
Final report

A study of the UK organics recycling industry in 2009



A report on the structure of the UK organics processing/recycling sector and the markets for its outputs

WRAP's vision is a world without waste,
where resources are used sustainably.

We work with businesses, individuals and
communities to help them reap the
benefits of reducing waste, developing
sustainable products and using resources
in an efficient way.

Find out more at www.wrap.org.uk

Written by: Dr Jane Gilbert, Jenny Chen, Dr Robert Pocock and Justin French-Brooks

Front cover photography: [Add description or title of image.]

WRAP and M·E·L Research Ltd believe the content of this report to be correct as at the date of writing. However, factors such as prices, levels of recycled content and regulatory requirements are subject to change and users of the report should check with their suppliers to confirm the current situation. In addition, care should be taken in using any of the cost information provided as it is based upon numerous project-specific assumptions (such as scale, location, tender context, etc.).

The report does not claim to be exhaustive, nor does it claim to cover all relevant products and specifications available on the market. While steps have been taken to ensure accuracy, WRAP cannot accept responsibility or be held liable to any person for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. It is the responsibility of the potential user of a material or product to consult with the supplier or manufacturer and ascertain whether a particular product will satisfy their specific requirements. The listing or featuring of a particular product or company does not constitute an endorsement by WRAP and WRAP cannot guarantee the performance of individual products or materials. This material is copyrighted. It may be reproduced free of charge subject to the material being accurate and not used in a misleading context. The source of the material must be identified and the copyright status acknowledged. This material must not be used to endorse or used to suggest WRAP's endorsement of a commercial product or service. For more detail, please refer to WRAP's Terms & Conditions on its website: www.wrap.org.uk

Executive summary

This report presents a market analysis of the UK organics recycling industry for the calendar year 2009. It is the latest in a series of annual projects that originated with the former Composting Association members' survey. Since 2006 this analysis has been commissioned through WRAP, working in partnership with the growing number of industry organisations in the organics recycling sector. This year's study has been led by a partnership consisting of WRAP, the Anaerobic Digestion and Biogas Association (ADBA), the Association for Organics Recycling (AfOR) and the Renewable Energy Association (REA).

Background, method and survey participation

The study covers the full range of organic waste treatment processes, including anaerobic digestion (AD), in-vessel composting (IVC), mechanical biological treatment (MBT), open air windrow (OAW) composting and thermophilic aerobic digestion (TAD).

The methodology for the study has been improved compared with that applied in previous years, in order to:

- make the results more reliable and more comprehensive;
- reduce the burden of the survey on respondents; and
- strengthen insights into the results and their implications.

Specific improvements to the methodology included:

- using waste input data obtained from operator waste returns submitted to the waste regulatory bodies for all permitted/licensed organics waste recycling sites in the UK, instead of relying on a sample of operator survey replies;
- using data supplied by the waste regulators to identify all registered exempt composting sites in the UK;
- using a telephone-based survey of site operators, supplemented by an emailed self-completion form, to gather data on site processes, products and end uses; and
- obtaining business performance information at site and process level, rather than the business-wide level used previously, thereby gaining more insight into process efficiencies.

The telephone survey approach was used for 309 sites, identified from a range of sources as being contactable and likely to have undertaken organics recycling in 2009. These sites were compiled onto an Organics Recycling Site Register (ORSR). A further sample of 547 registered exempt sites was selected from the regulator registrations; for these a postal questionnaire survey was used.

Valid survey responses were obtained from 204 site operators (145 permitted/licensed composting sites, eight AD sites, two MBT sites and 49 exempt composting sites). As well as the survey responses for these sites, waste input data were available for all 219 active permitted organics recycling sites in 2009. The operator waste returns allowed waste inputs to be characterised in detail according to the six-digit European Waste Catalogue (EWC) code. Although it is not known for certain how many registered exempt sites were operating composting processes in 2009, survey data indicated that 77% of exempt sites (2104 out of 2733 registered exemptions) were active.

The methodology was based on the 2009 calendar year, rather than the financial year used in previous surveys. This is because data sources are now centred on the regulators' site information and waste input data, which is only available by calendar year. This change in reporting period meant that only nine months had elapsed since the previous survey covering the reporting period 2008/09. As changes to the reporting period and the study methodology make comparisons difficult, differences in results should be viewed with caution. This report might best be viewed as a re-benchmarking of the previous 2008/09 survey, establishing a new baseline rather than simply tracking previous trends.

Estimates of the size and scope of the UK organics recycling industry in 2009

A total of 309 organics recycling sites were identified as operational in 2009, comprising 281 permitted composting sites, 17 AD sites, nine MBT sites, plus two TAD sites (described in Section 3.1).

Just under 6 million tonnes (Mt) of organic waste was treated at these sites in 2009, with:

- 5.5Mt of waste recycled at AD, permitted composting (IVC and OAW) and TAD sites, representing 93% of the total quantity of input waste to the industry (Section 3.1); and
- 0.4Mt processed at MBT sites.

An estimate was made of 2104 exempt composting sites, at which 0.9Mt of organic waste was recycled (Section 3.2.4).

At permitted sites, OAW was the dominant recycling method, followed by IVC. These treated 56% and 38%, respectively, of the total input quantity of waste. AD only accounted for 2% of the total (Section 3.2, Table 3.7). This was broadly in line with findings in previous surveys, in which composting dominated.

There was a marked difference in the sources of wastes treated at composting and AD sites, with composting operations processing predominantly municipal wastes (which accounted for 80% of the input waste there) and AD operations only processing 56% municipal waste (the remainder comprising commercial and industrial wastes; Section 3.2.2, Table 3.8).

More municipal wastes were collected through kerbside schemes than at bring sites, such as Household Waste Recycling Centres (HWRCs) (Section 3.2.3, Table 3.12). The emergence of 'food waste only' collection schemes was also noted, being far greater than estimates in previous surveys. The majority of organic local authority waste collected for recycling was green garden waste (69%), identified through the WasteDataFlow (WDF) returns (Section 3.2.3, Table 3.10).

Business analysis surveys enabled key business indicators to be established for benchmarking purposes:

- the industry was dominated by a large number of operators running one or two sites (75% of all operators are in this category; Section 3.3.1, Table 3.17);
- the aggregate turnover of the UK organics recycling industry was estimated to be £229M (Section 3.3.2, Table 3.19);
- the permitted composting sector was estimated to have a turnover of £187M;
- turnover per tonne of material at composting sites ranged from £30 (OAW composting systems) to £61 (IVC systems);
- the AD sector was estimated to have a turnover of £11M, calculated to be equivalent to £105/t;
- business rates were estimated to cost composting sites £2.45/t of material processed (Section 3.4, Table 3.21);
- a minimum of 2325 full-time equivalent (FTE) employees were engaged in organics recycling (Section 3.3.3, Table 3.20); and
- the composting sector is thought to be largely reliant upon gate fees as the primary source of revenue in their business models.

Composting

In 2009, the composting sector across the UK composted more wastes than in previous years. Notable features included the following:

- the majority of systems were OAW (comprising 62% of permitted operating systems, processing 53% of wastes);
- permitted IVC composting and totally enclosed systems accounted for 33% of systems and 43% of input wastes (Section 4.4, Table 4.9);
- 43% of UK permitted sites had a capacity of between 5000t and 25,000t per year (Section 4.3.1, Table 4.7);
- the majority of sites had been in operation for over five years, with a mean of 5.3 years (Figure 4.1); and
- in England and Wales, the majority of permitted sites were stand-alone, whilst in Scotland they were primarily co-located with other activities.

The vast majority of compost reported to have been manufactured was soil conditioner (84%), accounting for 1.4Mt (data from sample returns only), with other product categories only in the tens of thousands of tonnes (Table 4.27).

The manufacture of certified compost increased on previous years. The majority of composting sites across the UK in 2009 were engaged in the Publicly Available Specification (PAS) 100/Compost Quality Protocol (CQP) certification scheme, reflecting the approach to quality embraced by most sites:

- 2.9Mt of compost was manufactured at permitted and exempt composting sites (Section 4.7, Table 4.17);
- 61% of wastes identified in the operator waste returns were either certified or undergoing certification to PAS 100 (with or without the CQP), equivalent to 2.76Mt of waste (Section 4.8.1, Table 4.20);
- soil improver was the principal product, with an estimated 0.8Mt of certified product manufactured (Section 4.8.4); and
- the total value of compost manufactured at permitted composting sites was in the region of £9M.

However, the sector still appeared to rely upon the agricultural sector as its principal market, accepting 59% of all compost manufactured, suggesting this is a high volume, low value market. The majority of the compost was applied to cereals and other combinable crops (43%) followed by other arable crops (15%) (Section 4.10.1, Table 4.29).

AD

The UK's nascent AD sector was reviewed for the first time in this study. A total of 17 sites were identified, of which eight responded to the survey. The majority of the sites identified were located in England and Scotland (Section 5.1). Of those responding to the survey, the majority (63%) had only been in operation since 2006. Most were stand-alone sites, although two were co-located at food/drink manufacturing sites (Section 5.3).

Of the sites responding to the 2009 survey:

- 100% employed mesophilic, wet, continuous systems;
- 75% had single-stage systems, whilst 25% had two-or-more-stage systems;
- 50% of surveyed sites had pasteurisation units (Section 5.4.1); and
- three sites were approved to digest animal by-products.

In line with the composting sector, AD operators received most of their waste from municipal sources, although this was proportionally much less (56% for AD compared to 80% for composting). The majority of non-waste feedstocks were food processing by-products (87%), whilst manures and energy crops accounted for 12% and 0.3% respectively (Section 5.6.2).

The mean quantity of biogas generated in 2009 was 1.3M m³ per site, with 72% of sites generating heat and electricity on-site. The sale of electricity generated from biogas provided a substantial income to those sites registered with the Office of Gas and Electricity Markets (Ofgem) to receive Renewable Obligation Certificates (ROCs) (Section 5.7.1):

- 65,523 ROCs were issued and redeemed, generating a total of £2.4M;
- plants registered with Ofgem had a mean generating capacity of 1.1MW; and
- income from the sale of ROCs amounted to a mean of £203k per site – equivalent to 2734MWh of electricity generated per site.

Agriculture was the sole market for AD product, with 37% applied directly to land owned by the operator (Section 5.7.5). An estimated total of 161kt of whole digestate was applied to agricultural land in 2009. Grassland was the major recipient crop (52%) followed by cereals and other combinable crops (43%).

Overall conclusions

Between 2008/09 and 2009, the composting sector grew by about 5%, in line with surveys conducted in previous years. This 2009 study has, for the first time, mapped the nascent AD sector, which is expected to grow significantly in future years. A robust baseline thus exists for this important technology. It is anticipated that the organics recycling sector will continue to grow in the future, although it seems likely that AD and IVC systems will treat proportionally more wastes than they do at present.

Municipal waste remained the main feedstock for the organics recycling industry, but with non-municipal feedstocks forming a much greater proportion of AD waste inputs. The composting sector composted more wastes than in previous years. However, the dominance of OAW systems appeared to be reducing proportionally as more IVC systems became operational with the capacity to treat separately-collected food wastes. It is envisaged that this trend will continue in the future, although the over-reliance on gate fees as the principal revenue source and lack of market diversification may well leave some businesses vulnerable.

The AD organics recycling sector in the UK was at an early stage in its development in 2009. It appeared to source wastes from a wider range of suppliers than the composting sector, spanning both municipal and non-municipal sources. Non-waste materials were also important additional feedstocks and may indeed have been the most prevalent feedstock for those operational AD plants for which no waste input data could be obtained. Income generation largely relied upon gate fees and the sale of electricity, whilst marketing activities for digestate did not appear to be well developed.

Agriculture remained the dominant end-market for compost and digestate material products and expanded its size and market share slightly, with the professional and amateur horticultural markets also playing a significant role. The manufacture of certified compost to PAS 100 increased on previous years. Notably, food waste-derived products continued to increase, representing 25% of the total quantity of compost in 2009. Markets for digestate were in their infancy during 2009, although the study clearly showed a heavy reliance on agriculture.

The business analysis surveys suggested that, in 2009, the composting and AD sectors adopted different business models, with both operating as separate, mutually exclusive industry sectors. Greater divergence or integration may occur in future years.

Future recommendations

It is recommended that:

- the newly-established ORSR should be retained and supplemented annually;
- the inclusion of MBT processes in future organics recycling studies should be reviewed, with the option of addressing this sector elsewhere;
- further consideration should be given to ways of capturing data on the quantity of materials generated on site that enter into organics recycling processes, as well as those that originate off site; this data gap is especially important for the AD sector;
- the survey method should be further developed to capture more organics recycling at exempt sites;
- WRAP and industry partners should seek to plan and, where possible, integrate their survey requirements where the organics recycling industry is concerned; and
- with increased confidence in this revised baseline, consideration could be given to setting aspirational targets over a business planning period to, say, 2014, linking to the Coalition Government's policy to develop organics recycling over this period.

Acknowledgements

The authors would like to thank the numerous representatives from the various organics recycling companies contacted during the course of this study. Without their valuable contributions and good will this survey would not have been possible.

The authors also wish to thank the industry bodies ABDA, AfOR and REA, and members of the WRAP Organics Team, for their personal interventions that made a substantial contribution towards this study.

