

# Report

## **ENVIRONMENT AUSTRALIA ORGANICS MARKET DEVELOPMENT STRATEGY**

Prepared for  
**ENVIRONMENT AUSTRALIA**

Prepared by  
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## FOREWORD

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This report has been prepared by Meinhardt (Vic) Pty Ltd and EC Sustainable Environment Consultants in association with Environment Resource Management (Qld) Pty Ltd for Environment Australia. The project has been funded by the Commonwealth Government through the Natural Heritage Trust.

This report is based on information gathered from stakeholder consultation and research undertaken over the period October 1998 to November 1999. A draft report was made available for public review during October-November 1999; comments received from stakeholders have been reviewed and, where appropriate, included in this final report. Information in this report is current as at November 1999.

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On behalf of  
MEINHARDT (VIC) PTY LTD

Christine Wardle  
Project Manager

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## EXECUTIVE SUMMARY

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The *Organics Information Reference Site and Market Development Strategy* is an initiative of the Waste Management Awareness Program (WMAP) prepared for Environment Australia in support of the *ANZECC Green and Organic Waste Strategy for Australia*. This project consists of two separate reports; this Executive Summary summarises the *Organics Market Development Strategy* report only.

Organic waste represents a high proportion of the total waste stream and minimisation is imperative to achieve the national waste reduction target of 50%. Environment Australia identified a number of areas in the recycled organics (RO) industry requiring development to assist in organic waste management. This project investigated two, viz.:

- the need for a centralised Information Reference Site; and
- strategies required for RO market development.

A national stakeholder consultation process was conducted through surveys, meetings and discussions to provide opportunities for stakeholders in the RO industry to contribute to the project development. The draft report was also made available for public comment prior to finalisation of the project; comments received were reviewed and, where appropriate, included in the final report.

## Market Development Strategy

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The RO industry in Australia is subject to a wide variety of influences from Commonwealth, State and Local Governments and private sector interests. The majority of these influences are regional, with each State and Territory having specific requirements that need to be addressed on an individual basis. The *Market Development Strategy* therefore investigated the markets in each State of Australia (see *Appendix D: Market Development Review*) and developed a strategy for action on a national basis. The structure of the RO industry was examined and areas of responsibility identified.

In order to develop a targeted marketing strategy, it is important that markets are categorised in terms of their product requirements. Different market segments have different product specifications; this may impact on the type of processing technology used, the use of additives or specific organic raw materials to provide a RO product targeted to its application. Market segmentation is therefore required to provide the basis for identifying what specific product types and marketing factors will create demand. An analysis of RO markets around Australia identified the existing and potential market segments outlined in Table ES1.

**Table ES1 Market Segments**

MARKET SEGMENT	COMPOSITION
Extensive Agriculture	Pasture farming, broadacre farming, forestry.
Intensive Agriculture	Nurseries (production), fruit & orchard growing, market gardening, cut flower growing, mushroom farming, turf grass growing, viticulture, animal feedlots.
Rehabilitation	Landfill cover & rehabilitation, erosion stabilisation, land reclamation, restoration & revegetation.
Urban Amenity	Landscaping, Local & State Governments, nurseries (retail), sport, recreation & leisure, special projects.
Bioenergy	Gasification, pyrolysis, power stations, ethanol, incineration, anaerobic digestion, bioreactive landfills.
Bioremediation	Contaminated sites & soils, water purification, biofiltration.
Export	

The existing status and future potential of each of these target markets was assessed on a regional and national basis. Potential for market growth differs within each category of these segments and is subject to significant regional variation. For example the urban amenity market segment is currently the largest market for RO products in NSW and has been estimated at approximately 85% of the total market; despite this there is still potential for increasing penetration of this segment in other States. Demand also differs with respect to the type of RO product; products that have the greatest demand in the urban amenity market segment are compost and soil conditioner. Other products in demand include mulch, potting mix, liquid fertiliser and top dressing soil.

The major issue with regard to supply of organic raw materials relates to the processing and disposal of organic waste recovered from the municipal solid waste sector. This is because the ownership and responsibility for disposal of these organic waste materials is ultimately transferred to Local Government. The disposal of organic waste from the municipal sector poses the greatest need in Australia, and this report therefore focuses on the organic waste component of the municipal solid waste stream, including putrescible organics and biosolids.

Organic products can be produced without using RO. When RO material is used, it is often blended with other primary raw materials to produce finished products. Growth of RO use can therefore be achieved through replacement of non-RO raw materials and increasing the RO content in organic products, acceleration of market segment penetration and targeting of markets under-utilising RO products. An assessment of the competitor materials to RO was carried out in order to identify opportunities for replacement.

An analysis of the regulations and policies, industry status, market opportunities and barriers to RO industry development was conducted for each State. This information was synthesized to form a framework for a national situation analysis. This SWOT

(Strengths, Weaknesses, Opportunities, Threats) analysis identified key industry issues to be addressed, viz.

- Regulations/Standards: This examined State regulations and policies, Best Practice guidelines, Australian Standards, adoption of standards and the receptivity of end users and processors to adopting Australian Standards.
- Technical: This examined the areas of terminology, research and development, siting of processing facilities, infrastructure and processing equipment, input materials, product characteristics and manufacturing.
- Markets: Market analysis included examination of RO feedstock and raw material substitution, RO content factors, market data availability and authenticity, existing and potential markets, demand trends, market life cycle factors, market development, RO content products, common national issues, regional issues, purchasing policies and end-user quality requirements.
- Economics: Analysis in this section included raw material costs, differential waste disposal charges, transportation, incentives, economic implications of tighter environmental regulations, infrastructure and the economics of collection and processing of RO.
- Awareness/Education: This analysed consumer confidence, organisational needs, perceptions, knowledge and awareness levels, communication, classification systems, existing programs, education campaigns and barriers to expanding knowledge.

From this analysis, strategies were developed to capitalise on strengths and opportunities and remedy weaknesses and threats. Strategic actions to further develop and mature the RO market in Australia were determined and the most appropriate level of responsibility for implementation determined. Not all of these actions were able to be differentiated into specific areas of responsibility; many initiatives require joint action. It is recognised that some of these strategies are beyond the statutory ambit of Environment Australia, although it may play a role in facilitating change with other stakeholders throughout the RO industry.

It should be noted that the development of the RO market is not the sole responsibility of Commonwealth, State or Local Governments or the private sector. Rather, industry growth is the province of all stakeholders working together in a national coordinated approach to contribute within their areas of responsibility to the sustainable development of the RO industry. Recommendations for market development within each area of responsibility are outlined in order of priority in Table ES2.

**Table ES2 Market Development Strategic Recommendations**

RECOMMENDATION	COMMONWEALTH GOVERNMENT	STATE GOVERNMENT	LOCAL GOVERNMENT	PRIVATE SECTOR
Development of a National Recycled Organics Directorate and associated State Recycled Organics Directorates by promoting linkages between existing State-based organics industry associations. Explore possibilities of using existing organisational framework for NROD and SRODs (e.g. AMDN). Consider initial funding support to establish administrative framework. Encourage the exchange of information to all stakeholders in the RO industry.	✓	✓	✓	✓
Support the development and use of standardised terminology for organic waste and RO products on a national basis.	✓	✓		✓
Facilitate development of national Best Practice guidelines for biosolids, organics processing and RO products. Ensure national Best Practice guidelines and Australian Standards are used as a benchmark in decision-making process, including demonstration sites, case studies, procurement policies.	✓	✓	✓	✓
Support development of a RO product and industry accreditation scheme based on national Best Practice guidelines and Australian Standards. Encourage manufacturers to provide RO content and processing information on packaging of products as part of the accreditation scheme.	✓	✓		✓
Encourage establishment of a government procurement policy favouring the use of RO products with increasing RO content which conform to national Best Practice guidelines and Australian Standards.	✓	✓	✓	✓
Develop market penetration and acceleration strategies for those market segments identified as showing most potential for market growth. Facilitate coordination of R&D and market penetration strategies into alternative potential market segments. This should be synchronised with regional collection and reprocessing strategies.		✓		✓
Consider establishment of a National Environment Protection Measure dealing with organic waste management and recycled organics.	✓	✓		

RECOMMENDATION	COMMONWEALTH GOVERNMENT	STATE GOVERNMENT	LOCAL GOVERNMENT	PRIVATE SECTOR
Encourage State Government review of environmental and planning regulations with a view to coordinating requirements for the establishment of organic processing facilities.	✓	✓	✓	✓
Explore options and adopt a strategy for development of organic processing facilities. Identify suitable sites, incorporate viable sites into local planning schemes and allocate appropriate buffer distances.			✓	
Support the establishment of a dedicated R&D forum. This could be facilitated through the proposed National Recycled Organics Directorate. The organisation to be responsible for both product and application research and the development of suitable technology and equipment.	✓	✓		✓
Assessment of R&D funding programs at all Government levels to be benchmarked against the long term needs of the RO industry.	✓	✓		
Explore options to ensure product risk and liability is factored into decision-making process when preparing RO contracts.	✓	✓	✓	
Initiate discussions with other Government bodies to determine if opportunities exist for programs of joint benefit to the RO industry and other environmental issues.	✓	✓		
Consider implementation of a national community awareness program focused on the benefits of use of RO products on environmental issues such as water conservation, land degradation, acid soils, salinity and soil fertility. The program should focus on RO as a resource, not a waste. Ensure community education programs provide nationally consistent focus. Promote the use of RO products to industry associations in targeted alternative markets.	✓	✓		✓
Explore options for reporting of organic waste data in nationally consistent format.	✓	✓	✓	

RECOMMENDATION	COMMONWEALTH GOVERNMENT	STATE GOVERNMENT	LOCAL GOVERNMENT	PRIVATE SECTOR
Encourage establishment of cost-effective collection systems to maximise recovery of RO raw materials with minimum contamination levels.	✓	✓	✓	
Encourage implementation of landfill disposal charges which reflect the total cost of waste disposal and encourage the diversion of RO and other materials for reprocessing.	✓	✓	✓	
Promote the use of existing waste disposal levies on non-recyclable wastes to fund organic waste minimisation and utilisation programs.	✓	✓	✓	
Explore options for granting financial incentives to the RO industry. This may be in the form of taxation concessions, R&D rebates and council rate incentives for organic processing facilities.	✓		✓	
Encourage State Governments to target the RO industry as a priority for venture capital funding programs.	✓	✓		

# 1.0 Introduction

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## 1.1 Background

The Environment Australia *Organics Market Development Strategy and Information Reference Site* is an initiative of the Waste Management Awareness Program (WMAP) and has been developed in support of *the ANZECC Green and Organic Waste Strategy for Australia*. The aim of the project is to provide national strategic benefit in waste management practices for organic waste. Organic waste represents a high proportion of the total waste stream and minimisation of this waste is imperative to achieve the national waste reduction target of 50%.

This project consists of two reports, of which this is *the Market Development Strategy*. This report investigates the current status of the organics industry in Australia and looks at methods that Environment Australia may be able to utilise to assist in market development of the organics industry.

An *Information Reference Site* report has also been developed, addressing the information requirements to facilitate market growth through information dissemination. The *Information Reference Site* will be used as a mechanism to increase awareness and development regarding the processing and end use of organics, and formalise communication channels within the industry.

## 1.2 Project Scope

The project scope as developed by Environment Australia included:

- review of market development barriers and consideration of feasible actions that can be adopted to overcome these barriers impeding market growth. Issues that were considered include collection systems, separation requirements, the effectiveness of existing standards to monitor and ensure quality, and market and community perceptions;
- identification of market opportunities for recycled organics and potential obstacles to market growth, and development of strategies to exploit opportunities and overcome any obstacles identified;
- development of options for supporting sustainable market growth, including government initiatives to support and enhance market growth;
- development of strategies to improve consumer confidence in, and increase the use of, recycled organic products;
- review effectiveness of research and development initiatives, programs and trials in terms of national coordination and the extent of translation into commercial outcomes, broadly applied solutions or market expansion; and
- identify how to more effectively capture the benefits of research and development into recycled organic management and reuse programs.

## 1.3 Project Methodology

The project methodology involved:

- **Review of Current Practices**  
A literature review of Australian and international sources was conducted to consolidate the current approaches to market development.
- **Stakeholder Consultation**  
Extensive consultation with industry stakeholders throughout Australia was undertaken. Stakeholders were provided with topic headings and lists designed to prompt discussion. Participants were encouraged to share their knowledge and opinions about these topics to enable identification of future directions and information needs. Refer to Appendix E for material provided to stakeholders.
- **Current Market Development Review**  
A review of current market development practices was undertaken, identifying the requirements of both the market and industry.
- **Market Opportunity Analysis**  
This included analysis of the market structure, market size and market share. Upon review of the market structure, products for respective market segments, target markets and applications were identified. Market size and market share were assessed by identified segments.
- **SWOT Analysis**  
Strengths, Weaknesses, Opportunities and Threats for market development were identified. This analysis provided a platform for the development of the market and information strategy.
- **Market Development Barriers**  
Barriers impeding sustainable market growth were identified and an assessment provided to identify possible actions to overcome these barriers. The barriers identified included establishment of processing sites, development of end use markets, economics, technology and education.
- **Government Support Initiatives**  
Support mechanisms and incentives that can create and sustain market demand were identified for implementation by government at all levels.
- **Market Development Strategies**  
Strategies for the following were developed:
  - innovation management;
  - community education;
  - development of R&D outcomes;
  - collection systems;
  - processing facility establishment;
  - product standards;
  - procurement policies;
  - product liability risk management;
  - market penetration; and
  - information dissemination.

■ **Organics Information Strategies**

A review of information strategies was undertaken, with investigation of:

- Best Practice demonstration sites;
- Best Practice case studies;
- communications media;
- education officers; and
- industry associations.

## **1.4 Terminology**

Definitions of the terminology used in this report can be found in the Glossary at the end of this report. The terminology is primarily based on definitions outlined in the following Australian Standards:

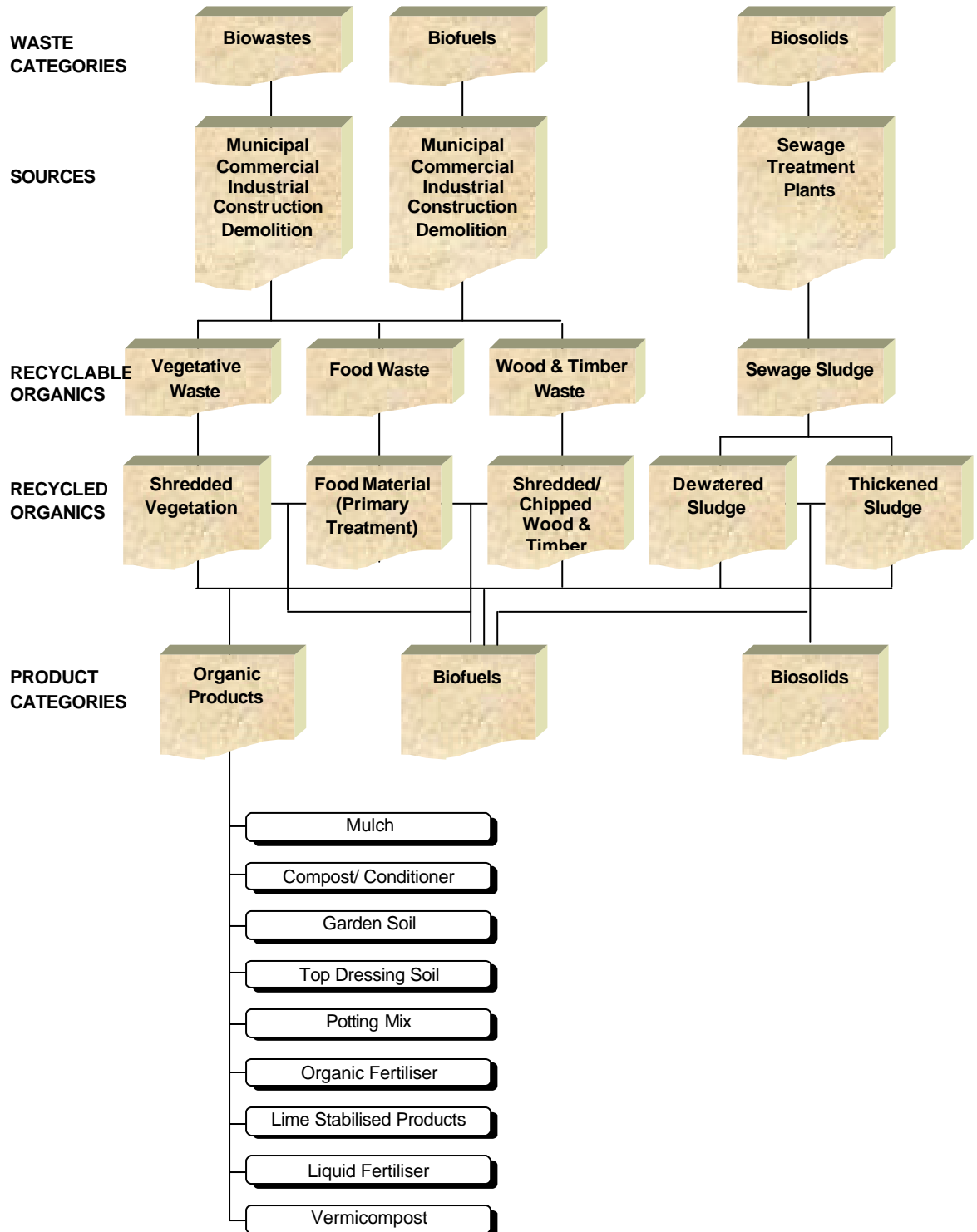
- *AS4454 Composts, Soil Conditioners and Mulches;*
- *AS4419 Soils for Landscaping and Garden Use;* and
- *AS3743 Potting Mixes.*

A flow chart of terminology used in this report has been developed in Figure 1.1. This chart describes the various stages of the flow of organics from waste category and source through to the product descriptions used in marketing of products to the end user.

The flow chart identifies three contract categories – biowaste, biofuels and biosolids. These categories describe the type of contract entered into by the respective authorities (e.g. Local Government Authority, water authority). The next stage in the flow chart identifies the sources of the respective materials, followed by a description of the types of recyclable materials that could be included in the contract category.

From this point on, the recycled materials are no longer considered waste materials but become raw material resources and are described accordingly. The final stage in this flow chart is the product categories that are sold by retailers after the manufacturers have produced finished products.

Figure 1.1 Material Flow Chart



## 2.0 Current Market Review

### 2.1 National Overview

The recycled organics (RO) industry in Australia is subject to a wide variety of influences from Commonwealth, State and Local Governments and private sector interests. The majority of these influences are regional, with each State and Territory having specific requirements which need to be addressed on an individual basis. A detailed investigation of individual State requirements is attached in Appendix D *Market Development Review*.

