

RMCG

Opportunities for managing waste and resource recovery in the agriculture sector

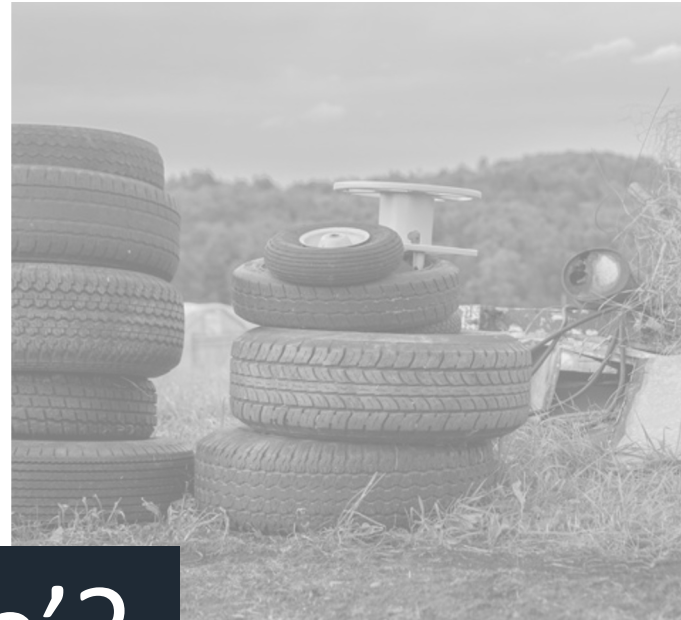
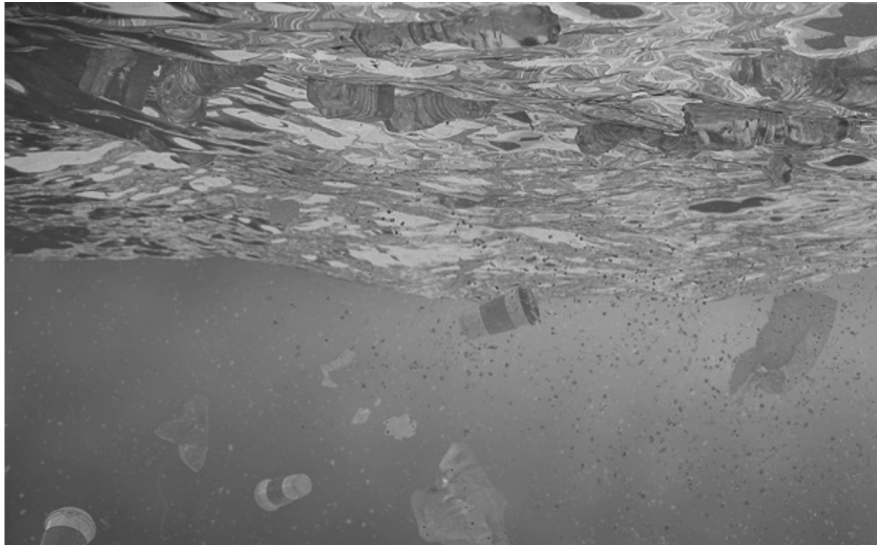
DR ANNE-MAREE BOLAND

WASTE EXPO AUSTRALIA SUMMIT 2023





1. Waste streams
2. Waste and Resource Recovery Roadmap
3. Opportunities to improve waste management – case studies
4. Focus for the future



What is farm 'waste'?



