## AUSTRALIA & NEW ZEALAND BIOSOLIDS PARTNERSHIP

# BIOSOLIDS PRODUCTION IN AUSTRALIA OCTOBER 2019



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## **1 INTRODUCTION**

In 2010, the Australian & New Zealand Biosolids partnership (ANZBP) commissioned a national survey to identify the main features of biosolids management across Australia and New Zealand. The survey was repeated in 2013, 2015, 2017 and again in 2019. This report pertains to Australia only and collates survey results for the 2018/19 financial year. This survey catalogues the following primary parameters:

- $\delta$  Biosolids production;
- $\delta$  Biosolids end use;
- $\delta$  Biosolids stabilisation grade;
- $\delta$  Biosolids contamination grade;
- $\delta$  Biosolids primary stabilisation process;
- $\delta$  Biosolids dewatering process.

These are the same parameters as previous surveys, with the exception of contamination grade which was added to the 2013 survey data. The results of this survey are presented on a national and state basis. Some discussion is also provided on significant changes since 2010.

## 2 METHOD

The approach used to determine the biosolids production in Australia was to survey as a minimum all plants servicing over 25,000 people or 5 ML/day. The ANZBP identified that this criterion would capture around about 80% of Australia's population. In the course of the survey many water utilities provided information on plants smaller than this threshold and where they did, the data was included. This year over 320 sites were surveyed representing a total equivalent person (EP) count of about 24.8 million. Note that EP can include commercial inflow so does not cover every site in Australia however the data collected represents a very high proportion of biosolids produced in Australia.

All classifications are made on the basis of dry tonnes of production.

The method for collecting biosolids production figures for lagoon-based systems changed in 2016/17. Previously, utilities were asked to estimate the average biosolids output from a lagoon. For the 2016/17 survey and this year they were asked to provide data on the quantity of biosolids which were removed from a lagoon. If no biosolids were removed, then the quantity was zero.

The standardised Contaminant Grades were streamlined this year as described in section 3.4. There is no significant change to the results because of lack of data one of the now combined categories.

## **3** CLASSIFICATIONS

To enable relatively simple analysis and presentation of the data, each area of information, such as end use, is classified into broad groupings. These groupings are discussed below.

## 3.1 **PRODUCTION**

Production is presented in terms of tonnes of dry biosolids.

## 3.2 END USE

The following classifications were used for end use:

- $\delta$  Agriculture: for biosolids applied to land for its fertiliser value without value added processing;
- $\delta$  Landscaping (compost): for biosolids processed through a composting facility and used for landscaping or other horticultural use;
- $\delta$  Forestry: for biosolids applied to plantation forests to aid tree growth;
- $\delta$  Landfill: for biosolids disposed to landfill;
- $\delta$  Ocean discharge: for biosolids discharged to the ocean;
- $\delta$  Stockpile: for biosolids stored, pending future planning, processing or use;
- $\delta$  Land rehabilitation: for biosolids applied to land, such as mine sites for rehabilitation of the land;
- $\delta$  Other: any other uses;
- $\delta$  Unspecified: for sites for which no data was provided by the utility or for which the end use could not be identified.

The following uses can be classified as being 'beneficial' uses: agriculture, landscaping, forestry and land rehabilitation.

#### **3.3** STABILISATION GRADE

Due to the different standards and naming conventions used for Stabilisation Grades across Australia, a standardised grading schema was applied (see Table 1). Stabilisation grade was classified on the basis of an A, B or Unstabilised grading. Some biosolids were not graded by the utility and are marked as NG (not graded) in the survey results.

Classification	NSW	Vic	SA	Qld	Tas	WA	NZ
А	А	T1, T2	А	А	А	P1, P2	А
В	В	Т3	В	В	В	Р3	В
Unstabilised	С	Unstabilised	Unstabilised	С	С	P4	Unstabilised

 Table 1 – Stabilisation grading

## **3.4 CONTAMINATION GRADE**

Due to the different standards and naming conventions used for Contaminant Grades across Australia, a standardised grading schema was applied (see Table 2). Contamination grade was classified on the basis of an A, B, C and Restricted/ Unsuitable for Use. Some biosolids were not graded by the utility and are marked as NG (not graded) in the survey results.

Victorian biosolids classified as C2 have been allocated a B contaminant grading consistent with previous surveys.

A previous category of Unsuitable for Use was used for Contaminant Grade E biosolids from New South Wales and Queensland. This year, any data collected with this grading was rolled in with the Restricted/Unsuitable for Use category. This biosolids with E contaminant grade was less than 0.2% of biosolids produced.