The following discussion incorporates these State-by-State findings to address the overall RO industry structure on a national basis.

#### 2.1.1 Statutory Authorities

Statutory authorities at Commonwealth, State and Local Government level have a role in the RO market. This may include a role as a regulator or as an end-user of RO products. The latter role is discussed further in Section 2.3 Market Segments.

The Commonwealth Government has developed a number of initiatives to address the management and/or minimisation of organic waste. Through Environment Australia, it has developed a Waste Management Awareness Program (WMAP) to promote the benefits and practicalities of effective waste management and recycling (including organics).

The objectives of the Waste Management Awareness Program are to:

- support and complement ANZECC waste reduction goals;
- promote market development for recycled materials;
- remove of barriers hindering the demand for recycled materials;
- promote sustained demand for recycled materials and recycled products;
- strengthen the financial base of recycling collection schemes;
- promote reuse and recycling initiatives; and
- promote source reduction strategies.

Additional national initiatives include the *ANZECC Green and Organic Waste Management Strategy for Australia* (discussed in more detail in Section 2.2) and projects such as this to investigate opportunities for market development and information sharing in the RO industry. ANZECC and ARMCANZ are also currently developing draft national *Guidelines for Sewage Systems Sludge (Biosolids) Management*.

There are a number of State-based bodies with a regulatory role in waste management and/or waste minimisation. The major bodies include:

- Department of Environmental Protection (Western Australia);
- Department of Land, Planning and Environment – Environment & Heritage Division (Northern Territory);
- Department of Primary Industries, Water and Environment (Tasmania);
- EcoRecycle Victoria (Victoria);

- Environment Protection Agency (South Australia);
- Environment Protection Authority (New South Wales);
- Environment Protection Authority (Victoria); and
- Environmental Protection Agency (Queensland).

The functions of these organisations are discussed in more detail in Appendix D. There are informal communication networks between these State bodies, however statutes, guidelines and Best Practice for the RO industry are generally developed by each State independently and requirements generally differ from one State to another.

Some States have established groupings of Local Governments with responsibility for waste management planning, e.g. Waste Boards (NSW) or Regional Waste Management Groups (Victoria). In other States, local councils retain the sole responsibility for organic waste management issues.

Additional Government resources provide research and development (R&D) assistance to the RO industry. This includes organisations such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and State-based Departments of Agriculture. Bodies active in the industry in each State are discussed further in Appendix D.

### **2.1.2 Other Organisations**

There are a number of non-statutory organisations that play an important role in the RO industry. These include:

- **Australasian Market Development Network**

The Australasian Market Development Network (AMDN) was formed in February 1999 and aims to cooperatively progress initiatives focused on market development for recovered resources. It is aimed at establishing alternative, broader markets that will result in sustainable, localised material applications for a range of recycled materials, including RO. Its membership consists of government and industry organisations with a focus on market development for recyclable materials, including Commonwealth and State Government agencies and statutory organisations, market development centres and peak industry bodies.

Its objectives are:

- to provide a forum for information exchange and dissemination on areas of common interest;
- to identify priority materials for market development;
- to exchange information on current and planned programs in the public and private sectors intended to develop markets for recyclable materials;
- to identify projects of national significance that should be jointly funded or managed by members of the network; and
- to identify other potential areas of cooperation to avoid duplication of effort (for example, materials strategies and grants for product and market development).

Due to its infancy, it is not well known; it has yet to establish a profile among stakeholders in the RO industry. While its scope is broader than the RO industry, the AMDN may offer the framework for future coordination of activities undertaken in the industry across Australia.

- **Waste Management Association of Australia**

The Waste Management Association of Australia (WMAA) is a national organisation with individual state chapters throughout most of Australia.<sup>1</sup> The WMAA deals with all facets involving the management of waste and holds formal conferences to discuss evolving issues in waste management. Organic waste is just one of the many issues it deals with in connection with waste management in Australia.

Subsidiary organisations and special interest groups dealing solely with organic waste have been established by the WMAA in some States. All of these State groups are involved in information sharing through a WMAA list server. A number of the groups are entitled the Cooperative Organisation for the Management, Marketing and Processing of Organic Soils and Technologies (COMMPOST). The goal of these organisations is to foster the continuous improvement and sustainable development of collection, processing and marketing in the RO industry by providing a focal point for representing a broad range of industry views and experience. The subsidiary organisations include:

- **COMMPOST NSW**

COMMPOST NSW was the first RO special interest group formed and originated under the auspices of an EPA (NSW) grant. The organisation has undertaken extensive research identifying local sustainable markets for recycled organic products.

- **COMMPOST QLD**

COMMPOST QLD is in the very early stages of developing a special interest organisation.

- **COMMPOST SA**

COMMPOST SA is providing the industry representation role in the development of state strategies currently being undertaken by the EPA and Planning SA.

- **Compost Special Interest Group WA**

The Compost Special Interest Group WA is also in the very early stages of development.

- **Compost Victoria**

Compost Victoria evolved from the establishment in 1997 of the WMAA (Victoria) Organics Recovery Working Group. The organisation has developed a 1999-2002 Draft Strategic Plan and is currently developing a business plan.

COMMPOST NSW and Compost Victoria are the leading Australian organisations that focus on organic waste and reprocessing. They hold regular meetings and have a significant membership comprised of a range of RO interests. However end-users and potential market segments are minimally represented in their membership.

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<sup>1</sup> The Western Australian organisation is an independent legal entity, but works closely with the WMAA and is currently moving towards official integration with it.

Additional organisations with a selective interest in the organics industry include the:

- Australian Water and Wastewater Association;
- Australian Cogeneration Society;
- Horticultural Research and Development Corporation; and
- Stormwater Industry Association.

However while there are a number of organisations with an interest in sections of the RO industry, there are currently no national organisations which represent the industry as a whole.

## **2.2 Regulations, Policies & Standards**

The *ANZECC Green and Organic Waste Management Strategy for Australia* (ANZECC 1996) is a strategy developed to assist the nation to achieve a 50% reduction in waste going to landfill and will aid in developing policies and practices, supporting and providing direction in waste reduction, reuse and recycling. The strategy has been developed in recognition that to achieve the national waste reduction, significant progress in areas such as green and organic waste is required.

The ANZECC document sets the framework for this report and companion report *Organics Information Reference Site*. Other actions outlined in the *ANZECC Green and Organic Waste Management Strategy for Australia* (ANZECC 1996) include:

- development of a National Solid Waste Database to monitor and report on performance in reuse and recycling of these wastes;
- development of a set of consistent standards for composts and other soil amendment products;
- development of a consistent national education and information program;
- development of a database on research and technology, and education and information program;
- preparation and adoption of green/organic waste strategies consistent with the national approach by each jurisdiction; and
- support for specific research and development projects, of potential national significance.

All States and Territories will aim to achieve the 50% reduction of waste by the year 2000 with the exception of NSW and the ACT. The waste reduction target for NSW has been set at 60%. The ACT aims to achieve zero waste to landfill by the year 2010.

Some individual State policies have been established with respect to organic waste. The NSW *Green Waste Draft Action Plan* (EPA 1996) proposes key actions for the diversion of organic waste from landfill. A *Draft Strategy for the Management of Green and Solid Organic Waste* (DEP 1997) has been developed in Western Australia. In both of these States, a ban on landfill disposal of green waste has been proposed.

Best Practice Guidelines for composting and/or organic processing have been established in Victoria and are being finalised in NSW, Queensland, South Australia, Tasmania and Western Australia. Guidelines for the use and/or management of biosolids have been established in NSW and South Australia and are in draft form in Victoria. Development of a Best Practice Guide for

Composting Animal Manures is being investigated in Victoria. These State-based initiatives are discussed in more detail in Appendix D.

The importance of both manufacturers and users adopting and adhering to product standards, in particular the Australian Standards, is well documented. The standards which apply to RO products include the following:

- *AS4454 Composts, Soil Conditioners and Mulches;*
- *AS4419 Soils for Landscaping and Garden Use;* and
- *AS3743 Potting Mixes.*

Additional State-based guidelines have been developed by some States outlining required product parameters for a number of contaminants.

There are also different standards for different market segments, e.g. the Nursery Industry Association of Australia has more stringent product requirements than Australian Standards. This is seen as a barrier by organic processors: there are cost implications of meeting a number of different requirements where there are no uniform product quality standards.

### **2.3 Market Segments**

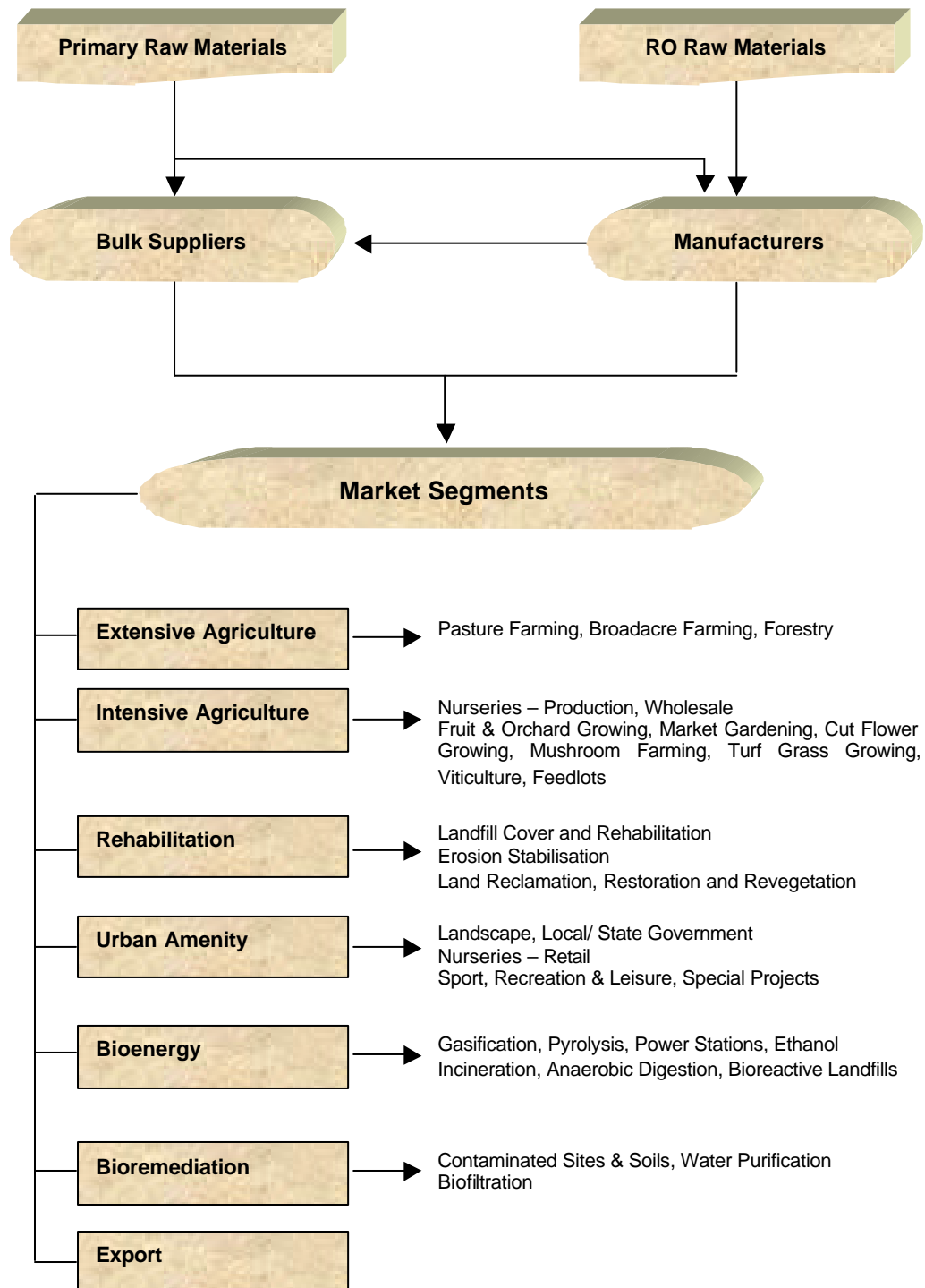
Figure 2.1 identifies the flow of resources from the supply of raw materials, the manufacture of finished organic products and the market segments that have existing and potential demand for products that contain RO.

The supply of end use products is dictated by the needs of the market. Different market segments often have different product specifications. This may impact on the type of processing technology used and the use of additives or specific organic raw materials to provide an RO product targeted to its application. Market segmentation is therefore required to provide the basis for identifying what the specific product types and marketing factors are that will create demand.

Organic products can be produced without using RO. When RO material is used, it is often blended with other primary raw materials to produce finished products. In some cases such as mulches, discrete products can contain all RO, but in other products RO is a component of the total product. For example, increasing RO demand in mulches can include replacing primary products, whereas increasing the amount of RO content in other products such as composts, garden soils, top dressing soils and potting mixes is a way to increase the market demand for RO. In some cases it may be possible with sufficient R&D and demonstrations to produce 100% RO products, but currently the majority of product demand is for partial RO content in finished organic products.

On this basis potential exists to substitute and combine other raw materials to create increased demand for RO. In a commercial sense these primary raw materials are the competitors of RO content. Consequently the competitive profiles of price and availability of these materials is examined in Section 2.4. However it is important to note that it is fruitless to replace another raw material which would then have to be disposed of to landfill if not utilised.

**Figure 2.1 Market Structure**



Increasing RO content needs the support of the manufacturing sector. In a recent analysis of manufacturers of organic products in the Greater Sydney Region (WMAA 1998), only 6 of the 28 manufacturers surveyed used RO content in their product mixes.

It is also important to note that some target markets require different degrees of processing. For example, some target markets in the bioenergy segment can use shredded vegetation and putrescible organics without the need for composting. However other target markets such as those in the urban amenity and agricultural segments require products manufactured to relevant standards, which can include pasteurisation and composting.

Existing and potential markets were identified by stakeholder consultation throughout Australia. The seven market segments identified (see Figure 2.1) are:

- **Extensive Agriculture:** pasture farming, broadacre farming and forestry;
- **Intensive Agriculture:** nurseries (production and wholesale), fruit and orchard growing, market gardening, cut flower growing, mushroom farming, turf grass growing, viticulture, animal feedlots;
- **Rehabilitation:** landfill cover and rehabilitation, erosion stabilisation, land reclamation, restoration and revegetation;
- **Urban Amenity:** landscaping, local and state governments, nurseries (retail), sport, recreation and leisure, special projects;
- **Bioenergy:** gasification, pyrolysis, power stations, ethanol, incineration, anaerobic digestion, bioreactive landfills;
- **Bioremediation:** contaminated sites and soils, water purification, biofiltration; and
- **Export.**

These market segments are discussed in the following sections. Existing and future potential for these market segments in each State and on a national basis has been examined in more detail in Appendix D.

### 2.3.1 Extensive Agriculture

Extensive agriculture is agricultural production in which relatively small amounts of capital and labour are invested per hectare. Activities include forestry, farming of sheep, cattle and other livestock, and broadacre farming of grain, oilseed and other crops.

The existing market demand in the extensive agriculture segment is estimated at less than 1% of the total RO product market. Limited quantities of RO are sold as a soil amendment to the sugar cane industry and there is some usage of biosolids in forestry applications, but existing penetration into this market segment is negligible. However considerable potential exists to expand in this segment.

There are a number of environmental issues impacting on Australian agricultural soils including salinity, acidity, loss of organic carbon, compaction, soil erosion and imbalanced nutrient content. There is potential for beneficial use of RO in amelioration of Australian agricultural soils, including:

- rehabilitation of degraded lands using lower quality composted organics and mulches;
- amelioration of acid soils using lime stabilised organics; and

- restoration of depleted soils by provision of organic carbon using pasteurised organics.

Typically Australian soils contained 2-4% organic carbon, however after 25-50 years of farming, the organic carbon levels in a large proportion of agricultural soils have been reduced to below 1-1.5%. With the advent of high analysis fertilisers, burning of stubble, tree clearing, monoculture and overstocking, there has been a major decline in soil humus content as reflected by declining organic matter and organic carbon content. The net result has been destruction of soil structure, cessation of microbial activity and declining fertility for pasture growth.

Salinity has now appeared in grazing country where the organic carbon levels are below 1.5%. With the loss of microbial activity, the soils have become exhausted. Further addition of mineral fertilisers has only increased the destruction of organic carbon. These soils can be repaired by the addition of materials containing organic carbon in balance with available nitrogen.

The major long term extensive agricultural market for RO is as a source of organic restoration of degraded agricultural soils. The application of RO products will improve soil structure and provide nutrients in an organic form to pasture, reducing the use of chemical fertilisers and thus minimising any subsequent environmental impacts.

High analysis chemical fertilisers contain nitrogen, phosphorous and potassium (NPK) ratios of around 22:10:5 respectively. However due to leaching and some nutrient loss in conversion from chemical to organic composition, all the nutrients are not readily available to be utilised by pasture. Organic fertilisers such as chicken litter and cow manure contain comparatively lower levels of nutrients but in an organic form which can be more readily utilised by the pasture.

As forestry becomes more plantation-orientated, soils that have been previously regarded as unsuitable for forestry could be improved with RO products and used to assist in moisture retention and weed suppression.

Additional opportunities exist for the use of lime-stabilised organics for a range of purposes including:

- pH adjustment of surface soil and sub-soil in strongly acidic soils, where plant growth can be limited by toxicities of aluminium and manganese and calcium deficiency;
- increasing pH to increase availability of plant nutrients including phosphorous, nitrogen and molybdenum;
- providing calcium for plant growth; and
- flocculation of soils with low infiltration capacities.

It should be noted that the attitudes of end-users and their willingness to utilise RO products will impact significantly on the growth of the extensive agriculture market segment. This market segment is yet to accept the use of RO, and there are likely to be issues of attitudinal change to be met in order to penetrate this market segment. These issues will include the source of the RO raw products, how materials are supplied, the method and rates of application, the applicability to different crop types and cost.

### 2.3.2 Intensive Agriculture

Intensive agriculture is agricultural production in which comparatively large amounts of capital and labour are invested per hectare e.g. wholesale nurseries, cut flower growers and market gardens. Land used for intensive agriculture is generally comparatively smaller in area than for extensive agricultural land uses such as broadacre farming and pasture.

In intensive agriculture, production is undertaken either outdoors or under cover in growing structures such as glasshouses and shade houses. Both situations may use existing land for cultivation or import RO products such as composts, garden soils and potting mixes.

Intensive agriculture usually involves intensive cropping of the land and therefore a greater amount of inputs are necessary. Similarly the land is worked more intensively by way of activities including ploughing, rotary hoeing, mounding, planting, fertilising and harvesting.