2.3 AGRICULTURE AND FORESTRY

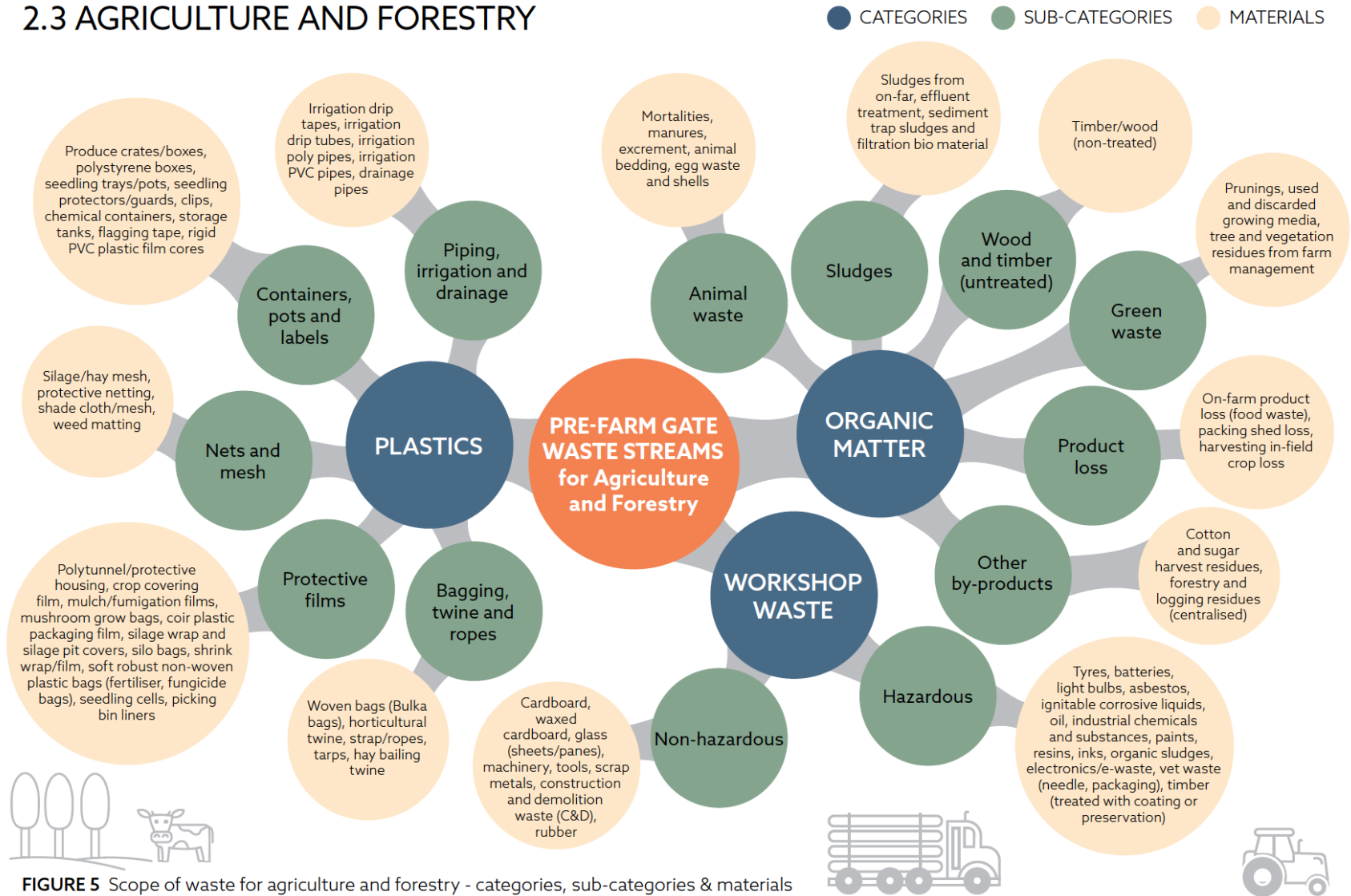



FIGURE 5 Scope of waste for agriculture and forestry - categories, sub-categories & materials



Quantifying and mapping
waste streams

9,553,713
tonnes
ORGANIC
MATERIAL



99,753
tonnes
PLASTIC
MATERIAL

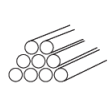


(estimate includes agriculture and forestry, not fisheries)

162,923
tonnes
WORKSHOP
MATERIAL



(estimate includes some, not all, workshop waste materials)



IRRIGATION PIPES,
TUBES & DRAINAGE
19,000 tonnes



SILAGE WRAP
14,000 tonnes



WEED MATTING
12,500 tonnes



SEEDLING TRAYS
10,000 tonnes

TABLE 1 Total pre-farm gate waste and recoverable resource generation

SECTOR	INDUSTRY SIZE/SCALE		TOTAL PRE-FARM GATE WASTE GENERATION		
	Hectares	Gross value of annual production	Organic (t/yr)	Plastic (t/yr)	Workshop* (t/yr)
Broadacre	28 million ¹	\$25.2b ¹	1,279,303	12,286	88,231
Dairy	332 million ha used for grazing (45 million of this is improved pasture) ¹	\$4.7b ^{1,2} for milk	2,095,430	7,797	678
Livestock		\$26.2b ¹	3,616,917	15,471	27,866
Horticulture	513,000 ¹	\$14.7b ¹	2,305,442	63,228	46,149
Fisheries - wild caught	not applicable	\$1.5b ³	not applicable	insufficient data	insufficient data
Fisheries - aquaculture	not applicable	\$1.6b ³	12,705	insufficient data	insufficient data
Forestry	134 million ⁴	\$2.2b ⁴	243,917	972	not applicable
TOTAL			9,553,713	99,753	162,923

