



CIRCULAR ECONOMY FOR ORGANICS

Permaculture Noosa
19th July 2018



Too
bent



Too
long





- On farm food waste, in part, is driven by supermarkets and consumers
- Most food waste from horticulture farms has an end user
 - Returned to production area (most commodities)
 - Sold on as seconds
 - Sold on for animal feed

War on Waste

Nationally found that on average shoppers threw out 5 shopping bags worth of food at home per week, worth about \$3500 every year.

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Recycling and Waste in Queensland 2016

150,000 tonnes food waste in SEQ in waste stream

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Noosa Council audit 2018

Food waste makes up 30% of waste stream.

Greenhouse gas contributions

Landfills are the greatest contributors to GHG emissions for local government due to methane (25 x more potent than CO₂) caused by anaerobic digestion of organic matter.

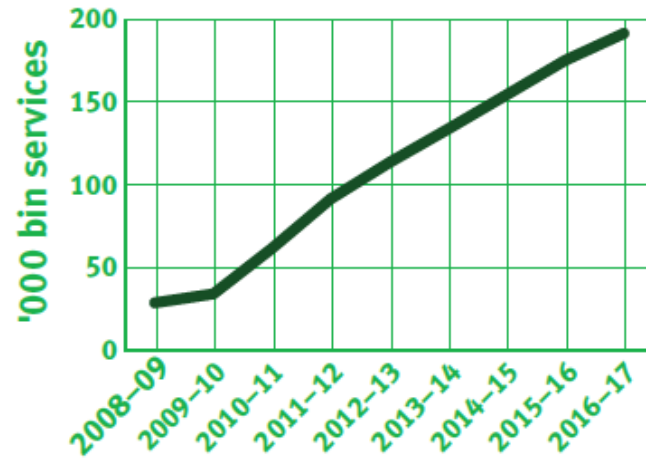
Garden waste
Timber products
Food waste

Self haul garden waste



Kerbside garden waste

Green bin service



Green bin service Qld 2017



Garden vegetation



Timber offcuts
(untreated)



Kerbside garden waste

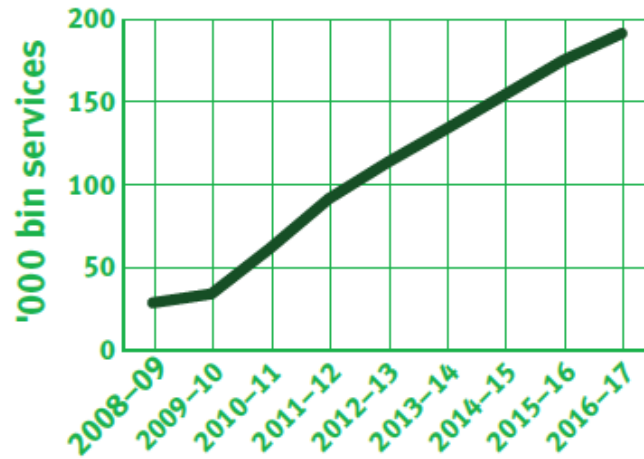


Garden vegetation

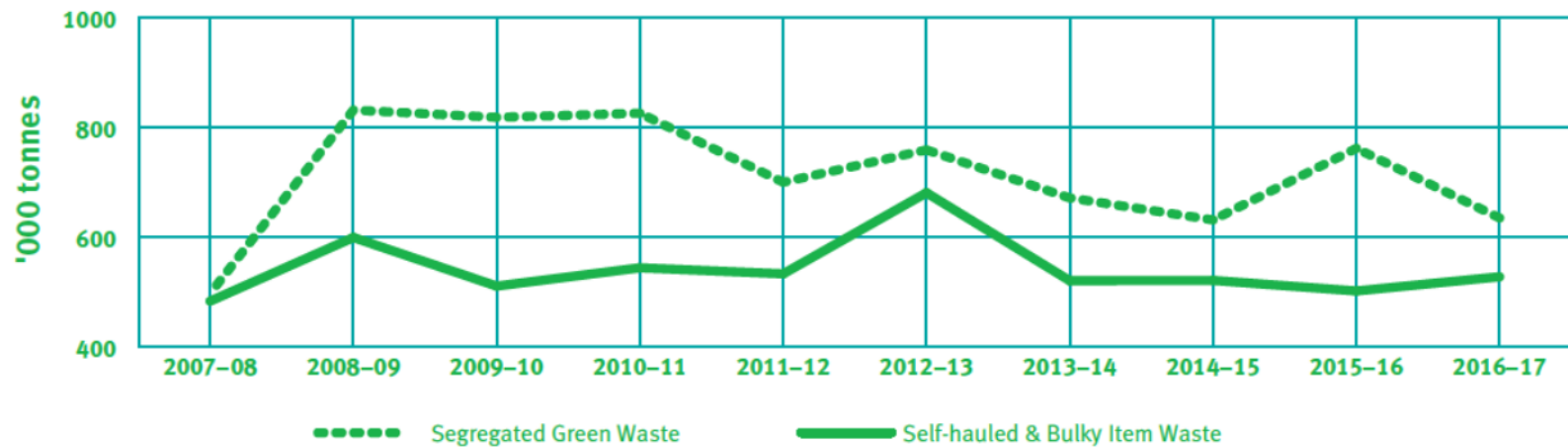


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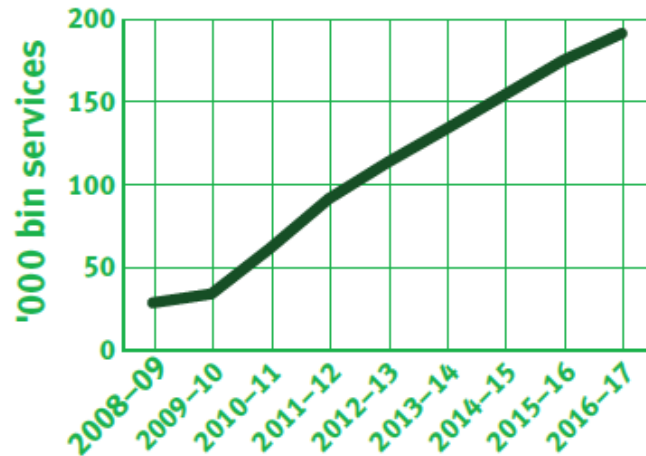