The soil is also more susceptible to environmental impacts such as salinity, wind erosion, water erosion, caking, compaction, soil-borne diseases, weed invasion and loss of soil structure. Many of these symptoms reduce the productivity of the land. Valuable land is sometimes left fallow or "green manured" in an attempt to rejuvenate it prior to further cropping, reducing farm output.

The RO content share in the intensive agriculture segment is estimated at just under 15% of total organic product demand (WMAA 1998) and while existing demand is relatively low, opportunities exist for increasing its market share.

The 1998 WMAA study identified the wholesale nursery market as the largest existing target market for all organic products in this segment, with high demand for potting mixes. However the target market with the greatest future potential for RO products was identified as viticulture (WMAA 1998). Composts used as mulch for water retention and fertiliser capabilities have the greatest potential for penetration into this market.

The intensive agriculture market segment can be further categorised as follows:

- **Wholesale Nurseries**  
Potential exists for increasing the RO content share in potting mixes used by the wholesale nursery market. This segment is particularly concerned with the aesthetics, consistency, quality and price of the organic product. Potting mixes are a high value product, consequently quality demands hold considerable importance.
- **Production Nurseries**  
Production nurseries primarily grow tube stocks. The potential for demand of RO products is minimal in this industry segment, as some technical requirements may not be met or may be harder to achieve in the short term.
- **Fruit & Orchard Growing**  
There is considerable potential for utilising mulches and composts/conditioners in the fruit and orchard industry. These products result in improved moisture retention, improved nutrient management and increased yields. However competition is strong in this market segment, with the use of chemical fertilisers manufactured on the basis of needs for specific nutrients and trace elements.

■ **Market Gardening**

There is some additional potential for market gardeners to use RO products including compost/conditioners, specialised garden soils and potting mixes in undercover growing. Traditionally this market has used fertilisers and animal manures as its main soil management tools. Some major supermarket chains are now specifically purchasing products grown from non-animal manure sources to prevent potential for salmonella and other outbreaks. The demand for organic products containing RO should increase in this market segment with increased knowledge amongst growers and more competitive pricing.

■ **Cut Flower Growing**

The cut flower market segment provides some potential for products containing RO including mulches, composts/conditioners, garden soils and potting mixes. Cut flower growers are increasingly moving towards undercover growing. After an initial crop grown in existing soils, growers import specially prepared garden soils and potting mixes to replace diseased and poor quality soils. Elevated beds and containers are used to contain the imported media which is generally replaced at the end of the average two year crop life.

■ **Mushroom Growing**

Due to the highly specialised requirements for producing mushroom compost, there appears to be some demand for mushroom growers to use animal manures and spoilt lucerne.

■ **Turf Grass Growing**

The potential for using composts/conditioners in the production of turf grass is considered small. Composts/conditioners are being looked upon favourably as a means of providing nutrients organically, assisting the management of nutrient run-off and providing disease suppressive qualities. However poultry manure and chemical fertilisers currently dominate this market segment. The main opportunity is for the application of a low cost compost/conditioner prior to reseeding. There is also potential for co-composting with animal manures.

■ **Viticulture**

The market demand for RO products in the viticulture industry is yet to be fully realised. Traditionally animal manures and lime are used as the main management tools in primarily clay soils. The market identifies with high nutrient content, in particular nitrogen. Currently mulching is done by hand, often using lucerne mulch and green manure.

Improving water retention is a major factor in this target market. RO products including mulch, soil conditioner and compost can be utilised in this target market to improve water retention and enhance the soil structure.

■ **Animal Feedlots**

There is a large market for organic materials as stockfeed ingredients for both the monogastric and ruminant industries. Some organics are processed into value-added products, ingredients and supplements; others are used as whole feeds and supplementary feeds. The major determining factors are price, energy/ nutrient content, moisture content and absence of contaminants such as pesticides and heavy metals.

Processes suitable for processing stockfeed-grade organics include baling, ensiling, pelleting, cubing and bulk mixing. Organic materials with high fibre content (>10-15%) are generally unsuitable as monogastric feeds. By

comparison, organic materials with a high digestible fibre content provide a valuable source of fibre for ruminants, whereas stockfeed with a high acid detergent fibre is indigestible and has a low feed value for ruminants.

Many biowastes such as cereal stubble and vegetable processing by-products have been used in animal feed rations or as supplements. These feedstuffs must be free from pesticides, contaminants and pathogenic organisms. Most residues from the municipal waste stream such as green waste, reject paper and sawdust are unsuitable as animal feeds because of the high fibre content and potential for contamination with pesticides and heavy metals. Biosolids are unsuitable because of contaminants and pesticides.

### 2.3.3 Rehabilitation

The rehabilitation market segment covers the restoration and preventative maintenance of degraded or potentially degradable landforms. Rehabilitation activities include revegetation projects, landfill cover, erosion control, acid soil amelioration and mine reclamation. The rehabilitation segment is characterised by both voluntary works and works as part of regulatory controls such as development consents and legally imposed orders.

Existing demand profiles in this segment are very low. There are existing markets for compost/conditioner and mulch, and strong future potential (WMAA 1998). In all other RO product categories, future potential demand is identified including liquid fertilisers and garden soils.

Target markets within this market segment include:

- **Landfill Cover and Rehabilitation**  
Opportunities exist for utilising RO in the rehabilitation of landfills. The volumes required are considerable. Mulch, compost and soil conditioner could be used to assist in establishing vegetation at the end of landfill lifespan.
- **Erosion Stabilisation**  
With the widespread problem of soil erosion throughout Australia, there is great potential for the use of RO products for erosion control. Mulches have been identified as “matting” well on steep slopes where erosion is most prominent. RO products also aid in the early development and vigorous growth of direct seeded trees.
- **Land Reclamation, Restoration and Revegetation**  
Potential exists for the utilisation of RO in land reclamation works. This resource can offer a viable alternative in re-establishing landforms compared to the traditional method of transporting topsoil.

Additional benefits of using RO products include the capabilities of suppressing weeds and retaining moisture. Opportunities for the use of RO in reclamation works include re-establishing industrial and mining sites. The benefit of utilising lime stabilised RO in the treatment of acid soils has been demonstrated. Due to the geographical extent of acid soils, this also offers considerable opportunities for lime stabilised products.

### 2.3.4 Urban Amenity

The urban amenity segment is characterised by the activities and situations in which RO products are used, including the beautification of environments such as parks, gardens, playing fields and roadsides, and sport, leisure and recreation situations such as golf, bowling and racing clubs.

The urban amenity segment is currently the largest existing market for RO products. This share is estimated at 85% of the total market and there is additional potential to expand the market demand in this segment (WMAA 1998).

The largest existing target market for the application of RO products is the landscape segment, followed by Local Government and retail nurseries (WMAA 1998). Special projects that require landscaping are also included in this segment. However demand identification in this latter market is a case-by-case situation and consequently is separated from other target markets such as landscape because specific penetration strategies need to be applied.

Overall, demand potential in the urban amenity segment throughout Australia is considered high. This market in NSW expanded rapidly from 1996 to 1998 but is currently over 75% saturated (WMAA 1998). Market penetration in other States appears to be low and offers high future potential. The products having most demand are composts and conditioners; the demand for mulches, composts and garden soils is relatively stable all year round.

Target markets included in the urban amenity segment are:

- **Landscape Contractors**

Landscapers utilise RO composts and mulches due to their superior stability on slopes, greater water retention and nutrient value, and cost benefit. The main applications identified by landscapers for the use of RO products are roads, commercial and residential works and sporting fields. Soil wholesalers predominantly supply blended bulk finished product that can contain RO.

According to landscapers, factors that influence their decision in selecting a product are product performance, environmental factors, product consistency, guarantees, availability, reliability of supply, quality and competitive prices.

- **Local / State Government**

The main applications for RO products by Local Government are parks, gardens, sporting grounds, golf courses, landscaping and nature strips. Products that have the highest potential in this target market include mulches, composts/conditioners and garden soils. In the Local Government segment, bulk purchases of mulch and top dressing soil dominate the market for organic products. Marketing sensitivities in this segment include product performance, product diversity, knowledge of supplier, proximity to sales outlet, quality and lowest price.

State Governments in many cases do not directly purchase organic products. The landscape market is responsible for undertaking many landscape works on State Government initiated projects and these are often large projects. Therefore much of the demand for organic products used on State Government works is captured in the landscape market segment. The organic product demand purchased directly by State Government is relatively small. However when sub-contracting landscape works, State Government departments can influence demand for RO products by having RO-targeted purchasing policies.

■ **Retail Nurseries**

Potential in retail nurseries is primarily for packaged potting mixes that contain RO. Mulches, conditioners such as mushroom compost and organic fertilisers including cow manure, sheep manure and chicken litter are also sold. Packaged compost products are already well-entrenched in retail nurseries and therefore additional potential is not significant. There is only minor potential for packaged mulch and gardens soils.

Opportunities exist to increase the RO content of potting mixes without jeopardising the structural requirements. Potting mix is a high value product and thus increasing the RO content would considerably increase demand for RO. The major driver is the opportunity to reduce ingredient costs to remain competitive in the market place.

■ **Sport, Recreation & Leisure**

The potential for RO products in this target market is mainly for beautification and maintenance programs, however there is also potential for fine compost and lime-amended products to be incorporated into top dressing mixes. The availability of mined topsoil and fine sand is diminishing and in turn this impacts on soil quality, thus there are increasing opportunities for additional blending of RO. The main product category is top dressing soils that are used to maintain turf surfaces. There is potential to increase the RO content of top dressing soil mixes in this market.

There is also potential for using mulches, composts/conditioners, garden soils, top dressing soils and organic fertilisers for passive recreational and leisure areas.

■ **Special Projects**

Many of these activities overlap with landscaping and other horticultural markets. Although this market segment does not offer a consistently sustainable demand for RO, considerable volumes can be required when large projects proceed. In the past these projects have included Sydney Airport, Homebush Bay Olympic Site and the Melbourne Tullamarine Freeway.

### **2.3.5 Bioenergy**

Waste to energy is a concept that is becoming more widely accepted internationally and could offer significant potential for RO. Organic materials with a high calorific value can be used to produce renewable energy. These materials are described as biofuels.

Biofuels can be derived from waste materials such as timber and forestry waste, paper pulp, recycled vegetation, reject pallets, reject paper and cardboard, bagasse, cereal straw and stubble, cotton trash and feedlot and chicken manure. These materials can be readily separated at source to safeguard against contamination, and can be used as renewable energy sources. While some materials such as sawdust, bagasse and rice hulls are currently used as fuel sources in Australia, the energy potential of the majority of RO is not fully exploited.

The benefits of biofuels are that some technologies can accept contaminated organic material that is not marketable in RO products. In addition, revenue can

be derived from power generation and greenhouse gas emissions can be reduced. Technologies within this segment include:

- gasification;
- pyrolysis;
- ethanol;
- aerobic digestion;
- process heat; and
- bioreactive landfills.

Although bioenergy is a significant end use opportunity for low quality RO, this market will be slow to develop until the market for renewable energy matures.

### **2.3.6 Bioremediation**

Bioremediation is the biological process involving microorganisms breaking down organic contaminants into harmless products, consisting mainly of carbon dioxide and water. Contaminant degradation occurs when microorganisms use the contaminant as either a primary energy source or it is metabolised incidentally when other food sources such as organic materials are available to the microorganisms. Microorganisms such as *Pseudomonas* sp. are well known for their ability to degrade toxic chemicals including polycyclic aromatic hydrocarbons (PAHs) found in fuel, oils and tars. Many other toxic chemicals can be bioremediated, including thiocarbonates, herbicides, insecticides, organophosphorous compounds, amines and sulfates. Bioremediation is increasingly being used in soil and water contamination issues.

The use of RO as an energy source in the bioremediation of contaminants is in its infancy, however potential for its use is substantial. Bioremediation target markets identified are:

- contaminated soils and sites;
- stormwater and water purification; and
- biofiltration.

Freshly shredded RO has been identified as a suitable medium for hosting microorganisms which bioremediate contaminated sites and soils. Filter media is being produced containing RO to purify stormwater and wastewater through bioremediation. RO are also a suitable material for filtering odorous exhausts from pet food manufacturing and enclosed compost facilities.

### **2.3.7 Export**

Potential demand is identified in the export market for RO composts/conditioners. A number of manufacturers have explored the possibility of exporting RO products to overseas markets. Although at this stage the amount exported is low, there appears to be increasing interest for Australian RO products, particularly from Asia and the Middle East.

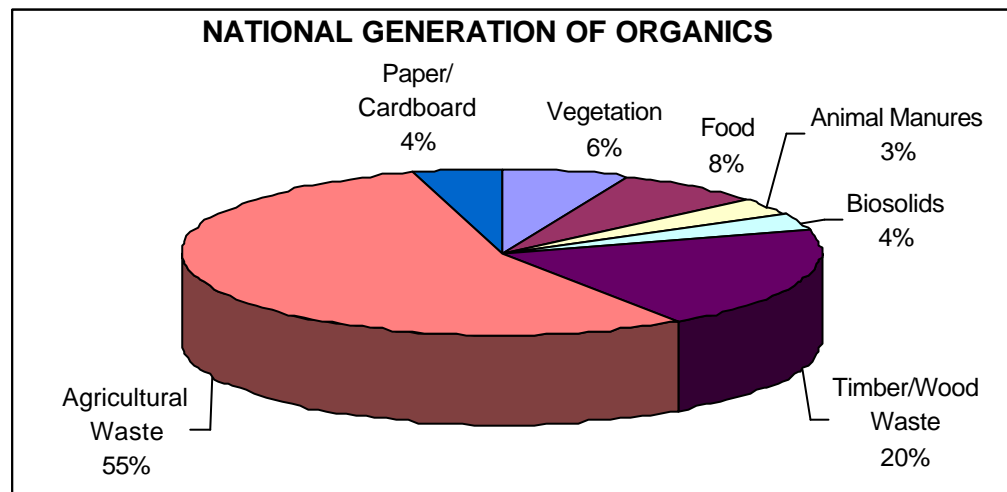
## 2.4 Organic Raw Materials

### 2.4.1 Generation of Organics

Analysis of data generated in the stakeholder consultation process identified the amount of waste feedstock available for processing in WA, NSW, Victoria and Queensland. In other States there is a lack of data to compile. The available data has been collated in Figure 2.2 to determine the national generation of organics.

It is apparent from Figure 2.2 that the largest fraction of feedstock is agricultural waste. This is very much influenced by the waste generation figure provided by Queensland stakeholders.

**Figure 2.2 National Organic Generation**



While this data may be inconclusive, it does identify that there are potentially large amounts of feedstock in the agricultural segment to convert into RO products to solve the many land and soil oriented problems in this segment.

Table 2.1 describes the extent of processing of various key feedstock materials as identified through stakeholder consultation. This indicates that the processing of agricultural wastes is increasing in all four states where data is available. There is little knowledge of market profiles of supply or demand in the rural areas in any States.

**Table 2.1 Feedstock Processing Profiles**

Materials	NSW	SA	WA	QLD
Agricultural waste	↑	↑	↑	↑
Animal manures	↔	↑	↑	↑
Ash	↔	?	↔	↑
Biosolids (wet)	↑	↑	↔	↑
Coal fines	↔	?	?	↑
Drain/culvert clearing	?	?	?	?
Food waste	↑	↑	↔	↑
Foundry sands	?	↑	?	?
Grease trap sludge	↑	↑	↑	↑
Hydroponics residues	↑	?	?	?
Limestone dust	?	?	?	↔
Paper pulp (wet)	↑	?	↑	↑
Red mud	?	?	↑	?
Soil & rubble	↑	?	↔	↑
Street sweepings	↓	?	?	?
Textiles	↑	?	↔	↔
Timber/wood waste	↑	↑	↔	↑
Uncomposted vermicast	↑	↑	↑	↑
Vegetation (excluding wood & timber)	↑	↑	↑	↑
Waste paper	↑	?	?	↑
Wool scouring	↑	↔	↔	↔
Wool scouring sludges	?	?	↔	↔

LEGEND:      ↔ = STABLE      ↑ = INCREASING  
                  ↓ = DECLINING      ? = UNKNOWN

#### 2.4.2 Source of Organics

RO raw materials are derived from the municipal, agricultural and industrial sectors. There are large volumes of organic waste produced in the agricultural sector including cereal straws, cottonseed, cotton trash, bagasse, molasses, forestry products, chicken litter, feedlot manure and mushroom compost. Similarly there are large volumes of organic waste produced in the industrial sector, including food processing wastes such as brewery waste, food rejects and sludges, fruit pulp and grape marc, and abattoir wastes such as animal carcasses and paunch material. Much of the organic material that has a high nutritional value as a stockfeed is currently utilised by the commercial sector in Australia. The disposal of these waste materials is the responsibility of the individual companies and producer organisations.

Incentives for reprocessing of these organic wastes are environmental regulations and the high cost of waste disposal. Market opportunities are usually identified by the commercial organisations, and it is considered there is little role for a national coordinated approach for disposal of these materials. Many of these materials are commercially processed and marketed and there is very little that Environment Australia can offer to assist this sector apart from supporting development of national processing and quality standards.

The major supply issue relates to the processing and disposal of organic waste recovered from the municipal solid waste sector. This has arisen because the ownership and responsibility for disposal of these organic waste materials is ultimately transferred to Local Government. The disposal of organic waste from the municipal sector poses the greatest need in Australia, and this report places emphasis on that portion of the total organic waste stream.

The reasons why this waste stream is difficult to process and market include:

- no uniform processing or marketing strategies among the more than 700 Local Government authorities in Australia;
- highly variable quality of incoming material;
- regional differences in market segment requirements;
- different political policies in the regional centres; and
- technological and regulatory barriers to processing domestic food waste.

For these reasons, this study focuses on the organic waste component of the municipal solid waste stream. It does not consider the RO wastes from the commercial sector except where those wastes pose major competition in market segments identified for the RO products.

Primary processing, consisting of material type separation and shredding, occurs either at drop-off points including landfills and transfer stations or during mobile shredding campaigns. The shredded materials are then placed in stockpiles for procurement by bulk soil wholesalers and manufacturers. Some operators permit the general public to purchase (or give away free) some materials, but these quantities are relatively small.

Primary processed RO raw materials are often separated and stockpiled by material type to enable more specific blending options for composted products, or in the case of mulches, production of different product types. These RO raw material categories include mixed vegetation, waste timber and municipal kerbside collected materials.

RO manufacturers make their own proprietary products from these raw materials and also supply processed RO products to bulk soil suppliers for blending and sale. This market supply chain is detailed in Figure 2.1.

Figure 2.3 describes the flow of putrescible (or biodegradable) organic waste from the categorisation of feedstock materials, through processing to target markets. The process begins by sorting the putrescible materials into those that are suitable for stockfeed from those that are not.