Project Steering Committee

Louise Wallace	ABDA
Matt Hindle	ABDA
Jeremy Jacobs	AfOR
David Collins	REA
Roisin Jones	WRAP
Louise McGregor	Zero Waste Scotland

In addition, the authors would like to extend their thanks to the following people who kindly provided data and responded to requests for clarification:

Edwina Hinton	Animal Health
Brenda Foster	Animal Health
Kiara Zennaro	AfOR
Percy Foster	Cré – Composting and Anaerobic Digestion Association of Ireland
Jon Rouse	Department for Environment, Food and Rural Affairs (Defra)
Andrea Purdy	Environment Agency (EA)
Marc Cowls	Environment Agency (EA)
Adrian Gregory	Northern Ireland Environment Agency (NIEA)
Cindy Lee	Scottish Environment Protection Agency (SEPA)
George Smith	Tanks and Vessels Ltd
Tom Quested	WRAP

Contents

1	Introduction	8
1.1	Context and background	8
1.2	The need for change	8
1.3	Revised methodology	8
1.4	Scope and outline of the report	9
2	Methodology.....	10
2.1	Recommended changes arising from the 2008/09 survey.....	10
2.2	Creation of a national organics recycling site register.....	10
2.3	Design of questionnaire survey forms.....	11
2.4	Method of sampling, survey distribution and administration.....	13
2.4.1	Permitted sites.....	13
2.4.2	Exempt composting sites	13
2.5	Response rates	13
2.6	Gross-up methodology.....	15
2.6.1	Permitted/licensed sites.....	15
2.6.2	Exempt composting sites	15
2.6.3	Financial turnover and employment	15
2.7	Citing data sources.....	16
2.8	Future recommendations on methodology development	17
3	Estimates of the size and scope of the UK organics recycling industry in 2009	18
3.1	Numbers of active sites, range of processes and quantities of wastes processed	18
3.2	Types and quantities of wastes recycled in the UK in 2009.....	20
3.2.1	Estimates of the total quantities of organic wastes recycled in the UK in 2009.....	20
3.2.2	Detailed analysis of the types and quantities of wastes recycled at permitted sites.....	22
3.2.3	Types and quantities of organic local authority wastes collected for recycling	24
3.2.4	Waste input estimates for exempt composting sites	28
3.3	Business analysis – financial size and employment	31
3.3.1	Company category	32
3.3.2	Financial parameters	33
3.3.3	Employment	34
3.4	Rateable value	35
3.5	Industry development.....	36
3.5.1	Planning applications.....	36
3.5.2	Planned development.....	36
3.6	Opportunities and challenges	37
3.7	Discussion and conclusions	38
4	Composting	41
4.1	Survey response rates	41
4.1.1	Permitted/licensed composting sites	41
4.1.2	Exempt sites.....	42
4.2	Site location characteristics of composting activities	43
4.3	Site capacity	46
4.3.1	Permitted/licensed sites.....	46
4.3.2	Exempt sites.....	47
4.4	Composting systems and processes	47
4.4.1	Waste pre-treatment.....	48
4.4.2	Biodegradable bags.....	49
4.4.3	ABPR	49
4.5	Origin of wastes and materials recycled.....	50
4.5.1	Permitted/licensed sites.....	50
4.5.2	Exempt sites.....	52

4.6	Wastes composted at permitted/licensed sites	53
4.7	Composted products.....	54
4.7.1	Quantities	54
4.8	PAS 100 and CQP certification	55
4.8.1	Certification status	55
4.8.2	Types of wastes undergoing certification.....	56
4.8.3	Composting systems at certified sites	57
4.8.4	Compost operators' perspectives on certification.....	57
4.9	Product types.....	59
4.9.1	Grades of product	59
4.9.2	Product categories	59
4.10	Market sectors	60
4.10.1	Agricultural crop applications	61
4.10.2	Compost distribution and value	61
4.11	Discussion and conclusions	64
5	AD	66
5.1	Survey response and quantity of organic waste inputs to AD processes.....	66
5.2	Treatment capacity	68
5.3	Site location.....	69
5.4	AD systems and operating processes	69
5.4.1	ABPR-approved AD sites.....	69
5.5	Sources of waste inputs digested.....	70
5.6	Wastes and other materials digested.....	71
5.6.1	Controlled wastes	71
5.6.2	Non-waste materials	71
5.7	Digested products	72
5.7.1	Biogas and energy outputs	72
5.7.2	Quantities and types of whole digestate, liquor and fibre produced	73
5.7.3	Post-treatment of whole digestate	74
5.7.4	PAS 110 and ADQP certification.....	74
5.7.5	Destination of the whole digestate, separated fibre and liquor	75
5.8	Discussion and conclusions	77
6	Summary of key trends in the UK organics recycling industry	80
6.1	Trends in waste inputs and processing methods.....	80
6.2	Quantity of compost and digestate products manufactured in the UK.....	80
6.3	Long-term UK trends in compost product types from 2004/05 to 2009	81
6.4	Compost and digestate products by nation and English regions	82
6.5	Products containing food wastes.....	84
6.6	Compost and digestate market sectors.....	86
6.7	Compost market sectors in Great Britain.....	88
6.8	Compost and digestate applied to agricultural crops	89
6.9	Distribution and sale of compost and digestate	92
6.10	PAS 100 certification.....	93
6.11	Conclusions	94
	Appendix A	98
	National Organics Recycling Survey: ADBA Survey Briefing	99
	National Organics Recycling Survey: AFOR Survey Briefing	100
	National Organics Recycling Survey: REA Survey Briefing	101
	Appendix B	147

1 Introduction

1.1 Context and background

Since 2004/05, M·E·L Research has undertaken an annual market study of the UK organics recycling industry (originally under the title of the Composting and Biological Treatment Industry Survey). This originated from the annual survey conducted by the former Composting Association, subsequently funded by WRAP from 2006. This study is recognised across the organics recycling industry as the most definitive market analysis of the industry's current activities and performance, and the principal source of evidence on trends and the structural and technological changes that are rapidly taking place within the industry.

Until 2009, the market analysis was conducted through a business survey sent to organics recycling operators known to be, or suspected as being, actively engaged in organics recycling during the year in question. The principal source of these business contacts was traditionally the membership database of AfOR, together with information from the Environment Agency (EA) and SEPA on the larger composting sites exempt from environmental permits or waste management licences. Survey questionnaires were sent by post to businesses on these lists, with email and self-completion online options offered in more recent years.

1.2 The need for change

2009 marked a change of approach. The need for this change had become increasingly evident from growing difficulties arising with the traditional approach. These are highlighted in Section 2 and included:

- the increasing number of firms who felt that the data requested duplicated data already supplied to the regulatory agencies;
- growing resistance to providing what was felt to be commercially sensitive information on markets and end uses, as well as financial data;
- the rapid expansion of new technologies (in particular AD) where the operational processes required a different, customised line of questioning as opposed to the standard one-size-fits-all survey questionnaire;
- the increasing amount of complex technical information needed to fully understand the workings of the organics recycling industry as it expands and matures;
- the resulting low/non-existent response from key sectors, such as AD and the larger multi-site composting firms, whose significant impact on the industry as a whole was not adequately captured in the survey; and
- the concerns felt by the industry as to the perceived value of the survey, which meant that it became harder to obtain responses.

1.3 Revised methodology

To address these growing concerns, a different approach was adopted for 2009's study. In essence, the new approach involves:

- using nationally published site record databases (i.e. secondary data sources) to replace the survey as the main source of information on scope, scale and waste inputs to the organics recycling industry, thus ensuring essentially a census of all organics recycling sites rather than simply a partial survey response;
- from this, creating a new register, the ORSR, to be held by WRAP and both contain the bedrock of information on the activities of the industry and act as a long-term, sustainable, annually updated database;
- adapting the survey instrument so that separate versions were created specifically for the different kinds of process, and replication of data sent to the regulatory agencies was removed;
- more actively engaging the major industry bodies AfOR, ADBA and REA, and WRAP's specialists in the Organics Team, in seeking to motivate and persuade key producers to take part in the survey;
- approaching the larger multi-site firms, and operators of new technologies, through an expert technical consultant telephone interview rather than through a distributed survey form; and
- applying a higher level of technical expertise in the design, analysis and interpretation of the data.

This current report presents the first outputs using this revised methodological approach. The survey period has switched from a financial year to a calendar year basis. This flows logically from the decision to make the published regulator site records the core data resource, as these data are only published by calendar year. As a result, the data in this report cover the calendar year 2009. To an extent it therefore overlaps the period covered by the previous 2008/09 survey report in that the first quarter of the 2009 calendar year was covered in both projects. Observed changes in the statistics are only for the nine-month period covering the transition between

the two reporting conventions. Because of this and the modifications to the approach, the current report is therefore best viewed as a 're-benchmarking' of the state of the industry in 2009. While comparisons can still be made with the previous survey, the nine-month interval and the changes in method mean that some caution should be exercised in interpreting these comparisons.

The revised approach has allowed the state of the organics recycling industry in the UK to be described in greater detail and with more confidence than using the previous approach. It has nevertheless been experimental and a number of learning points were identified during the course of this year's project, which should allow the study to be further improved in future. These learning points are included in the recommendations in Section 2, which covers project methodology. Nevertheless, the re-conceptualising of the approach has resulted in a new knowledge system that has responded to previous concerns and can now provide a revised basis on which to take this work forward in future.

1.4 Scope and outline of the report

The study captures the recycling of municipal organic waste arising from source-segregated kerbside collections of garden and/or food waste, or via green waste taken to public HWRCs. It also includes the recycling of feedstocks from non-municipal sources, such as green waste from landscaping and grounds maintenance, and food waste from the trade, retail and catering sectors. Waste inputs can either be source-segregated or mixed waste. This study does not include home composting, or composting undertaken on-site for organic waste generated at premises such as schools and hospitals.

The study covers a range of organic waste recycling processes operating across the UK, with particular emphasis on biological treatment techniques, such as composting and AD, as well as TAD and residual waste processing through MBT. Within this report the term 'organic waste' has been assumed to refer to 'waste of animal or plant origin which, for recovery purposes, can be decomposed by micro-organisms, or other larger soil-borne organisms or enzymes', although there are overlaps with definitions of 'bio-waste' and 'biodegradable waste' used in extant legislation.

A glossary of technical terms is provided at the end of this report to aid the reader. This year the survey has captured much greater detail on organic waste and other feedstocks such as manures and energy crops processed through new technologies such as AD – an emerging need as the industry diversifies.

Section 2 of the report begins by outlining the project and revised study methodology. Section 3 then presents an overview of the state of the organics recycling industry in 2009, describes the business status and economic parameters of the industry as a whole and looks ahead to future anticipated development of the industry, including site planning applications. Following this overview, Sections 4 and 5 report the detailed findings on the state of the main organics recycling processes: composting and AD. Where valid trends can be identified in terms of key performance indicators across the broad scope of the project, the relevant data, tables and trend graphs have been summarised in Section 6.

2 Methodology

2.1 Recommended changes arising from the 2008/09 survey

In the report of the 2008/09 survey, a set of recommendations was listed with the intention to strengthen and improve the methodology in future. It was recommended that:

- a definitive and annually updated list of organics recycling firms should be compiled and maintained, incorporating but extending beyond the AfOR membership list, and in particular including ADBA and REA members;
- established survey respondent contacts (named individuals) should be identified and their commitment to participation secured before the survey request was issued;
- further work should be undertaken within the industry to secure motivation, commitment and participation amongst larger companies and amongst companies specialising in the new technologies;
- for larger firms, a simpler mechanism should be devised for each site record to be returned – possibly developing the online system and relating the returns to existing reporting requirements of EA and SEPA;
- information collected from sites operating new technologies should be adapted to reflect the kind of additional information relevant to these processes rather than traditional composting processes; and
- consideration should be given to the feasibility of requesting more extensive site and process-specific returns so that the productive performance (per employee, per tonne) could be better understood at this level rather than at company-wide aggregate level, as previously happened.

The revised methodology used for 2009 responds to many of these points and contains additional developments on the estimation of the financial size of the industry. The new methodologies used for 2009 thus consisted of:

- the creation of a national ORSR derived from secondary data sources;
- the use of regulatory agency data on quantities and types of waste inputs from all permitted/licensed sites in 2009; and
- direct surveying of permitted/licensed and exempt AD, composting, MBT and TAD site operators through targeted questionnaires for each sector (replacing the previous one-size-fits-all questionnaire) to obtain site-based data on processes, products, business turnover and end-use markets.

Within this report, the overall project has been referred to as a 'study' in order to differentiate it from the individual 'surveys' carried out to obtain primary data. The methods used in the study are set out below.

2.2 Creation of a national organics recycling site register

The aim of the ORSR was to create a database listing all sites which were operational in 2009 and then to populate the register with data derived from a number of sources, including primary and secondary datasets.

The initial steps in the project involved seeking to acquire access to regulatory agency data on sites operating organics recycling processes in 2009. The core dataset available from EA was sourced through the published Waste Site Interrogator database for England and Wales 2009 and is referred to as the 'operator waste returns' in this report. This dataset contains records of waste permitted sites and EWC-coded inputs, allowing the sub-set of permitted organics recycling sites to be identified by reference to their site classification and organic waste inputs. A similar data source was provided by SEPA for sites located in Scotland. NIEA also provided a list of waste summary returns from waste licences and permits, under the terms of a project-specific agreement signed between NIEA and M·E·L Research for the purposes of this project.

Extensive filtering of these permitted site databases was required, according to waste inputs, to identify those permitted sites believed to be actively engaged in organics recycling processes and to disaggregate data at sites where multiple waste activities were carried out. The identity of and waste inputs to these sites were extracted and lodged in the ORSR, a Microsoft Access database created specifically for the purposes of this project.

From these sources, a comprehensive census audit was compiled for the calendar year 2009. The census included all sites in the UK operating under either an environmental permit or a waste management licence to undertake organics recycling activities and suspected on the basis of waste inputs and site classification to be operating organics recycling processes.¹ As well as comprising as close as possible a 100% census of permitted organics recycling sites, waste input tonnages were also available from these sources subdivided by EWC codes. These data, which were not available in previous years, now allow a complete coverage to be reported, on the quantities and source categories of external waste inputs to permitted organics recycling sites, insofar as the regulatory data can be regarded as a comprehensive data source.² As data can then be subdivided by process type determined from the site records, there is now a comprehensive record of permitted sites by process and by waste quantities for each of the major processes reported in this study.

To the list of permitted sites identified from the regulatory authorities, other potentially active organics recycling sites in England, Northern Ireland, Scotland and Wales were also identified from the following sources:

- sites registered as complying with or seeking certification under PAS 100 and, where relevant, the CQP;³
- lists of Animal By-Products Regulations (ABPR)-approved premises provided by Animal Health;
- membership lists provided by trade bodies;
- the register of ROCs awarded by Ofgem; and
- web searches.

Composting activities may also be undertaken on sites recorded by the regulatory agencies as exempt from a waste management licence or environmental permit, with relevant legislation in force in England and Wales, Northern Ireland and Scotland. The exemption allows composting to take place provided that a volume of less than 1000m³ is processed at any one time at the place where the waste was produced or the compost used. In previous years, exempt composting site operators were sent survey questionnaires if present on the AfOR membership database or if added through the judgment of WRAP's Organics Team as potentially significant composters, using data on site contacts from EA. As a result, while larger exempt composting activities were included, the survey did not capture any of the large number of smaller composting operations ongoing at exempt sites.

Exempt sites were also problematic for this study as there is no requirement for waste input tonnages to be reported, except in Scotland where SEPA maintains input tonnage data. In looking to upgrade this aspect of the study, exempt site location data were obtained from the regulatory agencies; therefore all 2733 Paragraph 12 composting exemptions in the UK for 2009 were recorded. It is recognised that, for an undetermined proportion of these sites, there may have been no active composting during 2009, so the site records will overstate the number of active composting locations. Data on this are reported later.

2.3 Design of questionnaire survey forms

While the ORSR database provided a comprehensive list of organics recycling sites in the UK, the survey questionnaire element remained an important mechanism for obtaining data on quantities of output and product, destination and end use, plus open-ended comments and insights on the development of the industry and the current state of the market.

Taking forward one of the principal recommendations for upgrading the project, the one-size-fits-all questionnaire used in previous years (which had been increasingly encumbered with options covering a range of treatment processes) was replaced by a separate set of five questionnaires each customised to a specific process.

¹ It was difficult to identify some sites, as the site classifications assigned by the regulators sometimes covered a number of waste management activities, such as transfer stations or civic amenity sites. In addition, AD sites were variously classified as biological treatment, composting or treatment sites.

