



## Chapter 6 Waste management



**Objective – waste products are avoided, minimised, reduced, reused or recycled wherever feasible or are disposed in a manner in line with community expectations and legislation**

Global outlooks suggest that the expansion of agricultural production is likely to slow, at least in the medium term, with limited area expansion and slower productivity growth, but supply should keep pace with demand such that prices that are expected to remain relatively high. In this context, measures to reduce food loss and waste will be important in meeting rising demand and for increasing productivity.

Production processes create waste. This section covers waste that is created as part of horticultural operations. This waste is usually put into landfills/tips, which is not good use of valuable space and can result in other environmental impacts such as creation of greenhouse gases and pollution of groundwater (e.g. chemicals and nutrients).

Wastes should be managed in accordance with the following order of preference (source: waste hierarchy from Environment Protection Act 1970):

- a) Avoidance;
- b) Reuse;
- c) Recycling;
- d) Recovery of energy;
- e) Treatment;
- f) Containment;
- g) Disposal.

Further references and resources can be located at the end of this chapter.


One of the key benefits associated with recycling is the avoidance of landfill. When organic waste (food, garden clippings, paper, timber) is treated in landfill, gases are emitted that contribute to green house gases emission. As organic matter breaks down in landfill both biogenic carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) are emitted. Methane is the most important of these gases from a green house gases perspective because it has a high global warming potential (21–25 times that of CO<sub>2</sub>). Biogenic CO<sub>2</sub> is not considered a source of anthropogenic green house gases because it is derived from natural sources and would be produced as part of natural cycles.

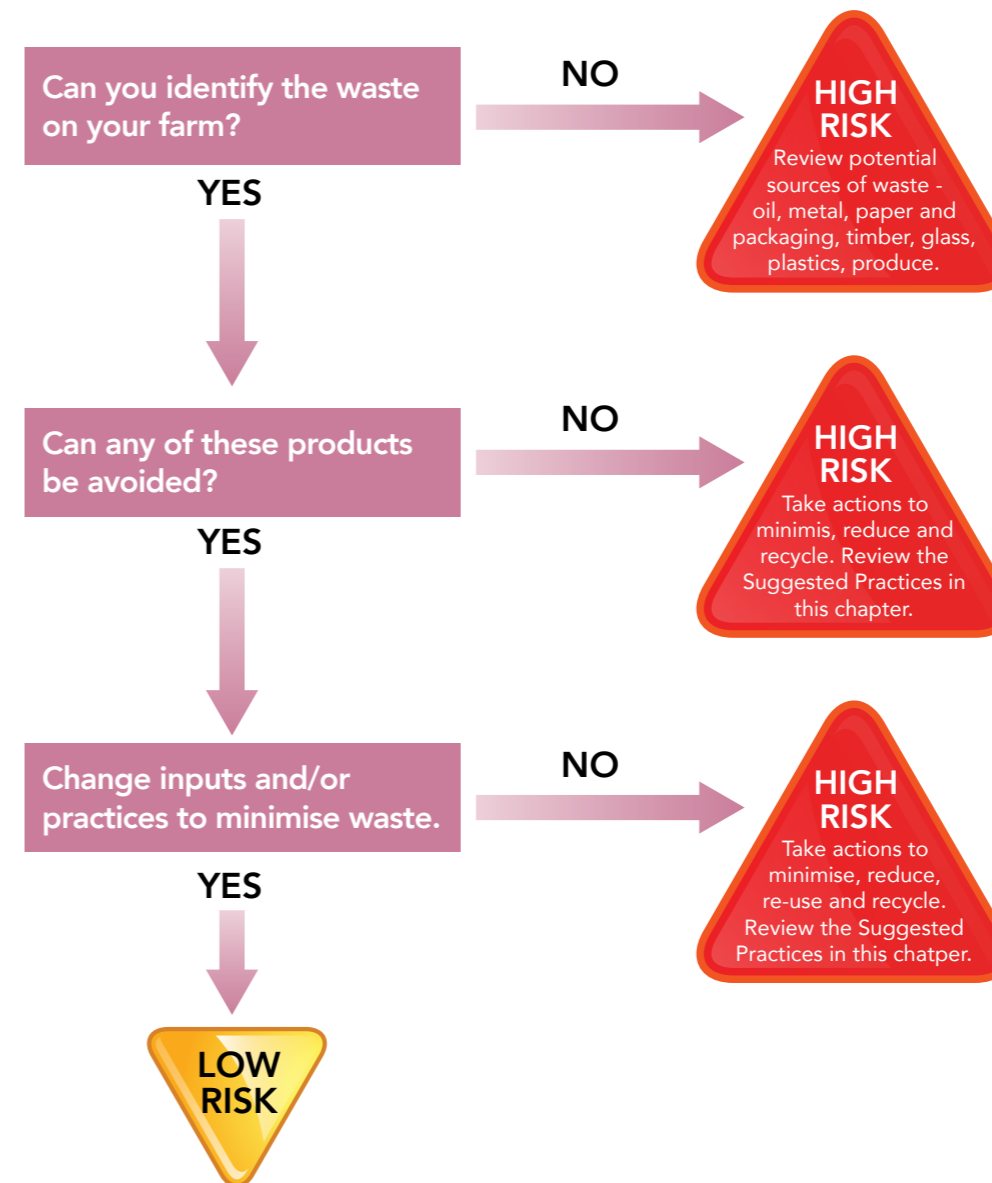
This chapter does not address water or chemical waste. For more information on these topics see 2b – Water quality, 3 – Chemical management, and 4b – Nutrient application.