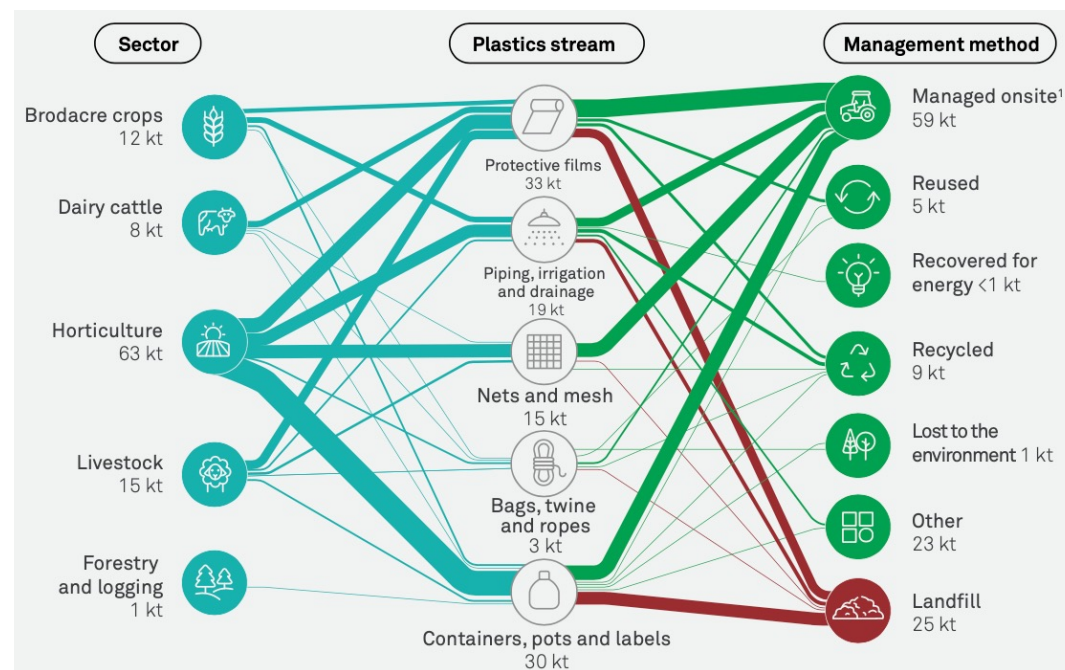
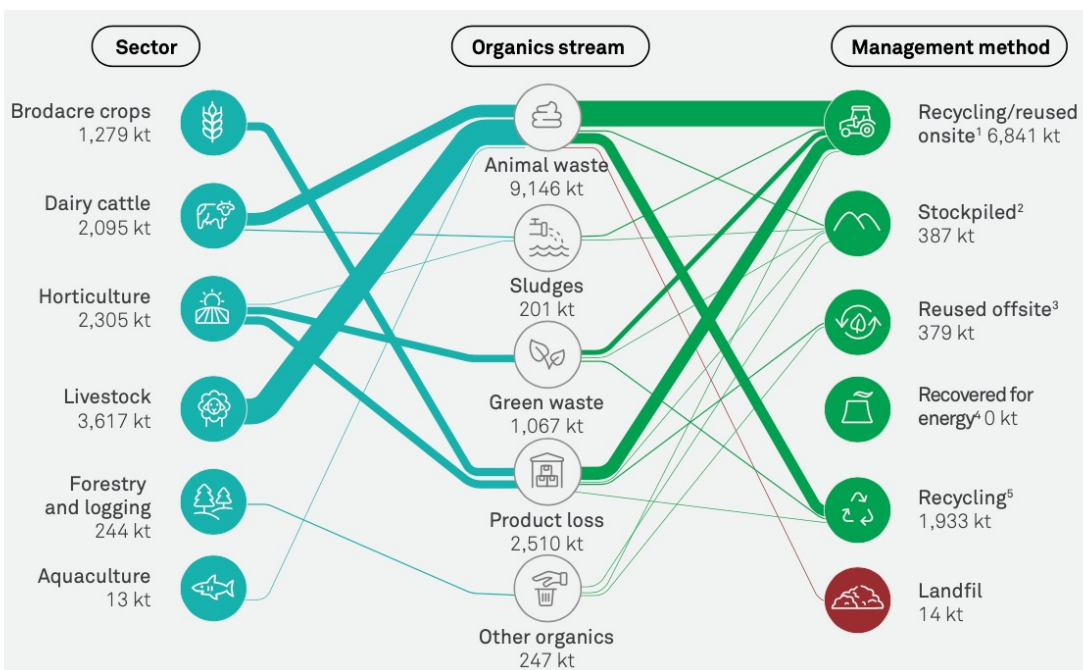
* Workshop includes tyres, batteries and oils for all industries, plus treated timber for vineyards only | ¹ ABS. (2022). *Value of Agricultural Commodities Produced, Australia - 2020-21* | ² Value of meat from the dairy industry is include in the livestock sector value | ³ Steven, A. H. et al. (2021). *Australian fisheries and aquaculture statistics 2020* | ⁴ ABARES. (2022). *Australian forest and wood products statistics, September and December quarters 2021*




Waste generation and fate

Organics

Plastics





Agriculture, Fisheries and Forestry National Waste and Resource Recovery Roadmap - October 2022