Classification	NSW	Vic	SA	Qld	Tas	WA	NZ
А	А	C1	А	А	А	C1	А
В	В	C2	В	В	В	C2	В
С	С		С	С	С	C2	В
Restricted or Unsuitable for Use	D, E	Unsuitable for use	Unsuitable for use	D, E	Unsuitable for use	Unsuitable for use	Unsuitable for use

Table 2 – Contaminant grading

## 3.5 STABILISATION PROCESS

Classification of the stabilisation process was made on the basis of the primary stabilisation process following the sewage treatment process. The following stabilisation process categories were used:

- $\delta$  Anaerobic digestion
- δ Aerobic digestion
- $\delta$  Agitated air drying
- $\delta$  Thermal drying
- $\delta$  Autothermal thermophilic aerobic digestion (ATAD)
- $\delta$  Thermal hydrolysis (e.g. CAMBI)
- $\delta$  Composting (used only for biosolids with no prior stabilisation)
- δ Incineration
- $\delta$  Lagoon (used for biosolids stored in liquid form)
- δ Lime stabilisation
- $\delta$  Long term storage (used for biosolids stored in dewatered form)
- $\delta$  Thermophilic anaerobic digestion
- δ None
- δ Other
- δ Unspecified

#### **3.6 DEWATERING PROCESS**

Classification of the dewatering process was made on the basis of the following categories:

- δ Belt filter press
- δ Conventional centrifuge
- $\delta$  High solids centrifuge
- $\delta$  Drying bed or drying lagoons
- δ None
- δ Other
- δ Unspecified

## 4 **RESULTS**

## 4.1 **PRODUCTION**

The total biosolids production of Australia identified in the current survey is 371,000 tonnes per year of dry solids, representing approximately 13% growth from the 2016/17 year. The previous survey results are shown in Table 3. From the data, the average solids content of dewatered biosolids is around 16% and this equates to around 2.3 million tonnes of biosolids in dewatered form (also called wet biosolids).

Table 3 -	- Annual	biosolids	production
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Year	Tonnes dry solids
2010	300,000
2013	333,000
2015	310,000
2017	327,000
2019	371,000

A breakdown by state of biosolids production is given in Chart 1. There were no significant changes in proportional state contribution from 2017 to 2019.



#### Chart 1: Biosolids Total Production 2018/19 Australia

## 4.2 END USE

Biosolids end use nationally and for each state is presented in Charts 2 to 8 following.

Beneficial use counts for 91% of biosolids end use in Australia, a slight drop from 94% in the previous survey.

The proportion of biosolids to agricultural is now about 70%, after an upward trend from 55% in 2010 to 75% in 2017. Land rehabilitation increased in proportion this year from 11 to 16% with the change in use being from agriculture to land rehabilitation.





Chart 3: Biosolids End Use 2018/19 New South Wales & Australian Capital Territory



#### Chart 5: Biosolids End Use 2018/19 South Australia







#### Chart 7: Biosolids End Use 2018/19 Victoria

(compost) 6%

> Landfill 12%

Agriculture 59%

## 4.3 STABILISATION GRADE

Biosolids stabilisation grade nationally and for each state is presented in Charts 9 to 15 following.

Not graded and Grade B have remained in similar proportions from the previous survey. Grade A is slightly higher in proportion and Not Graded slightly lower.



#### Chart 9: Biosolids Stabilisation Grade 2018/19 Australia

Chart 10: Biosolids Stabilisation Grade 2018/19 New South Wales & Australian Capital Territory





#### Chart 11: Biosolids Stabilisation Grade 2018/19 Queensland



## Chart 12: Biosolids Stabilisation Grade 2018/19 South Australia



#### Chart 14: Biosolids Stabilisation Grade 2018/19 Victoria

#### 4.4 CONTAMINANT GRADE

Biosolids stabilisation grade nationally and for each state is presented in Charts 16 to 22 following. This is the first survey where there has been a significant shift in the contaminant grade from previous surveys. The proportion of biosolids graded as contaminant grade C reduced from 49% to 36% with most of this shift being to contaminant grade B. This is almost entirely a shift by New South Wales producers.











#### Chart 18: Biosolids Contaminant Grade 2018/19 Queensland

#### Chart 19: Biosolids Contaminant Grade 2018/19 South Australia





#### Chart 20: Biosolids Contaminant Grade 2018/19 Tasmania







#### Chart 22: Biosolids Contaminant Grade 2018/19 Western Australia & Northern Territory

#### 4.5 STABILISATION PROCESS

Biosolids stabilisation process nationally and for each state is presented in Charts 23-29 following.

The types of stabilisation processes have stayed much the same as previous years.





Chart 25: Biosolids Stabilisation Processes 2018/19 Queensland





#### Chart 26: Biosolids Stabilisation Processes 2018/19 South Australia





#### 4.6 **DEWATERING PROCESS**

Biosolids dewatering process nationally and for each state is presented in Charts 30 to 36 following. There was very little change in the proportion of use of dewatering processes from the 2016/17 survey to now.











#### Chart 32: Biosolids Dewatering Processes 2018/19 Queensland







#### Chart 36: Biosolids Dewatering Processes 2018/19 Western Australia & Northern Territory