Further references and resources can be located at the end of this chapter.




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 **Risk assessment**



 **LOW RISK** – You probably don't have a significant problem in this area. You may like to read the Suggested Practices to check your understanding of the issue.

 **HIGH RISK** – You need to take some action. Read the Suggested Practices for that chapter.

Further references and resources can be located at the end of this chapter.



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**Review checklist**

To go straight to the worksheet for this chapter click [here](#).

**Relevant legislation and regulation**

Legal requirements are subject to change. Regularly check with Federal, State and Local authorities for updated requirements. [See here for links](#).

**Suggested practices****Identify and prioritise waste products**

The first step to managing waste is to determine the types of waste produced by your operations. Examples of waste products include:

Inert materials:

- Metal (car bodies etc.);
- Rubble; and
- Glass (building materials, bottles).

Persistent materials:

- Timber (wooden bins, pallets, crates);
- Packaging (waxed or unwaxed cartons, polystyrene boxes, plastic film, net wrap);
- Plastic (seedling trays, fertiliser and seed bags, mulch, irrigation drip tape; irrigation pipes); and
- Tyres.

Biodegradable materials:

- Paper and cardboard (office paper waste, packaging);
- Substrate (any growing medium used in place of soil; for example potting mix, peat);
- Spent hydroponic solutions;
- Reject plants and vegetative waste; and
- Reject (unmarketable) produce.

Toxic materials:

- Waste oil;
- Batteries;
- Waste pesticide/chemical liquids (dip solution, rinsates, etc.); and
- Treated timber.

Are the wastes a danger to humans or the environment? Are the wastes subject to government regulation?

Once you have identified wastes, it is then useful to prioritise them. This can be done by considering the amount of that waste generated by the operation and the potential impact of the waste on the environment.

Further references and resources can be located at the end of this chapter.



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**Waste avoidance or minimisation**

After identifying and prioritising wastes from your operation, some sort of waste disposal plan will help you determine how you are going to deal with these wastes. Can they be eliminated, reduced, substituted for another less wasteful product, recycled or is the only option to send to conventional landfill? Sometimes you might not currently have too many options for dealing with wastes, particularly in remote areas where, for example, recycling options may be limited.

One option to reduce packaging is to opt for bulk supplies of inputs where appropriate. The exception is pesticides and fertilisers, where it is good practice to keep stored supplies to a minimum.

Minimising waste can have a positive financial impact, and is a matter of looking closely at what gets thrown out and how things are done to find opportunities to minimise the creation of waste in the first place. Take waste disposal into account when choosing products. Wherever possible choose methods and equipment that offer extended life and produce relatively low amounts of waste for disposal. Consider using materials that biodegrade after they have been used.