Those materials that are suitable are processed into stockfeed. The remainder is processed by various technologies including land injection application, digestion, composting and lime stabilisation. The subsequent products are utilised in market segments including agriculture, urban amenity, bioenergy and rehabilitation.

**Figure 2.3 Flow Of Putrescible Organics**

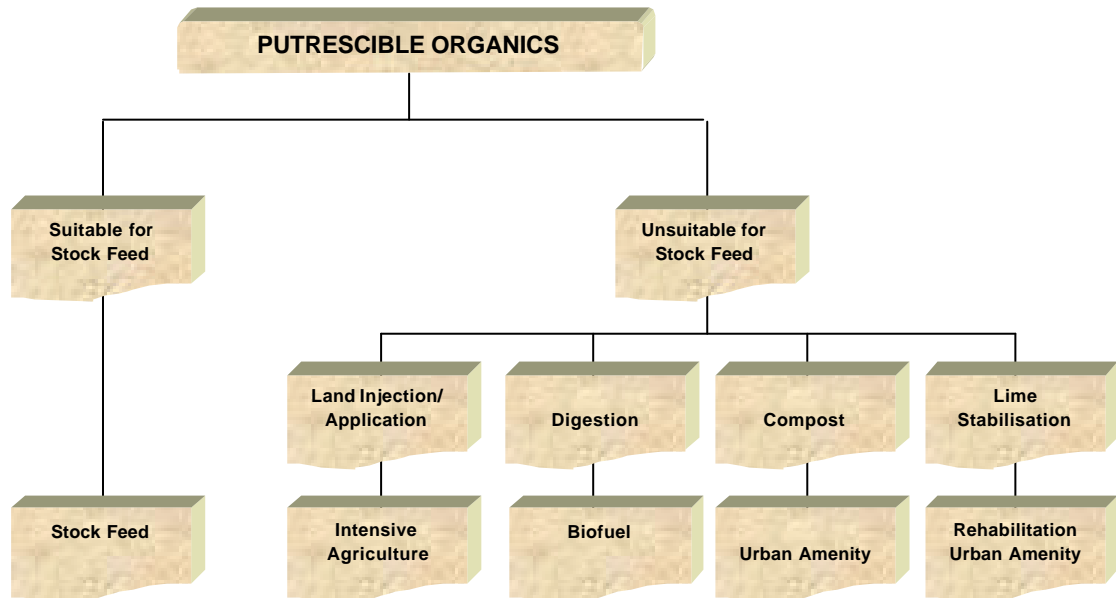


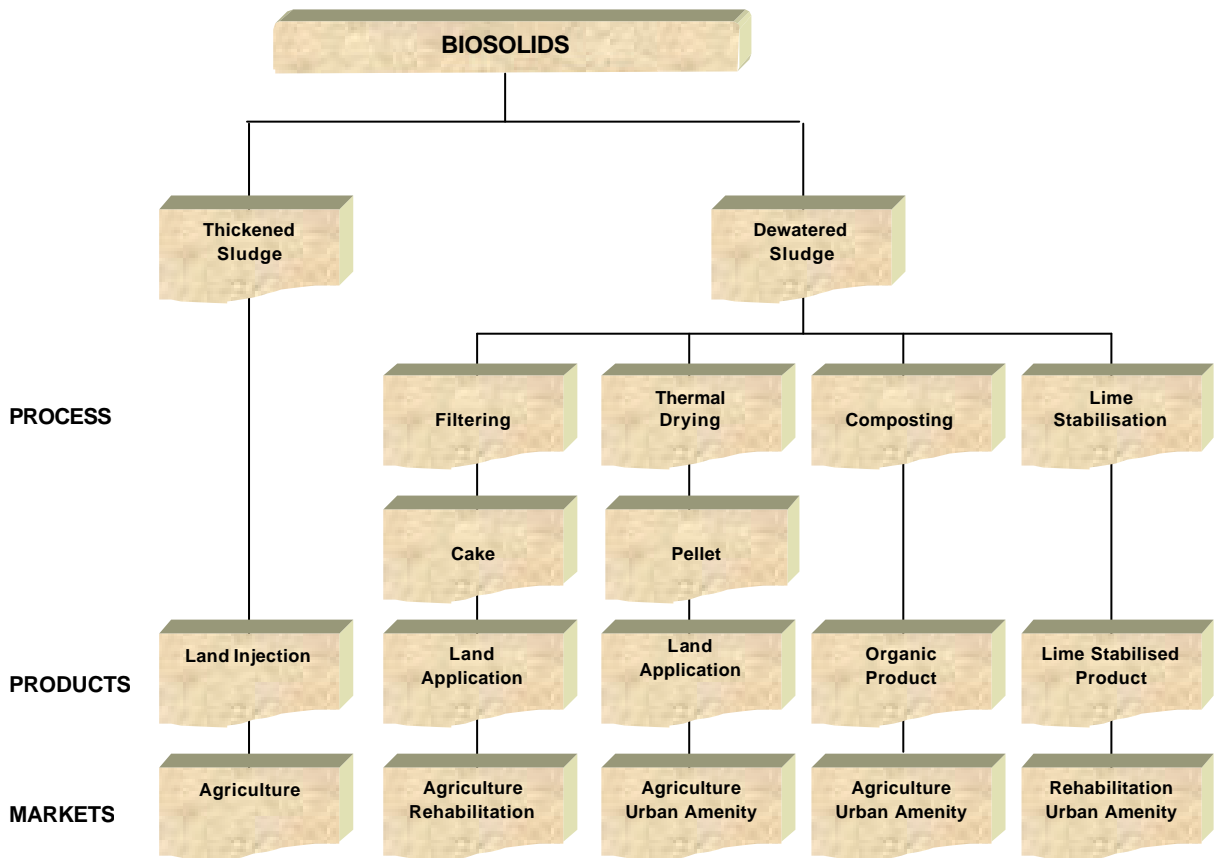
Figure 2.4 describes the flow of biosolids from the production of sludge, through various processing options to end use markets.

Thickened sludge is utilised in direct land injection, typically into agricultural applications. Dewatered sludge is processed by filtering, thermal drying, composting or lime stabilisation. Filtered sludge is converted into cake and, like thickened sludge, is also utilised in direct land injection.

Pellets are produced from the thermal drying process and can be used in either land injection or bagged for agricultural and amenity applications. Composting of dewatered sludge produces an organic product. Biosolids are often co-composted or blended with other RO.

Biosolids can also be lime-stabilised, producing products that can be used in various markets including the rehabilitation and urban amenity market segments. Lime-stabilised products can play an important role in the amelioration of degraded soils. Stakeholder consultation identified substantial future potential for this type of product in solving agricultural land and soil degradation problems.

Figure 2.4 Flow Of Biosolids



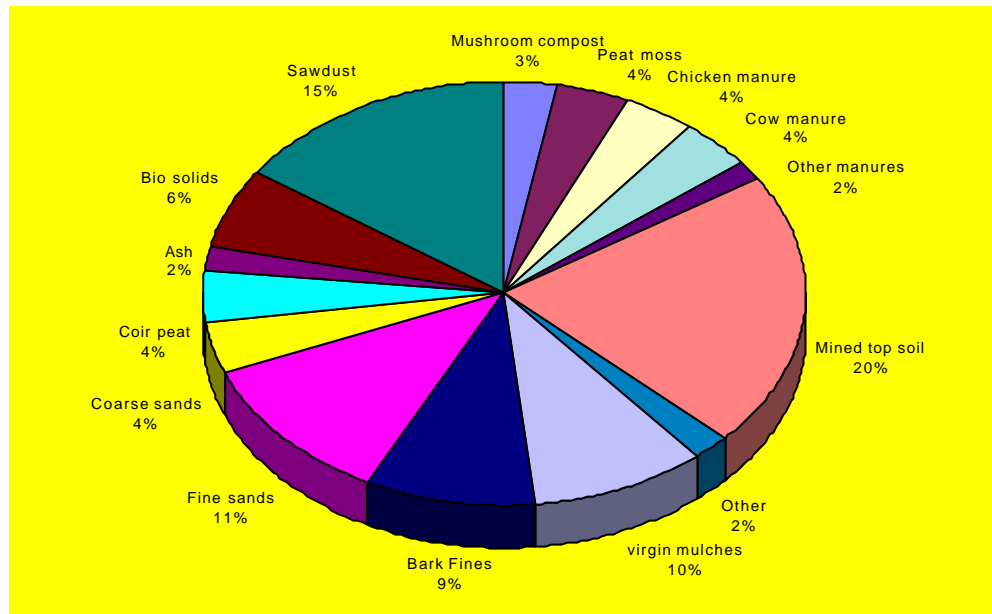
### 2.4.3 Competitor Materials

The opportunity for growth of the RO market is influenced by the availability, supply and price of competitor products. Therefore the competitor materials to RO need to be investigated to determine the likely effects on RO market development.

The non-RO raw materials used in the manufacture of organic products include inorganic materials such as coarse and fill sand, mined top soil and ash, and other organic materials such as sawdust, animal manure, virgin mulches and bark fines.

Figure 2.5 details the proportions of non-RO raw materials identified by the WMAA in NSW (WMAA 1998). Although these vary from State to State, it provides an indicative trend of the extent of potential for substitution and replacement by RO.

**Figure 2.5 Non-Recycled Organic Raw Materials**



Source: WMAA 1998

Inorganic raw materials from primary sources are an obvious area for replacement potential. In some cases these primary materials are mined from environmentally sensitive areas, have finite availability and are subsequently becoming more expensive.

Non-RO organic materials have been identified and assessed with a view to exploring opportunities to combine with RO to make value-added products. It is recognised that some of these products are not only used in the blending of finished products but are also used and sold as individual products in their own right. Trends, potential and other factors to be considered in substitution or combining with RO are discussed below.

#### ■ **Mined Topsoil / Fill Sands**

There are some manufacturers and bulk soil suppliers that have reduced their demand for mined topsoil and are using RO. Others are considering changing but there are those who are not considering changing despite the fact that they consider the price will increase and availability decrease in the future. This is a finite, environmentally sensitive resource that can be influenced by Government policy and regulations.

Fill sands include fine and coarse sands used in product manufacture. Most manufacturers and bulk soil suppliers are not considering changing from fill sands. Most consider the price will increase and availability will either be less or stable.

The alternatives, attributes, barriers and potential to combine is similar for both mined topsoil and fill sands. The alternative to mined topsoil and fill sands is a fine RO compost. Although it is somewhat application-specific, it is most successful on playing fields, which are one of the primary applications for these materials. The RO alternative is lighter and can save on transport and spreading costs. It is a renewable resource, makes a greater nutrient contribution, can be a pH adjuster and has a soil conditioning effect. Unlike

some topsoil, RO does not set hard. It can be cost-equivalent because it spreads further than mined topsoil and less volume is required. However, some applications for total RO replacement are not successful, particularly if used to fill holes or undulations that require the surface to remain flat indefinitely. RO will eventually break down causing depressions, and the colour may stain clothing when used on playing fields.

There is good potential to combine with RO when both are used in mixes, e.g. garden soils and top dressing. It is most economical to combine at soil mining sites. If blending has to occur away from the mining site, transport will add additional cost. RO compost and uncontaminated soil and rubble from recycled construction and demolition materials could replace both mined topsoil and fill sands.

The major barriers are traditional purchasing habits, the lack of knowledge and an understanding of the advantages and ability to increase the content of RO.

- **Sawdust**

The majority of manufacturers have changed from sawdust to RO due to the lower generation of sawdust resulting from fewer sawmills operating. As a result there will be less available and the price will either remain stable or decrease. Sawdust is commonly used in potting mixes and other soils.

The RO alternative is compost and/or fine timber mulch between 3 mm and 8 mm in diameter. RO compost provides some nutrient contribution and better nitrogen:carbon ratio, therefore fewer chemicals are required for composting. In some cases RO could be a cheaper raw material and has the advantage of possible disease suppressant capabilities. Fine timber mulch could be a cheaper raw material and has a slower breakdown rate that will maintain good soil structure.

The disadvantage of using RO compost is the potential for physical contamination. It may need more processing than sawdust and therefore have a higher cost. It may also break down faster than sawdust causing structure problems in potting mixes.

Both compost and mulch have high potential to combine with sawdust in appropriate circumstances as the main manufacturers currently use both products. The main barriers are perceptions about contamination, instability and additional perceptions about weed emergence and diseases in RO compost.

- **Animal manure**

Some suppliers have changed from animal manure to RO compost, however many are not considering changing at this time. Most expect price and availability to remain stable.

The alternative is fine compost with particle size of less than 5 mm and with the addition of nutrients from biosolids, putrescible organics or vermicompost. The advantages are that RO lasts longer in the soil, has no odour problems, provides a better balance of nutrients, is a denser product and contains a greater range of nutrients per m<sup>3</sup>. RO compost does not suffer from weed emergence like cow manure and is easier to handle when wet.

However, RO compost has a lower nutrient value and is denser so may have a higher transport cost to some locations. RO compost is also currently higher in

price. Traditional purchasing habits, user communication barriers and regulatory factors are also considered potential barriers.

There is high potential to combine with RO but it may be better to rotate RO with animal manure, as used together it is an excellent potential combination for better soil management.

- **Virgin mulches**

Most suppliers surveyed are not considering a change to RO mulches. A small number have changed to RO or are considering increasing RO content. Suppliers consider the price trends uncertain. Most consider that availability will increase, with some suppliers predicting stable availability.

Selection of alternatives depends on whether composted or uncomposted mulch is required. The alternatives are compost with a diameter less than 25 mm, 5-10 mm composted mulch and various grades of timber mulch for applications which do not require composting.

The dark colour of RO can act as good contrast for foliage and flowers, provides less compaction or settling and has less nitrogen drawdown potential. Microbial populations may also be established faster using RO mulch. However RO mulch is heavier and could add to transport cost; some virgin mulches are cheaper. In some market segments virgin mulches have a higher colour appeal, although work is being carried out on colouring RO mulches to increase aesthetic appeal.

The main barriers to increasing use of RO mulches are traditional purchasing and tendering habits and perceptions about contamination. The main potential to combine virgin and RO mulches could come from layering, with a bottom layer of RO mulch and a top layer of virgin mulch.

- **Peat moss**

There is a reluctance by manufacturers to change from peat moss usage. A small percentage is using wood fibre and/or RO compost. Suppliers indicate that peat moss prices will increase and most think that availability will diminish. Traditional peat moss usage has been largely replaced by an increase in the use of imported coir peat.

The alternative to peat moss is RO compost of less than 10 mm diameter. Peat moss is a finite resource in Australia while RO is a cheaper renewable resource. RO compost also has disease suppressant qualities and makes a nutrient contribution. In most cases RO compost is closer to users than peat.

The disadvantages are that RO compost is a denser material and can therefore cost more to transport. It is harder to re-wet so its water holding capacity may not be as good. RO can also be higher in electroconductivity, indicating a higher soluble salt content.

The main barriers are traditional purchasing and tendering practices and fear of contaminants (e.g. glass and plastic) often found in municipal RO collections (EcoRecycle Victoria 1998b). There is medium potential to combine peat with RO in potting mixes; up to 50% may be possible in some applications.

- **Mushroom compost**

Many suppliers are not considering changing from mushroom compost as a raw material. Others have either changed to shredded vegetation, RO

compost or animal manure, or are considering changing. In capital city regions many mushroom growers are being forced to relocate further away from populated areas due to planning and zoning restrictions. Suppliers believe a higher price is expected for mushroom compost and that availability will be stable or will decrease.

The alternative to mushroom compost is RO compost of less than 20 mm diameter. The advantages are that RO compost is a denser product with more organic matter per m<sup>3</sup> and it has a more stable pH, electroconductivity and maturity. RO compost does not shrink in volume as much as mushroom compost, which suffers significant shrinkage when held in stock. Unlike mushroom compost, RO compost is available all year.

The disadvantages are that RO, being a denser material, may have higher transport costs. It is also harder to re-wet when dry and its water-holding capacity may not be as good. Mushroom compost is cheaper and the source may be closer to some markets. These, combined with traditional purchasing habits and fear of contaminants, are the major barriers.

There is a low potential to combine mushroom and RO compost because it is transported directly from the farm to customer. Transporting to compost sites and blending costs will result in a non-competitive price.

The potential for these raw materials to be replaced by RO alternatives is summarised in Table 2.2. A rating of low, medium and high has been used to indicate the potential for replacement based on overall replacement potential, price competitiveness and potential to combine with the primary raw materials identified.

**Table 2.2 Raw Material Replacement Potential for RO**

Raw Material	Replacement Potential	Price Competitiveness	Potential To Combine
<b>Inorganic Materials</b>			
Mined topsoil	Medium	Medium	High
Fine sand	Medium	Medium	High
Coarse sand	Low	High	Medium
Ash	Low	Low	Low
<b>Organic Materials</b>			
Sawdust	High	Medium	High
Virgin mulches	High	Low / High	Low
Animal manure	Medium	Low	High
Bark fines	High	High	High
Biosolids	Low	N/A	High
Coir peat	Medium	High	High
Peat moss	Medium	High	High
Mushroom compost	High	Low	Low

Source: WMAA 1998

Of these primary raw materials, only coarse sand, ash, biosolids and a small number of other raw materials such as perlite and vermiculite are regarded as having low replacement potential. This is primarily due to soil structure requirements. However in the case of biosolids and vermicast, combination and not replacement is preferential. All other primary raw materials have a medium or high replacement potential.

In assessing replacement potential, consideration is given to price competitiveness of RO product in comparison to primary raw materials. Materials such as ash, some virgin mulches, animal manure and mushroom compost can

be purchased for a lower price than RO alternatives and therefore have low competitiveness from a price perspective.

Materials such as mined topsoil, fine sand and sawdust can be purchased at similar prices to RO alternatives and therefore its price competitiveness is considered medium. This may change in the near future as topsoil and fine sand is becoming more expensive and availability diminishing. RO alternatives are very competitive against coarse sands, bark fines, coir peat, peat moss and some virgin mulches.

The majority of primary raw materials have a high potential to be combined with RO materials. These include mined topsoil, fine sand, sawdust, animal manures, bark fines, biosolids, coir peat and peat moss. Primary raw materials that have a low potential to combine include ash, virgin mulches and mushroom compost, primarily due to logistical reasons.

#### **2.4.4 Supplier Groups**

After raw materials have been procured most are blended together to produce finished organic products. Mulch products are sold as a stand-alone product and are also used for blending in certain applications.

There are many different mixes sold in the market which use a complexity of different materials to produce products which meet the needs of the various growing situations within each target market.