Green bin service Qld 2017

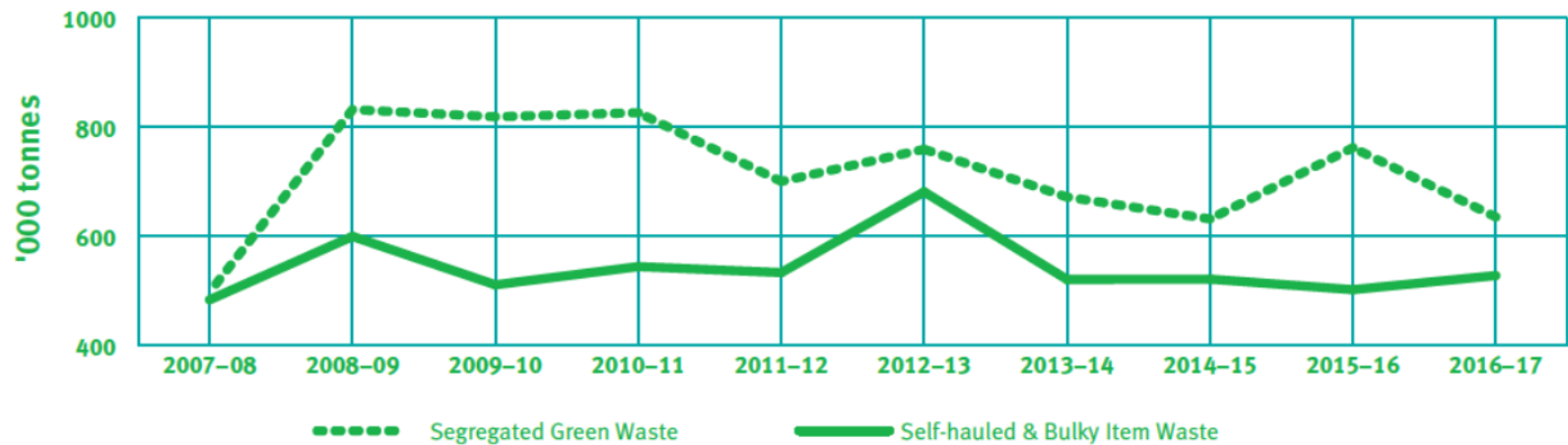


Kerbside garden waste

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Green bin service Qld 2017



Soil degradation

Soil degradation

- 80% of the world's agricultural land suffers moderate to severe erosion
- 10 million ha of agricultural land are lost through soil erosion every year (~0.7%)
- Over last 40 years ~30% of world's cropland has become unproductive
- 30-70 % decline in soil organic matter content in Australian soils

Sources:

Pimentell, D. & Burgess, M. (2013) Soil Erosion Threatens Food Production. *Agriculture* **3**, 443-463

2011 State of the Environment report , Australia

Source: WRAP DC Agri Reports (2016)

Soil degradation

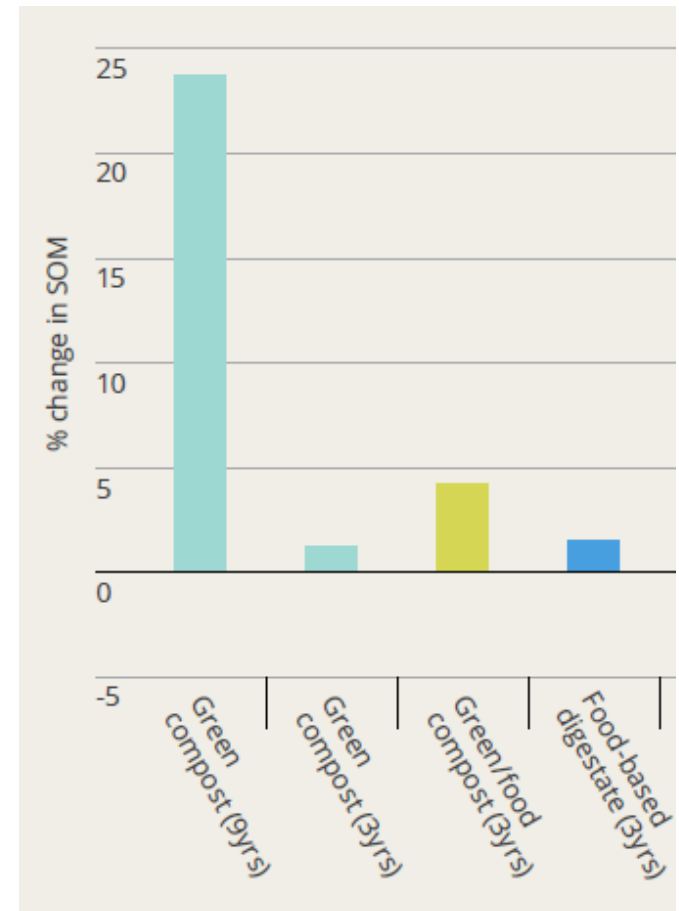
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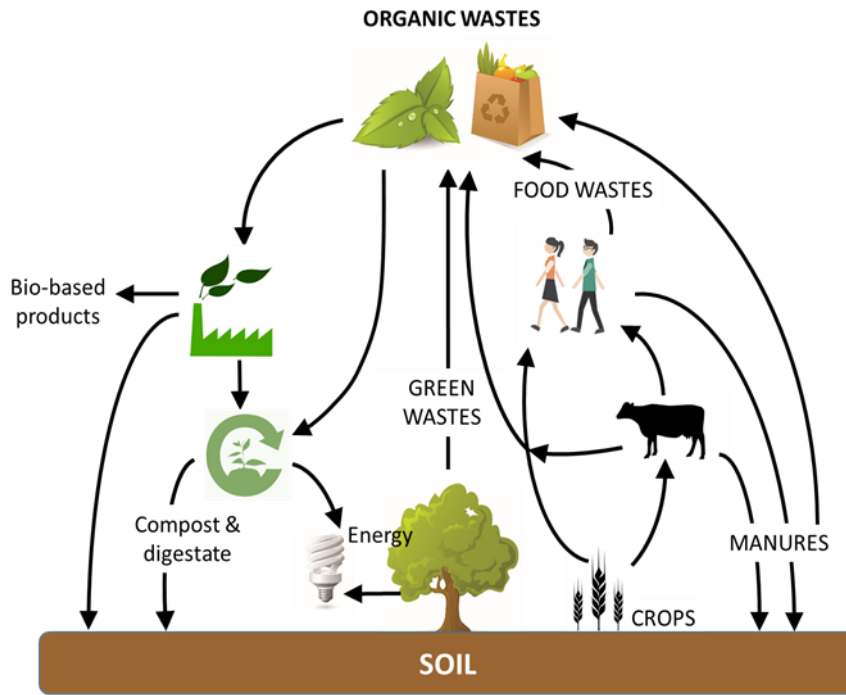
Compost can increase SOM