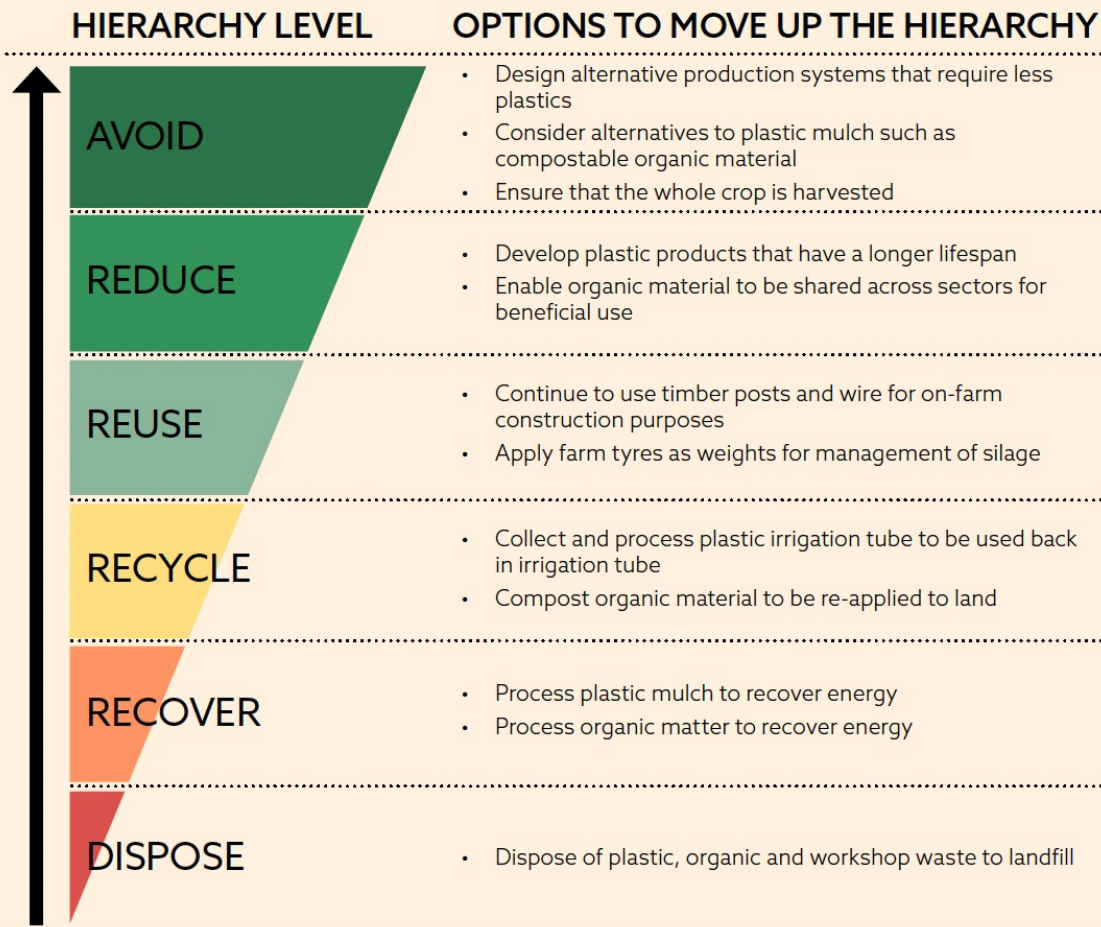
Roadmap for waste and resource recovery

- ▶ Provides background and context to waste issue
- ▶ Analysis of current waste policy
- ▶ Description of what industries are currently doing
- ▶ Highlights strategy for activities to be undertaken
- ▶ Provides a timeline to address issues to 2030



Pre-farm gate waste roadmap

▶ The goal for industries is for the management of materials to move up the waste hierarchy

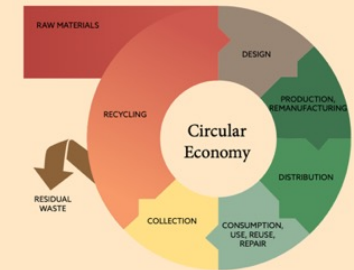


Waste hierarchy and circular economy

The 2018 National Waste Policy is underpinned by the waste hierarchy highlighting the key steps for avoiding the production of waste (Figure 1). The first and most preferable step is to consider if the waste can be avoided altogether. The final and least preferable step is to dispose of waste, and this should only be done where there is no opportunity for the previous six steps to be implemented.

The policy also subscribes to five overarching principles relevant to waste management in a circular economy, including:

1. Avoid waste
2. Improve resource recovery
3. Increase use of recycled material and build demand and markets for recycled products
4. Better manage material flows to benefit human health, the environment and the economy
5. Improve information to support innovation, guide investment and enable informed consumer decisions.