**Reuse or recycle**

Materials can be reused within the operation or sent for recycling. For instance, wooden bins can be repaired rather than sent to waste. Storage areas can be established for materials such as timber and steel. Materials being sent for recycling (e.g. paper, oil, glass, timber, steel) need to be collected and separated into dedicated recycling containers or areas for pickup. The local council may have recycling facilities in conjunction with the rubbish tip, or a local charity may collect materials for recycling. When donating waste materials to outside groups or organisations, ensure they are safe before releasing them. Consider distributing out-of-specification produce that is safe to be consumed to charity organisations, such as [Fareshare](#), [FoodBank](#), [OzHarvest](#) and [SecondBite](#). Some of these organisations will collect from the farm.

Consider recycling substrates, particularly peat-based products, as not all sources of peat are environmentally sustainable.

Consider composting waste vegetation and produce. The composted product can be returned to production areas as a soil ameliorant. Waste produce can also be returned uncomposted to fallow areas. If recycling waste produce as feed for livestock, ensure it does not contain unacceptable chemical residues.

Ensure waste produce composting or dumping areas are well away from packing and handling facilities to avoid re-contamination of harvested produce with disease, and to avoid attracting vermin to the packing facility.

Also consider environmental impacts of compost sites, such as nutrient rich run-off and the potential for contamination of waterways (surface and groundwater).

Take advantage of returnable packaging systems, for example returnable bulk fertiliser bags.

Consider reusing plastic materials. If an item can be used several times before it becomes unserviceable, the quantity of material that needs to be disposed of will be greatly reduced. To maximise recycling, take care when handling and using plastics.

If plastic items such as plant trays are reused, choosing more durable products can increase their life.

Waste oil from farming activities may be contaminated with substances such as metal particles from engine wear, fuel from incomplete combustion, rust, dirt, carbon, heavy metals and water. If not dealt with effectively, waste oil can lead to pollution of the environment and potential risk to public health and safety. Wherever practicable, waste oil should be recovered for reuse and recycling. It should be stored in a leak-proof

Some States have websites that assist in finding recycling options, See References and Further Resources.

Controlled/ prescribed wastes are any wastes that are hazardous to human health or the environment either directly or indirectly. These can be, for example, flammable, corrosive, toxic or give rise to gases that have these properties. If in doubt as to whether a waste is controlled or not, contact your local environment agency.

Further references and resources can be located at the end of this chapter.



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container in a banded area prior to collection by a reputable recycling business or delivery to a recognised disposal facility such as a local government collection depot or service station. Waste oil must never be applied to roadways as a dust mitigation strategy.

Contacting the manufacturer to see if a recycling system is in place is also a good option, for instance 'Netafim' has a cost-neutral\* recycling solution available to their growers whereby they supply a recoiling machine to the grower and a freight service for the coils to the processor. See [www.netafim.com.au](http://www.netafim.com.au) or contact Adam Roberts, Netafim Melbourne Office for more information on this service.

\*Note: there is no charge for freight only when sufficient quantity is at one location.

### Disposal

Disposal of materials should be the last resort and can include burning or burial in landfill (onsite or council disposal facility). There may be regulations related to burning of certain types of waste, particularly wastes that are defined as "controlled" or "prescribed" wastes. Controlled wastes include items such as agricultural chemicals and chemical containers, tyres and oil. These wastes need to be carefully managed and are closely regulated because of their potential adverse impacts on human health and the environment. Some controlled wastes, such as tyres, are not strictly hazardous but they may also need special management.

Consideration needs to be given to the other potential environmental impacts associated with disposal, such as creation of dark smoke and pollution of groundwater.

If disposing of waste materials on site, do not bury or dump them close to waterways or in a way that run-off or leachates from the waste material can contaminate waterways or groundwater.



### Monitoring and recording

Records that can (and in some cases must) be kept include:

- Waste management plans (can be as brief as a couple of sentences indicating major sources of waste and strategies taken to address them);
- Official receipts, offered to participants in the drumMUSTER program when they bring drums in for disposal. This is a signed document distributed through authorised inspectors at official drumMUSTER collection sites, listing the number of drums brought in for disposal. The receipt provides proof of participation in drumMUSTER and therefore proof of responsible disposal;
- ChemClear® documentation, issued to prove chemicals have been booked in for collection and also when chemicals are collected; and
- Receipts and invoices from recycling or commercial disposal businesses.

Disposal of surplus agricultural chemicals from the spray vat can be recorded on spray records.

The effectiveness of waste management can be assessed through water and soil tests.