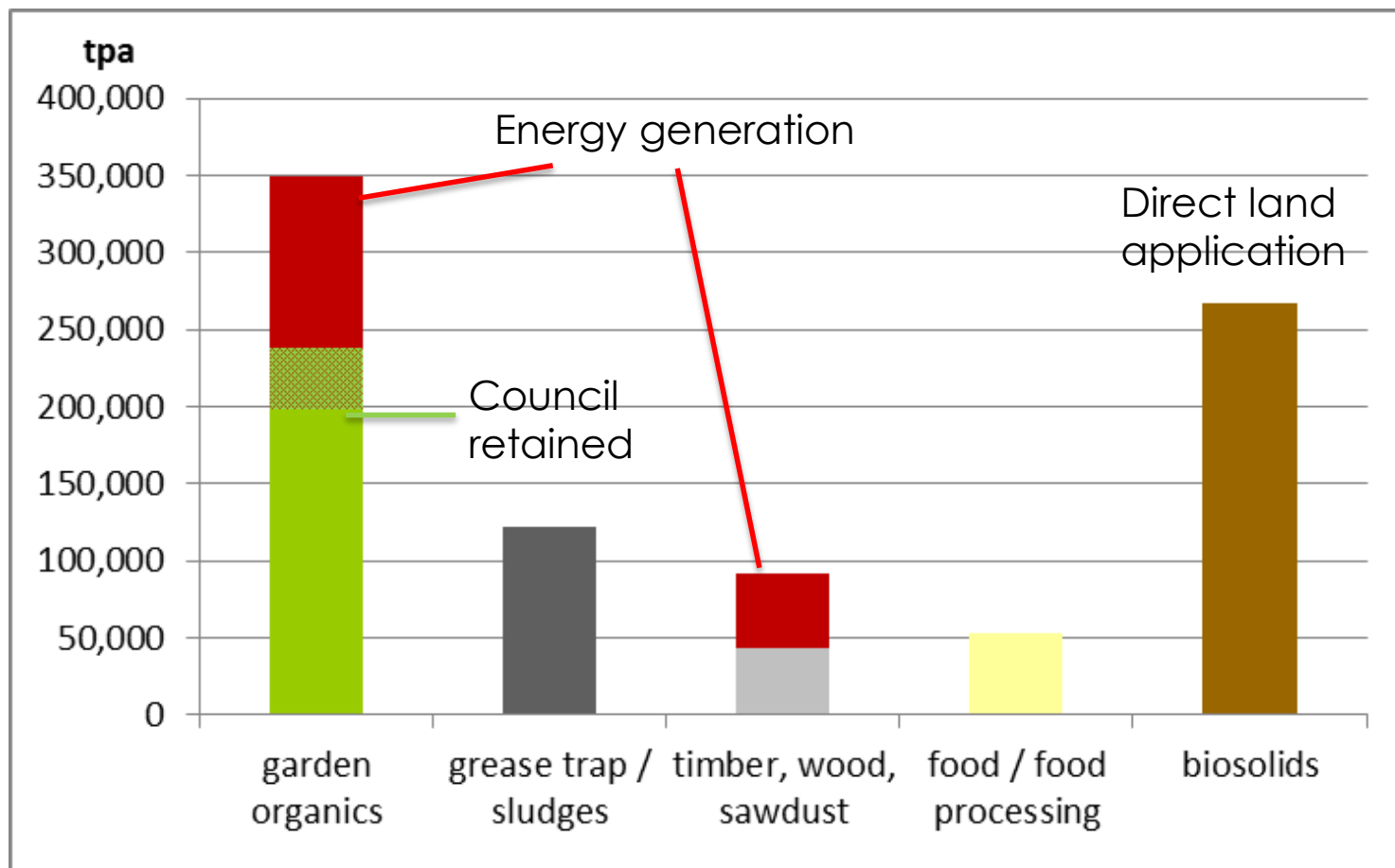
Source: WRAP DC Agri Reports (2016)

Organic waste

- Complex flows of nutrients and carbon
- **Underpinned by SOILS**
- Recycling organic wastes
 - Composting
 - Anaerobic digestion
 - Biorefining
- Significant benefits
 - Bio-based products
 - Compost
 - Biofertiliser
 - Energy
 - Reducing disposal impacts & costs



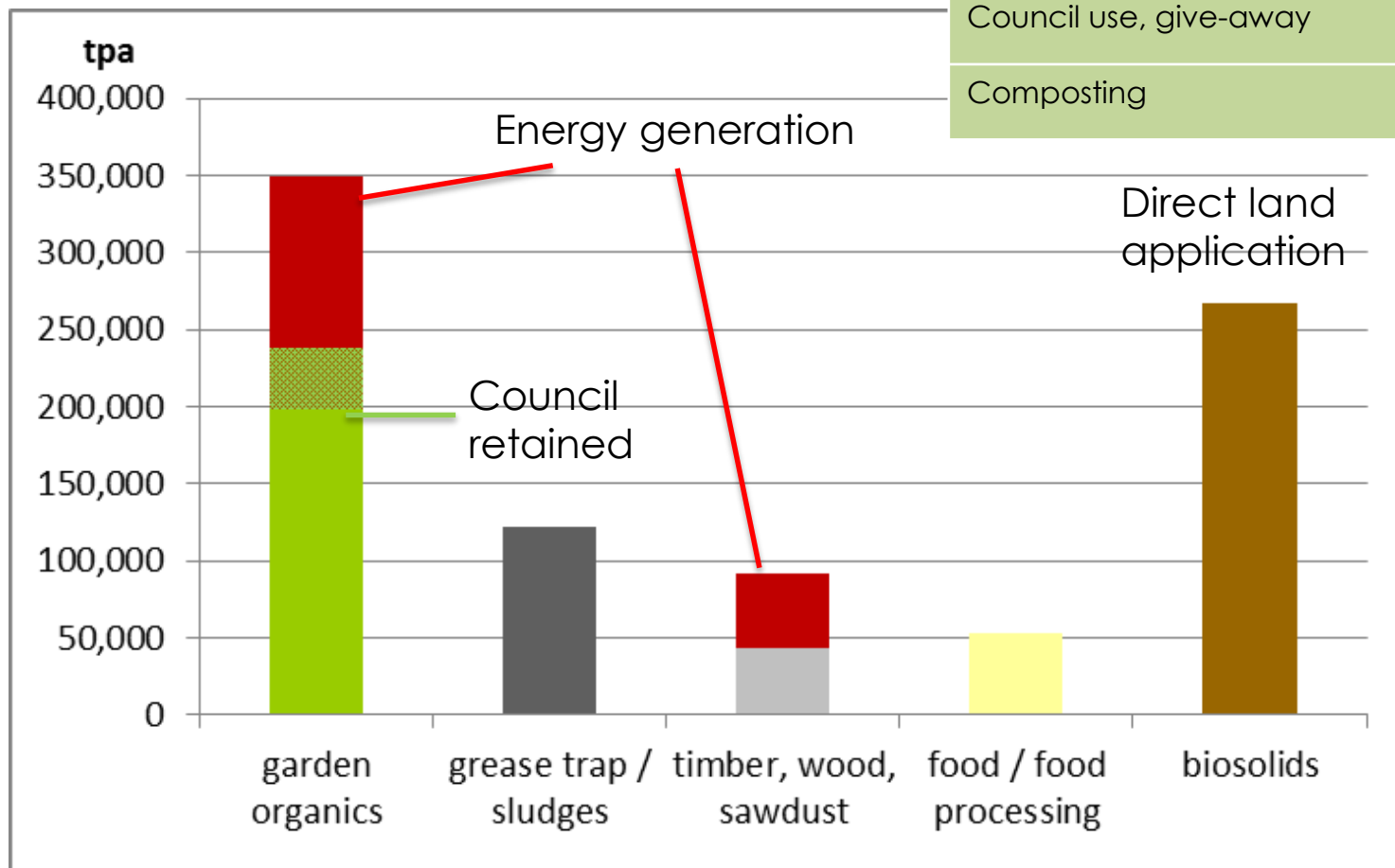
Organic Residues Processed and Utilised in SEQ 2016



