

On-farm composting – Status, Barriers, Opportunities

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Talk outline

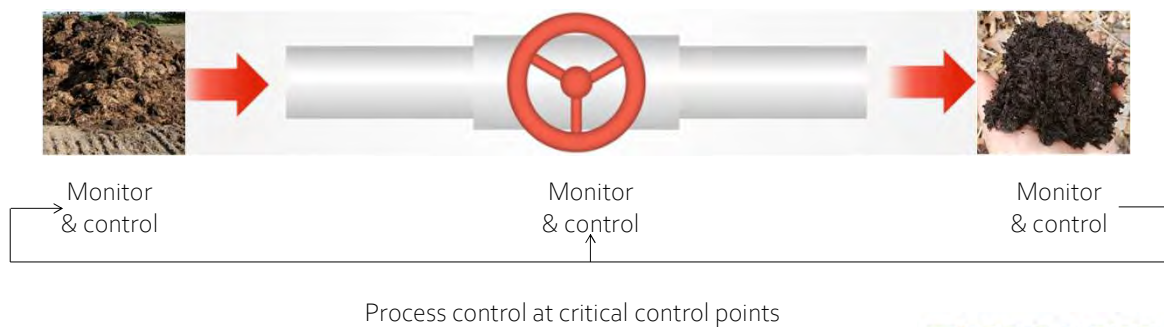
- Definition – what are we talking about?
 - What is composting, what it is not – with examples
 - Aligned practices
- Overview of current practice in Australia
 - What are the drivers for adoption?
- Barriers to adoption
- Opportunities
 - Different operating models



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Definition

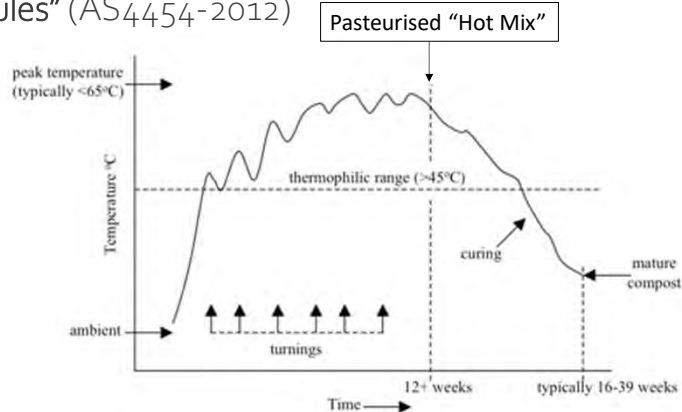
“Composting is the controlled microbiological decomposition of organic materials under aerobic and thermophilic conditions”



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Pasteurisation

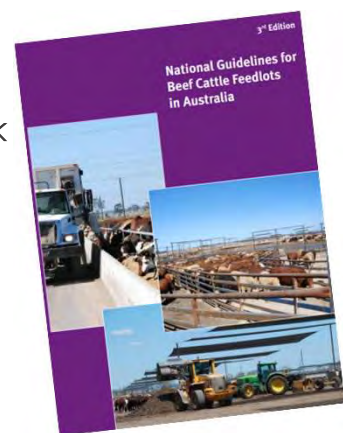
"A process whereby organic materials are treated to significantly reduce the numbers of plant and animal pathogens and plant propagules" (AS4454-2012)



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Use of agricultural residues

- Re-use of manure, spent bedding and effluents back to agriculture are commonplace in Australia
 - Extensive research has been conducted in Australia on sustainable reuse of these materials – much more than for composted products
 - All the major intensive animal industries have environmental management guidelines (pigs, feedlot, eggs, broilers and dairy) with advice on these matters



Composting is not the only solution, but it is a great one!

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On-farm composting in Australia

- The intensive animal industries may 'compost' as much or more material than commercial food and garden waste composters ("FOGO"), however:
 - The "composting pad" may stockpile and age manure and/or spent bedding
 - It is usually an 'ancillary' waste management activity rather than a commercial activity in its own right
 - The intention is not necessarily to produce boutique compost for sale
 - The end-product may be used back on the same farm or it may have a local market



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Waste or product?

- Composting can be used for:
 - Purely waste management purposes ("disposal")
 - Purely product manufacturing ("product")
 - A combination of the two ("by-product")
- Product manufacturing requires stringent control of input materials, the composting process and end-product quality

Examples of stringent process control in composting in Australia



Composted pine bark – potting media



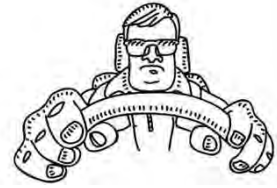
Composted mushroom growth substrate



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Drivers for on-farm composting

- Site and context-specific
 - What's the problem? If it "ain't broke, why fix it?"
 - How will it affect my bottom-line?
- Regulations and environmental compliance
- Cost of alternative options (e.g., landfill disposal of mortalities)
- Will it open up new opportunities?
- Biosecurity
- Personal values



