

Waste management and disposal in the nursery industry

In this month's Nursery Paper David Hunt from Environmental and Horticultural Research Consultants, reports on levy funded work investigating waste management and disposal in the nursery industry.

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Waste management and disposal have always been a part of business processes for Australian production nurseries. In recent times, the types of waste have changed and disposal costs have continued to increase. A greater use of product packaging has led to an increase in the amount of plastic and cardboard requiring disposal. The increasing cost to process these surplus resources, in addition to a community preference for resource recovery instead of landfill disposal, has led production nurseries to consider new ways to reduce waste management costs while also embracing environmental sustainability.

Waste comes in many forms and includes any material, effluent, surplus substance or item that does not function or is no longer required for production. It also encompasses the inefficient or inappropriate use of raw materials and resources or any actions that hinder production. Because of this broad definition, several waste analysts suggest that many businesses usually under-estimate the true cost of waste disposal, and in most circumstances the actual cost can be ten times more than shown in accounting records. The only way to determine the true cost of managing and disposing of waste is to ascertain where and why waste is generated. This will help to identify any alternative disposal methods and determine the best option to reduce costs.

Nursery & Garden Industry Australia (NGIA) commissioned a waste assessment project to identify the wastes generated by a production nursery and how changes in the waste disposal industry can be used to reduce costs for production nurseries. Responses to an online survey provided information about the type and quantity of waste being generated and the current disposal methods being used. A review of resource recovery principles, waste assessment procedures and waste companies were used to develop waste assessment guidelines to help managers identify the best waste disposal methods for their business.

Survey of production nurseries

In total 34 businesses provided waste management and disposal information for analysis. A detailed waste assessment was conducted at one large production nursery to provide a list of wastes and issues associated with production. The information from survey respondents varied in terms of yearly turnover, number of employees and the number of crops produced. Waste disposal costs were below one per cent of yearly turnover, ranging from \$250 to \$31,200 per year with staff hours allocated to waste management ranging from 1 to 40 hours per week.

Waste materials generated	Tonnes per year	% of total waste
General waste	535.93	39.345
Greenwaste and used media	408.64	29.999
Packaging card, paper and office paper	193.16	14.181
Plastic Containers	73.08	5.365
Pallets	66.04	4.848
Metals	25.04	1.838
Plastic wrap and packaging	22.50	1.652
Greenhouse film	10.83	0.795
Miscellaneous	7.90	0.580
Builders plastic and weed mat	7.31	0.537
General recycling	4.50	0.330
Batteries	1.77	0.130
Rubber, including tyres	1.66	0.122
E-waste (office and production)	1.34	0.098
Oil	0.72	0.053
Chemicals and fertiliser	0.47	0.035
Timber	0.42	0.031
Faulty equipment	0.25	0.019
Glass	0.22	0.016
Irrigation pipe	0.14	0.010
Irrigation fittings	0.11	0.008
Shadecloth	0.11	0.008
Total waste generated	1362.1	

Table 1: List of waste types and quantities generated by 34 nursery production businesses

The total estimated quantity of waste generated by the 34 surveyed businesses was 1362 tonnes per year. This potentially represents two per cent of the industry, suggesting that a minimum of 68,000 tonnes of waste is generated by the nursery and garden industry each year. There are five main waste categories: general waste (40%), greenwaste and used growing media (30%), cardboard and paper recycling (14%), plastics, including pots, packaging and pallet wrap (7%), and pallets (5%). The remaining 4 per cent is comprised of a variety of other production wastes and general recycling. This ranking, shown in Table 1, was relatively consistent across all surveyed businesses, with each nursery generating slightly different waste types and quantities due to differences in production methods, input resources used and crop type.