Source: Recycling & Waste in Queensland 2016

Organic Residues Processed and Utilised in SEQ 2016

Beneficial use pathway	tpa
Energy generation	160,000
Direct land application	375,000
Council use, give-away	40,000
Composting	416,000

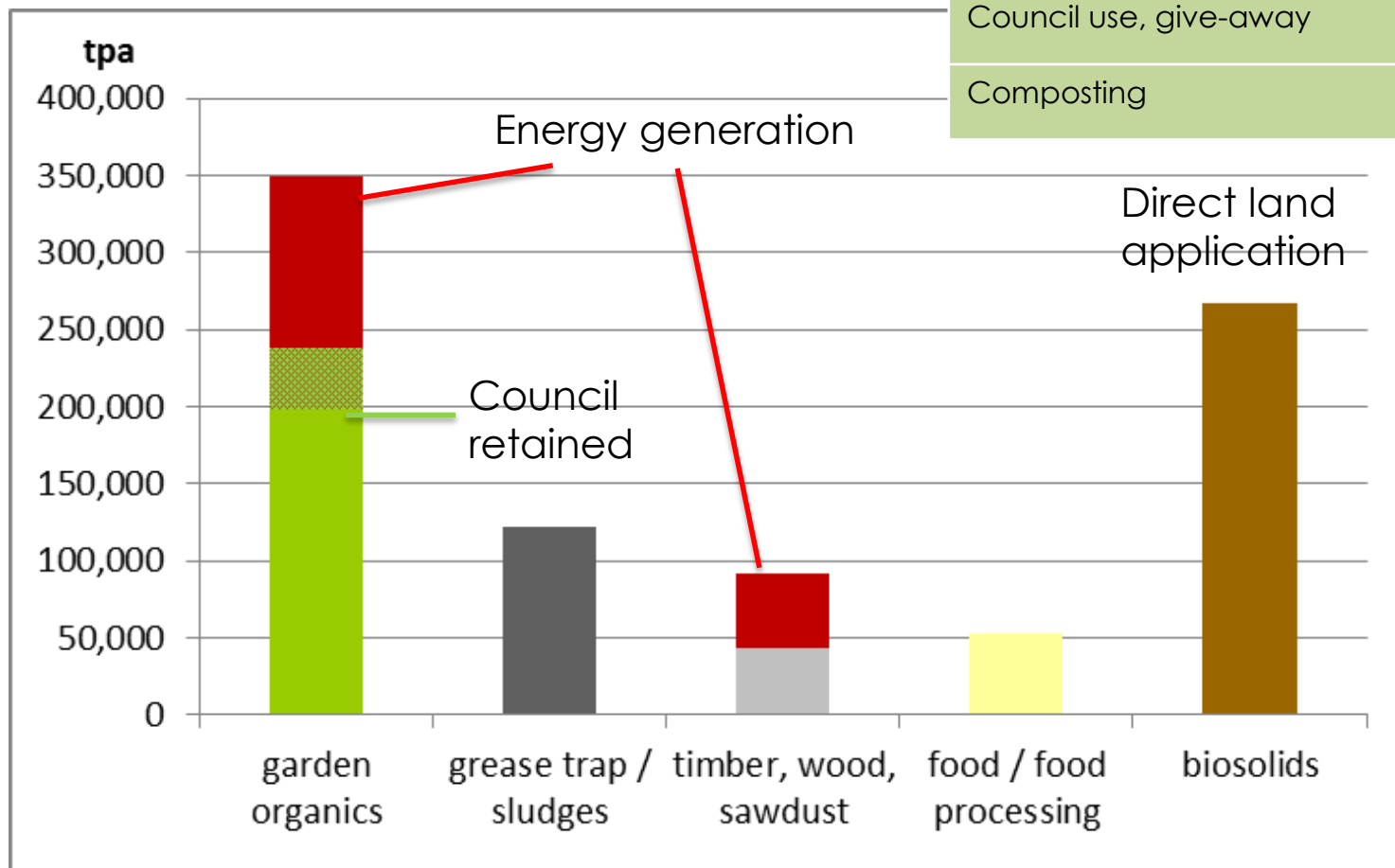


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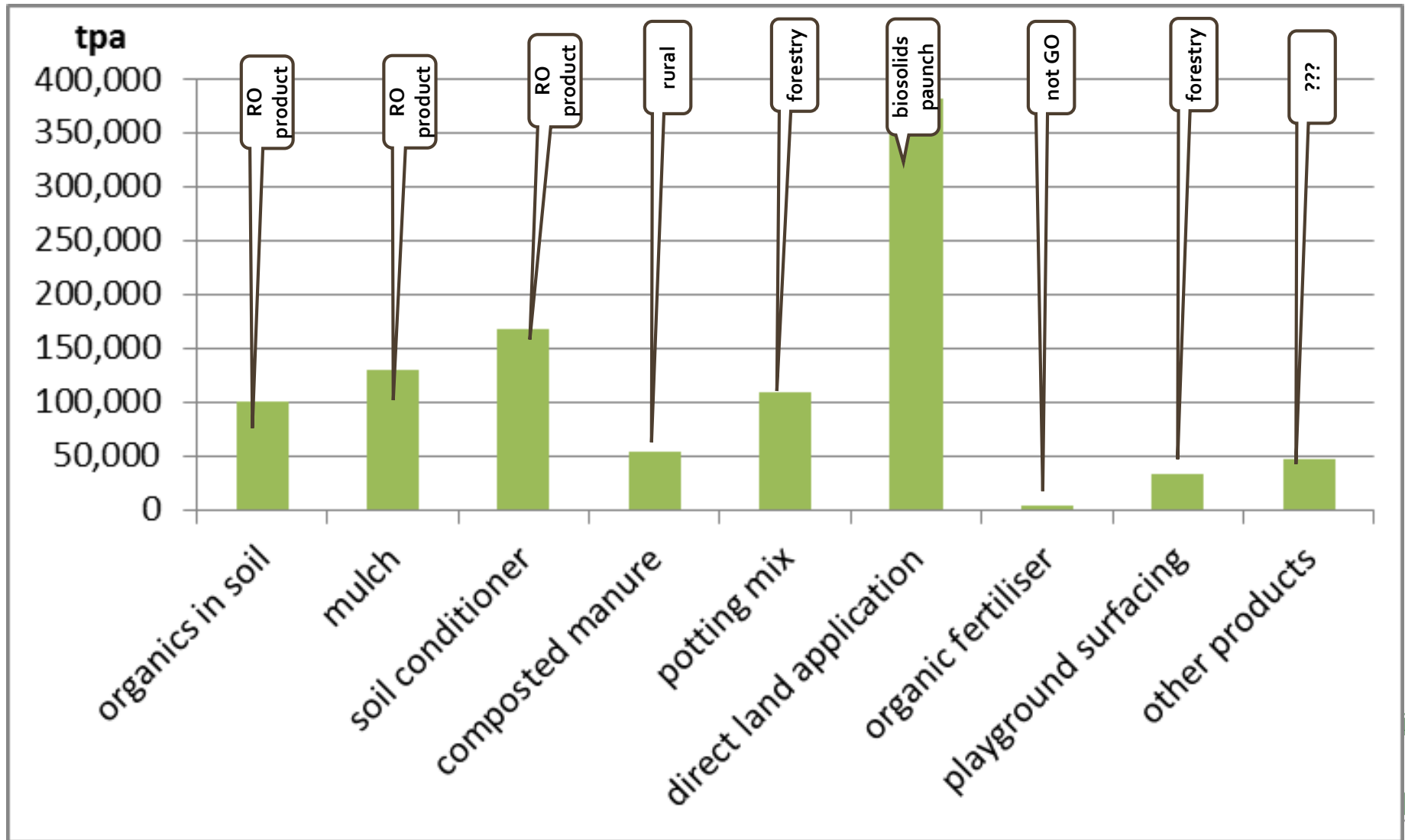
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Landfill FOGO (50% - 50%) 300,000