The three key bulk supplier groups in the market are manufacturers, bulk soil wholesalers and bulk soil retailers. The demarcation between these supplier groups is often difficult to distinguish as manufacturers are often wholesalers, wholesalers are often retailers and often blend their own products, and some retailers supply the trade. However it is important to have an understanding of these general distinctions to facilitate targeted marketing programs that are designed to increase RO content demand in all these groups.

## 3.0 Strategic Market Analysis

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### 3.1 Overview

The following analysis examines the Strengths, Weaknesses, Opportunities and Threats (SWOT) to identify those areas in the RO industry that require strategic development. In some cases issues and observations are deliberately repeated in various categories of the SWOT. For example, in this type of analysis problems can also present opportunities.

This analysis is based on a comprehensive review of the RO industry on a State-by-State basis (See Appendix D *Market Development Review*). This review was conducted by extensive consultation with stakeholders throughout Australia, from which a situation analysis was synthesized.

The SWOT analysis is divided into 5 sections:

- **Regulatory / Standards:** This area examines State regulations and policies, Best Practice guidelines, Australian Standards, adoption of standards and receptivity of end users to adopting standards.
- **Technical:** This section examines the areas of terminology, research and development, siting of facilities, infrastructure and processing equipment, input materials, product characteristics and manufacturing.
- **Markets:** Market analysis includes examination of RO feed stock raw material substitution, RO content factors, market data availability and authenticity, existing and potential markets, demand trends, market life cycle factors, market development, RO content products, common national issues, regional issues, purchasing policies and end user quality requirements.
- **Economics:** Analysis in this section examines raw material costs, differential disposal charges, transportation, incentives, economic implications of tighter environmental regulations, infrastructure and the economics of collection and processing RO.
- **Awareness / Education:** This section of the SWOT analyses consumer confidence, organisational needs, perceptions, knowledge and awareness levels. It also includes analysis of communication, classification systems, existing programs, education campaigns and barriers to expanding knowledge.

This analysis is used to identify and focus on issues from which strategies are developed to capitalise on strengths and opportunities, and remedy weaknesses and threats.

## 3.2 **Regulatory/Standards**

### 3.2.1 **Strengths**

Statutory and regulatory instruments are driving the utilisation of RO in order to achieve landfill disposal reduction objectives. The organic component of the waste stream provides the greatest opportunity for resource recovery and thus minimisation of the total waste stream. Reduction of the organic fraction is essential to achieve the national waste reduction target of 50% (ANZECC 1992). This has been recognised at all levels of government, and there is a strong level of commitment to address development of the RO industry.

Complementary guidelines in other areas such as meeting renewable energy targets and the Greenhouse Challenge can assist in increasing the utilisation of RO. Additionally, increased RO utilisation, as well as achieving waste minimisation objectives, provides management options for issues such as water conservation, soil fertility, erosion and environmental degradation.

Stakeholder consultation and the 1998 WMAA study indicates that a majority of RO manufacturers support the adoption of Australian Standards for product manufacture.

### 3.2.2 **Weaknesses**

There are no uniform national standards for organic waste processing apart from the voluntary Australian Standards, and no uniform biosolids guidelines. Some States have developed their own guidelines, whereas others have adopted interstate guidelines in the interim until national standards are developed. This has led to some requirements being adopted which are inappropriate on a regional basis. For example, some criteria specified for heavy metal contaminant levels may need to be reviewed according to regional geological conditions with consideration given to background levels in-situ. This regional flexibility needs to be established within national uniform regulations.

The lack of process certification and product standards provides minimal guidance to end-users as to which products are most appropriate for the intended application. In the Local Government sector these deficiencies make it difficult to select appropriate technologies and processes and develop compatible market strategies. This increases the potential for the spread of weed seeds and pathogens, with consequent damage to RO market potential.

Inconsistent policies filtering down to Local Government level often make it difficult to adopt necessary regional strategies. In some cases there are also inappropriate allocations of responsibility. In some States, water authorities fall within the control of Local Government and biosolids management is therefore a municipal responsibility. Management of organic waste and biosolids are often the responsibility of different departments within the same municipality. This does not facilitate an efficient organics management system at the local level, and may lead to conflicts with resource allocation.

### **3.2.3 Opportunities**

Initial steps have been undertaken in South Australia to incorporate planning and environmental authorities in the process of choosing an organic processing site (see Appendix D5.2). Opportunities exist to expand this approach across Australia to provide a more coordinated regulatory role.

If properly targeted, Government funding and grant programs accompanying waste minimisation objectives can create more market opportunities for RO. The coordination of this funding on a national basis can provide opportunities to carry out longer term and more effective market development programs.

Bringing regulations on animal manures into line with regulations on RO will provide a more level competitive environment for RO and can facilitate co-composting opportunities.

There is an opportunity for the introduction of regulatory models for rehabilitation works similar to mine rehabilitation legislative requirements. Because of environmental sensitivities, these requirements are mandatory for mine rehabilitation works irrespective of the financial implications.

Greater adoption by end users of Australian Standards for RO products will increase the integrity of the whole processing and manufacturing industry. Accreditation of RO processors and/or technologies to a developed standard will also provide quality assurance to the market.

### **3.2.4 Threats**

Uncoordinated and inappropriate regulations together with inadequate industry standards are jeopardising potential future markets. Existing guidelines can be restrictive and unrealistic for the approval of RO processing sites. Regulatory procedures for establishing a composting facility differ considerably amongst the States.

Approval processes for establishing organic processing sites differ both by location and by complexity; for example the process is far more comprehensive in Victoria and New South Wales compared to other States and Territories (see Appendix D). The dichotomy is that unsatisfactory facilities can also operate under many of the regulations currently in place.

This is often further compounded by the differing requirements of all of the statutory authorities involved in the approval and licensing of organic processing facilities. Local planning provisions may not necessarily be compatible with the environmental guidelines established by State licensing bodies. Furthermore, different departments within the same authority may be both advocating and denying approval for the establishment of a particular processing site. Many instances have been cited by stakeholders of a process which often pits municipal planning departments against their own waste management departments, Local Governments against regional waste management authorities, and regional environment authority operatives against capital city policy officers.

In many cases mulchers/chippers contracted by Local Government are not licensed, thus the potential for the spread of weed seeds and pathogens increases. This puts consumer confidence, and subsequently the future of RO

content products, at great risk. Delinquent operators that do not implement a quality assurance system create the potential for jeopardising the entire market.

It is imperative that supply and demand be synchronised to maintain stable market economics. This factor must be duly considered in the implementation of any statutory bans on RO waste from landfill disposal.

### **3.3 Technical**

#### **3.3.1 Strengths**

Processing organic waste is not seen as a highly technical nor complicated process. The technologies required for RO processing are known, and there is very little technical development required. The issue is more specifically an operational one, with operators needing expertise in feedstock formulae and process management. Australian expertise in this regard is well respected on an international basis.

Several research and development (R&D) and demonstration trials have been undertaken or are currently being undertaken. CSIRO and the State Departments of Agriculture are carrying out research into growing performances of crops using products containing or consisting entirely of RO (Buckerfield 1998).

In New South Wales and Victoria extensive analysis and R&D into organic waste recovery have been conducted (see Appendix D). Some State Governments are providing funding for RO development, often through levies on waste disposal, to develop RO initiatives. These R&D programs assist development of markets for RO and provide potential customers with scientific confirmation of product capabilities.

Best Practice procedures developed in NSW, South Australia and Victoria could improve industry practice and standardise organic processing operations. This will assist in gaining consumer confidence in the RO market.

#### **3.3.2 Weaknesses**

The use of terminology associated with RO has been identified by stakeholders as a potential barrier to market development. An emphasis on RO as a “resource” rather than a “waste” is considered an important factor in minimising negative market perceptions.

Terms used by the RO industry are also considered ambiguous, with different meanings to different people. The lack of standardised product descriptions is resulting in inconsistent and often unclear use of terminology. For example, the terms “mulch” and “compost” are often used interchangeably with little appreciation of the quality differences. While it may be difficult to achieve unanimous agreement for standardisation of terminology, it is essential to implement a classification system so that national collaboration is facilitated by a common language. This also applies to market descriptions.

The Best Practice procedures being developed by individual States are inconsistent in content and detail. A national approach to developing a single document with State variations would achieve the required consistency and avoid

the current duplication of this task. EcoRecycle Victoria has developed the most detailed manual (see Appendix D7.2); this may provide a blueprint for a national document.

There may be insufficient technically experienced personnel with processing skills to manage the significant volumes of RO diverted from landfill. There is also a widespread shortage of suitable sites for organic processing operations. Adequate expertise, support and infrastructure must be available to achieve significant diversion of RO from landfill.

The highly variable quality of incoming RO feedstock, including the presence of contamination, is a technical challenge to processing organics to Australian Standards. The technology required for elimination of contaminants prior to processing increases costs considerably.

Seasonal variations can result in inconsistent supply of volumes required. In some cases, the content of RO products is also considered to have inconsistent product properties. These variations create uncertainties in product availability and reliability.

Technical R&D currently being undertaken appears to be exclusively scientifically focused and lacks the inclusion of marketing expertise. Consequently it may not be as focused on market demand creation as necessary.

Results from R&D and demonstration programs are often not effectively or widely disseminated. Trials with exclusive commercial partners often lock up the intellectual property and consequently it is not made available for broad commercial outcomes. This can result in duplication of similar programs in each State.

There is a lack of scientific data on performance of high volume products with high RO content in many high potential target markets (e.g. 100% organic top dressing soils for the Local Government segment). Top dressing soils, garden soils and potting mixes have the lowest existing RO content, but have the highest demand potential. There is generally a lack of expertise in designing and manufacturing product mixes that utilise high RO content.

Increasing RO content needs the support of the manufacturing sector but only a small number use RO raw materials in their product mixes. For example, Australia's largest potting mix manufacturer does not use any RO even though it is technically feasible to do so (WMAA 1998).

Once RO products are produced, they need to be applied to growing situations in an economical manner. There is a lack of efficient spreading equipment for the large-scale application of RO products in agriculture. Inefficient spreading is a major cost in using the products and even where the products themselves are competitive, spreading costs can make them uncompetitive.

### **3.3.3 Opportunities**

This project initiated by Environment Australia provides the opportunity to establish the importance of manufacturing to Australian Standards to applicable end users and a national terminology classification system for products, raw materials and markets.

Inorganic primary raw materials have excellent potential for substitution by RO. In some cases these primary materials are mined from environmentally sensitive areas, have finite availability, and are subsequently becoming more expensive.

Non-RO materials can be replaced and/or combined with RO to make value-added products. For example, biosolids are an excellent example of a high nutrient material which augments the low nutrient content (particularly nitrogen) of recycled vegetation.

#### **3.3.4 Threats**

There is generally a lack of sufficient, readily available resources for appropriate R&D activities on a local and often even on a regional level.

There is a lack of methodology available to the Local Government sector for technology and process selection. As a result, each local authority has to develop its own decision matrix in order to evaluate suitable technologies and subsequent commercial tenders. This is a very expensive, confusing and frequently frustrating process for both Local Government officers and commercial operators. There is need for a uniform methodology for process evaluation which can be used by Local Government authorities.

Many identified market segments, primarily agricultural, have negative perceptions about issues relating to contamination and nutrient benefit levels of RO products.

The performance of the industry as a whole may often be judged on the poor performance of a single organic processor. Unqualified and inexperienced operators producing low quality and inconsistent products undermine industry credibility. The application of poorly manufactured RO products can result in the spread of weed seeds and disease-causing pathogens. This can undermine market confidence for a long period, and is costly to overcome.

There is a lack of incentives and motivation for product manufacturers to increase RO content in their products.

### **3.4 Markets**

#### **3.4.1 Strengths**

There is an abundance of RO feed stock material available for organic processing. There is high potential to substitute and combine with increasingly diminishing and more expensive non-RO raw materials. Substitution creates increased demand for RO products without needing to increase the overall market size.

Increases in RO content can result from R&D in areas such as organic top dressing soils, garden soils and potting mixes.

RO provides a successful solution to Australia's low quality soils and subsequently a large potential market for RO products.

### **3.4.2 Weaknesses**

There is a lack of rigorous analysis of supply and potential markets throughout Australia from which to develop effective demand creation and penetration strategies. Accurate data on organic waste generation throughout Australia is lacking, and quantitative analysis of potential RO markets is hindered by commercial confidentiality concerns. Information that is currently available is considered fragmented and the opportunity for misinterpretation is increased through recording of data using different parameters on a regional and sectoral basis.

There is insufficient adoption of 100% content RO products (e.g. mulches, top dressing soils and composts).

Differences in regional market requirements are likely, but largely unknown. Consequently the development of end-user markets in regional areas, particularly rural areas, needs to be examined.

While some regional market studies have been conducted, many are based on statistically invalid data, are not commercially based and focus only on compost markets. The lack of data collection systems in many regions contributes to a fragmented view of RO markets.

There is a lack of attention given to alternative end uses (i.e. other than urban amenity and agriculture) that could provide substantial markets for RO products.

### **3.4.3 Opportunities**

There is considerable evidence that in agricultural applications RO products can achieve unique positive results that add to the gross margin of the grower (Buckerfield 1998). There is also potential to exploit the organically grown food market with products grown in high quality standard products containing RO.

The large variety of feed stock materials means there are opportunities for specialised product development and supply of niche markets. Opportunities exist to develop products to suit long term, environmentally sustainable markets such as bioenergy, rehabilitation and bioremediation.

There are national issues common to all States where coordinated catalytic input could lead to processes to use existing products or develop new products suitable for meeting long term market demands. These include mitigating land degradation, controlling erosion, rehabilitating environmentally sensitive sites (e.g. mining, landfills) and improving water quality. There is also considerable potential for beneficial use of RO in amelioration of Australian agricultural soils.

Some major supermarket chains are now specifying supply of fresh products grown using fertilisers other than animal manures in order to prevent the potential spread of salmonella and other diseases. An opportunity exists to produce RO products as an acceptable alternative.

There may be export opportunities in a global marketplace for both the RO product and the intellectual property required to process organics satisfactorily.

#### **3.4.4 Threats**

The urban amenity market segment is not big enough to consume all RO waste generation. Full utilisation of RO is largely reliant on increases in the total product market demand and in primary raw material replacement.

Market life cycle analysis carried out in NSW indicates that at the current rate of market development, generated RO will not be fully utilised by the end user markets until the year 2016 (EPA NSW 1998). This indicates that market acceleration strategies are required, not simply market development.

Commercial tactics by RO producers generally revolve around market share capture, which does little to increase market size or develop new markets.

The generation of most municipal organic waste is continual on a year round basis, even though markets may be seasonal. This has implications in processing times and stockpiles. The highest demand period in spring follows the lowest generation period of winter; the low demand period of autumn follows the high generation period of summer.

There is a lack of formal purchasing policies favouring RO content products by Local and State Government authorities.

### **3.5 Economics**

#### **3.5.1 Strengths**

The escalating price of some raw materials used in organic product manufacture is increasing the viability of RO substitution options.

Where differential pricing for deposition of organic waste occurs at waste facilities, high quality materials are delivered by the commercial sector. This contributes to lower processing costs.

Some government authorities assist financially in the establishment of organic processing facilities. This contributes to a more viable RO industry which can invest in more efficient equipment and subsequently produce higher quality competitive products.

#### **3.5.2 Weaknesses**

Transport costs have been identified as a significant element in the overall price of processed RO products. Often the largest markets for the RO products are at some distance from the source of the organic waste.

Low disposal fees for organic waste deposition to landfill are not conducive to maximum RO recovery. There is community reluctance to pay organic processing fees which are not competitive with current underpriced landfill disposal charges.

Where collection and/or processing contracts are not of sufficient length to amortise the capital costs, the investment in more sophisticated organics collection and processing infrastructure is not viable.

Processing facilities are established primarily by the private sector and will only be established if the proposed operator determines that they are economically viable. The location of proposed facilities plays an important role in this determination. The distance from waste generators and end markets will significantly impact on facility costs, as will the infrastructure requirements of a particular site to conform to planning provisions.

The lack of consistency in the facility planning and establishment process has ensured that the approval of a site is a long and costly process. The uncertainty and cost of a time-consuming approval process has often proven to be a disincentive to RO processors in establishing a processing facility.

### **3.5.3 Opportunities**

Incentives to process RO to higher quality standards can be funded by increased levies for residual waste disposal.

Low cost organic processing options are well established in Australia. Processing sites established in regional centres are not likely to be disadvantaged due to requirements for capital-intensive equipment.

The increased cost of compliance with appropriately stringent environmental regulations (e.g. riverbed soil extraction, erosion control, water purification) can increase the viability of using RO products that provide solutions to these issues.

Increased cost of finite resource raw materials used in the manufacture of organic products increases the viability of substitution with RO raw materials.

### **3.5.4 Threats**

Generally the cost of waste disposal to landfill does not reflect the total cost of disposal. Low residual waste tipping fees discourage recycling and can result in downward pressure on fees that can be paid to processors. This discourages adequate levels of investment in processing technology.

Small communities may have difficulty meeting the financial cost of organic waste diversion and processing. Many often do not charge landfill fees and do not have the infrastructure to implement recovery programs. The capital cost required to establish a facility that manufactures products to the Australian Standards is high.

Continued pressure on costs can lead to cost-cutting measures which may impact on product quality. This may create inconsistencies in end-products, difficulties in marketing products and establishing brands. Industry standards may suffer as a result, impacting upon every processor in the RO industry.

RO products compete against other products, such as phosphate fertilisers, in the extensive agriculture market segment. Often these competitor products are much cheaper due to lower production costs, and RO products are not able to penetrate these market segments under the current price structure. The economic cost of recovering organic material from the waste stream therefore needs to significantly decrease in order to grow these alternative markets.

## 3.6 Awareness/Education

### 3.6.1 Strengths

There is recognition by most stakeholders that improved awareness and education is essential to effective market development.

The Australasian Market Development Network (AMDN) provides a forum for disseminating market information from which to develop R&D priorities and programs. This could link with representative marketing organisations to ensure effective target marketing of R&D activities.

### 3.6.2 Weaknesses

There is a lack of widespread awareness about the benefits of using RO products in a wide variety of applications and markets.

There is an attitude among elements of rural communities and the agricultural industry that they do not want to buy the city's waste. This is reflective of the waste terminology often used when describing RO products.

Lack of awareness and knowledge by a large range of stakeholders about RO materials, processes, products and associated benefits is a key barrier to market development. All sections of the RO industry suffer from the deficient exchange of information symptomatic of the immature state of the organics industry.

There is little knowledge of market demand sensitivities in potential target markets.

Secrecy within the industry due to commercial competitiveness is hindering the sharing of market information. This must be broadly available if wider commercial outcomes are to be achieved.