Although there is a large quantity of greenwaste generated, only 21 per cent is sent to a commercial processing facility for mulching or composting. Fifteen per cent is still being sent to landfill via a general waste service and the remaining 64 per cent is dumped or composted onsite but no longer used for production. Eighty two per cent of survey respondents stated they recycle cardboard and paper, and sixty four per cent recycle plastic growing containers but less than 52 per cent recycle other plastics (chemical and fertiliser drums, packaging, pallet wrap and strapping). Several survey respondents stated they have halved their general waste disposal costs by recycling as many materials as possible. Several respondents expressed frustration associated with not being able to recycle certain wastes and the increasing quantity of plastic packaging that goes to general waste. A large proportion of recyclable materials are still being disposed as general waste, primarily due to the limited recycling infrastructure and services outside of city centres.

Waste management options and disposal costs

To reduce waste disposal costs in a production nursery requires an understanding of the types of waste generated, how much is generated, why it's generated and how often it is generated. However another factor that should also be considered is the collection value of a waste material. The collection value will help to determine if separating and recycling a waste is more beneficial than general waste disposal. The collection value is dependent on several influencing factors such as, the type, quantity and frequency of waste generated, the contamination level, the price and demand for recycled materials, and the transport distance from point of collection to the processing facility. Large quantities of clean waste material that can be sold-on has a higher collection value and is more likely to be picked up than small quantities of mixed waste.

The first step to determining the most cost effective disposal option for your business is to carry out a waste assessment. An assessment can also help to identify any inefficient production processes which are generating more waste than expected or an increase in waste at one production area. Once the assessment has been completed and waste details are known, the next step is to determine the best option available to reduce waste disposal costs in the business. The waste minimisation hierarchy can be used to assist the decision process (Figure 1).

Avoiding or reducing waste is a better option than diverting waste as the initial costs are not incurred and the resources are not used. This involves reviewing production processes and purchasing

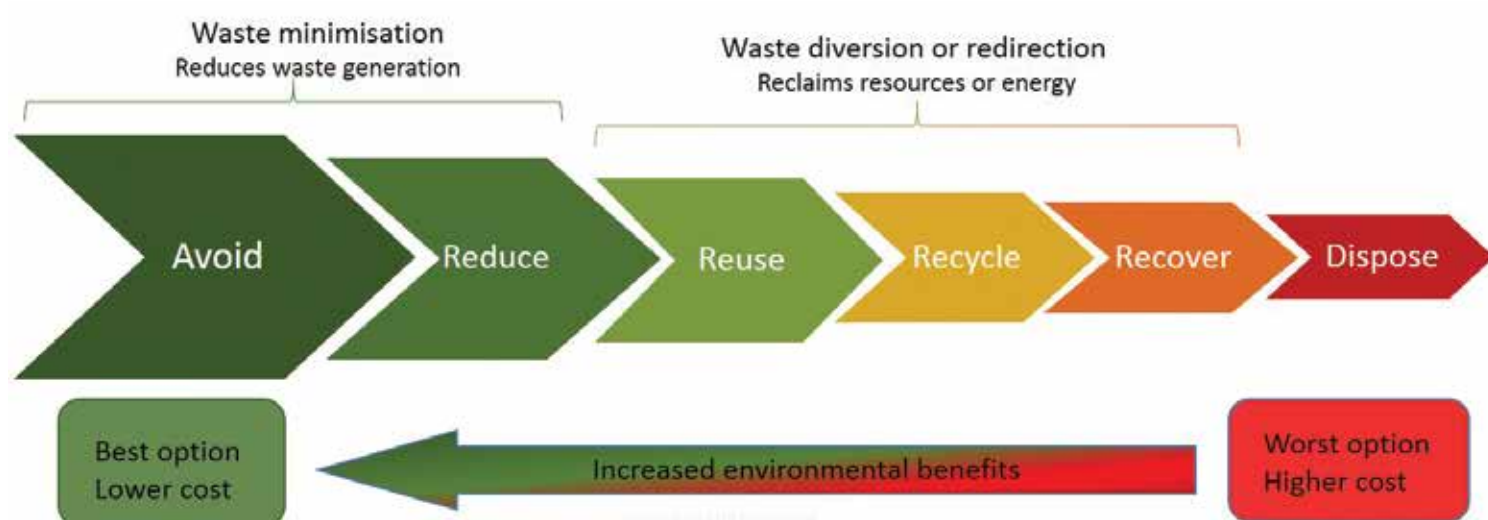


Figure 1: The waste minimisation hierarchy.

practices to increase resource use efficiency and reduce waste generation. For example, a change in suppliers or an increase in production may have increased the volume of packaging needing disposal. In this case purchasing products in bulk to reduce the volume of packaging or reviewing the production process can improve resource use efficiency.