Barriers

- The regulatory environment is confusing
 - Varies from State to State
 - Unclear whether on-farm composting is covered by existing guidelines or not (open to interpretation)
 - Wholesale adoption of guidelines derived for commercial composting is a problem
 - Commercial composting guidelines may not appropriately consider farm context (e.g., risk factors, economics, location etc)
- Cost:benefit
 - In particular, the high capital costs but also costs of obtaining regulatory approvals
- Knowledge and expertise
 - Not usually seen as "core business"



Opportunities

- For government – promote economy-wide recovery, reuse and processing of organic residues for a true circular economy:
 - Raw material (“feedstock”) from town and country can be complimentary (in terms of nutrient balance)
 - Develop compost processing closer to a potential market for the end-product
 - Reduce regulatory burden to encourage more smaller rural and regional facilities
 - Develop composting guidelines that are better suited for these facilities. It’s an opportunity to service both agricultural waste and municipal streams
 - On-farm composting of municipal / commercial organics could deliver superior environmental outcomes, and support agricultural enterprises



Rural-Municipal partnerships

- Deliver pasteurised “Hot Mix” from the city to farm for final processing. Could be combined with farm by-products
- Works best where relationships can be cemented at the local level e.g., town → farm within same region (rather than big city → distant farm)
- Decentralisation
- Great in theory, but there are pitfalls:
 - Farm by-products tend to be more consistent than organics from the city
 - City organics can be highly contaminated with glass, soft plastics etc (though efforts are underway to clean this up)
 - Needs full-on vigilance and commitment from both city supplier and the farmer
 - Regulatory burden increases

“City to Soil”

- Was running mainly in NSW and ACT
- Using the “Groundswell” process
 - Using tarpaulins and yeast/syrup additive
 - Is it “composting” or “anaerobic fermentation”?
- The project was widely promoted and supported but it didn’t continue
 - But, what exactly were the drivers?
 - Suffered from lack of technical evaluation



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Composting on dairy farms in SW Victoria

- Run by Geelong Compost and Camperdown Compost
 - Green organics brought onto farm and blended with dairy shed effluent
 - Process managed by Geelong Compost company
- At its peak around 80 (mainly) dairy farmers
- Addressed a specific need (“driver”): dairy shed effluent management
- Now scaled right back to a few farmers
 - Driver is transient
 - Expensive to manage and logistically challenging
 - More complex regulatory environment now in Vic



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Mobile composter

- This operator travels all over the eastern states
 - 4 turners, 2 screeners and 1 loader
 - Compost batches up to 60,000 tonnes
 - Multiple batches of compost can be within 50-100km apart
 - Travelling up to 400 km in a day!



Photo courtesy of Ross O'Halloran



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UpperValley Disposal, California

Photos courtesy of Matt Cotton



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Maybe Austria has got it right?

- Clear political decision at all government levels to integrate farmers into organics recycling supply and value chain
- Stringent environmental regulations
- Farmers get paid for composting services, and derive income



<https://www.kompostieranlage-ottensheim.at/>

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Farmer-run operations

- Works best where farm has the required space and access to all the required input materials
 - E.g., manure, spent bedding, mortalities, straw
 - Where scale is not too large that it cannot be managed by farm staff
- Compost generated from farm materials could be applied back on farm soil to grow feed for the livestock
- Other opportunities for integration within farming system
 - E.g. heat recovery from composting and anaerobic digestion

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- Bede Burke egg farms, Tamworth:

- Layer manure, mortalities
- Uses the compost to grow grain for the hens with the straw from the crop going in to make the compost



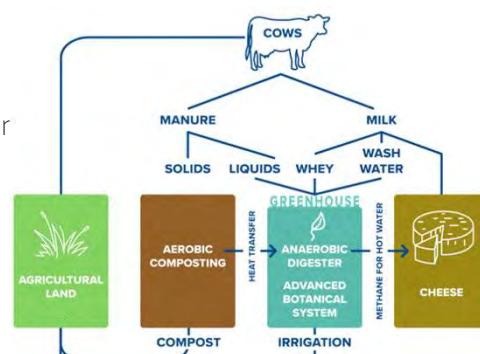
Photo courtesy of Byron Stein



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- Closed-loop process integration

- Solids and effluent
- Composting with heat recovery
- Anaerobic digestion and energy recover
- Phytoremediation through greenhouse



Jasper Hill Farm, Vermont USA

Design and construction costs for the Green Machine were made possible in part by grant funding from:



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Contractor-run operation

- An experienced composter operates compost operation for the farming business:
 - Typically on the farm business' land
 - Financial arrangements vary (commercial in confidence):
 - Site set-up costs (probably borne by farming business)
 - Site lease to contractor
 - Equipment supplied by contractor
 - Raw material (feedstock) supplied to contractor at no charge
 - Contractor's main revenue probably comes from sale of end product



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Contractor-run

- This operation at a piggery in Victoria composts mainly spent bedding along with some mortalities
- Strong market demand for the end-product
 - Getting stronger as costs of fertilisers rise



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Conclusion

- Composting is a *controlled* manufacturing process
- Drivers for composting are site and context-specific
 - It is not for everyone
- Barriers to adoption in Australia are challenging
 - Particularly around regulation
- In the right circumstances a number of operating models are possible



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Thank You!

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