² Some sites identified during this study from the sources listed above were not identified in the operator waste returns, although it is unclear why this was the case.

³ The specification for whole digestate, separated liquor and separated fibre derived from the AD of source-segregated biodegradable materials (PAS 110) was published in 2010 by WRAP and the British Standards Institution (BSI), whilst the Anaerobic Digestate Quality Protocol (ADQP) was published in September 2009. As the Biofertiliser Certification Scheme was launched in January 2009, this meant that AD sites were unable to gain certification during 2009.

These were:

- AD processes;
- exempt composting sites;
- permitted composting sites;
- MBT sites; and
- TAD sites.

The revised survey method was designed to make the questionnaires more specifically relevant to each site operator and to remove questions that duplicated input data, which were now available through the operator waste returns. Overall, this strategy was designed to address the operator concerns raised in previous surveys, that the questionnaires were over-lengthy, duplicated data already provided (e.g. to regulators) and covered issues not relevant or appropriate to the specific operator.

The site survey questionnaires were developed through collaboration between WRAP, ADBA, AfOR, REA and M·E·L Research for completion by firms potentially engaged in organics recycling. Copies of the survey questionnaires and covering letters are included in Appendix A. The questions included sections asking for data relating to the:

- end markets and end uses of the product;
- financial data pertaining to the site process;
- qualitative market perceptions of the site operator;
- quantity and type of product output; and
- type of organics recycling process or technology.

The 2009 survey marked a first attempt to capture financial data (turnover and number of employees) related to specific sites, in contrast to the previous surveys where this 'business survey' question was asked of companies rather than individual site operators. For example, it was noted in 2008/09 that, although an average 'turnover per input tonne or employee' could be quoted for the organics recycling industry as a whole, it was not possible to break this down by process and examine the respective differentials by type of process, even though it was anticipated that the different processes would vary substantially in terms of these parameters.

The attempt to gather financial data at site level, rather than at business level, was made in order to try and address this information need. It was recognised, however, that seeking financial data at site level was likely to prompt concerns about commercial confidentiality, which is why the previous survey requested aggregated data at business level. Even under the previous survey, concerns were raised about business-level data and around 15% of respondent businesses declined to complete the financial section. Seeking data at individual site level was anticipated to produce an even greater level of concern and as a back-stop it was decided to retain a business-level aggregated survey for those who may wish to confine their responses to the broader level. As with much survey research, the dilemma has been between obtaining more detailed and useful information at site level, while risking lower response rates; or getting broader, aggregated but less informative data at company level in the attempt to maximise the response rate.

In consequence, a 'head office' survey was also designed, consisting essentially of a request for turnover and employee levels for business activities relating specifically to organics recycling. This was set up as an online self-completion survey and was emailed as an online web link by industry partners to their company member contacts. Thus financial information for 2009 was collected through two options, business level and site level, with data analysis addressing and adapting responses as necessary to remove any duplication. In the event, the response achieved at site level was felt sufficient to justify progressing with the more detailed analysis that this source generated.

Given the rapidly developing nature of some aspects of the industry, it should be noted that the picture presented in this market survey does not take account of developments since the end of December 2009. At the time of completing the 2009 study, many operators were already preparing their own 2010 year-end returns and so the industry status is necessarily somewhat dated in the context of recent rapid development in the new technologies. Looking to the future, it will be necessary to settle on a data collection period striking the right balance between immediacy and the availability of national data.

2.4 Method of sampling, survey distribution and administration

2.4.1 Permitted sites

To promote the survey amongst the membership of the main industry bodies, two e-communications were sent to members by the three partners: ADBA, AfOR and REA. The first communication was a prior notification email sent during the week commencing 10 January 2011, followed by a technical briefing note to launch the survey which was despatched by the industry partners in the week commencing 24 January 2011. This technical briefing was also accompanied by a web link to the online head office survey.

Following this notification, direct contact was then made from 31 January 2011 to identified site operators, with the intention of completing the survey directly with them. This was intended to provide a more personal and less anonymous means of direct contact than in previous years, which centred on the posting and emailing of a survey form that recipients were asked to self-complete.

Surveying was targeted to prioritise:

- the 35 sites where AD processes were potentially active in 2009 (and the 17 subsequently identified as having been actively processing in this period); and
- the 'top 20' composting firms, chosen according to the number of sites and input tonnages recorded in 2009 through the operator waste returns.

By targeting resources in this way and concentrating on the AD and larger composting sites, responses were obtained from companies that had not taken part in previous surveys.

Chasing up of other composting sites, including a sample of exempt sites, also continued until a cut-off in the week commencing 7 March 2011.

2.4.2 Exempt composting sites

A total of 2733 sites were identified from the regulator databases as having registered a composting exemption. However, it was unclear which of these sites were active during 2009. In order to survey these in a cost-effective manner, a sample was selected with the dual purpose of:

- identifying those sites most likely to encompass larger composting operations (e.g. those responding to the survey in previous years and those operated by waste management companies); and
- covering a broad cross-section of sites taken from the site's listed activity (e.g. farm, nursery, waste management site etc).

All sites covering activities where composting was expected to be most prevalent were included in the postal survey sample, which totalled 574 exempt sites out of 2733. The sample included 46 depots, 36 recycling centres, 59 nurseries, 53 allotment sites and 57 landfill sites (totalling 251 sites), while a random sample of 10% of all other registered exempt sites (of whatever size or category) was also included, along with the individual sites specifically selected for the reasons above (totalling 323 sites).

2.5 Response rates

In total, 70% of all organic waste material composted in 2009 and 70% of compost product manufactured was captured through ORSR survey respondents in this study. The AD plants supplying data increased from two in 2008/09 to eight in 2009 (47% of sites known to be active in the sector). Two records providing partial data were removed, giving a total of 204 sites compared to the 194 sites providing data in 2008/09.

In addition, through the head office survey and site data, altogether 111 individual sites provided financial and employment data at site level (98 through the interview survey and a further 13 through the postal exempt sites survey). This compares to the 95 data items collected in 2008/09, which were business-only financial returns not disaggregated to sites.

Table 2.1 summarises the response rates achieved.

Table 2.1: Summary of responses achieved for 2009

Process type	Operational sites in 2009	Survey responses	Response rate (%)	Site-based financial data
Composting (permitted)	281	145	51.6	98
AD	17	8	47.1	0
MBT	9	2	22.2	0
TAD	2	0	0.0	0
Composting (exempt)	529*	49*	9.3*	13

* The exempt site sample of 529 was drawn from the population of 2733 identified sites. Replies were received from 49 active exempt sites, with a further 45 indicating that sites were inactive.

Based on the statistical sources and response rates, it has now been possible for the first time to estimate the overall accuracy of the data presented in the study. Previously it was difficult to estimate this with any confidence, as there was no national reference point for the 'population' of sites from which the samples were drawn.

For national statistics now based on operator waste returns to the regulators, we have taken this as a definitive census of activity. Accounting for operator error in submitting returns, it would be prudent to work to a notional instrument error band of +/- 2% at the 95% level of confidence, to take account of any reporting errors.

For the data based on survey returns, sampling errors were calculated from standard statistical sampling tables for categorical data (e.g. where respondents gave answers to tick-box-type questions). These sampling tolerances show:

- for the permitted composting sites, 145 returns from a 281 population gives data accurate to +/-5.1% at the 95% level of confidence;
- for all permitted sites, 155 returns out of a population of 309 gives data accurate to +/-5.0% at the 95% level of confidence;
- for all exempt sites (94 survey and 87 SEPA records), 181 returns from an estimated population of 2733 gives data accurate to +/-6.5% at the 95% level of confidence; and
- for the exempt site survey data on active sites only, 49 returns from an estimated 2104 active sites⁴ gives data accurate to +/-13.2% at the 95% level of confidence.

Where the data relate to 'continuous' variables (such as tonnages), confidence intervals (CIs) have been determined by calculating the standard deviation of the sample around the mean value and, from this and the sample size, calculating the 95% CI. To provide a comparative basis with the percentage error bands from categorical data, the numerical CIs (e.g. +/- x tonnes) have been expressed as percentages of the mean. The glossary at the end of this report sets out definitions for CIs calculated for discrete (categorical) and continuous data.

Calculating CIs for this study is complicated by the fact that many analyses rest on multi-source data and apportionment of continuous variables to the results for categorical data analysis. The principle of the approach has therefore been to allocate the data/tabulations in this report to one of three broad bands of confidence:

- (i) where data are typically accurate to +/-2% and with errors arising mainly from non-sampling errors in the data reported to the regulators;
- (ii) where data are typically accurate to around +/-5% taking account of sampling errors, reporting error and the variance where this has been calculated from continuous data; and
- (iii) where data are typically accurate to around +/-13% again taking account of sampling and reporting errors and the variance in continuous data.

In each case, this is a broad indication of the level of confidence that can be held in the data, rather than a specific statistic calculated in each case; it is a best practicable estimate based on standard tables and measures of variance where these can be approximately determined; individual CIs for each table have not been separately calculated from raw data.

⁴ The survey responses from inactive sites suggested that 23% of the 2733 registered exempt sites were inactive, giving an estimate of 2104 active exempt sites, as explained in Section 3.2.4.

2.6 Gross-up methodology

2.6.1 Permitted/licensed sites

In previous years, the annual organics recycling industry survey was based on a sample survey of firms in the industry, with the annual national quantity of waste inputs and organic product outputs being calculated from a grossing-up methodology using WDF. WDF is the Defra-sponsored database of local authority quarterly data returns on local authority waste collection, recycling and disposal.

In essence, the previous method involved taking the total tonnage of WDF-reported organic municipal waste collected for recycling to represent the total quantities entering the industry and then apportioning this total across the survey percentages to give an estimated total tonnage processed through the various technologies and processes. Details of the previous methodology can be found in the 2008/09 survey report.

For the 2009 report, instead of back-calculating based on survey estimates, site inputs to the various organics recycling processes are represented by the summed actual data obtained by the regulators, thereby removing uncertainties surrounding the validity and representative nature of this aspect of the gross-up methodology. Outputs and end products/destinations were still dependent on responses to the questionnaire survey as these data cannot be derived through secondary data sources. The method for extrapolating national output product and end-use tonnages from the survey responses is to multiply up the observed totals from the survey respondent sample in proportion to the percentage of the known input tonnages that are covered by the sites responding to the survey. These gross-up estimates come with the associated accuracies and confidence levels described earlier.

2.6.2 Exempt composting sites

While this is an effective method for all permitted/licensed sites, it does not take account of sites operating under Paragraph 12 exemptions from site permitting. With the exception of SEPA, the regulatory data sources do not include waste input data, only site location and status. Therefore, while the regulatory data sources on exemptions can be used to determine precisely how many exempt sites were registered, as well as the type of site, data on both waste inputs and outputs cannot be calculated from this source.

For exemptions, then, a new set of methods for UK estimation was developed. Three separate alternative methods were applied independently and a best estimate taken from this triangulation (see Section 3.2.4). The basic principles of the three UK gross-up methods used were as follows:

- **SEPA average site tonnage extrapolation** – grossing up to the UK total of exempt sites using ‘per site’ averages obtained from the SEPA regulatory returns;
- **UK size band extrapolation** – calculating the distributional profile of exempt sites from the survey and SEPA data, and inferring an average tonnage per site band; then calculating the UK total by summing the averages multiplied by the numbers of sites estimated to fall within each size band UK-wide; and
- **WDF balance method** – calculating exempt site inputs from the residual balance remaining after deducting the reported permitted/licensed sites from the WDF total.

All three estimation methods produced very similar results. The WDF balance method was finally selected for use in the overall dataset. The advantage of this method is that it allows the results from this study to be reconciled with published waste flow data. It has the potential to be projected directly onto any other national waste management data analysis that may be undertaken by WRAP or other partners in parallel with this project.

It should be noted that, for all UK data covering both permitted and exempt sites, it has now been possible to produce strong, robust and reliable calculations of input and output tonnages for each of the four nations within the UK. This aspect of the survey is much stronger as a result of the new methods, compared with the previous method relying exclusively on survey returns which was exposed to the risk of low response levels and resulting high errors of estimates with regard to the smaller nations.

2.6.3 Financial turnover and employment

Estimates for the financial turnover and employment associated with the UK organics recycling industry have also been improved by refining the gross-up methodology, now that financial performance data are available at site rather than business level. Previously the gross-up was undertaken in relation to input tonnage, by adding up the

reported business turnovers from participating companies and making an estimate for non-respondents and those respondents not supplying financial data (by calculating a simple average turnover per tonne and applying this to the remaining proportion of WDF tonnage attributed pro rata to these non-respondent firms). In effect this involved using an average 'per tonne' figure across all companies irrespective of the type of process being operated. After the 2008/09 survey, concern was raised within WRAP that this method may not adequately reflect differences in turnover per tonne and employment per tonne that are likely to occur according to the type of process used.

This problem has been addressed in this study through the use of the site-based survey returns (either online, through interview or via the exemption postal survey). Section 3.3.2 below shows how this analysis has allowed separate turnover and employee 'per tonne' coefficients to be calculated for the various different process types. Coefficients have been calculated for:

- AD;⁵
- IVC permitted site composting;
- MBT;
- OAW permitted site composting; and
- exempt site composting.

2.7 Citing data sources

As the data used in this study were derived from a number of primary and secondary data sources, the relevant sources have been cited alongside the corresponding tables and figures in this report. These sources are summarised below.

Primary data sources

- head office operator survey (permitted sites) – composting, AD and MBT sites;
- operator survey (exempt sites); and
- operator survey (permitted sites) – composting, AD and MBT sites.

Secondary data sources

- AfOR certification database – PAS 100 and CQP certifications;
- Animal Health ABPR-approved premises (in Great Britain);
- Department of Agriculture and Rural Development Northern Ireland ABPR-approved premises lists;
- Ofgem – list of ROCs issued; and
- operator waste returns – details of controlled waste treated from EA, NIEA and SEPA registers.

Data presented within this report refers to the whole of the UK unless otherwise stated.

⁵ No calculations have been made for TAD processes as no survey returns were received from the two identified TAD operators.

2.8 Future recommendations on methodology development

- The existing register of identified organics recycling sites should be retained and updated annually.
- WRAP and industry partners should seek to plan and, where possible, integrate their organics recycling industry survey requirements and agree a regular schedule for the various items of data collection.
- Industry partners should be retained on the Project Steering Group.
- Further consideration should be given to ways of capturing the processing of materials generated on-site, especially for the AD sector, to allow non-waste input feedstocks and resulting outputs to be better covered.
- Further developments should be made to the method used for exempt sites. Whilst the 2009 study has now generated a much more comprehensive picture of the scale and diversity of exempt site activity than previously, it is now clear that further developments are needed to improve coverage of quantities of waste treated at the larger exempt organics sites.
- The inclusion of MBT processes within this study should be reviewed and consideration given to the option of addressing this sector elsewhere. This is because the nature of MBT processes is complex and it is unclear whether these sites should be included in a study of organics waste recycling.