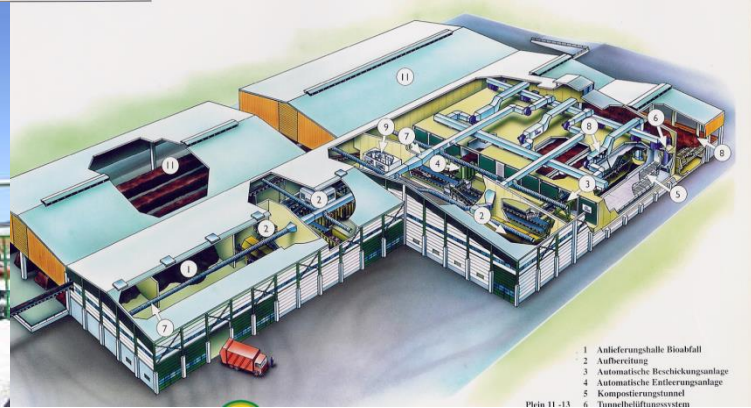
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Recycled Organics Products Generated (2015)



Composting Technologies



Alternative Processing Technologies

Wet AD



Dry Continuous AD



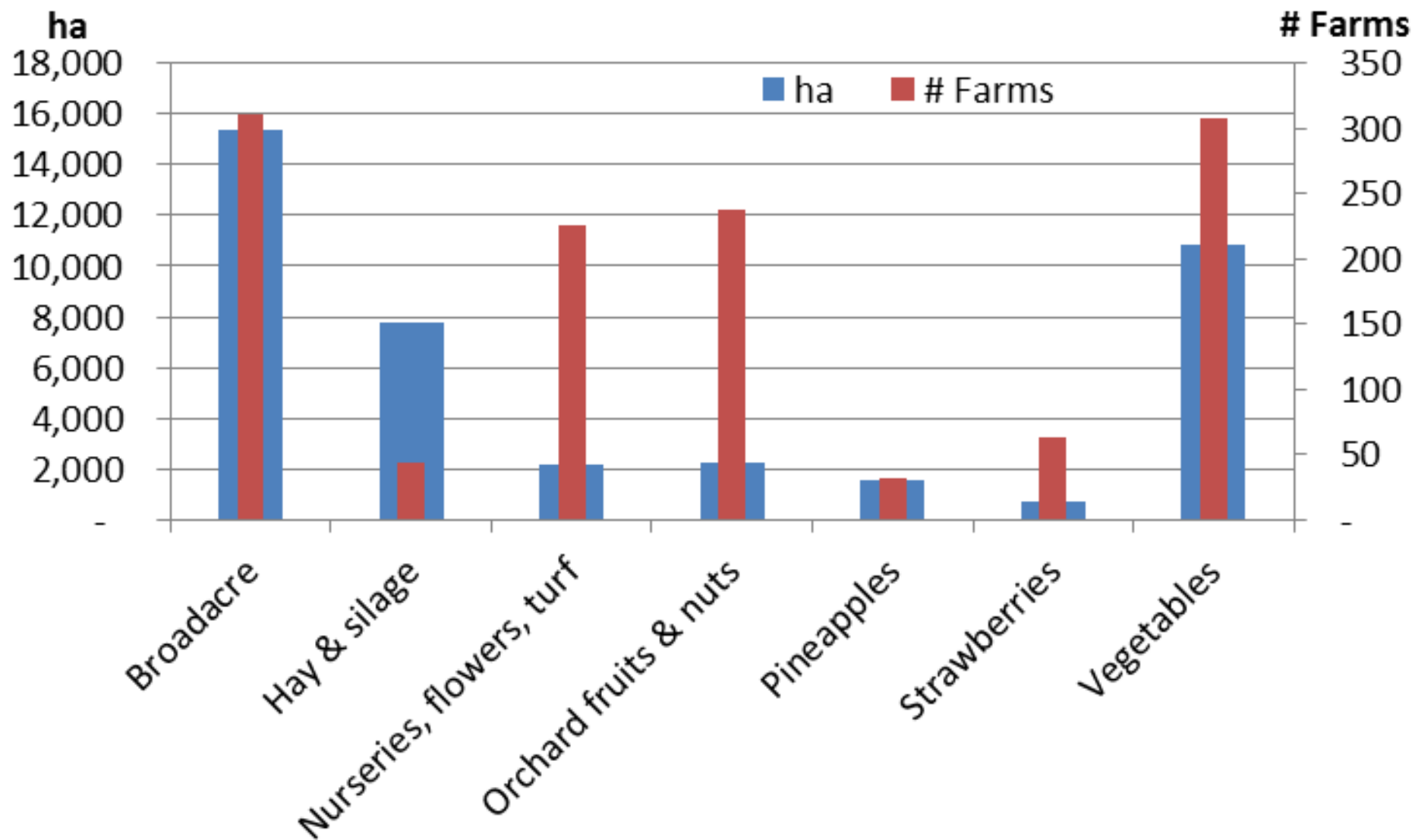
Dry Dis-continuous AD



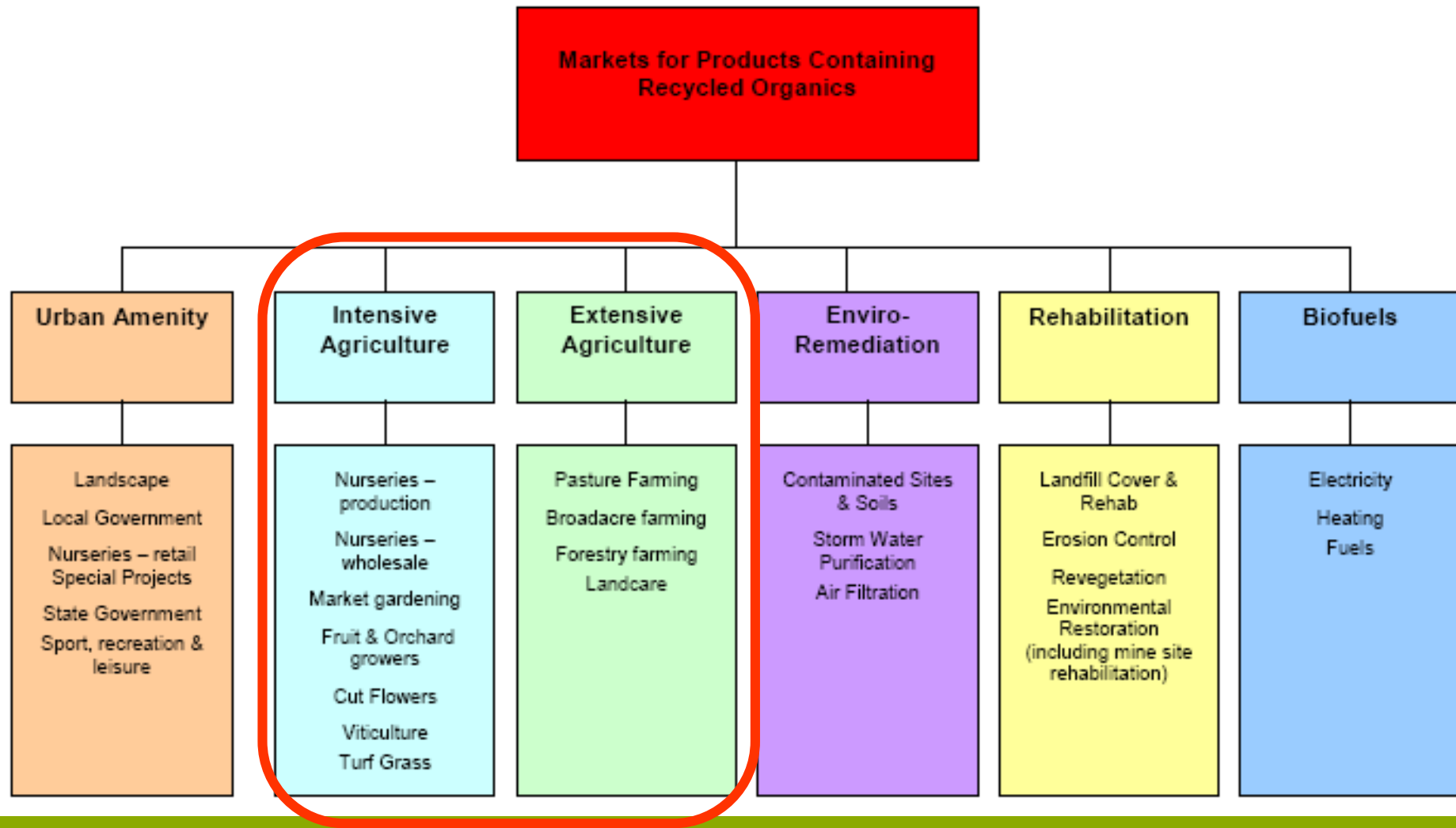
Thermal Processing



Agriculture & Horticulture in SEQ