### References and further resources

For access to relevant references and further resources click here.



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### Waste management - references and further resources

(web links accurate as at 11 February 2014)

Note: A number of Horticulture Australia Limited (HAL)-funded project final reports have been identified as references within this document. This is by no means representative of all the research & development (R&D) or final reports available in this area. For full list of HAL final reports visit the HAL website [www.horticulture.com.au](http://www.horticulture.com.au). Alternatively, contact HAL or your peak industry body for more information on research & development outcomes specific to your industry.

Australian Government Department of Environment (2009) National Waste Policy <http://www.environment.gov.au/topics/environment-protection/national-waste-policy>

Australian Government Department of Environment - Used Oil Recycling <http://www.environment.gov.au/node/21308>

#### Charities that recycle/redistribute surplus fresh produce in Australia:

- Fareshare (VIC only) <http://fareshare.net.au>
- Foodbank <http://www.foodbank.org.au>
- OzHarvest Food Rescue [www.ozharvest.org](http://www.ozharvest.org)
- SecondBite – food for people in need <http://secondbite.org>

ChemClear® - Collection of unwanted chemical or out of date chemical, handling and storage tips [www.chemclear.com.au](http://www.chemclear.com.au)

DrumMUSTER® - Collection of empty chemical containers [www.drummuster.com.au](http://www.drummuster.com.au)

DECCW (2010) Environmental benefits of recycling, Sydney South: Department of Environment, Climate Change and Water, NSW. <http://www.epa.nsw.gov.au/resources/warr/1058BenefitsOfRecycling.pdf>

DEPI (2013) Getting Full Value, Melbourne: Department of Environment and Primary Industries. <http://www.depi.vic.gov.au/environment-and-wildlife/sustainability/waste-management-and-resource-recovery>

DSEWPac (2012) Waste and Recycling in Australia, Canberra: Department of Sustainability, Environment, Water, Population and Communities. Report prepared by Hyder Consulting. <http://www.environment.gov.au/resource/waste-and-recycling-australia-2011-incorporating-revised-method-compiling-waste-and>

FoodWise <http://foodwise.com.au/foodwaste/food-waste-fast-facts/>

Stanley, R. (2011) Commercial feasibility of banana waste utilization in the processed food industry (HAL Project Reference BA09025). Horticulture Australia Ltd, Sydney, NSW. [www.horticulture.com.au](http://www.horticulture.com.au)

#### State-specific information

- ACT <http://www.environment.act.gov.au/waste>
- NSW <http://www.epa.nsw.gov.au/waste/index.htm>
- NT <http://www.ntepa.nt.gov.au/waste-pollution>
- QLD <http://www.ehp.qld.gov.au/waste/index.html>
- SA [http://www.epa.sa.gov.au/environmental\\_info/waste](http://www.epa.sa.gov.au/environmental_info/waste)
- TAS <http://epa.tas.gov.au/epa/resource-recovery-and-waste>
- VIC <http://www.epa.vic.gov.au/your-environment/waste>
- WA <http://www.epa.wa.gov.au/Pages/default.aspx>

Sustainability Victoria – Integrated waste management <http://www.sustainability.vic.gov.au/en/Our-Priorities/Integrated-Waste-Management>

National Technical Committee for Organics Recycling (2004) Best Practice Guidelines Series Composting, Edition 1: February 2004, Waste Management Association of Australia [www.wmaa.asn.au](http://www.wmaa.asn.au) (membership required to access publications).

NSW DPI (2003) How to compost on farm NSW DPI Agnote DPI-448. New South Wales Department of Primary Industries, NSW. [http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0003/166476/compost-on-farm.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0003/166476/compost-on-farm.pdf)

OECD/FAO (2013) OECD-FAO Agricultural Outlook 2013-2022. OECD Publishing and FAO, Paris. <http://www.oecd.org/site/oecd-faoagriculturaloutlook/>

Wildman, H. (2008) Horticultural waste reduction and conversion through microbial bioremediation (HAL Project Reference HG06024). Horticulture Australia Ltd, Sydney, NSW. [www.horticulture.com.au](http://www.horticulture.com.au)

ZeroWaste SA <http://www.zerowaste.sa.gov.au/at-home/fact-sheets>

Further references and resources can be located at the end of this chapter.



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