3 Estimates of the Size and Scope of the UK Organics Recycling Industry in 2009

This Section presents a comprehensive summary of the size and scope of the UK organics recycling industry in 2009. Using the techniques described in Section 2, secondary data sources and primary survey data have been analysed and, where practicable, grossed-up to generate estimates of:

- the number and distribution of different types of organics recycling sites in the UK;
- the quantities of waste materials entering these different sites;
- overall financial turnover and employment within the industry; and
- the industry's plans for future growth and development.

This Section is therefore a comprehensive account of the best estimate of the current situation in the UK organics recycling industry as a whole. It is followed in Section 4 by a more detailed analysis of particular aspects of the composting industry, including compost product types, compost quality, PAS 100, markets and end uses of the compost product. Section 5 contains a similar analysis of the AD industry.

Most of Section 3 is focused on presenting an account of the 2009 reporting year. Section 6 provides comparisons, where possible, with previous years' surveys and identifies trends.

The study is based on a range of data sources and applies to specific sub-sets of the industry, e.g. permitted sites and exempt sites and the WDF local authority collected waste data. The survey that was carried out with site operators and different datasets covers different processes. Some data collected apply to a particular process (composting, AD, MBT) but other data apply to all processes. This complexity in the structure of the industry and in the sources of industry data means it is important to note carefully the particular scope and boundaries to which specific tables/figures in this Section apply. Care has been taken to signpost as clearly as possible the sources of the data and any qualifications in the titles, footnotes and text of the tables/figures.

3.1 Numbers of active sites, range of processes and quantities of wastes processed

The study of organics recycling sites known to have been, or suspected as being, in operation during the calendar year 2009 generated a list of 309 permitted/licensed and otherwise specifically identifiable organics recycling sites in the UK.⁶ These were identified from a number of sources, including:

- operator waste returns supplied by the regulatory authorities;
- lists of approved premises under the ABPR held by Animal Health;
- membership lists from trade bodies;
- electricity generators registered with Ofgem; and
- internet searches.

These sites were entered into the ORSR and comprise the sites which formed the main focus of the site survey.

Data from permitted/licensed sites within the ORSR for which operator waste returns were available (219) indicated that they processed a total of just over 5Mt of controlled waste⁷ across the UK (Table 3.1). A total of 2733 registered exempt composting sites were identified, based on data supplied by the regulatory authorities. Estimates of inputs to exempt sites are made separately in Section 3.2.4 below.

⁶ The majority of these sites operated under an environmental permit or waste management licence. However, some identified from other data sources were not listed in the operator waste return databases supplied by the regulators; it is unclear why this was the case. In addition, some AD plants would not have required a permit or licence due to the non-controlled waste feedstocks they processed. However, they were included in the ORSR as they represented an important emerging sector. A large number of exempt composting sites were not included in the ORSR.

⁷ Controlled wastes are household, commercial and industrial wastes as defined in The Controlled Waste Regulations 1992 (as amended).

Table 3.1: Number of organics recycling sites listed in the ORSR and total quantity of controlled wastes processed

Process type	Number of sites listed in the ORSR	Proportion of sites in the ORSR (%)	Sites identified in operator waste returns	Quantity of waste processed (t)*	Proportion of waste processed* (%)
AD	17	5.5	5	45,110	1.0
Composting	281	90.9	204	4,517,594	90.0
MBT	9	2.9	9	438,010	8.7
TAD	2	0.7	1	16,706	0.3
Total	309	100.0	219	5,017,420	100.0

Sources: Animal Health ABPR-approved premises, Ofgem, operator waste returns, trade bodies and web searches.

* This data column covers controlled waste inputs to the permitted/licensed sites, based on operator waste returns (n=219, CI= +/-5%).

Aerobic composting was the dominant treatment method, accounting for 91% of permitted/licensed sites and 90% of waste. 17 AD plants (5.5%) were in operation, although these only treated 1.0% of the total quantity of input waste. By comparison, MBT plants only accounted for 2.9% of individual sites, but processed almost 9% of the total amount of input waste,⁸ illustrating how different treatment techniques operated at different scales. Note, however, that some of this input tonnage to MBT may not be organic waste, as indicated in footnote 8.

The range in the quantities of controlled waste treated is summarised in Table 3.2, which shows that the mean quantity processed at an MBT plant was over 48kt in 2009, compared with just over 22kt at composting sites. As only one TAD system was identified in the operator waste returns, data on waste processed related to this single site (over 16kt). The mean quantity of waste treated at AD plants appears low (9kt). This is probably because the operator waste returns only included wastes and would exclude other non-waste feedstocks, such as manures and energy crops. In addition, the data will not have reflected a full year of operations for those sites that only began operations during 2009, although it has not been possible to calculate the scale of underreporting.

Table 3.2: Minimum, maximum and mean quantities of wastes treated at permitted organics recycling sites

Process type	Minimum (t)	Maximum (t)	Mean (t)
AD	1618	20,646	9022
Composting	530	187,937	22,145
MBT	744	253,693	48,668
TAD*	16,706	16,706	16,706

Source: operator waste returns (n =219, CI = +/-5%).

* One site.

The majority of permitted sites (77%) were in England, with Scotland accounting for 17%, Wales 5% and Northern Ireland 2% (Table 3.3). England also treated a greater quantity of waste than the other nations of the UK (83%). The arithmetical average waste input per site was lower in Scotland and Wales than in England (Table 3.4). The small number of sites in Northern Ireland makes a comparison less reliable.

⁸ This included the total quantity of waste processed at MBT sites, not just the 'organic fraction', as it was not possible to identify the biodegradable fraction based on the EWC codes supplied in the databases. The organic fraction sent for biological treatment at MBT sites would also be dependent upon the technology and extent of mechanical separation beforehand.

Table 3.3: Distribution of identified organics recycling sites on the ORSR across the four nations of the UK in 2009

Process type	Proportion of number of sites in each nation of the UK				
	England	Northern Ireland	Scotland	Wales	Total
AD	12	0	4	1	17
Composting	217	5	44	15	281
MBT	6	0	3	0	9
TAD	2	0	0	0	2
Total	237	5	51	16	309
Proportion	76.7%	1.6%	16.5%	5.2%	100%

Source: operator waste returns (n = 309, CI = +/-5%).

Table 3.4: Distribution of quantities of waste treated at permitted sites across the four nations of the UK in 2009

Process type	Quantity of waste treated in each nation of the UK (t)				
	England	Northern Ireland	Scotland	Wales	Total
AD	34,450	0	10,660	0	45,110
Composting	3,715,044	253,867	496,560	52,123	4,517,594
MBT	375,664	0	62,346	0	438,010
TAD	16,706	0	0	0	16,706
Total	4,141,864	253,867	569,566	52,123	5,017,420
Proportion	82.6%	5.1%	11.3%	1.0%	100.0%

Source: operator waste returns (n= 219, CI =/-2% as census reported statistics).

It should be noted that the total UK input tonnage reported in Table 3.4 (5,017,420t) relates to the regulator data on controlled waste entering permitted/licensed sites.

3.2 Types and quantities of wastes recycled in the UK in 2009

3.2.1 Estimates of the total quantities of organic wastes recycled in the UK in 2009

Data derived from operator waste returns and further estimates of waste composted at exempt composting sites suggest that in the region of 6Mt of organic waste was treated (including organic waste accepted at MBT facilities) in 2009 (Table 3.5).⁹ This includes an estimated 902kt for exempt sites (see calculation in Section 3.2.4) and an additional 60kt of waste that the survey identified as entering AD sites but was not reported in the regulator data (discussed in Section 5). A further 49kt of material consisting of manures and energy crops was also digested at AD plants, but this is excluded from Table 3.5 as these materials do not count as 'wastes' – again this is discussed further in Section 5.

Table 3.5: Total UK organic waste treated in 2009 split according to waste source and recycling method

Source of waste	Quantity of waste treated by recycling method (t)				Total (t)
	Composting	AD	TAD	MBT	
Municipal	3,602,364	25,351	2346	403,580	4,033,641
Non-municipal	915,230	19,759	14,360	34,431	983,780
Unclassified AD site inputs*		60,000*			60,000
Total of all permitted sites	4,517,594	105,110	16,706	438,011	5,077,421
Exempt site estimate	902,277	0	0	0	902,277
Total	5,419,871	105,110	16,706	438,011	5,979,698

Sources: operator waste returns (permitted composting and AD) and operator survey (exempt composting sites) (n= 219, CI =/-2% as census reported statistics).

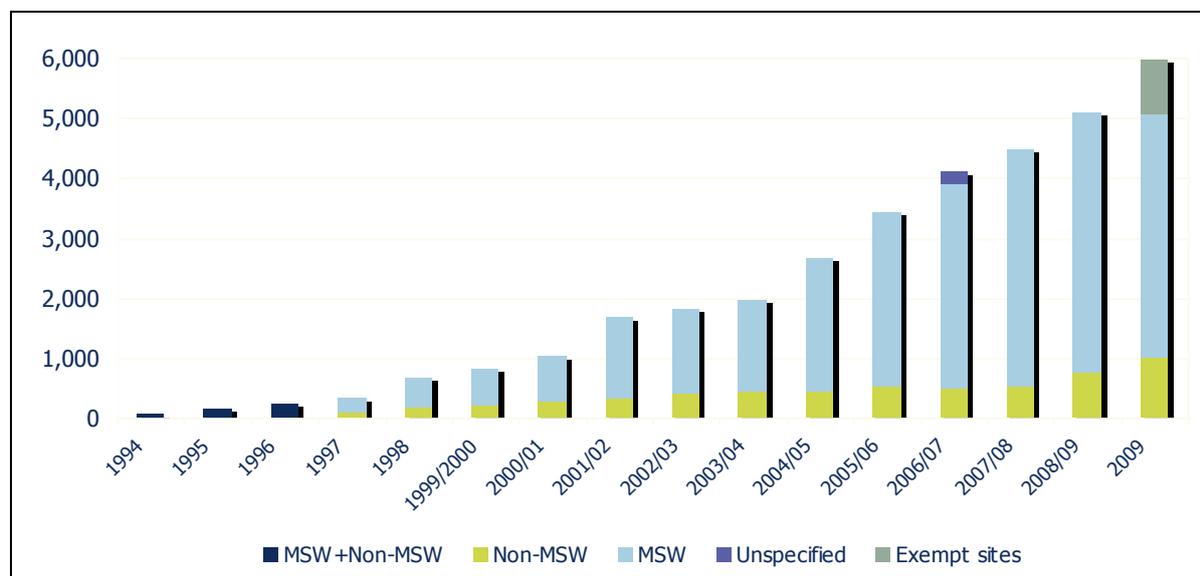
*An extra 60,000t was reported by operators that responded to the AD survey.

⁹ The derivation of these data is discussed separately in subsequent sections.

Altogether, a total of 5.5Mt of waste was recycled¹⁰ at composting, AD and TAD sites, representing 93% of the total quantity of waste, whilst an additional 0.4Mt was processed at MBT sites (7%).

A comparison of the quantities of wastes recycled with previous years is shown in Figure 3.1,¹¹ Table 3.6 and Table 3.7, although the different methodological approaches and timeframes employed in the various surveys prevent detailed comparisons being made. The trends graph includes for the first time a separate estimate of the quantities input to exempt sites, which is calculated at 902kt for 2009. Exempt site inputs were not separately calculated for previous years and their tonnage is included in the general municipal solid waste (MSW)/non-MSW data.

Figure 3.1: Growth in organic waste recycling in the UK



Source: operator waste returns (n = 219; composting, AD & TAD only) and operator survey (exempt composting sites, n = 112) (CI = +/-5%).

Table 3.6 shows that the estimated total organic waste inputs across the UK (excluding MBT) have increased by 8.6% (440kt) between the 2008/09 and 2009 reporting periods.

Table 3.6: Quantities of UK organic waste inputs recycled by different methods in 2008/09 and 2009

Process type	2008/09		2009		Change (%)
	Quantity of waste (kt)*	%	Quantity of waste (kt)**	%	
AD	113	2	105	2	0
Exempt composting sites	704	14	902	16	+ 2
Permitted composting sites	4285	84	4518	82	- 2
TAD	0	0	17	0	0
Subtotal	5102	100	5542	100	0
MBT	629		438		
Total	5731		5980		

*Grossed-up survey data.

** Sources: operator waste returns (n = 219, composting, AD and TAD only) and operator survey (exempt composting sites, n = 112) (CI = +/-5%).

¹⁰ The vast majority (99.97%) was derived from source-segregated waste.

¹¹ Figure 3.1 excludes wastes processed at MBT sites. This is both for consistency with the historic data reported in this time series and also because of the continued uncertainty as to whether the waste processing undertaken at MBT sites should be classified as recycling (see discussion in Section 2).

From Table 3.7 it can be seen that a much higher proportion of input material was going to IVC (38%) in 2009 compared with 2008/09 (17%). A corresponding reduction is seen in OAW (56% in 2009 compared to 75% in 2008/09). This may reflect the changed reporting system as well as an underlying structural change in the process.

Table 3.7: Quantities of organic waste recycled through different treatment methods in 2009 and 2008/09

Process type	2008/09		2009	
	Quantity of waste (kt)*	%	Quantity of waste (kt)**	%
AD	113	2.2	105	1.9
IVC	852	16.7	2078	37.5
OAW	3816	74.8	3117	56.2
Other	321	6.3	242	4.4
Total	5102	100.0	5542	100.0

* Grossed-up survey data.

** Sources: operator waste returns (n = 219, composting, AD and TAD only) and operator survey (exempt composting sites, n = 112) (CI = +/-5%).

3.2.2 Detailed analysis of the types and quantities of wastes recycled at permitted sites

The annual waste returns supplied by the waste regulatory bodies provided a detailed insight into the quantities and types of wastes received at permitted organics recycling sites. As operators are required to submit these returns under the terms of their permit/licence (i.e. they are mandatory), they are the most accurate datasets available. This was the first year that such detailed waste analyses were possible and they have provided a unique insight into the types and quantities of wastes recycled, as described by the relevant six-digit EWC code.¹²

This subsection of the report only describes activities at permitted sites. The analysis of activities at exempt sites is provided in Section 4 below.

Municipal waste – EWC Chapter 20

Just over 80% of the total quantity of wastes treated was classified under EWC code Chapter 20 (Table 3.8). This category includes 'municipal wastes and similar commercial, industrial and institutional wastes including separately collected fractions'. This is similar to the 2008/09 survey,¹³ where an estimated 85% of waste fitted this category. The difference is probably the result of obligations placed on local authorities to recycle wastes and divert biodegradable municipal wastes from landfill.