Reusing an item in its original form for the same purpose more than once will help to reduce costs and resource use. Simply washing or sterilising reusable items can be considerably cheaper when the combined purchase and disposal costs are considered. One large production nursery has embraced the reuse principle by installing a steaming system to sterilise growing containers and production equipment. A second hand diesel steam generator and cargo container was installed with a new control unit at a cost of \$39,400. The system is run overnight for 12 hours to ensure all items are sterilised. The system has the potential to save more than \$30,000 in growing containers, provide for a continuous supply of clean production equipment and will pay for itself in the second year of use.

Recycling involves the collecting and processing of an item to recover the raw material to remake the original item or a new item. For example, an increased volume of clean packaging could warrant separation from general waste for recycling. Collecting a sufficient quantity of clean packaging such as cardboard or plastic to increase the collection value can reduce disposal costs. If a large quantity is generated some collection companies may provide a compactor to assist in onsite collection. An added advantage of separating these materials from general waste could be to reduce your general waste disposal requirements allowing for a cheaper service.

Recovery involves the partial recovery of the base material or partial recovery of the energy expended in the material during production. For example, burning greenwaste or rubbish to power an electrical generator. This is less cost effective as only the energy component of the material is recovered but has provided a supplemental fuel source for one production nursery.



Figure 2: Rejected plants and greenwaste dumped in onsite landfill

Disposal is the loss of all raw material and energy that has been expended in the item during production. It has a higher environmental cost due to the contamination and gas emissions given off during decay in landfill sites.

Which option is available to you will depend on the waste service in your area and the collection value of your waste materials. At the moment, the best option for a production nursery to reduce its waste disposal costs is to offer a waste collection company clean, sorted waste material that can be easily sold on. The larger the quantity that can be supplied, the greater the chance of having the material collected for free. Some companies will offer free use of collection bins or compactors if the collection value of the waste materials is high.



Figure 3: An increase in plastic packaging on inputs increasing disposal costs.

Due to the large variety and different volumes of wastes generated in a production nursery and the limited recycling services across Australia, it may not be possible to find a solution or service for all materials in all locations. However, recycling services are constantly growing and will be available in most areas for a cost. Remember, it is possible to reduce overall waste disposal costs by using separate general waste and recycling services or donating recyclables to an environmental or community group. Also consider other businesses in the local area. Is there a neighbouring business that could use your discarded packaging or a landscaping business that might want your greenwaste for compost? Is there a neighbouring business that generates a similar waste that might agree to a bin-share arrangement, so you can increase the collection value of the combined waste materials?



Figure 4: Containers being prepared for steaming or recycling.



Figure 5: Disused or damaged equipment wanting to be recycled.

Finding the best service for your needs may take some time and work, but using search services like the business recycling website (<http://businessrecycling.com.au/info/>), the recycling near you website (<http://recyclingnearyou.com.au/>) and other search services can help. Alternatively, contact any waste collection company and ask if they accept the material you want recycled. If they can't help you, ask if they can suggest a company that can.

No matter how the production waste in a nursery is currently being managed, it is certain that disposal costs will continue to increase. It is prudent business practice to implement waste minimisation and recycling practices to turn waste into a tradable commodity. For a sustainable future, the nursery industry needs to purchase products made from recycled materials and encourage the ongoing development of waste recycling services to change the way wastes are viewed.

Further information:

The project has developed several documents to help managers with the waste assessment process. These can be obtained from your local Nursery & Garden Industry representative and include - Nursery waste assessment form; Waste management cost calculation worksheet; Steps to reduce waste management and disposal costs.