Potential Market Sectors for Recycled Organic Products

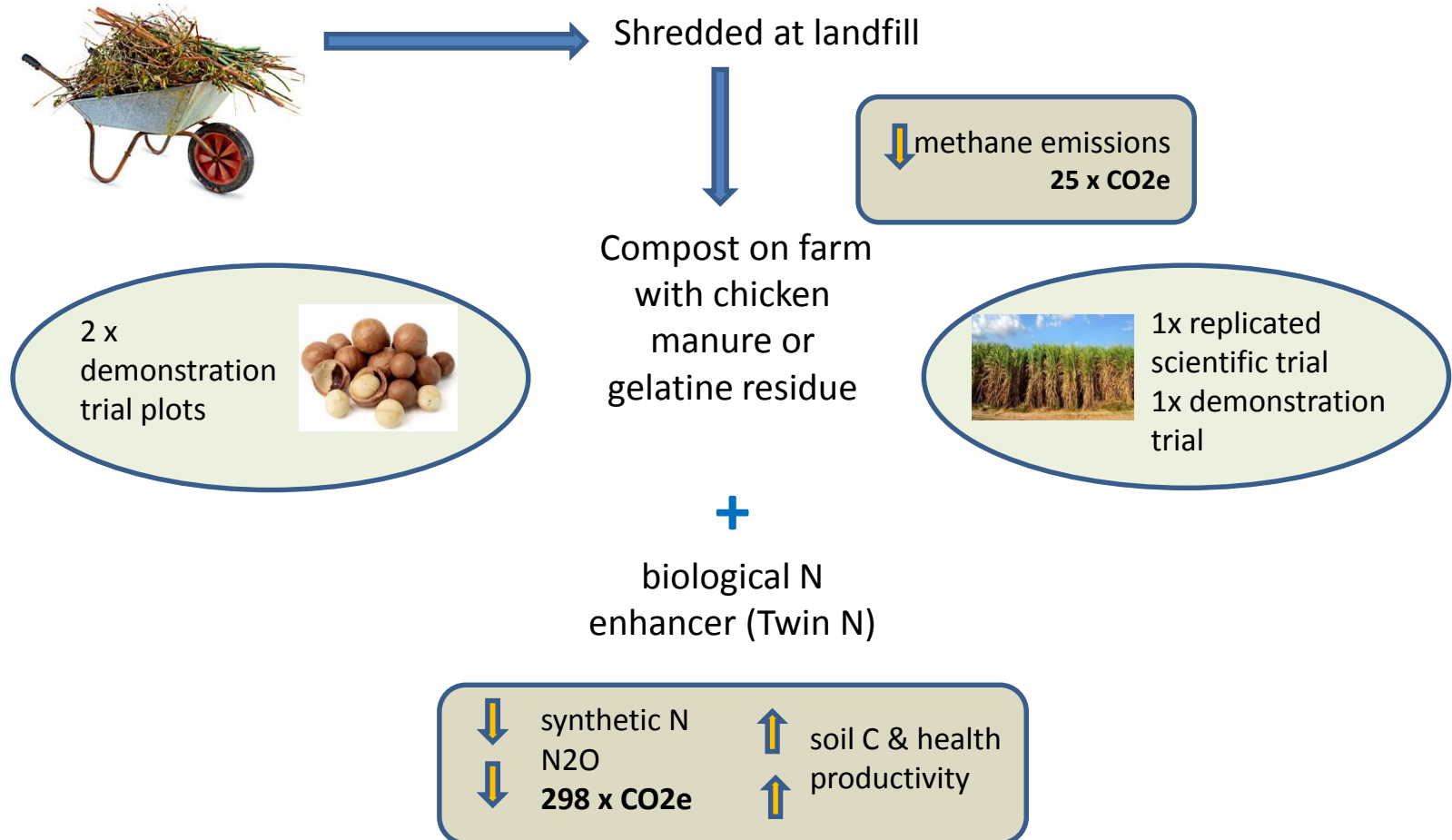


Enhanced compost trials in macadamia orchards on the Sunshine Coast

Susie Chapman, Healthy Land & Water
Johannes Biala, The Organic Force Pty Ltd



Can organic N sources be used to reduce mineral N fertiliser rates whilst reducing GHG emissions from landfill, and also enhancing soil C and productivity – and farm viability?