Table 3.8: Breakdown of the quantities of wastes recycled in 2009 by treatment option

Waste source	Breakdown by treatment option (t)				Total treated (t)	Proportion of controlled waste treated (%)
	Composting	AD	TAD	MBT		
Municipal	3,602,364	25,351	2346	403,580	4,033,641	80.4
Non-municipal	915,230	19,759	14,360	34,431	983,780	19.6
Total	4,517,594	45,110	16,706	438,011	5,017,421	100.0

Source: operator waste returns (n= 219, CI = +/-2% as census reported statistics).

As in previous years, the largest proportion from municipal sources was garden and park wastes (EWC code 20 02 01) (53% of the total quantity of waste¹⁴), with 2.5Mt out of the total 2.7Mt composted. This reflects the predominance of green waste composting operations and the way in which the industry has grown, illustrating that these operations remain the principal organics recycling route, although the way materials are being processed seems to be changing, with proportionally more going to IVC.

¹² Further information on EWC codes can be found in: EA, 2006. Using the list of wastes to code waste.

¹³ AfOR, 2010. Survey of the UK Organics Recycling Industry 2008/09.

¹⁴ Due to the way data were collected in this survey, it was not possible to make a direct like-for-like comparison with data collected in previous years.

Separately collected kitchen and canteen food wastes (EWC code 20 01 08) accounted for the next largest category (11% of the total), with over 0.5Mt composted. Notably, this category accounted for the largest fraction (56%) of municipal waste going to AD plants. Separately collected wood (EWC code 20 01 38) accounted for approximately 0.1Mt, with the majority composted.

Other waste categories to note included: street cleaning residues (EWC code 20 03 03), of which just over 46kt was composted; soil and stones (EWC 20 02 02; 38.7kt); and glass (5.9kt). As glass is inert and would have an adverse impact on compost quality, it was assumed these entries were misclassifications. It is worth noting that these non-biodegradable wastes are not permitted feedstocks under the PAS 100 certification scheme.

Wastes from markets (EWC code 20 03 02; 2.8kt) and edible oils and fats (EWC code 20 01 25; 1.3kt) were treated principally at AD plants, rather than through composting; the latter would provide a feedstock with a high biogas yield.

As only one TAD site was identified in the operator waste returns databases, care needed to be taken in generalising from the analysis. Notably, garden and park wastes (EWC code 20 02 01) accounted for the entire municipal source for this site, although this was presumably grass clippings as it is unlikely that structural materials (e.g. woody wastes) would be suitable for treatment using this technology, which relies on slurried wastes that can be pumped. Alternatively, it could have been food waste slurries (e.g. EWC 02 02 01) that had been miscoded.

Just under 68kt of composted waste was 'mixed municipal waste' (EWC code 20 03 01) and was accepted at 17 different composting sites. A total of 48,773t was from three sites in Scotland which were thought to have co-composted MBT residues with other feedstocks. These wastes would have been excluded from the PAS 100 certification scheme, which only allows source-segregated feedstocks.

Non-municipal wastes – EWC Chapters 1 to 19

Only 19.6% (just under 1Mt) of wastes identified from the operator waste returns was from non-municipal sources. This accounts for just 13% of the 7.5Mt of food waste estimated by WRAP to be generated during manufacturing, distribution, retail sale and hospitality in the UK.¹⁵ Although the Landfill Tax was levied at £40/t during 2009/10, it appears that alternative treatment or disposal routes were preferred rather than organics recycling.

Almost half (48%) of non-municipal wastes came from Chapter 2 sources (defined as 'wastes from agricultural, horticultural, hunting, fishing and aquacultural primary production, food preparation and processing'). The majority (450kt) was composted, although these wastes were also processed at AD and TAD plants. Notably, they were not treated at MBT plants.

Of the Chapter 2 wastes, the majority (40%) was plant tissue waste (EWC code 02 01 03), with 189kt composted and only a small fraction (473t) treated at a TAD plant. Sludges from washing and cleaning (EWC 02 02 01) comprised 16% of the total, with almost 77kt composted. Of the materials unsuitable for consumption or processing (EWC codes 02 02 03 and 02 03 04), just under 70kt were composted and 7.8kt were digested in an AD plant.

Waste packaging (Chapter 15) accounted for 12kt, of which just under 9kt was paper and cardboard, with almost all (i.e. except for 4t) composted.

Construction and demolition wastes (Chapter 17) accounted for 229kt (23%) of the non-municipal waste, with all of it composted. It was dominated by two wastes: soil and stones (EWC code 17 05 04), comprising 40% (95kt), and mixed construction and demolition wastes (EWC code 17 09 04), comprising 41% (98kt). As it is unlikely that these materials would be biodegradable, they were presumably blended with composts to form soil substitutes. (By way of comparison, an estimated 38kt of compost was used in soil-blending operations.)

Wastes from waste treatment facilities (Chapter 19) accounted for 205kt (21%), with 68kt of 'other wastes from mechanical treatment of wastes' (EWC code 19 12 12), representing 33% of the total quantity of waste categorised in that chapter; this was split between composting (37kt) and MBT (31kt). 18% (38kt) of waste

¹⁵ Unpublished internal estimate.

comprised wood (EWC code 19 12 07), which was composted. A total of just under 11kt of 'digestate from anaerobic treatment of animal and vegetable waste' (EWC code 19 06 06) was processed at one AD plant. Other categories to note include: 9kt of off-specification compost (EWC code 19 05 03), which was composted (this was presumably screened oversize or failed batches that required re-composting); 19kt of the 'non-composted fraction of municipal and similar wastes' (EWC code 19 05 01), of which the majority was composted; and 14kt of 'sludges from treatment of urban waste water' (EWC code 19 08 05), which was also composted.

3.2.3 Types and quantities of organic local authority wastes collected for recycling

Data on 'organic' local authority-collected wastes was obtained from WDF¹⁶ and provided a breakdown of the origins of source-segregated organic wastes collected by, or on behalf of, a local authority. WDF is a web-based system for waste data reporting by UK local authorities to government and, as such, acts as a central repository of waste collection data. It includes data on wastes collected at the kerbside and through central points (such as HWRCs), as well as local authority collections from trade premises, parks and local authority premises and household sources. The data relates to the financial year 2009/10, which meant that a detailed comparison with the operator waste return data (discussed in the previous Section) was not possible, although an approximation was made of the total tonnage data as shown below.

As explained in Section 2, with the advent of a direct census of operator waste returns from the regulatory agencies, WDF no longer plays the pivotal role in the study as in previous years, where it formed the cornerstone of the whole gross-up methodology. However, it remains an important data source on the quantity and origins of the municipally sourced organics recycling inputs and it remains key to the estimation method used for other wastes not captured by permitted sites. Also, for the first time, the 2009/10 WDF data included an expanded section on the types of waste collected, namely:

- green garden waste only;
- mixed garden and food waste;
- waste food only;
- wood for composting; and
- other compostable waste.

Previous years' data was only split into 'green waste' and 'other compostable waste', which meant that the 2009/10 data has provided a much greater insight into municipal waste collections. The extra subdivision of material types has added valuable new detail to the sources of this input feedstock.

WDF provided data on organic waste categories collected in a number of ways, as well as those sent for recycling (Table 3.9). There is a difference (70kt) in the quantities recorded as sent for recycling, compared with material collected for this purpose. This issue also arose in last year's survey and the difference is assumed to be caused by rejected material.¹⁷ The WDF data did not enable an estimate of the quantities of wastes sent to different treatment processes, such as composting or AD. Thus, while the WDF data on wastes collected was used for consistency in estimating annual trends, the quantities of wastes 'sent for recycling' were used in the subsequent analyses of actual organics recycling inputs.

¹⁶ See www.wastedataflow.org

¹⁷ This is often material that, whilst separately collected for the intention of organics recycling, turns out to be of poor or contaminated quality and is subsequently taken either to MBTs or used as 'shred and spread'.

Table 3.9: Quantities of UK organic wastes collected and sent for recycling in 2009/10

Nation	Quantity of organic material collected (t)	Quantity of organic material sent for recycling (t)
England	3,773,344	3,794,492 ¹⁸
Scotland	409,786	373,462
Wales	233,137	232,060
Northern Ireland	186,032	132,330
Total	4,602,299	4,532,344

Source: WDF (CI = +/-2% as census reported statistics).

The types of municipal wastes collected during 2009/10 split across the four nations of the UK are shown in Table 3.10.

Table 3.10: Types and quantities of organic wastes collected by local authorities in the UK in 2009/10

Waste category	Quantity of waste collected in each nation of the UK								UK Total	
	England		Northern Ireland		Scotland		Wales			
	t	%	t	%	t	%	t	%	t	%
Green garden waste only	2,603,423	69.0	146,167	78.6	293,241	71.6	120,922	51.9	3,163,753	68.7
Mixed garden and food waste	469,571	12.4	37,545	20.2	16,767	4.0	62,985	27.0	586,868	12.8
Waste food only	89,028	2.4	433	0.2	2330	0.6	18,590	8.0	110,381	2.4
Wood for composting	63,852	1.7	1570	0.8	524	0.1	170	0.1	66,116	1.4
Other compost-able waste	547,470	14.5	317	0.2	96,924	23.7	30,470	13.0	675,181	14.7
Total	3,773,344	100.0	186,032	100.0	409,786	100.0	233,137	100.0	4,602,299	100.0

Source: WDF (CI = +/-2% as census reported statistics).

In total therefore, it was reported that some **4.6Mt of organic waste was collected for recycling by local authorities in 2009/10**; this compares to 4.34Mt reported in 2008/09 – an increase of 6%. Of the total, 4.5Mt was sent for recycling. This is greater (by 0.8Mt¹⁹) than the estimate of 3.7Mt of municipal waste recycled at AD, composting and TAD sites (excluding MBT for the reasons already given) recorded through operator waste returns in 2009 (e.g. see Table 3.8). As indicated above, the difference can be equated to waste treated at exempt composting sites (where an estimate of 0.9Mt has been made).²⁰ It remains possible, though, that some may also be accounted for by green waste that was 'shred and spread'.²¹ It also illustrates that differences exist between datasets.

¹⁸ The aggregate total sent for recycling in England, as reported by WDF, is slightly greater than that collected for recycling. This may be due to a time delay between collection and consignment for recycling affecting the data reported for a particular quarter.

¹⁹ NB the operator waste returns and WDF refer to slightly different timeframes (2009 and 2009/10, respectively).

²⁰ The wastes recorded in the operator waste returns databases relate to permitted/licensed sites only. Data on quantities of wastes recycled at exempt sites was not collected by the EA or NIEA; SEPA was the exception and provided data on wastes treated at exempt composting sites, which was provided in a separate database.

²¹ This technique involves shredding green wastes and spreading directly to land without any managed aerobic stabilisation. Local authorities in England may have counted green waste treated in this manner towards their National Indicators in 2009/10; however, Defra has indicated that this would no longer be possible for 2010/11.

In England, where local authority functions in certain areas are split between a Waste Disposal Authority (WDA) and a Waste Collection Authority (WCA), and in others performed by a Unitary Authority (UA), the breakdown is shown in Table 3.11. This shows that nearly half (46%) of organic wastes in England was collected by WCAs. It is useful to analyse the sources by local authority function as this may affect the organics composition, with more food waste likely to originate from WCA kerbside collections and more green waste from WDA HWRC sites.

Table 3.11: Organic wastes collected by different local authority types in England in 2009/10

Waste category	Quantity of waste collected by each local authority type (t)			England Total (t)
	UA	WDA	WCA	
Green garden waste only	1,074,970	590,155	938,298	2,603,423
Waste food only	26,164	19	62,845	89,028
Mixed garden and food waste	102,963	9220	357,388	469,571
Wood for composting	21,531	32,288	10,033	63,852
Other compostable waste	195,789	4123	347,558	547,470
Total	1,421,417	635,805	1,716,122	3,773,344
Proportion	37.7%	16.8%	45.5%	100.0%

Source: WDF (CI = +/-2% as census reported statistics).

Across the UK, the methods used to collect wastes are shown in Table 3.12. The majority (64%; 3.0Mt) of waste was collected through kerbside schemes, with just under 1.9Mt in the 'green garden waste only' category. This is the first time in this study that a greater proportion of garden wastes was identified as collected through kerbside schemes than through HWRCs/bring sites; the results obtained in previous surveys have shown that bring sites dominated (43% being generated at bring sites in 2008/09). The change in WDF reporting method may, however, go some way to explaining this difference.

Kerbside schemes also accounted for 576kt of mixed garden and food waste and a further 106kt of food waste only. The latter represents a significant increase on the figure (estimated at 36kt) for food waste kerbside collections in the 2008/09 survey²² (although the differences in data collection methodology between the two surveys restrict the comparability of any in-depth analysis). HWRCs accounted for 28% (1.3Mt), of which the majority (94% of all HWRC site waste) was green garden waste, with 64kt comprising wood for composting.

Table 3.12: Types/quantities of local authority waste collected by different methods across the UK in 2009/10

Waste category	Quantity of waste collected through different methods (t)								Total (t)	% of total
	Kerbside recycling	Comm. & industrial recycling	Voluntary kerbside recycling	HWRC	Bring sites	Voluntary bring sites	Street recycling	Other		
Green garden waste only	1,885,996	19,573	7359	1,224,725	24,286	1808	6	N/R	3,163,753	68.7
Waste food only	106,188	3702	0	0	491	0	0	N/R	110,381	2.4
Mixed garden and food waste	575,953	546	0	10,369	0	0	0	N/R	586,868	12.8
Wood for composting	553	1986	0	63,576	0	0	0	N/R	66,115	1.4
Other compostable waste	397,222	6438	193	9371	6331	19	252	255,354	675,180	14.7
Total	2,965,912	32,245	7552	1,308,041	31,108	1827	258	255,354	4,602,297	100.0
Proportion	64.4%	0.7%	0.2%	28.4%	0.7%	0.0%	0.0%	5.5%	100.0%	

Source: WDF (CI = +/-2% as census reported statistics). N/R = Data not recorded.

Organic wastes categorised as 'other compostable' accounted for 675kt (15%) and were mainly split between kerbside collections (397kt) and 'other' (255kt). It is unclear what these wastes were, although mixed green waste and cardboard co-collections could account for some. Where local authorities undertake complex collection operations that are hard to classify in terms of the main categories, it is likely these are reported under the 'other' option.

²² AfOR 2010. Survey of the UK organics recycling industry 2008/09.

Collection methods did not vary significantly across all four nations (Table 3.13), with kerbside collections dominating and HWRC sites providing the second largest source of waste in England, Scotland and Wales. Notably, Northern Ireland relied predominantly on HWRC sites (59%), with kerbside collections only accounting for 41%. Of interest was the reliance on 'other' collection methods in Scotland (20%) and Wales (12%). Without further investigating original WDF returns, it is not possible to determine what these methods were, although this gap in knowledge is important and could be worth examining in detail in future studies.