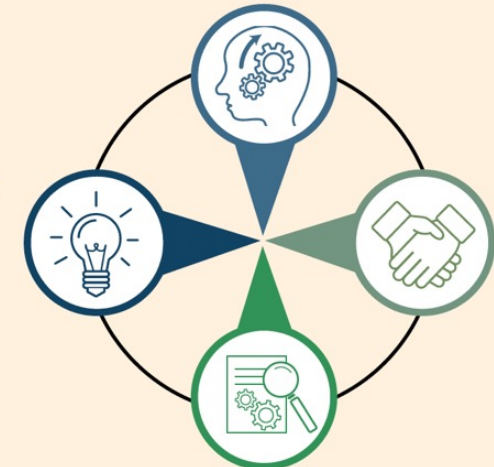


BEHAVIOUR CHANGE

- Designing out waste
- Waste solutions
- Markets for waste

KNOWLEDGE

- Education
- Awareness
- Promotion



PARTNERSHIPS

- Current activities
- Policy and legislation
- Product stewardship

RESEARCH & DEVELOPMENT

- Current activities
- Policy and legislation
- Product stewardship



Case studies

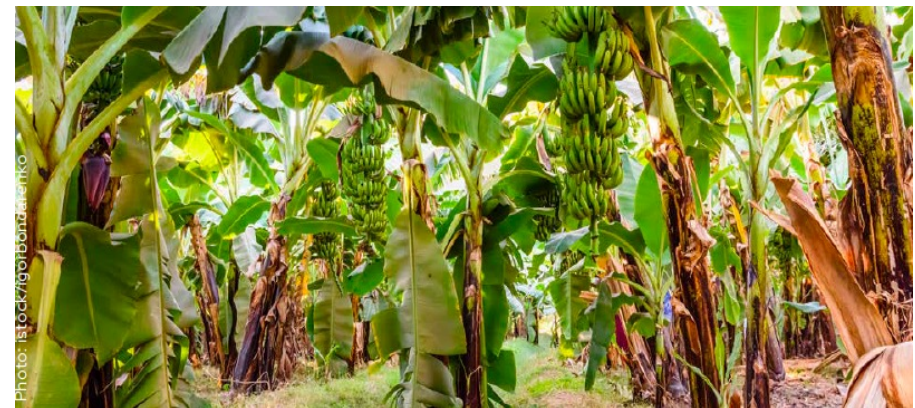
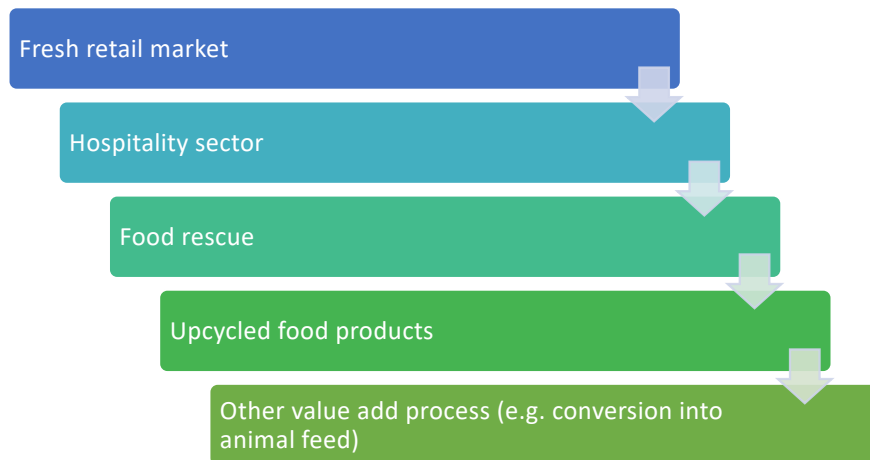
- Whole crop purchasing
- Alternatives to treated timber posts
- Soil-biodegradable plastics
- Plastics stewardship scheme

1. Whole crop purchasing (WCP)

“WCP is an agreement between a producer and a retailer/wholesaler to purchase the whole crop, and thus the whole crop is harvested. The aim is to reduce on-farm crops loss.”

Crop suitability: seasonal production peaks, short shelf life, pest/disease/physical damage, cosmetic standards

Highest value use

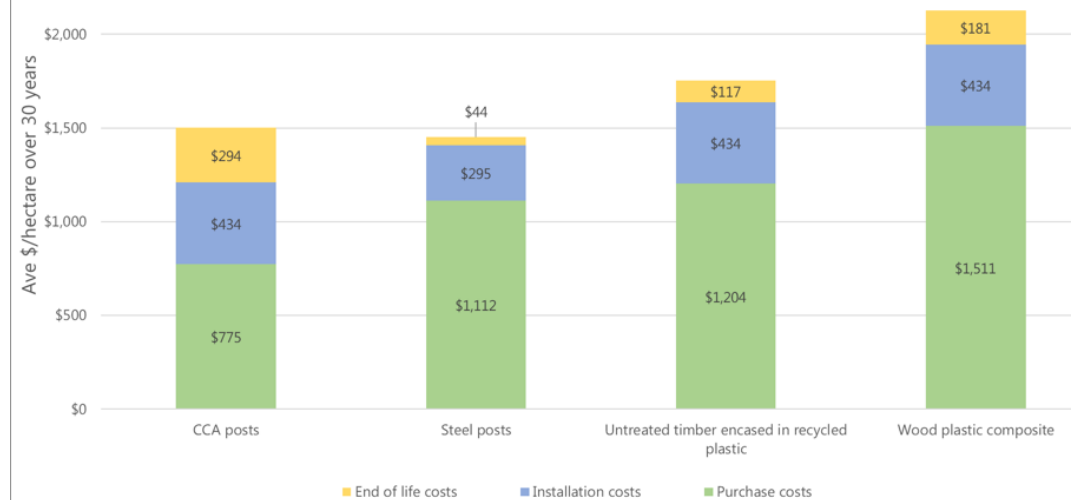


2. Alternative to treated timber posts

Analysis: whole-of-life costs, up front purchase, installation, failure rates, disposal costs, replacement costs

Benefits: Reduce bushfire risk, quicker installation, recyclable

Risks: Higher upfront costs, cost of disposal not considered, performance uncertainty



*Not based on discounted cash flow. Does not include costs for clips and strainer posts. Based on average of 650 posts installed per hectare of vineyard.

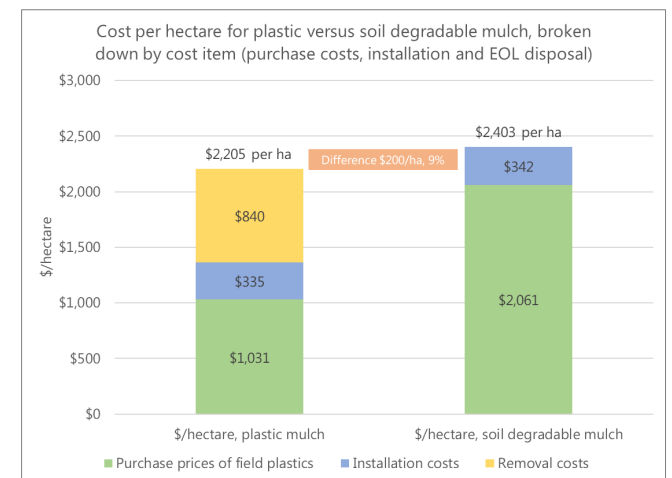
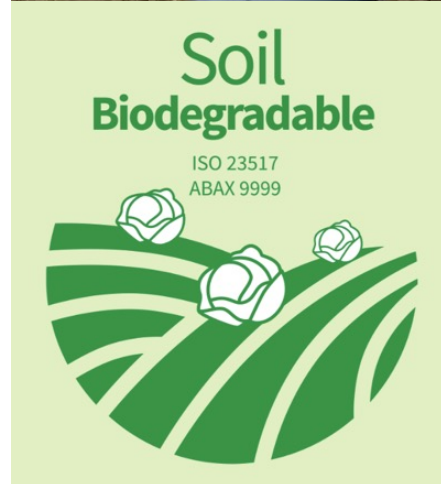
3. Certified soil biodegradable plastic mulch film