The results of research, development and trials are not readily available to all participants in the RO industry. This often leads to duplication of activities and use of resources in actions that do not necessarily best position the industry for market growth. Decisions may be made without reference to previous experience or detailed knowledge of the industry. Alternatively where such information is available, it may be outdated and not reflect current market conditions.

Communication systems within some States are better than others, with some statutory authorities acting as a clearing house of relevant information on organic waste management issues. While the AMDN has been established to assist coordination on a national basis, the network has yet to exhibit significant success in this area in the RO industry.

### **3.6.3 Opportunities**

Establishment of a centralised repository and coordinated approaches to establishing communication networks including R&D projects, results and trials will more effectively capture and disseminate the benefits of RO products to achieve broad commercial outcomes.

Many stakeholders within the RO industry acknowledge the lack of information currently available to them, and actively seek to participate in the dissemination of information to their industry.

The RO industry is a young industry, with constant development of improved processes and technologies. Stakeholders are therefore generally receptive to change and keen to develop the industry.

The move towards organic processing needs to be viewed as a means of creating a beneficial resource rather than a management option or 'sink' for diverting material away from landfill. This perception undermines the value of this resource and hence affects its acceptance in the market.

### **3.6.4 Threats**

Lack of end user confidence is viewed as a considerable barrier to market development. There are many negative public misconceptions about the use of RO (particularly biosolids) in organic products. Consumers require guarantees that the product supplied is consistent in quality and can be supplied in the volumes required, despite seasonal variability of raw material supply. There are very few consumer confidence strategies currently being pursued.

There is no standardised classification system for markets, products and product descriptions. There are often misconceptions about product types amongst end users, with consumers unfamiliar with differentiation between product types and quality (e.g. mulch vs. compost).

A majority of end users may not be aware of the implications and risks associated with using products that do not comply with Australian Standards.

There is a lack of awareness by the public about the real cost and negative environmental impacts associated with the landfill disposal of organic waste.

There is a lack of coordinated, widespread education campaigns to inform the community on organic waste contamination issues.

## 4.0 Development Strategies

### 4.1 *General*

From analysis of the RO market, it is evident that there are a number of strategic actions that can be taken to further develop and mature the RO market in Australia.

These strategies have been developed in line with the analysis included in Section 3, and have been differentiated into the following categories:

- regulations, policies and standards;
- technical;
- marketing;
- economics; and
- awareness / education.

### 4.2 *Regulations, Policies & Standards*

#### 4.2.1 National Best Practice Guidelines

There is a need for national guidelines and standards to be further developed for all RO, including biosolids, organic processing and RO finished products. Standards for RO products need to be applicable across Australia but flexible enough to account for differences in climate and geology/soil characteristics to reflect differences in background levels of some heavy metals in different areas of the country. Best Practice guidelines should also be developed for composting processing operations in addition to RO products. EcoRecycle Victoria has prepared Best Practice guidelines for Victoria (EcoRecycle Victoria 1998d) and is currently finalising licensing arrangements for adoption by other State agencies. Interstate stakeholders have acknowledged that this document provides an excellent model for national guidelines. Provision of national guidelines may be facilitated by the establishment of an appropriate organics National Environment Protection Measure (NEPM).

**Recommendation MDS1:**

Consideration be given to establishing national organic waste management guidelines through the establishment of an appropriate National Environment Protection Measure (NEPM).

**Recommendation MDS2:**

Consideration be given to facilitating one national Best Practice guideline document for biosolids, organics processing and RO products. This could be established around the Best Practice guidelines developed by EcoRecycle Victoria with the inclusion of appropriate regional variations.

#### 4.2.2 Purchasing Policies

To put waste minimisation objectives into practice, Governments at all levels should adopt purchasing policies that support the use of RO products. In-house activities may include separation of organic waste at source and implementing actions to preferentially utilise recycled products.

There is considerable opportunity at Commonwealth, State and Local Government level to establish procurement policies which favour the utilisation of RO products. This is likely to increase RO use in the urban amenity market segment, use by local/statutory authorities and in special projects. A strategy for implementing procurement policies on a national level may be established in conjunction with ANZECC and the Australian Local Government Association.

This national policy should encourage the production of quality RO products by stipulating use of products manufactured in accordance with Best Practice and adhering to Australian Standards. It may also require suppliers to be accredited to an Australian organics industry certification.

**Recommendation MDS3:**

Consideration be given to establishment of a procurement policy favouring the use of RO products for all relevant Commonwealth Government departments.

**Recommendation MDS4:**

Options be examined for encouragement of RO-specific procurement policies at State and Local Government level.

#### 4.2.3 Environment & Planning Policies

Appropriate regulations and policies are fundamental to environmental protection. However current regulations often discriminate against organics processing facilities compared to other waste facilities (see Appendix D7.4). The extreme difficulty experienced by the private sector in locating appropriate sites does not assist waste reduction objectives.

Site requirements for an organic processing facility are currently based on the output. This enables operators processing relatively small volumes of organic material to operate at lower standards. Thus policies such as these could jeopardise the market for organics, affecting processors operating at large scale.

Environmental and planning policies should be devised to encourage the development of processing facilities and reuse of the product. These policies should be developed with consideration of factors such as waste diversion goals, product contaminant issues and buffer distance requirements, and provide consistency to all organic processing facilities regardless of throughput or type of organic waste processed.

State Governments should be encouraged to review all regulations and policies that inhibit the development of professional processing facilities and subsequent manufacture of high quality products. This could be facilitated by a national summit to find solutions to developing consistent regulations, policies and guidelines that balance the need for facilities while giving due consideration to environmental factors. Any review should encourage relevant Government

authorities to take on the role of identifying potential sites and/or lease these sites to operators.

**Recommendation MDS5:**

Consideration be given to encouraging State Governments through the auspices of ANZECC to review environmental and planning regulations with a view to coordinating processing site requirements.

**4.2.4 Product Standards**

Currently Australian Standards applicable to RO products are voluntary and are mainly adopted by only larger processors and manufacturers. Many end-users therefore lack confidence in RO products, as they cannot be sure that the RO products do not expose them to any risks (e.g. spread of pathogens, weed seeds).

A campaign should be developed targeting organic product purchasers and promoting greater adoption of standards covering RO products. Government procurement policies should also specify the purchase of organic products that meet the relevant Australian Standard. Product certification schemes endorsing relevant standards should be supported.

There is a need for standardised product descriptions so that quantity estimators and end-users can specify the products to be used. The Commonwealth Government can lead the way with establishment of terminology classifications and definitions for use in Government contracts.

Support should be given to the Standards Committee *CS/037-0010-552 Garden Soils and Potting Mixes* to assist in the development of a database of manufacturers' test results on composts for human and plant pathogens. This will enable the collection of data on methods and results and may correlate findings that will enable simpler tests to be included in future standards.

A specific campaign will be required for animal manure processors and marketers to maximise the adoption of standards and to ensure compliance with national health standards for pathogen control. Product standards may be required for stockfeed products derived from RO and systems processing liquid food by products such as soil injection technologies.

**Recommendation MDS6:**

Consideration be given to supporting the development of a product accreditation scheme in conjunction with the RO industry. The scheme would require national promotion to organic processors and end-user markets.

**Recommendation MDS7:**

The product accreditation scheme include a requirement for minimum RO content, manufacture to Australian Standards and compliance with all required permits and licences.

#### 4.2.5 National Recycled Organics Directorate

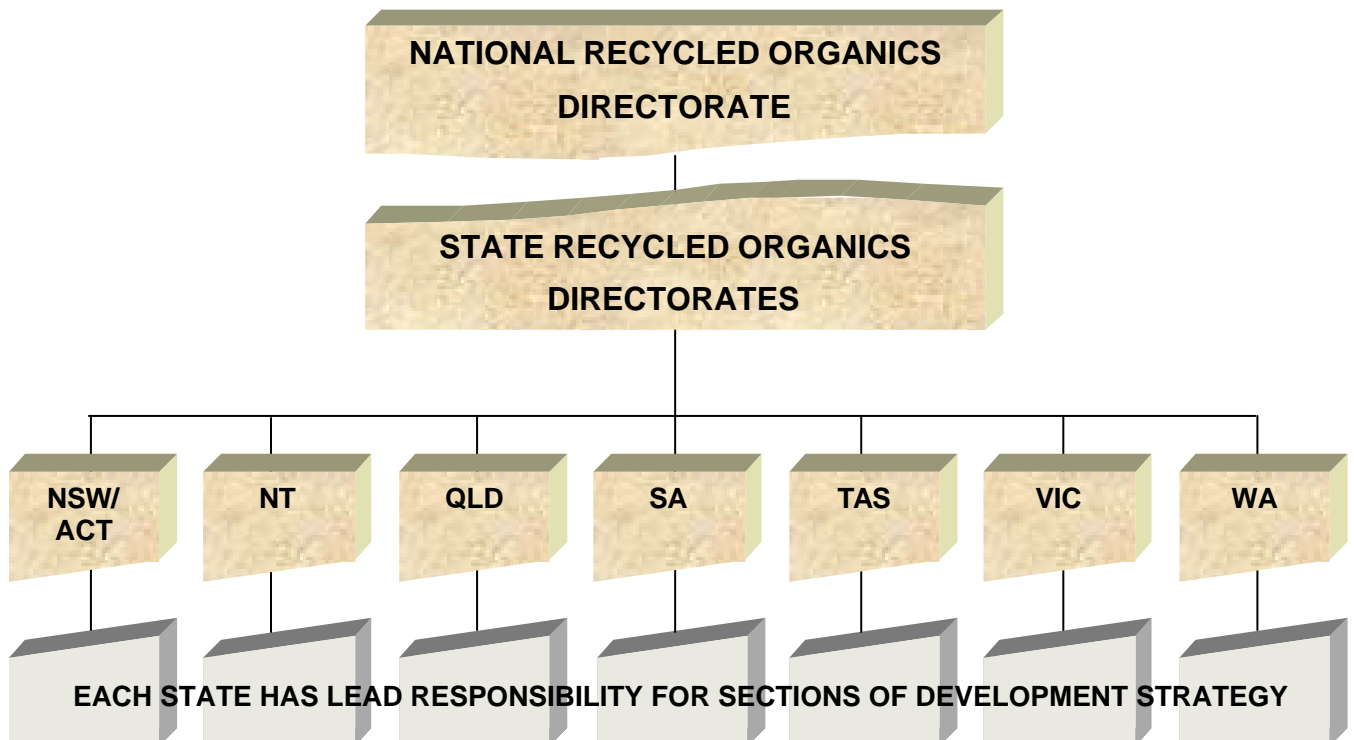
There are a number of issues that affect the RO industry as a whole (e.g. establishment of industry standards, market growth) and are best facilitated by a national industry body. At present industry coordination is fragmented, with State bodies representing local interests only.

A national RO directorate would greatly assist the growth of the industry. The organisation could facilitate development through:

- liaison with regulators;
- RO industry representation on national issues;
- encouragement of use of product standards;
- assistance in development of processor accreditation scheme;
- coordination of R&D programs;
- facilitating industry communication;
- development of new RO markets; and
- end-user education campaigns.

This report proposes a model for the development of a National Recycled Organics Directorate (NROD) which is represented in Figure 4.1.

**Figure 4.1 National Recycled Organics Directorate Structure**



Under the model outlined in Figure 4.1, NROD would be an umbrella organisation for State Recycled Organics Directorates (SRODs), with membership drawing on organisations with an interest in the RO industry.

One of the key themes of this report is that actions carried out at State level for development of the RO industry lack coordination on a national basis. The goal

of NROD should not be to duplicate action being taken at State level, rather to act as a coordinating body for strategic planning, industry development and facilitation of communication between the States.

Each State and Territory has instigated waste minimisation programs of varying degrees of success, including establishment of organisations with responsibility in this area. These organisations are outlined in Appendix D, and include bodies such as the DEP (WA), EcoRecycle Victoria (Victoria) and EPA (NSW, Qld, SA and Victoria). These bodies have State Government funding allocations to allow them to address waste reduction issues, including RO.

SRODs should draw on these existing organisations and funding, but provide a more focused approach to RO among the various State organisations. SROD membership should be based on the statutory authorities mentioned above, with additional representation from R&D organisations such as State Departments of Agriculture, CSIRO Land and Water (SA), TIAR (Tasmania) and IHD (Victoria). Other members may include:

- waste management authorities (e.g. NSW Waste Boards, Regional Waste Management Groups);
- water authorities (e.g. NT Power and Water Authority, WA Water Association);
- research organisations (e.g. Murdoch University Centre for Organic Waste Management); and
- Local Government representatives (e.g. Municipal Association of Victoria, interested councils).

All of these organisations have a legislated responsibility or interest in the RO industry, which includes in-house financing of resources and/or personnel.

Additional membership within each SROD may consist of other appropriate private sector organisations, e.g. COMMPOST (NSW, QLD, SA) and Compost Victoria (Victoria) or individual processors. A membership fee may or may not apply to these members, depending on resource requirements of the SRODs.

Another level of membership may also be appropriate in order to develop interest in the RO industry by potential user market segments. For example, expansion into the extensive agriculture market segment should be facilitated by encouraging input from organisations such as the NSW Farmers Association and Victorian Farmers Federation. This should not be done on an *ad hoc* basis of advice on selected issues; instead membership of the SROD should be encouraged to ensure the markets are more closely linked with development of the RO industry. This level of membership may be discouraged through requirement of a membership fee; accordingly membership should be free of charge.

Each SROD would provide representation on NROD. Additional representation may also come from national bodies such as ALGA and the National Environment Protection Council. It is envisaged that Environment Australia would have a vital role to play as Chairman/Facilitator of NROD.

NROD would coordinate RO industry development on a national basis. The Directorate would liaise with SRODs to develop individual State responsibilities in specific issues of the RO industry development strategy. For example, one SROD may take on lead responsibility for investigation/implementation of an information strategy, another SROD may have responsibility for product

standards, and so on. The lead SROD may in turn allocate responsibility for selected areas of the issue to other SRODs.

It is expected that allocation of these responsibilities would be in line with areas of particular interest to individual States. This may include issues currently or previously under investigation by State bodies, or integrated with initiatives which are part of other waste minimisation programs funded by the States.

This model maximises utilisation of existing resources at State level and will prevent duplication. Additional funding may also be sourced from the private sector, particularly for R&D in targeted areas. However it is envisaged that Environment Australia would need to provide additional resources, such as initial seed funding and/or personnel, to establish the organisational framework and administrative resources for the National Directorate.

As an initial step, Environment Australia would need to canvass State organisations to gain agreement to the concept. The framework may need further fine tuning to meet any issues raised by RO industry stakeholders. This will require a process of consultation, possibly involving a series of State and Territory seminars which may also need to be funded by Environment Australia.

There is a possibility that some existing framework can be utilised in development of the NROD and SROD model. For example, an interface group has been initiated in NSW and may provide a nucleus for the NSW SROD. The Australasian Market Development Network (AMDN) has recently been established to coordinate development of markets for a range of recycled materials, including RO. The AMDN may provide a forum for establishing the proposed NROD. Environment Australia forms part of the membership of the AMDN; it is recommended that Environment Australia explore this possibility with the AMDN.

**Recommendation MDS8:**

Environment Australia facilitate the development of a National Recycled Organics Directorate and individual State Recycled Organics Directorates by promoting a forum for linkages between existing State organics organisations.

**Recommendation MDS9:**

Environment Australia explore with the Australasian Market Development Network (AMDN) the possibility of the AMDN providing a forum for establishment of the proposed NROD.

**Recommendation MDS10:**

Consideration be given to funding support to assist in the formation of a National Recycled Organics Directorate.

## 4.3 *Technical*

### 4.3.1 **Standardisation of Terminology**

Inconsistencies in terminology create much confusion within the RO industry. There are inconsistencies across different States, as well as individual understanding of the terms used. There is a need for an all encompassing term as well as specific definitions for waste stream materials. This can be achieved through consolidation of definitions used in Australian Standards, proposed

Government procurement policies, State-based environmental organisations and Best Practice guidelines.

The use of terminology associated with waste is also a barrier to market development. An emphasis on RO use as a resource rather than a waste output will assist in eliminating negative market perceptions.

**Recommendation MDS11:**

Options be examined for supporting the establishment of a national classification system for RO products.

**Recommendation MDS12:**

Encourage the use of standardised terminology across all States through the auspices of the proposed NROD (see Section 4.2.5).

#### 4.3.2 Data Collection

It was evident during the preparation of this report that insufficient data is currently available to determine whether RO processing is viable on a regional basis. Quantification of RO raw materials and potential markets was not possible as in many cases there is no data being collected at all. In many States there is a requirement for statutory reporting by Local Government of waste volumes being deposited at landfill. This requirement could be expanded on a national basis to require reporting of organic waste volumes passing through waste management facilities.

Inconsistencies in the way RO industry data is collected are also evident. For example, data on organic waste generation may be recorded in different units (e.g. loose/compacted, volume/weight) and may not necessarily include all types of organic wastes. There needs to be consistency to allow for collation of data across all States/regions and to enable meaningful comparisons to be made when monitoring the growth of the organics industry.

**Recommendation MDS13:**

Options be explored with statutory organisations for Local Government reporting of organic waste volumes. The data recorded should be measured in a consistent format.

#### 4.3.3 Research & Development

Current RO research and development is often fragmented, short term and lacking in broad commercial applications. Many processors and manufacturers are actively involved in R&D programs for their own commercial benefit and applications are not broadly available. On a national basis, there has been duplication of research, development and trials; this lack of coordination has not been conducive to maximising effective use of the limited resources available to the RO industry.

A national R&D forum should be developed with responsibility for:

- developing guidelines for R&D projects;

- providing a focal point for identifying and assessing all R&D;
- coordinating both production and application research;
- development of suitable technology and equipment;
- monitoring and coordinating national R&D;
- compiling data on R&D trials and demonstrations; and
- providing R&D information for inclusion on Information Reference Site.

It is proposed that responsibility for this role be taken by NROD (see Section 4.2.5). Given the proposed organisation's close links with all stakeholders in the industry, it is likely to more effectively link R&D with both technical and commercial objectives.

The national R&D forum should coordinate future publicly funded research and development programs. Consideration should be given to establishing collaborative and broadly funded programs to maximise the dissemination of results. Programs should also be planned for long term research to more accurately assess the long term benefits of RO products.

A national R&D information and planning system should be established and maintained to assess the effectiveness of organics research and development. It is expected that this would form part of the R&D strategy of NROD.

Future organics research and development should be linked closely with the outcomes and recommendations of organics marketing analyses carried out throughout Australia. To assist in the broad commercial application of organics research and development, better utilisation is required of structured marketing techniques.