Table 3.13: Methods used for the collection of local authority organic wastes in the UK in 2009/10

Nation	Proportion by mass of wastes collected (%)								Total
	Kerbside recycling	Comm. & industrial recycling	Voluntary kerbside recycling	HWRC	Bring sites	Voluntary bring sites	Street recycling	Other	
England	66.9	0.5	0.1	28.2	0.4	0.1	0.0	3.8	100.0
Northern Ireland	40.6	0.0	0.7	58.5	0	0.0	0.0	0.2	100.0
Scotland	56.4	1.8	0.0	19.2	2.5	0.0	0.0	20.1	100.0
Wales	57.9	2.2	1.9	24.2	1.9	0.0	0.0	11.9	100.0
UK	64.4	0.7	0.2	28.4	0.7	0.1	0.0	5.5	100.0

Source: WDF (CI = +/-2% as census reported statistics).

In WDF the quantities of organic wastes sent for recycling to different sites were recorded. This provided an indication of the distribution in the amount of waste sent to different sites and is shown in Table 3.14. (As noted above, there was a small difference in the total quantities of waste estimated from the 'wastes sent for recycling' data sub-set compared with the total quantities of wastes collected through the various kerbside and bring schemes, which has been attributed to reject material.)

Table 3.14: Wastes sent for recycling in the UK in 2009/10 classified according to quantities sent to individual sites

Quantity of wastes sent to individual organics recycling sites (banded in t)	Number of sites to which waste was sent for recycling	Proportion of sites (%)	Quantities sent to individual sites	
			Total (t)	Total (%)
0-<500	12	2.8	2394	0.1
500-<1000	10	2.3	6808	0.2
1000-<5000	98	22.8	302,715	6.7
5000-<10,000	126	29.3	953,647	21.0
10,000-<15,000	103	24.0	1,270,111	28.0
15,000-<20,000	32	7.4	558,740	12.3
20,000-<30,000	30	7.0	700,483	15.5
30,000-<40,000	13	3.0	429,462	9.5
40,000-<50,000	4	0.9	178,594	3.9
50,000-<60,000	1	0.2	59,817	1.3
60,000-<70,000	1	0.2	69,573	1.5
Total	430	100.0	4,532,344	100.0

Source: WDF (CI = +/-2% as census reported statistics).

These data suggest that local authorities tended to send less than 10kt of waste to individual permitted sites for recycling (57% of sites), but that these accounted for only 28% of the total quantity of waste. Conversely only 11% of authorities sent over 20kt to individual sites, but these sites accounted for 32% of the total quantity. This distributional profile highlights the fact that, in tonnage terms, the larger sites, although smaller in number, account for a proportionally higher fraction of the UK's input tonnages. Notably, there was one English UA that

sent just under 70kt of green garden waste to a site that was classified as 'other/exempt'. As this was unlikely to have been a single exempt composting site (which is limited in its treatment capacity to between approximately 2100t and 4300t per year), this quantity may have been disposed of through 'shred and spread', which has been discussed above.

3.2.4 Waste input estimates for exempt composting sites

A good deal of the data analysis thus far described relates to regulator data on waste inputs to permitted/licensed sites. Little research had been done previous to this study specifically on sites registered as operating under an exemption. As outlined in Section 2, this gap has been addressed through regulator data on exemptions and an attempt in this study has been made to estimate more accurately than hitherto the quantities of organic materials composed under an exemption.

A total of 2733 registered Paragraph 12 exempt composting sites were identified from the exemptions recorded for 2009 by the EA, NIEA and SEPA. This national census provided a statement of the scale, extent and prevalence of exempt sites across the four nations of the UK (data from this source is reported in detail in Section 4). This site listing contained a proportion of inactive sites and an allowance was made based on responses in the survey data and SEPA returns (see Section 4) for an estimate of 23% of registered exemptions being inactive during the year 2009.²³ This gave an estimate of 2104 active sites involved in composting.

As indicated above, there were no nationally comprehensive records of waste inputs to exempt sites held by the regulatory agencies. The 2008/09 survey did not differentiate between permitted and exempt sites in the estimation method. As quantities of controlled wastes recycled at permitted sites were now generated through regulator waste input data, a new complementary method was required to calculate the fraction of organic waste recycling taking place through exempt sites.

Three alternative methods have been used to produce an estimate for inputs to these sites, using the survey returns and a partial dataset on inputs to exemptions recorded by SEPA. The basic principles of the three alternative gross-up methods were as follows:

- **SEPA average site tonnage extrapolation** – grossing up to the UK total of exempt sites using 'per site' averages obtained from the SEPA regulatory returns;
- **UK size band extrapolation** – calculating the distributional profile of exempt sites from the survey and SEPA data and inferring an average tonnage per site band, then calculating the UK total by summing the averages multiplied by the number of sites estimated to fall nationally within each size band; and
- **WDF balance method** – calculating exempt site inputs from the residual balance remaining after deducting the reported permitted/licensed sites from the WDF total.

The results from these three separate computations are presented and compared below.

SEPA average site tonnage extrapolation

The first method for calculating exempt site organics inputs was based on the regulator data from SEPA, which records input tonnages. Altogether 87 exempt sites were registered in Scotland by SEPA, of which 20 (23%) were inactive. A total of 56,319t was reported as entering the remaining, active, sites. However, upon close inspection, a small number of these sites reported tonnages (in one case, 16,364t) which are substantially higher than would be permissible under an exemption. From separate calculations²⁴ it is possible to determine that the maximum annual input tonnage (consistent with the Paragraph 12 exemption criteria) lies between 2100t and 4300t, depending on the maturation time of the composting process. A cut-off threshold of 4000t was therefore set as the maximum allowable organic waste inputs on these sites specifically relating to exempt activities on the site. This is plausible given that the sites in question appear to cover waste disposal activities more generally, as well as exempt activities. It is possible that these site operators have reported wastes going to other site disposal options and not just to the registered exempt composting process.

²³ This has been based on SEPA returns and the replies to the postal survey indicating inactive sites.

²⁴ These estimates are based on the requirement under Paragraph 12 exemptions that no more than 1000m³ of material is held at the site at any one time. At an average compost bulk density of 4t/m³, this creates a limit of 400t of compost present at any one time and equates to an input maximum of 533t to allow for shrinkage and moisture loss. Compost maturation cycles range from 6 to 12 weeks, giving between 4.3 and 8.7 maximum cycles per year. From this it can be determined that the maximum total annual input tonnage for an exempt site ranges from 2311t to 4622t.

The adjusted data allow an average 'tonnes per active exemption' coefficient to be calculated as follows:

Wastes recorded under SEPA data as entering exemptions in Scotland	= 56,319t
Less overestimates for tonnages exceeding 4000 tonnes per year	[-24,715t]

Adjusted total waste input to 67 active exempt sites	= 31,604t
Arithmetic average input tonnage per site	= 471t*

For 2104 sites active in the UK, this gives a final gross-up estimate of 990,984t

* The EWC waste input codes allow it to be determined that 7% of this input tonnage is non-municipal.

UK size band extrapolation

The SEPA data (adjusted to take account of the assumed overstated organic waste inputs at the largest sites), together with the exempt site survey replies, allow for a distributional profile of exempt sites by size band to be calculated for the UK. This information in itself is of substantial intrinsic value, as it highlights the wide contrast in the scale of activity falling under the exempt activity heading. A very large proportion of the exempt sites process extremely small quantities of material, while a small number are in fact substantial operations on a par with the smaller permitted sites (see Section 4 for more details).

This makes the use of an 'average' site input somewhat unrepresentative, as the majority of sites take inputs much smaller than the arithmetic average. To cater for this, an alternative gross-up method can be derived by calculating the distribution of sites by input size bands and calculating the probable inputs for these bands of sites by multiplying the estimated total number of sites nationally in that size band by a more representative annual tonnage typical of that size band. This was termed the 'national size band extrapolation' method and the results are shown in Table 3.15.

Column (a) in Table 3.15 presents the proportion of sites within the SEPA records falling into the size input bands listed. Thus 25% of all active registered exemptions in the SEPA sample take in less than 10t a year, while 10% take in over 1600t a year. Column (b) shows the cumulative proportion of sites with increasing size band; thus 50% of all sites take 50t a year or less. Column (c) is an estimate of the total number of active exempt sites in the UK in that specific size band, derived by apportioning the UK estimate of 2104 active exempt sites across the size bands in proportion to the SEPA data (i.e. column (a)). Column (d) gives a mid-point estimate for an average annual tonnage for sites in that particular size band and column (e) shows the total UK tonnage estimated to enter sites of that size band, obtained by multiplying the number of sites (column (c)) by their average input tonnage (column (d)). Summing column (e) therefore generates a total UK estimate of 810,302t entering exempt sites in the UK. From this it is possible to calculate how much of the UK input enters sites of each size band and the cumulative percentage of the UK total that is represented by sites up to the specified size band (the final two columns).

Table 3.15: Estimate of the quantities of waste composted at registered exempt sites in the UK in 2009 using 'UK size band extrapolation' method

Size band for annual quantity of input waste (t)	(a) Proportion of sites in band (%)	(b) Cumulative proportion of sites (%)	(c) Estimated number of sites in band	(d) Estimated annual site throughput (t)	(e) Total per size band (t)	Total share in size band (%)	Cumulative share (%)
<10	25	25	526	2	1052	0.1	0.1
10-<25	8	33	168	15	2525	0.3	0.4
25-<50	17	50	358	35	12,521	1.6	2.0
50-<100	17	67	358	70	25,042	3.1	5.1
100-<500	8	75	168	225	37,879	4.7	9.8
500-<1600	15	90	316	650	205,180	25.3	35.1
≥1600	10	100	210	2500	526,103	64.9	100.0
Total	100		2104*		810,302	100.0	

* Total site count: n = 2733; site count after inactive sites removed: n = 2104 (assumes 23% were inactive).

The distinctively skewed nature of the distribution is a notable feature and has implications for interpreting the amount of composting ongoing at different sites. For example, half of all active exempt sites are estimated to take under 50t per year and between them they account for just 2% of the total exempt input tonnage. By contrast 10% of sites take over 1600t per year and represent nearly two-thirds (65%) of the total UK exempt input tonnage.

In summary, Table 3.15 shows that the 2104 active sites in the UK composted a gross-up estimate of 810,302t of waste in 2009.

WDF balance method

Section 3.2.3 above has already pointed to the balance outstanding in WDF input tonnages, after accounting for what is recorded as entering the permitted/licensed sites. A number of adjustments are required before finally determining the appropriate quantity to assign to the exempt site inputs.

Firstly, account needs to be taken of the differences in the time period between the WDF data (2009/10) and permitted site input data (2009). This becomes a factor due to the continuing annual growth in organics recycling, meaning that the 2009/10 data are proportionally inflated. This can be readily adjusted by removing a quarter of the apparent annual growth to account for the quarterly mismatch in accounting periods. As the WDF total has risen by 250,000t over the 12 months, a quarter of this (62,500t) has been subtracted from the 2009/10 data to create an inferred annual figure for the calendar year 2009, as shown below.

2009/10 WDF organics tonnage sent for recycling (excluding MBT)	= 4,532,343t
Less quarterly adjustment	[- 62,500t]

WDF adjusted to 2009	= 4,469,843t
Less municipal organics entering permitted sites 2009 (regulator data)	= 3,630,066t

Balance to reconcile against exempt site municipal waste inputs	= 839,777t
Additional non-municipal inputs based on 7%* of total ²⁵	= 62,500t
Final estimate of exempt site inputs	= 902,277t

* Combined SEPA and survey data (n =116, CI = 13%).

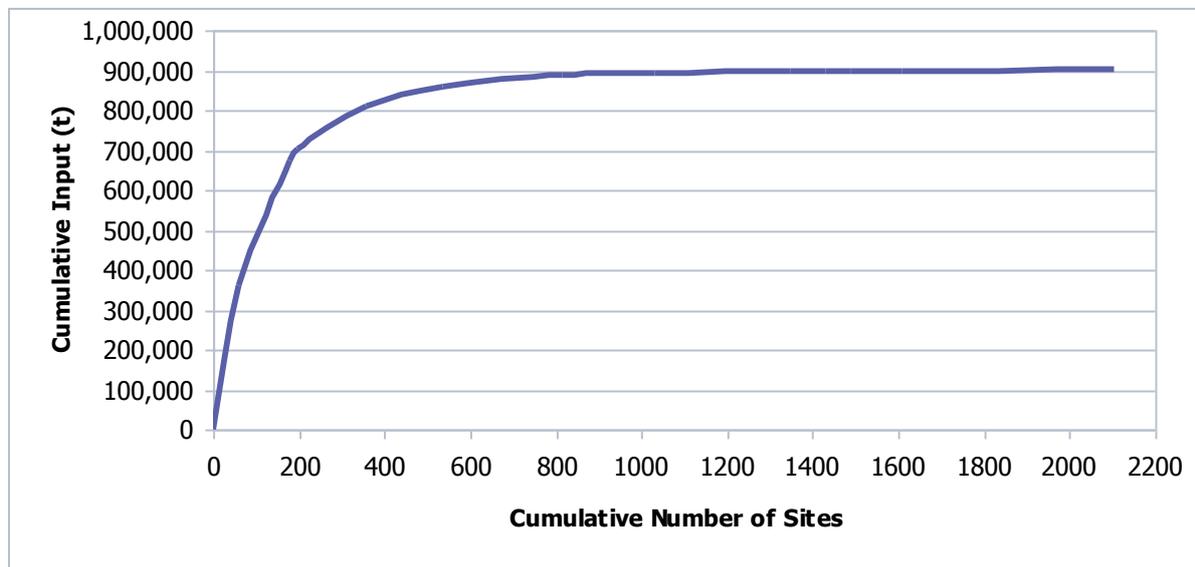
²⁵ The SEPA exempt site data and survey data include a split between municipal and non-municipal inputs, with an overall average for non-municipal inputs of 6.92% (rounded above to 7%). If 839,777t is taken as the best estimate for the 93.08% exempt site input that is municipal based on the WDF reconciliation balance, then the corresponding estimate for the non-municipal input is 62,433t rounded above to 62,500 at three significant figures.

These three methods represent a more in-depth investigation into the likely scope and scale of composting inputs to exempt sites in the UK than attempted in the previous annual organics recycling industry studies. The three methods produce estimates of broadly similar order, ranging from 810,302t to 902,277t to 990,984t; in other words, ranging around 10% either way of the central estimate. This range falls within the relevant estimates of error bands for the exempt site surveys of +/-13%, set out earlier in Section 2, showing that statistically these three estimates are not significantly different.

For the remainder of this study, the mid-range estimate of 902,277t generated by the WDF balance method has been used, as it provided the best UK estimate of waste inputs to exempt composting activities. As well as representing the intermediate figure, this also has the advantage of reconciling WDF data and ensuring the results of this research can be projected into any further national waste data estimates that WRAP or other partners may develop.

By applying this total to the distribution projection from the UK size band extrapolation method, a UK estimate was then made of the proportion of input tonnages going to exempt sites, by site size (Figure 3.2). It can be seen from Figure 3.2 that around half the total exempt site input tonnage was estimated to be accounted for by the 100 largest out of the 2104 active sites. Conversely, some 1400 of the smallest sites (two-thirds of the total) contributed very little of the UK total input tonnage (under 20,000t).