Identified key potential crops and areas: vegetable, strawberry, nursery

Compared cost: upfront purchase, installation and disposal

Risks: performance, upfront cost, green washing of plastic options

Benefits: Soil benefits (no micro plastics), no removal (labour, fuel, landfill savings)



4. Stewardship scheme for agriculture plastics

- >110,000 tonnes of plastic used annually, and increasing
- Poor understanding of pathways for management
- Poor access to collection, disposal or recycling options
- Mixed polymers
- Non-plastic contamination (organics – plant and soil, metal)
- Dispersed generation and long distances increase transport costs
- Limited alternative products – essential to production systems



Agricultural plastic and polymer types



Plastic codes Polymer Type



PETE



HDPE



PVC



LDPE



PP



PS



OTHER

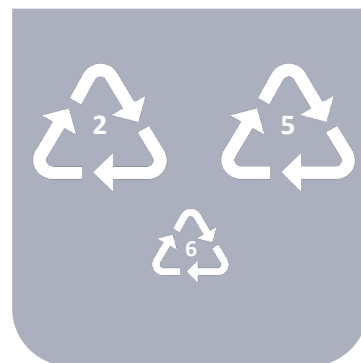
- Cotton film
- Berry film (from coir packaging)
- Polytunnel/ protective housing
- Crop cover film
- Mulch/ fumigation films
- Silage wrap
- Clear film wrap

- Water reservoir
- Irrigation tapes
- Irrigation pipes and fittings
- Drainage pipes

- Silage mesh
- Protective netting
- Shade cloth/mesh

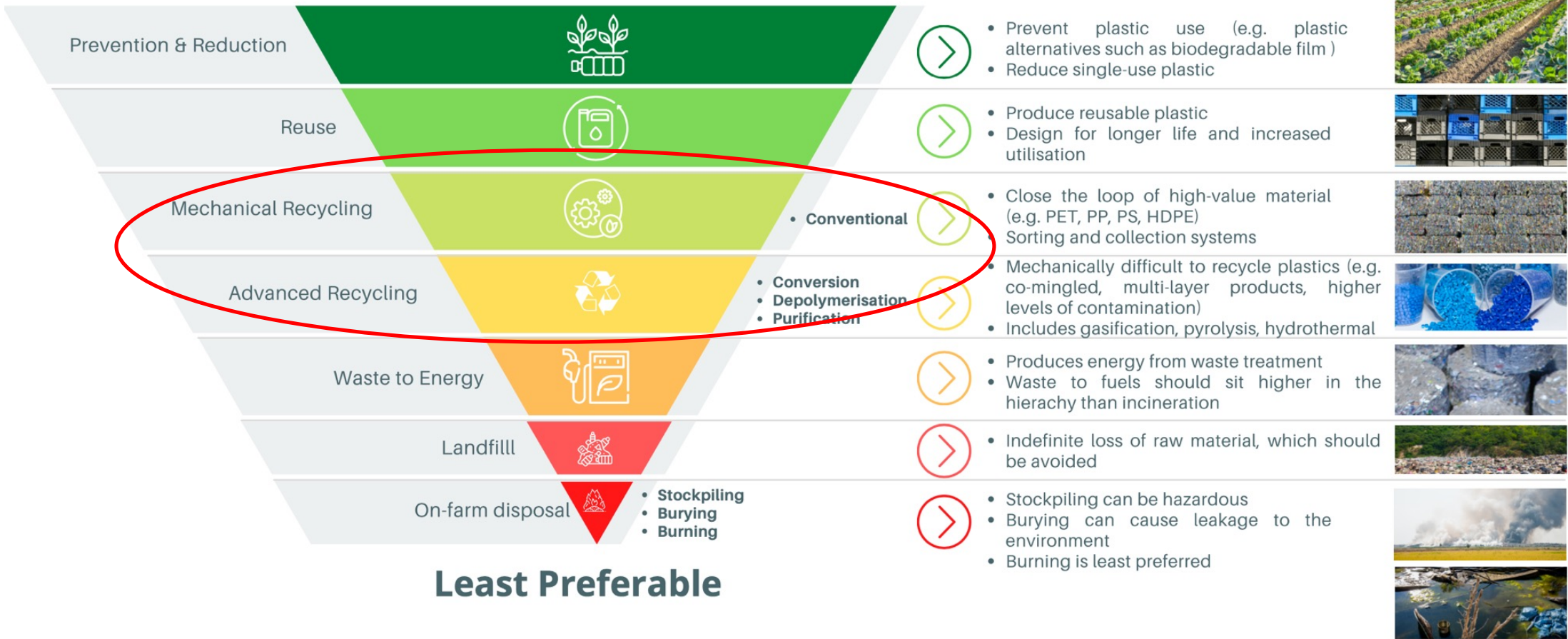
- Bulka bags
- Horticultural twine
- Twine/ ropes/ string
- Tarps