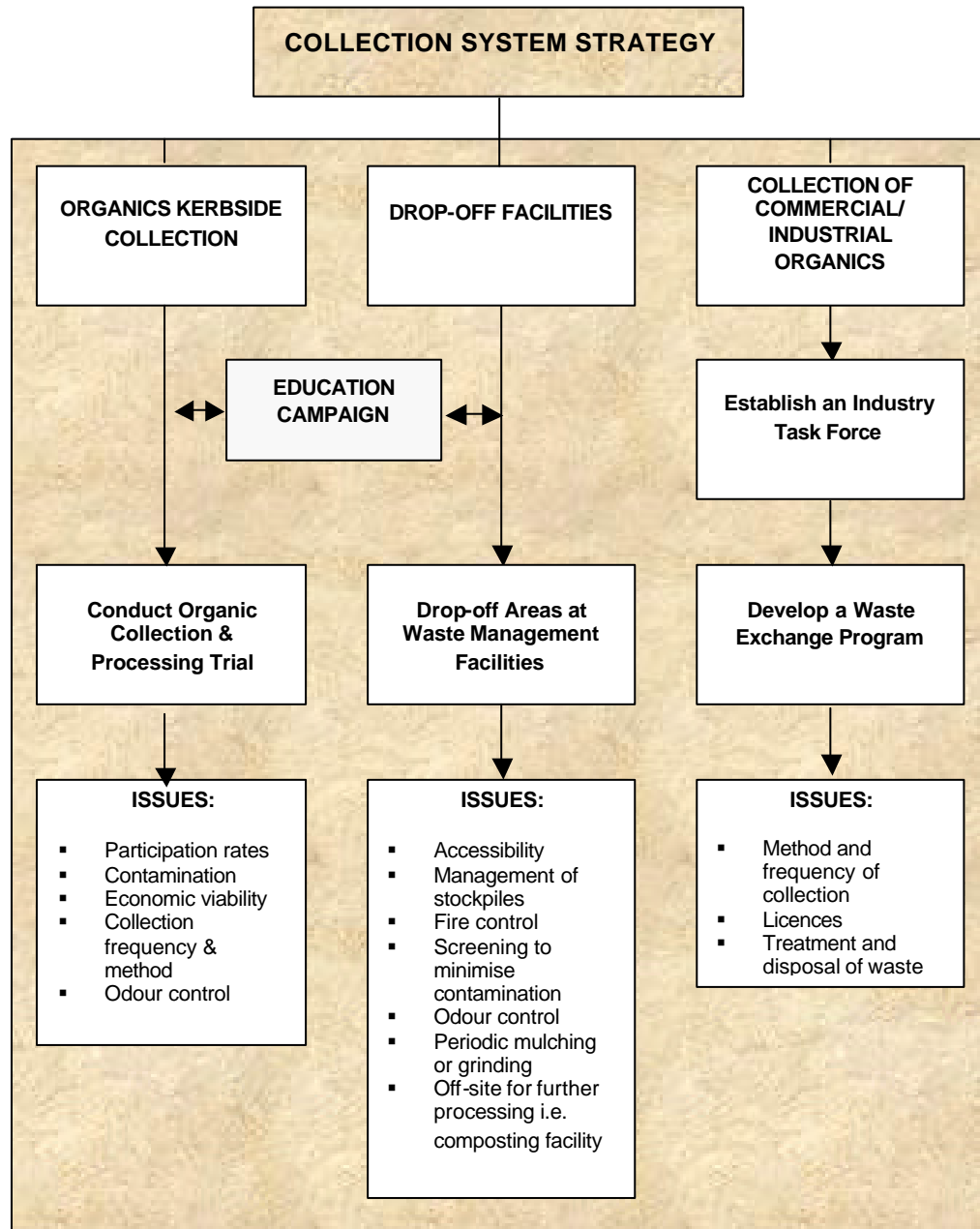
**Recommendation MDS14:**

Options be examined for supporting the establishment of a dedicated national R&D forum to better coordinate and facilitate organics R&D.

#### **4.3.4 Collection Systems**

Contamination of feedstock organic material adds to processing costs, affects equipment performance and is detrimental to product quality. Thus diversion of organic material should be supported with a collection system that encourages separation at source. Maximising the collection of RO also depends upon the establishment of cost-effective collection systems. The adopted system will vary from region to region and is dependent on several factors including economic viability and physical factors. Figure 4.2 provides a brief review of collection system strategies.

Figure 4.2 Collection System Strategy



Where it is not feasible to implement a kerbside collection system for organics, a drop-off area should be provided at waste management facilities. The establishment of drop-off arrangements should also be encouraged at private processing operations for both residential and commercial use. High participation rates are dependent on a user-friendly system, i.e. the collection system needs to be very simple and require minimal effort. The collection system should be established on a regular frequency to encourage participation through increased awareness.

For the system to be effective it is vital that an education campaign be implemented prior to introduction and maintained throughout the service. The education campaign would need to address the significance of preventing contamination in terms of environmental impacts and product value. The

collection service employed should encourage diversion of organic waste, not increase generation. It should be emphasised as part of the education campaign that the aim of the collection system is to recover a valuable resource.

Local Government should be encouraged to identify and implement effective, efficient and safe collection strategies and implement community education programs that reduce contamination and maximise organic recovery.

**Recommendation MDS15:**

The establishment of cost-effective collection systems be encouraged at Local Government level to maximise recovery of good quality RO raw materials.

#### 4.3.5 Product Liability & Risk

The issue of product liability has neither been fully addressed nor tested in many parts of Australia. The impact of a substantial product failure from the use of low quality and/or contaminated RO products (e.g. spread of disease) will have detrimental consequences for the RO industry. Negative impacts will adversely affect demand and market penetration, which will subsequently jeopardise waste reduction goals.

Government at all levels should become fully aware of the implications of product liability. This is of particular concern to Local Government, which in many instances is not aware of the implicit legal risk associated with RO product contamination and its possible effects on end-users. Local Government has many areas of concern in this issue. Organic waste from municipal kerbside collections has a much higher contamination rate than organics from other sources (EcoRecycle Victoria 1998b) and biosolids can often contain significant concentrations of heavy metals (NSW Agriculture 1996). A precedent has not yet been established in Australian law which establishes delineation of liability between raw material supplier (i.e. Local Government) and processor in the event of compensation for use of contaminated RO products. This issue is compounded by the practice of some councils which give away free mulch which has not undergone any treatment to reduce possible contamination.

This issue should be taken up with ALGA to ensure contractual decision-making by Local Government is based on a full understanding of the risks involved and appropriate measures taken to transfer or reduce risk exposure. This may be facilitated by the development of a standard methodology to be used by all Local Governments for evaluating organic processing and collection systems.

To minimise risks to all stakeholders, RO products must be processed using Best Practice procedures and the products comply with relevant Australian Standards. The proposed National Recycled Organics Directorate (see Section 4.2.5) could also encourage the implementation of an accreditation system to ensure these requirements are met.

**Recommendation MDS16:**

Proposed procurement policies include the requirement for Best Practice processing and Australian Standards compliance.

**Recommendation MDS17:**

Options be explored with ALGA to ensure product risk is factored into Local Government decision-making when assessing RO contractual arrangements. This may include development of a standard methodology for decision making.

## 4.4 **Marketing**

### 4.4.1 **Marketing Coordination**

There is a need for the establishment of a marketing planning and information system to monitor, refine and disseminate useful information and successful market penetration strategies in existing and alternative potential markets. The marketing tasks should include market demand sensitivity analysis to identify how to accelerate demand consistent with relevant programs for waste reduction objectives (e.g. ban on disposal of garden waste to landfill proposed by NSW and WA).

Future marketing analysis and strategic development should be carried out independently in the public domain to ensure it can be broadly disseminated and applied. This may be facilitated by the proposed NROD (see Section 4.2.5) and supported by Environment Australia.

**Recommendation MDS18:**

Environment Australia support the proposed NROD to coordinate and disseminate market analysis.

### 4.4.2 **Increasing RO Content**

Strategies and incentives should be developed to encourage manufacturers to utilise a greater percentage of RO content in their product mixes. This may be through lower costs for the provision of RO raw materials, and evidence through R&D programs that RO materials are equivalent in performance, quality and price.

The proposed Government procurement policies for RO products should also stipulate high RO content of approved organic products. This will likely encourage higher RO content being applied to product mixes generally.

**Recommendation MDS19:**

Proposed national R&D forum work towards higher RO content in organic products.

**Recommendation MDS20:**

Proposed Government procurement policies should incorporate RO content of products as a criteria for inclusion on approved list of products.

#### 4.4.3 Demand Growth

Because existing markets are insufficient to utilise all RO generated, support must be given to the development of well-targeted alternative markets including the bioenergy, rehabilitation, bioremediation and extensive agriculture market segments.

This will require national coordination of R&D with market penetration strategies and should involve the proposed NROD (see Section 4.2.5). This can be facilitated in collaboration with other relevant organisations (e.g. Landcare, Greening Australia, National Greenhouse Office, Sustainable Energy Development Authority). The opportunities for joint funding programs in common areas of interest (e.g. the use of RO products to restore depleted and degraded agricultural soils) should also be explored.

**Recommendation MDS21:**

Proposed NROD facilitate coordination of R&D and marketing strategies into alternative potential market segments.

**Recommendation MDS22:**

Environment Australia initiate discussions with other Commonwealth bodies to determine if opportunities exist for programs of benefit to the RO industry and other environmental issues.

#### 4.4.4 Sustainable Markets

Competitive and sustainable markets should not be jeopardised by saturation of the market with an oversupply of collected RO raw materials. Studies in NSW in response to the proposed ban on landfill disposal of garden waste (EPA NSW 1998) found that the ban could not be implemented as the infrastructure was not in place to process the glut of garden waste and the RO market demand would not have met supply. Anecdotal evidence from the DEP suggests that WA is faced with a similar situation in response to their proposed landfill ban.

It is therefore vital, for long-term strategies to be effective, that sustainable markets are developed in synchronisation with infrastructure, collection and reprocessing strategies.

**Recommendation MDS23:**

Proposed market penetration strategies be developed in synchronisation with regional programs for infrastructure, collection and processing in order to ensure sustainable markets for RO products.

## 4.5 Economics

#### 4.5.1 Taxation Initiatives

The cost of transport, particularly to regional areas where the potential use of RO products in broadacre agricultural applications is large, is a disincentive to the use of RO products. The tax on fuel is an area that the Commonwealth Government may act upon. Other taxation incentives the Government may

provide include rebates for R&D investment by the private sector where results are made broadly available.

**Recommendation MDS24:**

The Commonwealth Government explore options for taxation incentives to use RO products.

#### 4.5.2 R&D Funding

Funding for R&D should be focused on the need for more long term, commercially applicable R&D within the RO industry. Assessment of any Government funding grant applications should consider this criteria when awarding R&D grants.

The proposed NROD (see Section 4.2.5) should coordinate R&D funding to ensure targeting of areas necessary for maximum market growth. NROD should also investigate all possible funding options available within the RO industry and opportunities for cross-funding in specific target markets. Options may include:

- The Horticultural Research and Development Corporation collects funding from the nursery industry via a container levy imposed on each plant container sold within the industry. Funding is then made available for research that can benefit the industry.
- The Rural Industries Research and Development Corporation also provides industry funding for research into programs such as sustainable agriculture and resilient agricultural systems.
- Additional R&D funding is available through programs run by State-specific statutory authorities.

**Recommendation MDS25:**

Environment Australia encourage assessment of applicable Commonwealth and State R&D funding programs against a background of the R&D needs of the RO industry.

**Recommendation MDS26:**

R&D funding should be focused on targeted market development in accordance with a national strategy facilitated by NROD.

#### 4.5.3 Venture Capital Funding

Some State Governments are involved in targeted industry growth through the provision of funds direct to industry participants. Targeting of the RO industry as a priority industry may enable provision of venture capital funding in the form of low interest loans for the establishment of organic processing facilities.

**Recommendation MDS27:**

State Governments be encouraged by NROD to target the RO industry for provision of venture capital funding.

#### 4.5.4 Financial Incentives

Council rates incentives may be offered to organics processors to encourage development of appropriate facilities in individual Local Government areas. This may include reduction of rates or arrangements whereby rates are foregone.

**Recommendation MDS28:**

Environment Australia explore options with ALGA for Local Government rates incentives for the establishment of organic processing sites.

#### 4.5.5 Waste Disposal Pricing

Local Government should set landfill disposal charges to cover the total cost of waste disposal and encourage the diversion of organic and other wastes for reprocessing. Waste disposal pricing should also cover the cost of processing organic wastes.

Some States also impose a levy on all wastes landfilled. Such levies encourage diversion of waste through higher disposal charges, and provide a source of funding for research into waste reduction and processing. A proportion of these funds may be allocated specifically to market development for RO products.

**Recommendation MDS29:**

Environment Australia work with ALGA to encourage Local Government to implement landfill disposal charges which reflect the total cost of waste disposal and encourage the diversion of RO and other materials for reprocessing.

**Recommendation MDS30:**

The Commonwealth Government through ANZECC promote the use of levies on non-recyclable wastes in all States to fund organic waste minimisation and utilisation programs.

## 4.6 Awareness / Education

#### 4.6.1 Information Reference Site

Development of a central repository of information for the RO industry is considered crucial to establishing an effective communication system between all stakeholders. This is explored in detail in the companion report *Organics Information Reference Site*.

#### 4.6.2 Information Dissemination

While information gathering is an important function of many State Government bodies, dissemination of information is of equal importance. Information on the RO industry should be made readily available to industry (processors and end-users) and domestic users on a national basis. The proposed NROD (see Section 4.2.5) should act as a conduit for information sharing between all stakeholders in the RO industry, assisted by the AMDN.

Local Government should actively collect data and support the gathering of information. Information gathered about organic waste volumes generated, collection systems, community education and market development initiatives should be shared between local councils. Information sharing may occur via regional waste management groups (where they exist) and appropriate statutory authorities.

**Recommendation MDS31:**

Environment Australia encourage the on-going sharing of information between relevant State and Local Government authorities.

**4.6.3 Product Promotion**

Focusing on the marketing of RO as a means of diverting waste from landfill creates the perception among potential markets that RO is a waste not a resource. The perception that should be created is that RO is a valuable resource that provides an effective solution to several environmental problems. In promoting the benefits of organic products, RO products should therefore be marketed as potential solutions to issues such as water conservation, land degradation, acid soil remediation and land salinity.

This promotion should be conducted on a national basis to ensure consistent messages are conveyed to the community at large. This campaign may be assisted by Environment Australia through the implementation of a national community awareness program.

The proposed NROD (see Section 4.2.5) should actively promote the use of RO products in alternative potential markets. This may include liaison with other identified industry associations, e.g. National Farmers Federation, Nursery Industry Association of Australia.

Providing technical information on packaging is also important in avoiding misuse of products, emphasising product variability and in turn increasing consumer confidence. This may be encouraged through the proposed industry accreditation scheme.

**Recommendation MDS32:**

Promotion of RO products should focus on their use as an environmental resource, not as a waste.

**Recommendation MDS33:**

Environment Australia give consideration to supporting a national community awareness program on the benefits of RO products.

**Recommendation MDS34:**

The proposed NROD should promote the use of RO products in alternative markets through liaison with other industry associations.

**Recommendation MDS35:**

Provision of RO content and processing information on packaging be included as part of the proposed industry accreditation scheme.

#### **4.6.4 Community Education**

Community education is most effective through regional education officers and local environmental groups. While these play an important role in information dissemination, the lack of coordination among them may lead to mixed messages being sent to stakeholders. Some suffer from a lack of immediacy or relevance to Australian market conditions. Others may be limited in coverage of the industry audience.

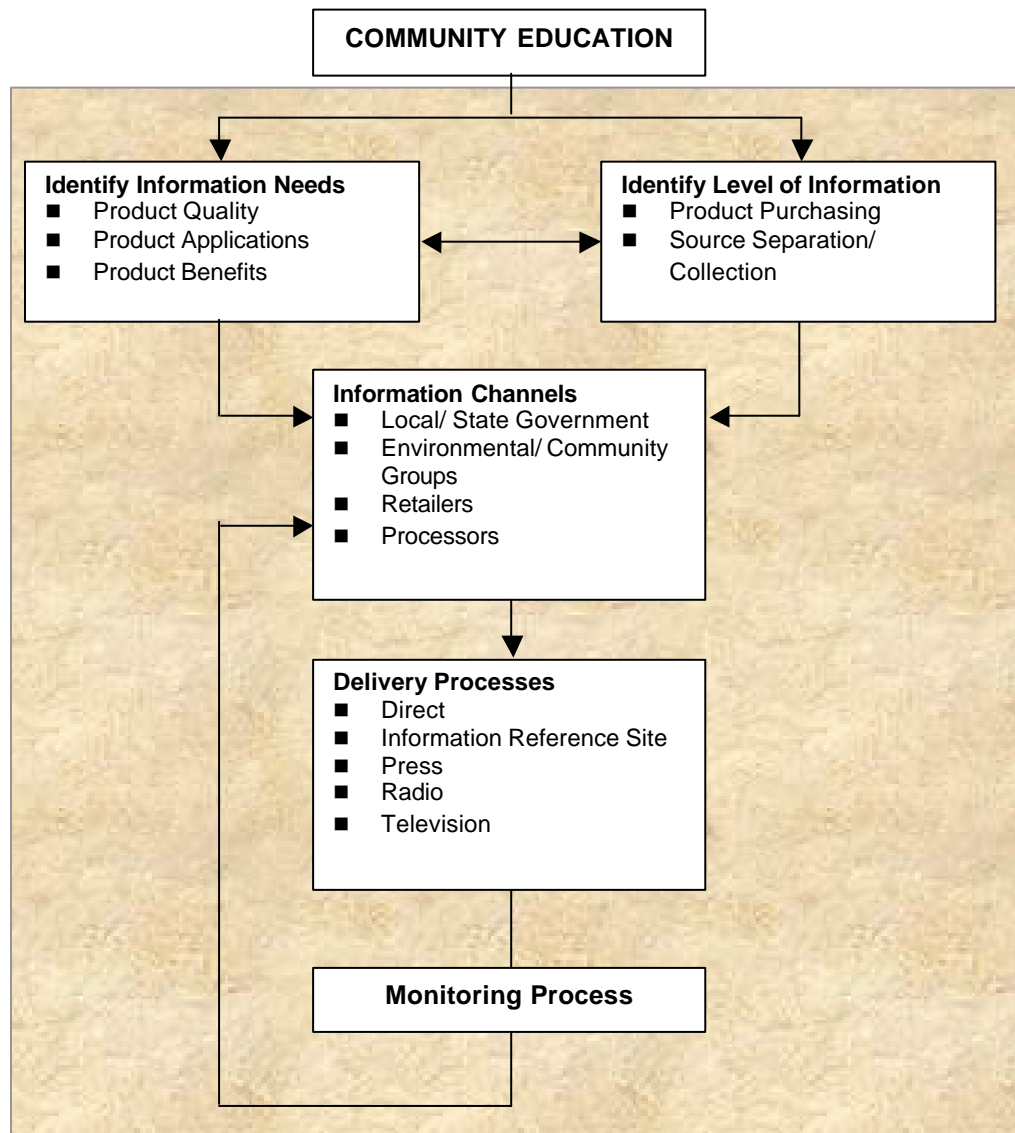
There is also inadequate information available to the community. The community needs to be informed of the benefits of using RO and become familiar with product differentiation. The process of communication is vital in dispelling myths associated with the application of RO and assist individuals in making informed decisions when purchasing organic products.