Figure 3.2: Cumulative frequency distribution of UK exempt sites by estimated input tonnage in 2009



Source = SEPA and survey data combined returns (n=113, CI= +/-13%).

3.3 Business analysis – financial size and employment

This part of the survey aimed to collect data on key business indicators, to gain an understanding of the structure and financial characteristics of the industry. As explained in Section 2, financial and business data was gathered through two routes:

- business-based returns obtained through a short electronic survey sent to the head office of businesses (the 'head office' survey) to gather company-wide organics recycling data; and
- a range of similar questions on site-based turnover and employment requested at individual sites through an operator telephone/email survey (the 'operator' survey).

The data, when combined, give a means of assessing financial performance at site/process level as well as across businesses as a whole. Responses covered 40 businesses (for the head office survey). Site-based information responses, obtained from the operator survey, were achieved for 98 of the 309 sites on the ORSR survey sample and 13 of the exempt site survey respondents (out of a total of 579 in the sample), giving site-based financial information for 111 individual sites in total. While the 111 site-based financial records form a comparatively low percentage response, it is an encouraging result in terms of the industry's willingness to provide data at this level, given the concerns about confidentiality of data at the individual site level. The relevant sampling CI (for categorical responses) is around +/- 7%, enough for a broad national estimate to be made. The data are

sufficient to provide useful markers to help companies benchmark their operations and identify industry-wide issues and to confirm that future surveys should centre more firmly on the site-based rather than business-based approach.

3.3.1 Company category

In 2009, the organics recycling industry was dominated by specialist composting or AD companies, collectively accounting for 60% of all responding companies (Table 3.16).²⁶ Agricultural companies comprised 13% and waste management companies 10%. Only 5% were water treatment companies, although this may change in the future if AD capacity at waste water treatment works starts to be utilised more widely for controlled wastes.

Table 3.16: Principal business activity of organics recycling businesses in 2009

Business activity	Number of respondents	Proportion of respondents (%)
Composting company	20	50.0
AD company	4	10.0
Composting and AD company	1	2.5
Water treatment company	2	5.0
Solid waste treatment/disposal company	4	10.0
Equipment/plant supplier/hire company	0	0.0
Agricultural company	5	12.5
Horticultural/landscaping company	1	2.5
Community group/not-for-profit company	0	0.0
Local authority	1	2.5
Other	2	5.0
Total	40	100.0

Source: head office survey (company data received from respondent firms replying to the survey sent out by industry partner members) (n = 40, CI = +/-13%).

The majority (n = 25, 63%) of responding companies operated only one site, suggesting the organics recycling sector was diverse and made up of a large number of smaller companies. Notably, one company operated 45 different sites (Tables 3.17 and 3.18). Overall, each company operated an average (arithmetic mean) of 3.6 sites, although this statistic is distorted by the presence of two companies operating over 20 sites; 37 of the 39 companies providing data operated five sites or less.

Table 3.17: Number of sites operated by organics recycling businesses in 2009

Number of sites	Number of respondents	Proportion (%)
1	25	62.5
2	5	12.5
3	3	7.5
4	2	5.0
5	2	5.0
>5-10	0	0.0
>10-20	0	0.0
>20	2	5.0
Unspecified	1	2.5
Total	40	100.0

Source: head office survey (company data for respondent firms from industry partner members) (n = 40, CI = +/-13%).

²⁶ Business-wide data only.

Table 3.18: Minimum, maximum and mean number of sites operated by organics recycling businesses in 2009

Mean number of sites	3.6
Minimum number of sites	1
Maximum number of sites	45

Source: head office survey (company data received from respondent firms replying to the survey sent out by industry partner members) (n = 40, CI = +/-13%).

3.3.2 Financial parameters

The size of the UK organics recycling economy has been estimated through this survey for several years based essentially on an average 'turnover per input tonne' coefficient. The data reported here for 2009 has been derived from the improved methodology described in Section 2 and results more accurately from estimated turnover per tonne coefficients for each individual process type. The results are shown in Table 3.19. **Overall the UK organic recycling sector had a minimum estimated turnover in 2009 of £229M, which compares with £226M in 2008/09 (which also included MBT operations).²⁷ When an additional allowance is made for MBT and the unaccounted AD sites, the estimate for 2009, on a like-for-like basis with 2008/09, is £263M.**

It was estimated that the permitted composting sector had a turnover of £187M in 2009, whilst the nascent AD sector had an estimated minimum turnover of £11M. The estimate for businesses operating exempt sites was £30.1M. No responses were obtained from MBT sites so no calculation is shown in Table 3.19.

Table 3.19: Estimated 2009 company turnover in the UK according to organics recycling technique

Size band of annual company turnover	Turnover apportioned by organics recycling technique (£)						TOTAL (d+e+f)
	Composting sites					(f) AD sites where inputs known	
	(a) IVC sites (permitted)	(b) OAW sites (permitted)	(c) Other permitted composting system sites	(d) Sum of permitted composting sites (a+b+c)	(e) Exempt composting sites		
<£10,000	0	10,000	0	10,000	25,000	0	35,000
£10,000-<£50,000	0	60,000	30,000	90,000	30,000	0	120,000
£50,000-<£100,000	0	225,000	0	225,000	225,000	0	450,000
£100,000-<£500,000	1,200,000	5,400,000	300,000	6,900,000	1,500,000	300,000	8,700,000
£500,000-<£1M	750,000	3,750,000	0	4,500,000	0	750,000	5,250,000
£1M-<£3M	12,000,000	6,000,000	2,000,000	20,000,000	0	0	20,000,000
Unspecified*	68,194,147	35,464,877	2,296,559	107,829,280	184,847	7,417,830	115,431,957
<i>Estimate for non-respondents**</i>	<i>10,128,074</i>	<i>17,864,209</i>	<i>21,382,493</i>	<i>47,501,079</i>	<i>28,538,674</i>	<i>2,568,720</i>	<i>78,608,473</i>
Grand total of actuals and estimates	92,272,221	68,774,086	26,009,052	187,055,359	30,503,521	11,036,550	228,595,430
Total quantity of waste	1,377,634	1,678,447	131,135	3,187,217	58,119	80,646	
Turnover per tonne (from actual survey responses)	61.0	30.3	35.3	39.5	33.8	105.0	

Sources: operator survey (permitted sites waste input data, n = 219), head office survey (permitted sites, n = 98) and operator survey (exempt composting sites, n = 13) (CI = +/-13%).

* Not all survey respondents completed this section; therefore this estimate was based on the known quantities of waste treated by these companies and the estimated turnover per tonne of sites who replied.

** This accounts for sites that did not complete the survey and was estimated from the total quantity of waste derived from the operator waste returns and the process-specific estimated turnover per tonne obtained from the survey returns.

The turnover broadly reflects the degree of sophistication of the treatment system (which affects both capital and operating costs), with estimated turnover per tonne of input waste treated as follows: AD plant £105/t, IVC £61/t and OAW £30/t. Composting at exempt sites averages £34/t. Broadly, income would be derived from gate fees

²⁷ AfOR, 2010. Survey of the UK organics recycling industry 2008/09.

and the sale of products such as compost, digestate and energy.²⁸ Collectively, permitted composting sites had an estimated turnover of £40/t; this compares with £39/t in 2008/09 and £36/t in 2007/08.

The data also provided a useful indicator of minimum viable business sizes. Respondent operators of IVC and AD systems did not have turnovers of less than £100,000, whilst two respondents operating OAW systems had turnovers of less than £10,000.

This method is conceptually more robust and reliable than the previous one-size-fits-all approach; however, it does merit further development in future. For example, as the method projects financial data onto input tonnages, no account is taken of the business value associated with wastes generated on-site. This is a particular issue with AD sites, where some deal predominantly or exclusively with materials generated on-site and the current method cannot generate a valid figure in these cases. There is also no estimate provided for MBT sites.

To allow a like-for-like comparison to be made with 2008/09, an allowance has therefore been made for the 12 of the 17 AD operations for which no regulator waste input tonnage was available. This was done by applying the average turnover per site to these additional 12 sites. For MBT operations a notional turnover of £25 per waste input tonne has been applied as a professional best estimate. These calculations generate an additional estimated turnover of £34M and therefore result in a total best estimate for the size of the whole industry across the UK, like-for-like with 2008/09, of £263M (an increase of 16%).

3.3.3 Employment

The same approach was used to produce national estimates for total FTE employment in the organics recycling industry. An estimated 2209 FTEs were directly employed in composting and AD during 2009, with a further 116 at MBT sites (shown in Table 3.20; includes grossed-up estimates to account for non-respondents). This compares with 1707 in 2008/09 and 1351 in 2007/08.

IVC sites recycled 4088t of waste for every FTE, compared with 537 for other systems (which included, for example, turned continuous block composting). This reflects the greater level of containment and process control at IVC sites, which reduces the need for manual operation.

The five AD plants responding to this part of the survey appeared to employ more people per tonne of waste than IVC plants. However, this was more likely to reflect the nascent status of the AD industry, with manning levels reflecting anticipated, rather than actual, tonnages. In view of the uncertainties in this data, there was no gross-up undertaken for the additional non-participating AD plants.

The FTE estimate for MBT plants appeared to be proportionally higher than for composting and AD, although this would probably have included ancillary recycling activities at these sites. Combining the data for permitted composting sites and AD sites gives an estimate of 2652t per employee. For comparison, data from a report on Ireland's organics recycling sectors²⁹ has been used to calculate an estimate of 1400t per employee.

On average, permitted composting sites had a turnover of £158,000 per employee, with AD at £229,000 per employee.

²⁸ Sales of products are discussed separately in Sections 4 and 5.

²⁹ Calculated from data presented in InterTradeIreland's 'Market report on the composting and anaerobic digestion sectors' (2011). (The survey period was not specified.)

Table 3.20: Estimated number of full-time employees engaged in organics recycling in the UK in 2009

Size bands of full-time employees	Number of employees by organics recycling method							
	Composting sites					AD sites	MBT sites	ALL SITES
	IVC sites	OAW sites	Other composting systems sites	Total permitted sites	Exempt composting sites			
<1	0	1	0	1	3	0	0	4
1-5	81	189	9	279	57	12	0	348
6-10	112	88	16	216	0	0	8	224
11-20	31	62	0	93	0	16	16	125
21-50	71	71	0	142	0	0	0	142
Unspecified*	12	36	18	66	3	9	0	78
<i>Estimate for non-respondents**</i>	<i>30</i>	<i>157</i>	<i>201</i>	<i>387</i>	<i>914</i>	<i>11</i>	<i>92</i>	1,404
Total number of employees	337	604	244	1184	977	48	116	2325
Waste (t)	1,377,634	1,678,447	131,135	3,187,217	58,119	80,646	89,490	
Waste per employee (t)	4088	2783	537	2692	60	1674	778	
Turnover per employee	£273,798	£114,047	£106,562	£157,971	£31,239	£229,091	ND	

Sources: operator survey (permitted sites, n = 219), head office survey (permitted sites, n = 98) and operator survey (exempt composting sites, n = 13) (CI = +/-13%).

* Not all survey respondents completed this section; therefore this estimate was based on the known quantities of waste treated by these companies and the estimated turnover per tonne of sites who replied.

** This accounts for sites that did not complete the survey and was estimated from the total quantity of waste estimated from the operator waste returns and the actual estimated number of employees per tonne.

ND = not determined.

3.4 Rateable value

Data on the rateable value of some sites were obtained from the operator survey (Table 3.21). The rateable value of a site will vary depending upon regional differences and the technology applied, as the level of infrastructure will have a bearing on the rateable value charged. However, on average, business rates at composting sites were equivalent to £2.45/t of waste composted, whilst the one AD site that replied indicated that the rateable value was equivalent to £1.40/t of waste. This source of data provides a useful guide to one of the operating costs of the industry, in addition to labour costs. The 2009 survey approach shows that rateable value data can be obtained, but its importance should be reviewed by WRAP and partners before deciding whether there is merit in seeking more comprehensive coverage of this financial parameter in future.

Table 3.21: Minimum, maximum and mean rateable values of composting and AD sites in 2009

	Composting Sites	AD sites
Mean (£)	39,323	14,000
Minimum (£)	100	
Maximum (£)	202,000	
£/t of waste processed	2.45	1.40
Number of sites providing data	19	1

Source: operator survey (permitted sites, n = 20, CI = +/-13%).

3.5 Industry development

3.5.1 Planning applications

A review of the planning applications and appeals for organic waste recycling sites in the journal *Waste Planning* provided a useful insight into the development of this sector in Great Britain³⁰ during 2009. Although *Waste Planning* does not cover every application submitted, it provided a representative overview of the types of application and some of the associated planning issues. A summary is provided in Table 3.22, which shows that 29 new sites and four existing sites were awarded planning permission in 2009 to either construct new facilities or develop existing infrastructure.

Table 3.22: Summary of planning applications and planning appeals in Great Britain in 2009

Facility type	Planning consent granted		Consent deferred/ refused/ appeal dismissed	Total number of sites
	New sites	Existing		
IVC	6	0	1	7
OAW	4	4	3	11
AD	10	0	0	10
AD & IVC	1	0	0	1
MBT	8	0	1	9
Total	29	4	5	38

Source: *Waste Planning Issues 74 (2009), 75 (2009), 76 (2009), 77 (2009), 78 (2009) & 79 (2010)*.

Three of the MBT plant cited in *Waste Planning* stated that they would have an AD stage. In addition, one variation to an existing approval was granted to allow the operator to accept wastes from within the county in which it was located, and one application by a horticultural company to blend organic products, including compost, and sand was also granted. A number of refusals were given, for the following reasons:

- site access issues (1);
- appearance, impact on the local surroundings and close proximity to listed buildings (1);
- close proximity to food processing plant (1); and
- close proximity to residential areas and schools (potential bioaerosol and odour impacts) (2).

3.5.2 Planned development

A number of respondents to the survey indicated that they had plans to expand or develop their site (Table 3.23). A third of the responding composting sites indicated that they had plans to diversify their operations, whilst 21% stated that they wished to increase capacity. Of the AD sites, 63% indicated that they wished to develop new sites (compared with only 9% of composting sites). This illustrates the emergence of the AD sector whose growth was through the establishment of new sites, whilst composters were attempting to diversify and expand their existing operations.

³⁰ *Waste Planning* only covered planning applications and appeals in England, Scotland and Wales; it therefore did not include Northern Ireland. However, it provided a useful indication of the type and nature of planning applications and appeals across the UK.

The United Kingdom (UK) is the collective name for the countries England, Northern Ireland, Scotland and Wales, whereas Great Britain (GB) in this study refers to England, Scotland and Wales.