- Produce crates/ boxes
- Polystyrene boxes
- Seedling trays/ pots/ racks
- Clips
- Chemical containers
- Storage tanks



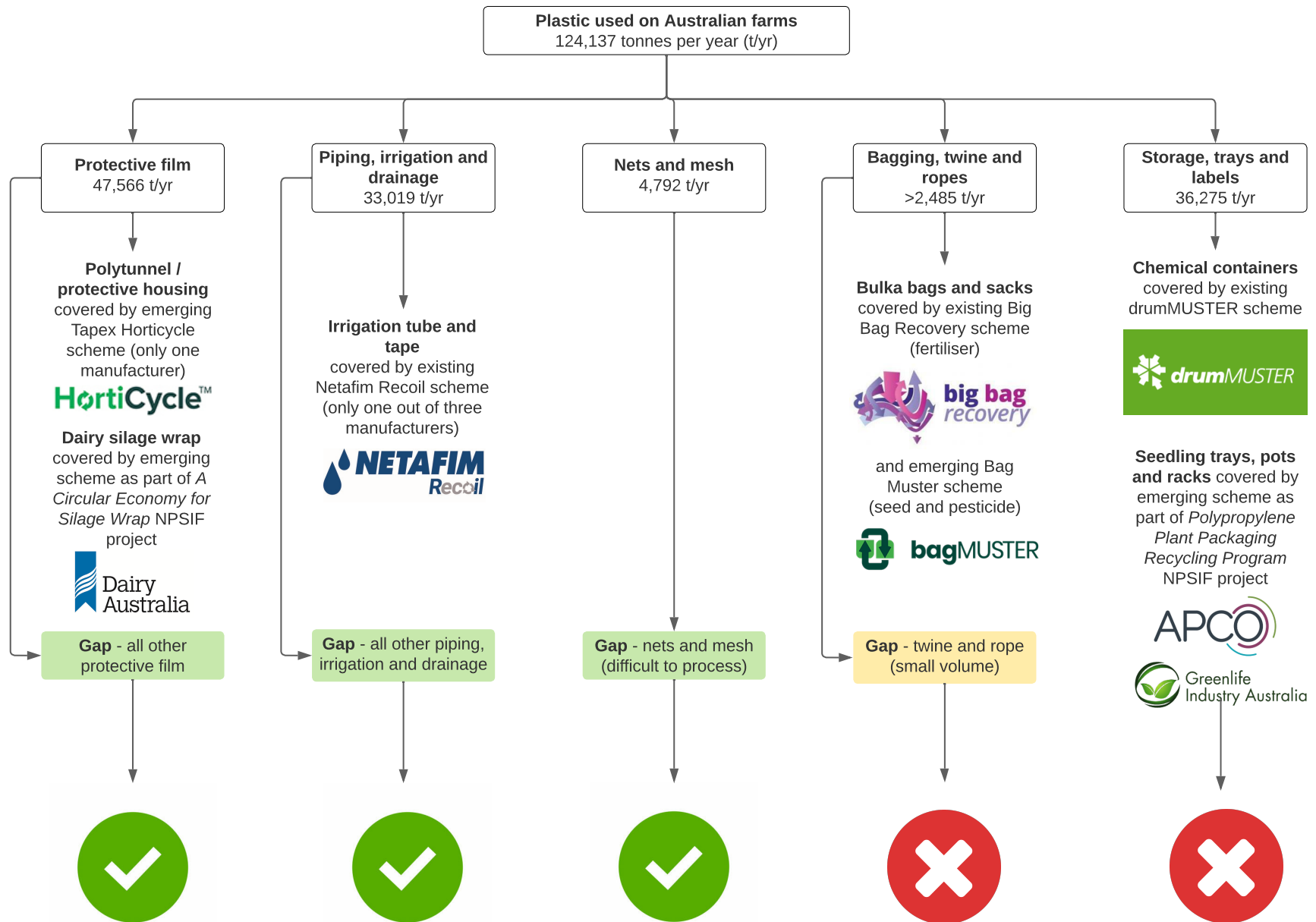
Potential solution – considering the waste hierarchy

