
<td>150</td>
<td>400</td>
</tr>
</tbody>
</table>
Pathogens

Based on System and feedstock:
If only yard wastes (others):
• In-vessel system – min of 3 days at 55°C
• Windrow system - min of 15 days at 55°C and turned 5X
• Static pile – min of 3 days at 55°C, insulation cover need
• Recontamination is possible

OR (AND)
• Fecal coliform <1000 MPN per g dry wt
  and (OR)
• Salmonella sp.<3/4g MPN/g dry wt
Foreign Matter (Canada)

a) Sharp Foreign Matter
   Category A – No sharp foreign matter greater than 3mm per 500 ml.

   Category B – ≤ 3 sharp foreign matter per 500ml with dimension ≤ 12.5 mm. This compost shall not be used in pastures, parks or for residential purposes.

b) Other Foreign Matter
   Category A – No more than 1 piece of foreign matter greater than 25mm in any dimension per 500 ml.

   Category B – No more than 2 pieces of foreign matter greater than 25mm in any dimension per 500 ml.
Product Certification
The US Composting Council’s Seal of Testing Assurance Program (‘STA’) is a compost testing, labeling and information disclosure program.
Site Selection Factors & Facility Management
Siting Considerations

• Soil type
• Nearness to population
• Resource/Waste generation
• Topography/Terrain
• Climatic conditions
  • Precipitation
  • Wind
Permits

• Class of Facility
  • Type of feedstock
    • Green matter
    • Include animal manure or food waste
    • Include MSW or MSS
  • Quantities of feedstock
  • Technology used
Classification of Composting Facilities

- High Quantity, Low Impacts
- High Quantity, High Impacts
- Low Quantity, Low Impacts
- Low Quantity, High Impacts
- No Registration
### Classification based only on quantities

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantities</th>
<th>Requirements</th>
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<tbody>
<tr>
<td>No Registration</td>
<td>Basic on-farm or</td>
<td>No Permit</td>
</tr>
<tr>
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<td>backyard composting</td>
<td>e.g. &lt;500</td>
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<tr>
<td></td>
<td></td>
<td>tonnes/annum</td>
</tr>
<tr>
<td>Registration</td>
<td>Low volume</td>
<td>No Permit</td>
</tr>
<tr>
<td>No Permit</td>
<td>centralized</td>
<td>e.g. &lt; 5000</td>
</tr>
<tr>
<td></td>
<td>facilities</td>
<td>tonnes/annum</td>
</tr>
<tr>
<td>Permit</td>
<td>High volume</td>
<td>Permit</td>
</tr>
<tr>
<td></td>
<td>centralized</td>
<td>e.g. &gt; 5000</td>
</tr>
<tr>
<td></td>
<td>facilities</td>
<td>tonnes/annum</td>
</tr>
</tbody>
</table>
Site Selection: Environmental

Inclusion

• groundwater flowpaths identified
• soil and bedrock conditions identified
• topography, geology and groundwater conditions allow for minimal impact
Site Management Issues

- Noise Control
- Dust Control
- Litter Control
- Vector and Vermin Control
- Odor Control
- Leachate and Runoff Control
- Maintenance
Conclusion and Recommendations

• The potential for the development of a composting industry is high in the Caribbean
• There is need for the establishment of regional compost quality guidelines for the Caribbean
• IICA and other National Composting Councils e.g. CCC could assist the Bahamas and other Caribbean countries to develop their Codes of Practice and Compost Quality Guidelines.
Thank You!
WEBINAR

Composting as a Business

📅 9 July ⏰ 12:00 p.m. (Eastern time)

Speakers:

Dr. Abimbola Abiola
Technical Specialist, Environmental Remediation and Reclamation in IICA’s Climate Change, Natural Resources and Productive Risk Management Program.

Hon. Michael Clifton Pintard
Minister of Agriculture and Marine Resources of The Bahamas.

Shacara Lightbourne
Acting Country Representative/Technical Specialist IICA Delegation in The Bahamas

Presenter:

Moderator:

Live transmission on FB @IICAnoticias