Figure 4.3 provides a strategy outline for community education. State Governments have a role in promoting waste minimisation and reuse and creating awareness of environmental issues such as land degradation. This would also be a role for environmental groups. Local Government in particular should establish an education campaign on source separation and associated contamination issues.

A monitoring process should be put in place to assess information receptivity and in turn review the effectiveness of information channels.

The proposed NROD (see Section 4.2.5) would have an important role in coordinating the education strategy and ensuring that consistent messages are imparted across Australia.

**Figure 4.3 Community Education Strategy**



**Recommendation MDS36:**

Environment Australia liaise with State and Local Government authorities to support community education programs on organic waste issues and the use of RO products. These programs should be coordinated by NROD to ensure consistent messages are imparted across Australia.

**4.6.5 Best Practice Demonstration Sites**

In some States of Australia, a demonstration site has been established to illustrate the use of Best Practice at organic processing facilities. However a single demonstration site cannot promote market development on a national basis. A network of sites per State would be required to address regionally

specific issues and gain coverage of a majority of industry players. This is not cost-effective and cannot be justified.

It is acknowledged that demonstration of techniques is an effective method of imparting knowledge. Where demonstration sites currently exist, these should be utilised to promote a national approach to Best Practice.

**Recommendation MDS37:**

Environment Australia should liaise with State Government authorities to ensure that those States with current or proposed demonstration sites utilise proposed national Best Practice guidelines.

#### **4.6.6 Best Practice Case Studies**

Case studies have proven successful in changing practices in a number of industries, particularly with respect to cleaner production and introduction of Best Practice. However organics case studies are expected to target only organics processors and some local authorities, and will not reach potential end users of RO products. Best Practice case studies are therefore expected to influence market development on an indirect basis, with encouragement of quality issues as an important factor in organic processing.

Where case studies are publicised by State bodies, these should be implemented in conjunction with statutory authorities of all States to promote consistency of Best Practice on a national basis. This may also facilitate resource sharing and allow more cost-effective implementation.

**Recommendation MDS38:**

Environment Australia should liaise with State Government authorities to ensure development of case studies is in line with proposed national Best Practice guidelines.

#### **4.6.7 Education Officers**

Waste and recycling education at the community level is undertaken by a variety of education officers appointed by Local Government, regional waste management groups and statutory authorities. Additional education officers may work within community organisations such as Landcare, Greening Australia and local environmental groups. These education officers provide a wide coverage of the Australian community, however none of these are necessarily focused on RO issues. Competing resources may mean that limited attention is given to organics as opposed to other environmental or waste issues within their areas of responsibility. These education officers also do not necessarily promote the same actions across Australia. Local and/or State issues may impact on the messages being imparted to the community, and detract from a national communication approach.

However given the reach of these education officers across the bulk of the Australian population, it is important to work within this network to ensure that the information being received at community level is consistent with the aims of RO industry development. Local and regional education officers generally receive

their information from State-based organisations. Therefore in order to communicate the right messages at community level, there needs to be coordination between the States of the information provided to the education officers.

This can then lead to utilisation of regional and municipal education officers to promote awareness of organic waste issues, RO product quality, minimisation of raw material contamination, assist in implementing organic collection systems and processing sites, and promotion of purchasing policies at local level. Education officers of some organisations, e.g. Departments of Agriculture, may also assist in raising awareness of RO product value to prospective end users.

This important coordinating role is expected to be one of the responsibilities of the proposed NROD (see Section 4.2.5).

**Recommendation MDS39:**

Environment Australia should liaise through NROD with other Commonwealth, State and Local Government bodies to coordinate a national RO education program.

## 5.0 Recommendations

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The following strategic recommendations are made in order of priority for RO market development. These recommendations have been differentiated into specific areas of responsibility, with many initiatives requiring joint action. It is recognised that some of these recommendations are beyond the statutory ambit of Environment Australia, although it may play a role in facilitating change throughout the RO industry.

It should be noted that the development of the RO market is not the sole responsibility of Commonwealth, State or Local Government or the private sector. Rather, industry growth is the province of all stakeholders working together in a national coordinated approach to contribute within their areas of responsibility to the sustainable development of the RO industry.

### 5.1 **Commonwealth Government**

The following recommendations are made for Environment Australia to assist in development of programs that effectively target those issues identified as pivotal to RO market development. It is recommended that Environment Australia, working where appropriate with other Government bodies, proceed to:

- facilitate development of a National Recycled Organics Directorate and associated State Recycled Organics Directorates by promoting a forum for linkages between existing State-based organics industry associations. Explore the possibility of the Australasian Market Development Network providing the organisational framework for the NROD. Consider initial funding support to establish organisational framework and administrative resources for NROD;
- support the development and use of standardised terminology for organic waste and RO products on a national basis;
- facilitate development of national Best Practice guidelines for biosolids, organics processing and RO products. Liaise with State and Local Government authorities to ensure national Best Practice guidelines are used as a benchmark in demonstration sites, case studies and decision-making process where appropriate;
- support development of a RO product accreditation scheme in conjunction with other industry stakeholders through a national promotion campaign;
- consider establishment of a procurement policy for Commonwealth Government departments favouring the use of RO products with increasing RO content which conform to national Best Practice guidelines and Australian Standards. Encourage development of similar procurement policies at State and Local Government level;
- consider establishment of a National Environment Protection Measure dealing with organic waste management and recycled organics;

- encourage State Government review of environmental and planning regulations with a view to coordinating requirements for the establishment of organic processing facilities;
- support the development of a dedicated RO R&D forum. This could be facilitated through the proposed NROD. The forum would be responsible for both product and application research and the development of suitable technology and equipment;
- encourage assessment of R&D funding programs at all Government levels against a background of the long term needs of the RO industry;
- explore options with Local Government to ensure product risk and liability is factored into decision-making process when preparing RO contracts;
- initiate discussions with other Commonwealth bodies to determine if opportunities exist for programs of joint benefit to the RO industry and other environmental issues;
- give consideration to the implementation of a national community awareness program focused on the benefits of use of RO products on environmental issues such as water conservation, land degradation, acid soils, salinity and soil structure. The program should focus on RO as a resource, not a waste;
- liaise with State and Local Government authorities to ensure community education programs provide consistent focus on organics processing and use of RO products;
- liaise with Australian Local Government Association to maximise Local Government support for the RO industry. This support may be provided in the form of rates incentives for organic processing sites;
- explore options with State and Local Governments for reporting of organic waste data in nationally consistent format;
- encourage the establishment of cost-effective collection systems at Local Government level to maximise recovery of RO raw materials with minimum contamination levels;
- work with State and Local Governments to encourage implementation of landfill disposal charges which reflect the total cost of waste disposal and encourage the diversion of RO and other materials for reprocessing;
- promote the use of waste disposal levies on non-recyclable wastes in all States to fund organic waste minimisation and utilisation programs;
- explore options for granting financial incentives to the RO industry in the form of taxation concessions and R&D rebates; and
- encourage State Governments to target the RO industry as a priority for venture capital funding programs.

## 5.2 State Government

It is recommended that the appropriate environmental departments of State and Territory Governments implement the following actions to assist development of the RO industry:

- work with Environment Australia to establish the National Recycled Organics Directorate through development of State Recycled Organics Directorates;
- work with Environment Australia in the development and use of standardised national terminology for organic waste and RO products;
- work with Environment Australia in development of consistent national Best Practice guidelines for biosolids, organics processing and RO products. Benchmark RO initiatives against national Best Practice guidelines and Australian Standards;
- support development of a RO product and industry accreditation scheme based on national Best Practice guidelines and Australian Standards. Encourage manufacturers to provide RO content and processing information on packaging of products as part of the accreditation scheme;
- develop State Government procurement policies favouring the use of RO products with increasing RO content which conform to national Best Practice guidelines and Australian Standards;
- assist development of market penetration and acceleration strategies for those market segments identified as showing most potential for market growth. Facilitate coordination of R&D and market penetration strategies into alternative potential market segments;
- consider establishment of a National Environment Protection Measure dealing with organic waste management and recycled organics;
- conduct a review of environmental and planning regulations with a view to coordinating requirements for the establishment of organic processing facilities. Ensure consistent requirements for all types of facilities involved in organic waste management;
- ensure assessment of government R&D funding programs is consistent with long term needs of the RO industry;
- explore options with Local Government to ensure product risk and liability is factored into decision-making process when preparing RO contracts;
- initiate discussions with other State bodies to determine if opportunities exist for programs of joint benefit to the RO industry and other environmental issues;
- ensure community education programs provide consistent focus on organics processing and use of RO products. Promote the use of RO as a resource, not a waste;
- initiate requirements for reporting by Local Government of organic waste data in nationally consistent format;

- encourage the establishment of cost-effective collection systems at Local Government level to maximise recovery of RO raw materials with minimum contamination levels;
- work with Local Government to encourage implementation of landfill disposal charges which reflect the total cost of waste disposal and encourage the diversion of RO and other materials for reprocessing;
- explore options for the use of waste disposal levies on non-recyclable wastes to fund organic waste minimisation and utilisation programs; and
- explore options for supporting the RO industry through venture capital funding programs.

### **5.3 Local Government**

The major responsibility for RO actions at the local community level rests with Local Government. In some States the planning responsibility lies with Regional Waste Management Groups or Waste Boards, although implementation of initiatives may be carried out by member municipalities. Therefore the following recommendations for Local Government initiatives may require the collaboration of regional waste groups as well as the Australian Local Government Association to ensure national and local implementation.

Strategic recommendations for Local Government are:

- work with Environment Australia to establish the National Recycled Organics Directorate through development of State Recycled Organics Directorates;
- ensure proposed national Best Practice guidelines and Australian Standards are used as a benchmark in the RO decision-making process;
- establish a procurement policy which favours Local Government use of RO products with increasing RO content which conform to national Best Practice guidelines and Australian Standards;
- explore options and adopt a strategy for development of organic processing facilities. Identify suitable sites, incorporate viable sites into local planning schemes and allocate appropriate buffer distances;
- ensure product risk and liability issues are included in the decision-making process when preparing RO contracts;
- liaise with State Government to develop strategy for reporting of organic waste data in nationally consistent format;
- establish cost-effective collection systems to maximise recovery of RO raw materials with minimum contamination levels;
- implement landfill disposal charges which reflect the total cost of waste disposal and encourage the diversion of RO and other materials for reprocessing;
- liaise with State Government to enable use of waste disposal levies on non-recyclable wastes for funding of organic waste minimisation and utilisation programs;

- explore options for providing support to the RO industry, including rates incentives for organic processing facilities and community education programs consistent with national education program; and
- encourage State Governments to target the RO industry as a priority for venture capital funding programs.

## **5.4 Private Sector**

The private sector of the RO industry encompasses all non-statutory stakeholders and represents a major interest in the development of the RO market. Although this sector is currently fragmented across sectional interests, regional and local issues, initial progress has been made towards a coordinated industry approach through the development of State-based industry associations (e.g. COMMPOST NSW/SA, Compost Victoria).

It is recommended that these State-based industry associations work with other stakeholders to develop the proposed National Recycled Organics Directorate and State Recycled Organics Directorates. Upon the establishment of NROD, cohesive action can then be taken in the following areas:

- liaise with Commonwealth, State and Government authorities in all issues likely to impact upon the RO industry;
- support the development and use of standardised terminology for organic waste and RO products on a national basis;
- promote the development and use of Australian Standards and national Best Practice guidelines for biosolids, organic processing and RO products;
- support development of a RO product and industry accreditation scheme based on national Best Practice guidelines and Australian Standards. Encourage manufacturers to provide RO content and processing information on packaging of products as part of the accreditation scheme;
- promote the establishment of procurement policies for all levels of government which favour the use of RO products with increasing RO content which conform to national Best Practice guidelines and Australian Standards;
- develop market penetration and acceleration strategies for those market segments identified as showing most potential for market growth;
- facilitate coordination of R&D and market penetration strategies into alternative potential market segments. This should be synchronised with regional collection and reprocessing strategies;
- encourage State Government review of environmental and planning regulations with a view to coordinating requirements for the establishment of organic processing facilities;
- establish and/or liaise with proposed R&D organisation to ensure long term needs of the RO industry are incorporated into R&D programs; and
- promote the use of RO products as a resource, not a waste, to other industry associations in targeted alternative markets.

# Glossary

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<b>ALGA</b>	Australian Local Government Association
<b>AMDN</b>	Australasian Market Development Network
<b>Animal Manure</b>	Any organic product composed mainly of animal excreta. Most commonly used types are duck, poultry and cattle manures.
<b>ANZECC</b>	Australian and New Zealand Environment and Conservation Council
<b>ARMCANZ</b>	Agriculture and Resource Management Council of Australia and New Zealand
<b>AS</b>	Australian Standard
<b>Ash</b>	A by-product derived from the burning of coke or coal.
<b>Bark Fines</b>	The finer grades produced from screening pine bark that can then be used in the manufacture of growing media or as mulch.
<b>Biosolids</b>	Solid, semi-solid or slurry material produced by the treatment of urban sewage.
<b>C&amp;D</b>	Construction and demolition
<b>C&amp;I</b>	Commercial and industrial
<b>Coarse Sand</b>	Aggregate material with a particle size between 0.5 mm – 1.0 mm.
<b>Coir Peat</b>	Fine particle material derived from the processing of coconuts.
<b>COMPOST</b>	Cooperative Organisation for the Management, Marketing and Processing of Organic Soils and Technologies
<b>Compost</b>	Material resulting from the controlled microbiological transformation of organic materials such as animal manures, bark fines, biosolids, leaf mulch, sawdust and shredded green waste under aerobic and thermophilic conditions rendering them safe for use in growing situations.
<b>CSIRO</b>	Commonwealth Scientific & Industrial Research Organisation
<b>DENR</b>	Department of Environment and Natural Resources (South Australia)
<b>DEP</b>	Department of Environment Protection (Western Australia)
<b>EIS</b>	Environmental Impact Statement
<b>EPA</b>	Environment(al) Protection Agency/Authority (New South Wales, Queensland, South Australia, Victoria)
<b>Fine Sand</b>	Aggregate material with a particle size between 0.10 mm – 0.25 mm.

<b>Garden Soil</b>	A material consisting of natural soil, amended natural soil, a blend of sand, natural soil materials and organic materials, which is suitable for the culture of plants usually grown in domestic gardens and landscaped areas.
<b>GIS</b>	Geographic Information System
<b>GSR</b>	Greater Sydney Region
<b>Humus</b>	Organic matter resulting from the partial decomposition of plant and animal material.
<b>IHD</b>	Institute for Horticultural Development (Victoria)
<b>Leaf Mulch</b>	A material of known origin containing predominantly branches and leaves that is suitable for applying to soil surfaces and is free from weed seeds, plant propagules and disease.
<b>LGA</b>	Local Government Authority
<b>Mined Top Soil</b>	A soil that has been extracted from the surface or subsurface of primarily alluvial flats and river banks. Typically it will have a bulk density of greater than 1.0 kg/L.
<b>Mulch</b>	Any composted organic material (excluding plastic) that is suitable for placing on soil surfaces or any non-composted material which is free from weed seeds, plant propagules and disease that is suitable for placing on soil surfaces. Composted products used as mulch include composted recycled organic product (shredded vegetation). Non-composted products used as mulch include gravel, hardwood chip, pine barks, pine chip, pine flake, straw and wood waste mulch.
<b>Mushroom Compost</b>	The spent residue from beds of organic materials that have supported a crop of mushrooms.
<b>NEPC</b>	National Environment Protection Council
<b>NEPM</b>	National Environment Protection Measure
<b>NH&amp;MRC</b>	National Health and Medical Research Council
<b>NPK</b>	The ratio of Nitrogen:Phosphorous:Potassium
<b>NROD</b>	National Recycled Organics Directorate
<b>OH&amp;S</b>	Occupational health and safety
<b>Organic Top Dressing</b>	A product suitable for surface application to lawns and playing fields which contains a high proportion of composted organic material generally of less than 5 mm in diameter.
<b>PAH</b>	Polycyclic aromatic hydrocarbons
<b>Peat Moss</b>	The partly decomposed remains of sedge or sphagnum found in swamplands, which has a highly porous structure capable of holding large quantities of water and air.

<b>PET</b>	Polyethylene teraphthalate
<b>Potting Mix</b>	A growing medium suitable for the establishment and development of a wide range of plants in containers. Products include mixes for tub, tube, indoor, regular grade, premium grade, seedling, African violet, bulb, orchid, hanging basket and acid-loving plant use.
<b>R&amp;D</b>	Research and development
<b>Recycled / Recyclable Organics (RO)</b>	Organic material that has the potential to be or has been recycled. This material would otherwise be deposited to landfill.
<b>Sawdust</b>	Fine timber particles derived from milling and sawing operations of hardwood (generally <i>Eucalyptus</i> species) or softwood (generally <i>Pinus</i> species) timber production.
<b>Shredded Vegetation</b>	An uncomposted garden or tree material of unknown origin which is chipped, milled, shredded or ground which requires further controlled processing to eliminate weed seeds, plant propagules and disease.
<b>Soil Conditioner</b>	Any composted or non-composted material of organic origin, which is produced or distributed for adding to soils. This term may also refer to 'soil amendment', 'soil additive', 'soil improver' and similar terms but excludes polymers which do not biodegrade, such as plastics, rubber and coatings.
<b>SROD</b>	State Recycled Organics Directorate
<b>SWOT</b>	Strengths, Weaknesses, Opportunities, Threats
<b>TIAR</b>	Tasmanian Institute of Agricultural Research
<b>Top Dressing Soil</b>	A soil which is suitable for surface application to lawns and does not contain any mineral particles which do not pass a 2 mm sieve, contain more than 15% by weight of organic particles which pass a 5 mm sieve but not a 2 mm sieve; and contains any organic particles which do not pass a 5 mm sieve.
<b>Vermicast</b>	A solid organic product derived from worm farming.
<b>Vermicompost</b>	Vermicast that has undergone controlled processing under aerobic and thermophilic conditions to eliminate weed seeds and pathogens.
<b>WMAA</b>	Waste Management Association of Australia
<b>WMAP</b>	Waste Management Awareness Program

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