Most Preferable



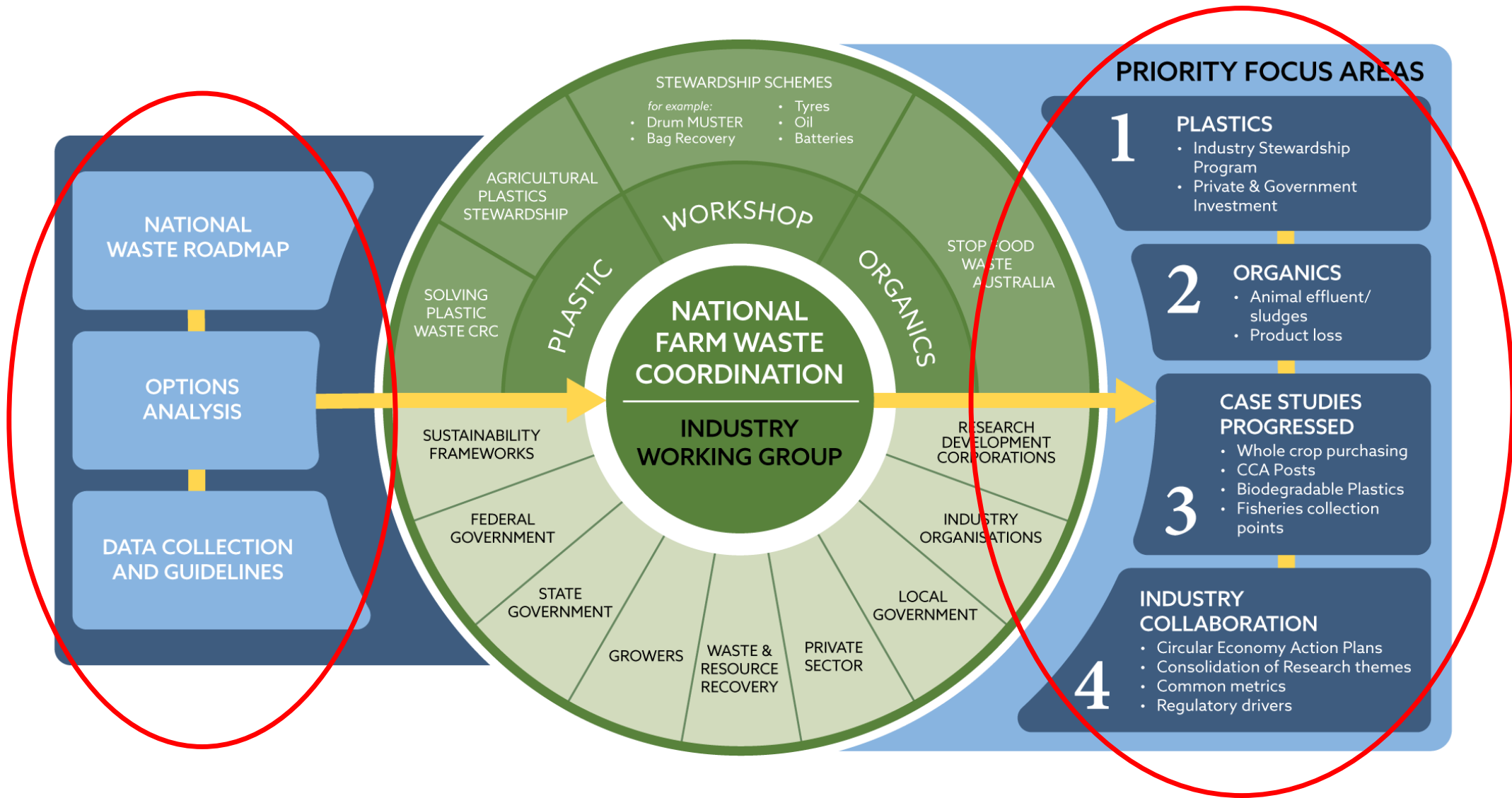
Least Preferable

National Agricultural Plastics Stewardship Scheme



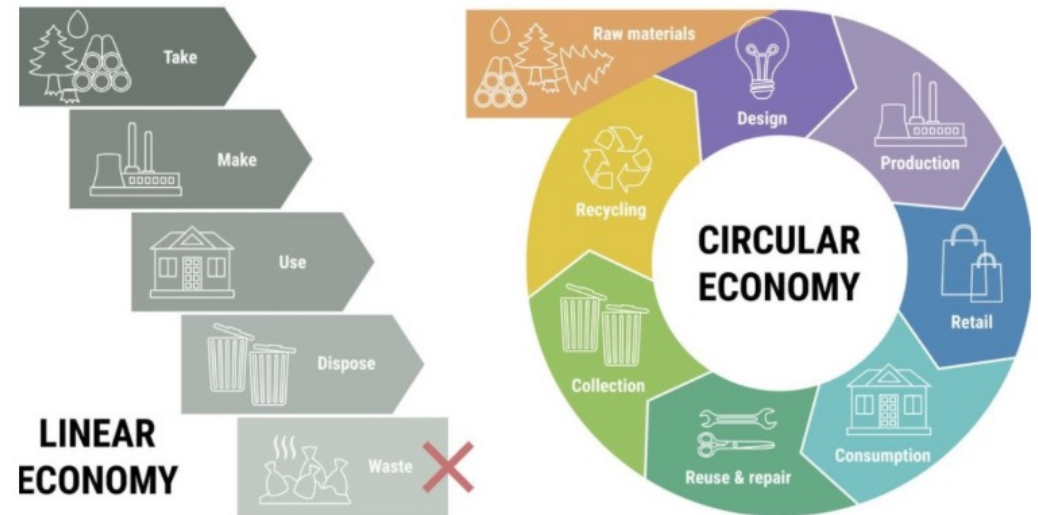


Focus for the future



Moving towards circularity

- Maximising resource efficiency
- Linking with sustainability activities and industry frameworks
- Monitoring performance
- Demonstrating that circularity makes business sense



Acknowledgements

- Project team – Carl Larsen, Clinton Muller, Donna Lucas, Steph McNulty, Emily Tee, Isabel Axiö, Tristan Wardley, Dimi Kyriakou and Kelly Ross, RMCG
- Scott Wallace and Brock McDonald, Growcom
- Ed George, EPR Enviro



Australian Government

**Department of Climate Change, Energy,
the Environment and Water**



AgriFutures[®]
Australia

Thank you