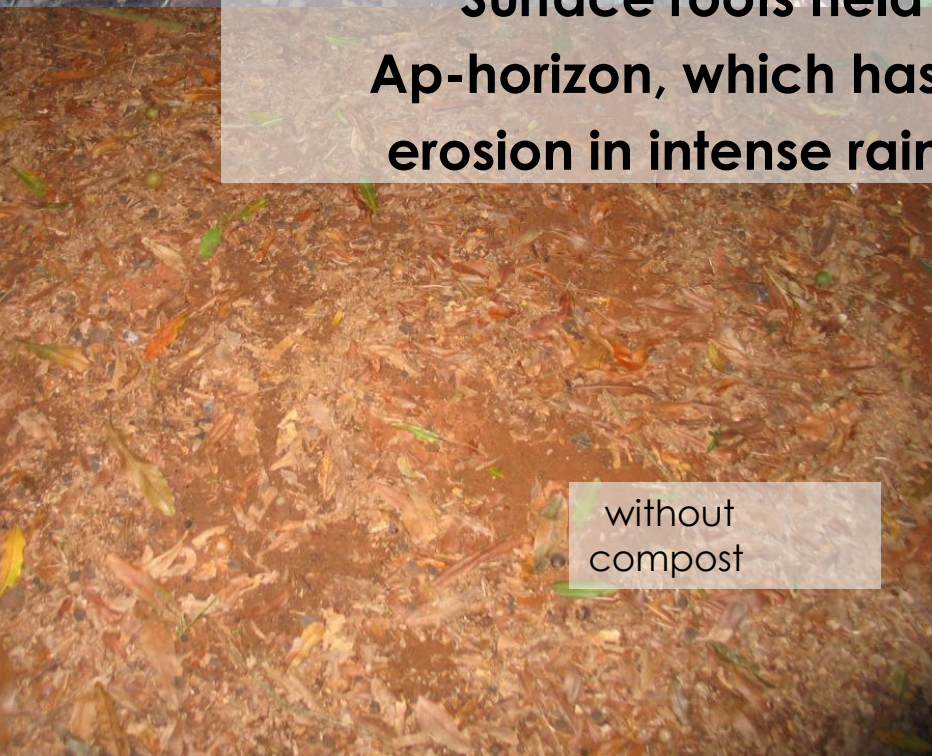


Findings

- Application of compost + biologically N fixing agent (Twin N) can partially substitute mineral fertiliser
 - With compost alone: reduced by 80 kg N/ha
 - With compost + Twin N: reduced by 170kg N/ha
- Analysis of soil and leaf samples did not show any appreciable differences between treatments.
- Combined nut yield (nut in shell) for 2013 and 2014 did not show any marked difference between treatments.
- Combined compost and Twin N treatments appeared to have positive synergistic effect on yield
- Demonstrates the viability of low-cost on-farm composting in passively aerated piles, allowing the production of tailor-made, low-P compost for use in macadamia, which are sensitive to elevated soil P levels.



Surface roots held compost and built Ap-horizon, which has significantly reduced erosion in intense rainfall events (400 mm).



without
compost



with
compost

A close-up photograph of dark, rich soil. The soil has a crumbly, aggregated texture, likely due to worm activity. It is interspersed with various organic materials, including thin, light-colored sticks, dried leaves, and small twigs. Several small, bright green seedlings are visible, emerging from the soil surface. The lighting is natural, highlighting the textures of the soil and the organic matter.

**Longer term improvements in soil structure
starting to show with increased worm activity**





Circular Economy for Organics on Sunshine Coast

Driven by Johannes Biala of CROWN

Conclusions - key messages

- Significant quantities of both carbon and plant nutrients in organic wastes
- Can be extracted and/or transformed
 - Range of bio-based products – biorefining/biotechnology
 - Composting/AD processes
- Significant potential to improve soil organic matter content
 - Mechanisms to value this need to be developed
- Policy and fiscal incentives needed
 - European Union's Circular Economy Package
 - Stimulate demand
 - Overcome investment and technical barriers
- Partnerships with other sectors
- Expand occupational core competencies
- New product standards needed
 - Product specifications
 - End of waste criteria



Dr Jane Gilbert
Carbon Clarity
UK



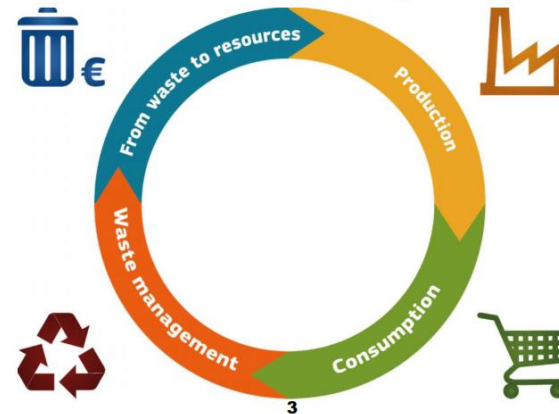
EC Circular Economy Package

- Published in December 2015
 - “Closing the Loop - An EU Action Plan for the Circular Economy”

From a Linear Economy...

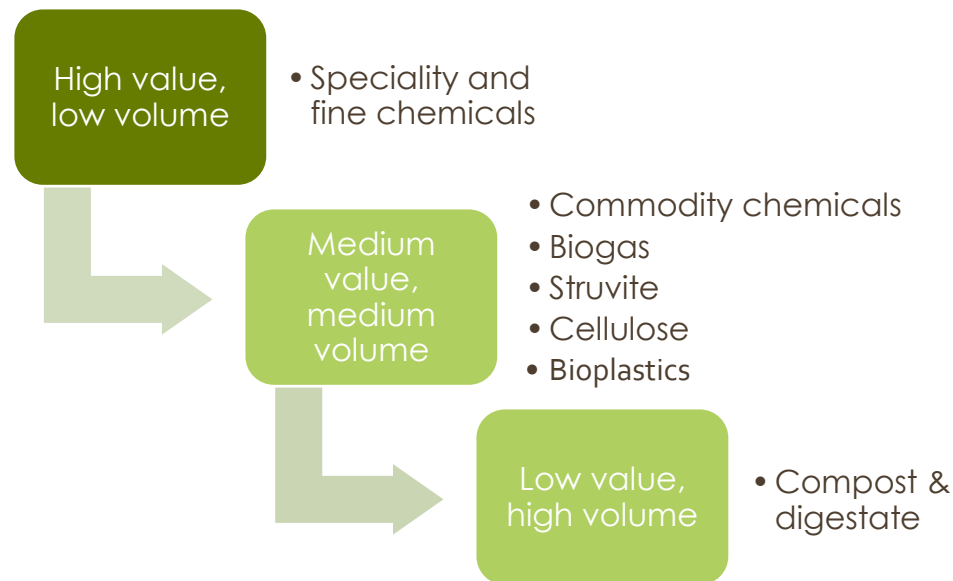


...to a Circular Economy



Bioeconomy opportunities

- Potential to extract carbon and nutrients from organic wastes and convert into high value products (USD \$ billions pa)
- Now receiving industry, academic & government interest



Farmers have to be seen as ...

... potential **large users** of compost, provided quality and price are right

... **full commercial partners** in the organics recycling supply chain



Offer Business Opportunities

Organics Recycling Partnerships with Farmers offer Long-term Win-Win Solutions for Regional Councils and the Farming Sector

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6000 m³ Sunshine Coast Compost



800 M3 Council Green Waste.



On Farm Processing



Ex Mining Trommel - \$50k – Small Scale – High Cost

Macadamia Plantation – Non Irrigated

2000+ M3 Amcor Cardboard Pulp & Chicken Manure.



On Farm Static Piles Of Very Rough Council Green Waste















garden waste only



Yes



Grass



Shrubs & flowers



Weeds



Leaves & loose bark



Prunings & clippings



Branches & palm fronds



No



Rubbish of any kind



Plastic paper metal or glass



Food scraps & plastic bags



Treated timber



Sand rocks & gravel



Large logs & stumps

Bin lid must be closed and weigh under 80 kg

This resource will become soil

www.sunshinecoast.qld.gov.au
07 5475 7272

 **Sunshine Coast**
COUNCIL

Cameras installed, letters written



Production of organic soil amendments requires high quality outputs

- Farmers, horticulturalists (and home gardeners) do not want to apply rubbish to their soil, especially where food is to be grown
- Quality is vital
- Quality assurance is required (e.g. meeting AS 4454 and the new horticultural specification in development)



Food & Agribusiness Network

Sunshine Coast

Noosa

Gympie

Moreton Bay



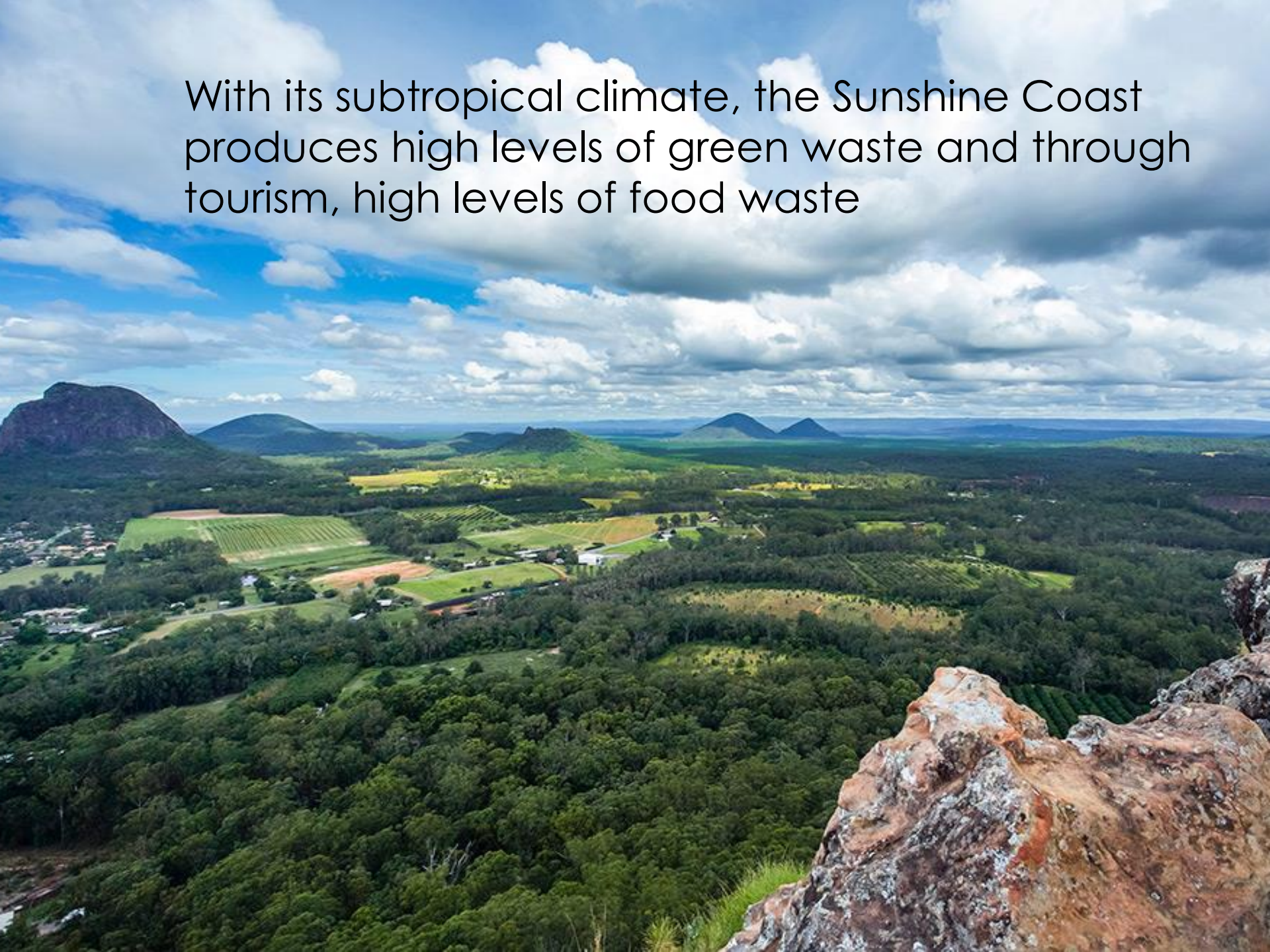
The importance of a Circular Economy

- “The proper processing of organic waste into soil amendments **enhances the ongoing sustainability of the Sunshine Coasts agricultural sector**, which employed around 3,000 people and contributed \$544 million to the Sunshine Coast’s Gross Regional Product in 2010/11.

A vibrant agricultural sector, in turn, supports farm suppliers and the food and beverage processing sector, which forms an integral part of the Agribusiness section of the Sunshine Coasts Regional Economic Development Strategy 2013-33.”

- ✓ Strong link to FAN’s Vision: To create a more prosperous food and agribusiness economy

With its subtropical climate, the Sunshine Coast produces high levels of green waste and through tourism, high levels of food waste



Future

- **Politics:** Whole of Government support
- **Collection:** Education, minimize impurities
- **Processing:** Select / modify existing technologies
- **Funding:** Long-term viable mix of appropriate gate fees and justified sales revenue
- **Processors:** Generate fit for purpose and value added products
- **Science:** Assist in product development and demonstrate the economic value of agricultural compost use



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Compost for Macadamias

<https://www.youtube.com/watch?v=m1VDtjDqNJ4>

Compost for Cane

<https://www.youtube.com/watch?v=cFuqGJ11VA4>