Table 3.23: Respondents' plans to expand or develop organics recycling sites beyond 2009

Proposed development	Proportion of respondents by type of site (%)		
	Composting	AD	MBT
Develop new site(s)	9.0	62.5	0.0
Diversify operations at site (e.g. include anaerobic stage, biomass)	33.1	12.5	50.0
Increase capacity	20.7	50.0	50.0
Other*	7.6	0.0	0.0
None	15.9	12.5	0.0
Unspecified	32.4	25.0	0.0
Number of responding sites**	145	8	2

Source: operator survey (permitted sites, n = 155, CI = +/-5%).

* Included where operators were unsure of planned development, and others planning to produce the blending of composts to manufacture topsoils.

** Percentages are based on the number of responding sites but can sum to more than 100% as multiple answers were allowed.

Data was not obtained from the TAD site.

3.6 Opportunities and challenges

The majority of respondents operating permitted composting and AD sites (55% and 50%, respectively) identified regulatory compliance as a challenge for their business (Table 3.24). Both types of operator also cited gate fees as one of the greatest challenges for their business in the next 2-5 years.

Table 3.24: Business challenges identified by respondents in 2009

Challenge	Proportion of respondents by type of site (%)		
	Composting	AD	MBT
Being able to win contracts	3.4	0.0	0.0
Capacity	1.4	0.0	0.0
Costs	8.3	0.0	0.0
Competition for feedstock with biomass facilities	4.8	0.0	0.0
Gate fees	34.5	37.5	0.0
Local authority decision on green waste collection	4.8	0.0	0.0
Finding markets/outlets for products	22.8	0.0	0.0
Planning permission	4.1	0.0	0.0
Quality of input material	3.4	0.0	0.0
Reduce carbon footprint	1.4	0.0	0.0
Regulatory compliance	54.5	50.0	0.0
Other	5.5	25.0	100.0
Unspecified	2.8	0.0	0.0
Total number of respondents	145	8	2

Source: operator survey (permitted sites, n = 155, CI = +/-5%).

The responses to the 'other' option included:

Composting:

- educating people in the use and benefits of recycling and reusing (1);
- odour (2);
- securing enough garden waste to combine it with the increasing amounts of food waste (1);
- securing funding for infrastructure (1); and
- convincing end-users that green waste quality is comparable to peat etc. (1).

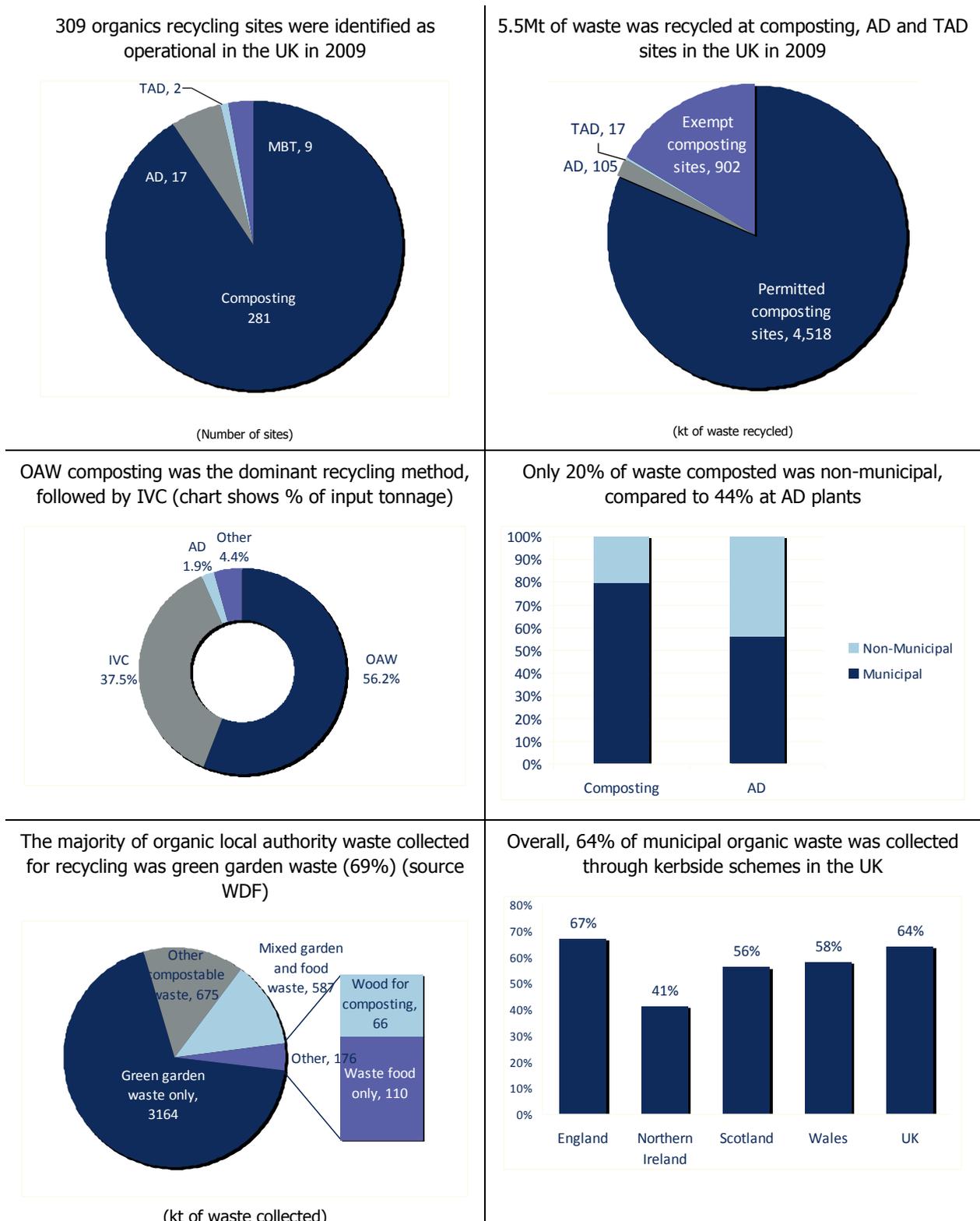
AD:

- utilising heat on-site for hot water (1).

3.7 Discussion and conclusions

Figure 3.3 summarises a number of indicators identified in the 2009 study of the UK's organics recycling industry.

Figure 3.3: Summary indicators identified in the UK organics recycling industry study 2009



Overall, the UK organic recycling sector had a minimum turnover in 2009 of £229M, with a minimum of 2325 FTE employees (Sections 3.3.2 and 3.3.3).

This discussion summarises the results and conclusions from Section 3 and refers to tables or figures above where relevant. Across the UK, a total of 5.5Mt of waste was recycled at AD, composting (IVC and OAW) and TAD sites, representing 93% of the total quantity of input waste to the industry, whilst a further 0.4Mt was processed at MBT sites (7%; Section 3.2: Tables 3.5 and 3.6). All in all this produced an estimate of close on 6Mt of waste entering the industry as a whole.

Permitted aerobic composting (IVC and OAW) was the predominant treatment method (Section 3.2, Table 3.7), accounting for 90% of sites and 94% of waste, which is broadly in line with findings in previous surveys in which composting dominated. The 17 AD plants identified during this study seem likely to represent the emergence of this sector, largely in response to government drivers and the promotion of AD nationally.³¹ Planned development of the sector suggested that similar numbers of AD, composting and MBT facilities were scheduled to be built (based on planning applications reviewed; Section 3.5.1, Table 3.22). Composting site operators also indicated that they wished to diversify their operations, whilst operators of AD plants indicated that they aimed to develop new sites (Section 3.5.1, Table 3.23). The composition of the sector is thus anticipated to change in future years, with a larger representation of anaerobic compared to aerobic treatment methods.

Local authority-collected waste remained the principal waste stream entering permitted sites (just over 80% of the UK total; Table 3.8), with local authority-collected garden and parks wastes accounting for 53% of the total quantity of waste (Section 3.2.2). This probably reflects the targets placed on local authorities to recycle and divert biodegradable municipal waste from landfill, which have resulted in a comprehensive network of recycling schemes in place across all four nations of the UK. More wastes were collected through kerbside schemes than at bring sites, such as HWRCs (Section 3.2.3, Table 3.12). The emergence of 'food waste only' collection schemes was also noted, which was far greater than estimates in previous surveys. This change in the nature of separately collected fractions and the increase in quantities of food waste seem likely to be reflected in the changing composition of recycling infrastructure in the future. This was noted in the review of planning applications for AD and composting sites, in which 47% comprised AD and/or IVC sites (Section 3.5.1, Table 3.22).

Feedback during the survey from operators of green waste-only composting sites indicated they were concerned that local authorities might increasingly move towards combined green and food waste collections (which would necessitate containerised systems under the ABPR³²), potentially leaving investment in OAW facilities redundant.

Only 20% of waste treated at permitted sites was from non-municipal sources (Section 3.2.2, Table 3.8), representing just 13% of the total quantities of non-household food wastes estimated by WRAP.³³ Despite the Landfill Tax being levied at a rate of £40/t during 2009/10, it appears that this was not a sufficiently large driver to encourage organics recycling of waste generated by the commercial waste sector. As the Landfill Tax continues to increase at a projected rate of £8/t per year, it is anticipated that a greater fraction of commercial and industrial wastes will be recycled through AD, composting or TAD processes.

Data on exempt composting sites enabled an estimate of the quantities of wastes recycled at small-scale sites to be made. There were a large number of sites (estimated at 2104) active in 2009 (Section 3.2.4, Table 3.15). However, they only accounted for a relatively small fraction of the total quantities of wastes composted and their contribution was dominated by just a small proportion of the larger exempt sites. As new environmental permitting legislation came into force in 2007 in England and Wales, this may mean that some larger exempt composting sites will require permits in future years, hence the nature of these sites may change.

The business analysis part of the 2009 survey provided valuable information for stakeholders to use for benchmarking purposes. Overall, the industry was dominated by a large number of operators running one or two sites (75%; Section 3.3.1, Table 3.17). This reflects the pattern identified in previous years.

The permitted composting sector was estimated to have a turnover of £187M, out of a total estimated organics recycling industry turnover of £229M (Section 3.3.2, Table 3.19). Turnover per tonne of material ranged from £30

³¹ See, for example: Defra, 2009. Developing an implementation plan for anaerobic digestion, This was the relevant document in 2009, although updates have been published subsequently by Defra.

³² This is discussed in Section 4.

³³ Unpublished internal estimate.

(OAW composting systems) to £61 (IVC systems). Business rates were estimated to cost composting sites £2.45/t of material processed (Section 3.4, Table 3.21). At composting sites, estimates of gate fees by WRAP were broadly £24/t at OAW systems, and £45/t at IVC systems.³⁴ Where sold, the price of compost was in the region of £0-15/t,³⁵ although the total market worth was only estimated to be £9M (5% of the turnover estimate). These data indicate that the composting sector is largely reliant upon gate fees as the primary source of revenue in their business models.

Verbal feedback during the course of the survey indicated that operators were increasingly fearful of competition from other service providers, which would push down gate fees and make their operations less profitable. Data on wastes recycled obtained from secondary sources did not provide for any estimates of 'shred and spread' operations, although it seems likely that some of this waste would have been accounted in the exempt composting site estimates. Defra's stated intention that this practice would not count towards the 2010/11 National Indicator may change this situation in England in future years, as would implementation of the Waste Framework Directive.

The estimated turnover of £34/t at exempt sites (Section 3.3.2, Table 3.19) was surprisingly high and greater than for OAW (£30/t). Given the differential in running costs between permitted and exempt sites (due to the environmental protection measures mandated in an environmental permit), this further strengthens the unease of permitted site operators regarding exempt site competitors, which may potentially operate to lower environmental standards.

The AD sector participating in this survey was estimated to have a turnover of £11M, with a calculated £105/t turnover (Section 3.3.2, Table 3.19). Gate fees for AD sites (£57/t as estimated in the 2010 WRAP survey) were generally higher than for composting sites (which from the same source averaged at around £40/t³⁶). The implication is that in contrast to composting where product sales added relatively little to overall turnover, the sale of renewable energy provided a valuable additional revenue stream in the economics of AD sites.³⁷

In conclusion, it is anticipated that the organics recycling sector will continue to grow in the future, although it seems likely that AD and IVC systems will treat proportionally more wastes than they do at present. In order to survive, it appears that existing OAW composting sites will need to diversify their operations to accommodate greater quantities of local authority food waste collections as well as commercial and industrial wastes.

³⁴ WRAP, 2010. Comparing the cost of alternative waste treatment options.

³⁵ This is discussed in Section 4.

³⁶ Ibid.

³⁷ This is discussed separately in Section 5.

4 Composting

This section presents a detailed analysis of composting in the UK in 2009. It focuses mainly on analysis of the survey responses, with national gross-ups having been covered mainly in the summary data in Section 3.

4.1 Survey response rates

4.1.1 Permitted/licensed composting sites

A total of 281 permitted³⁸ and other identified composting sites³⁹ were extracted from secondary data sources and entered into the ORSR, of which a total of 145 (52%) responded to the operator survey. This is shown in Table 4.1, broken down by tonnes of feedstock processed across the nations of the UK. (Note that separate data for Northern Ireland are not presented in this Section due to low numbers potentially revealing individual site identities.)

Overall, the revised 2009 survey technique captured 70% of the wastes treated at permitted composting sites as recorded in the operator waste returns, compared to the 50% capture achieved through the previous technique in 2008/09, giving greater confidence in the results. This improved capture rate has arisen, in particular, through greater participation of the larger, multi-site operators who occupy the 'top 20' producer categories. This component of the sector has in previous versions of the survey proved particularly reluctant to participate.

Table 4.1: Composting sites identified in the UK and entered into the ORSR, plus survey response rates, in 2009

	Number	Quantity of waste processed (t)
UK		
ORSR	281	4,517,594
Sites taking part in survey	145	3,187,217
Response rate	51.6%	70.6%
England		
ORSR	217	3,715,044
Sites taking part in survey	115	2,629,476
Response rate	53.0%	70.8%
Scotland		
ORSR	44	496,560
Sites taking part in survey	23	327,546
Response rate	52.3%	66.0%
Wales		
ORSR	15	52,123
Sites taking part in survey	6	42,258
Response rate	40.0%	81.1%

Sources: operator survey, operator waste returns, Animal Health ABPR-approved premises, trade bodies and web searches.

³⁸ Throughout this Section, the term 'permitted' is used synonymously with 'licensed', as parallel systems operated in 2009 in the four nations of the UK.

³⁹ It was assumed that all of the identified sites were operational during 2009; however, where survey data was lacking, it was not possible to verify this.

4.1.2 Exempt sites

Small-scale sites need not obtain a full permit or licence from the relevant waste regulation authorities.⁴⁰ In 2009, sites that processed less than 1000m³ at any one time at the place where that waste was produced, or where the compost was spread, could obtain an exemption under Paragraph 12, Schedule 3 of the 2007 Environmental Permitting Regulations.⁴¹ These sites were not required to submit operator waste returns to the relevant regulator and were surveyed separately to the permitted sites in this study.

A total of 2733 exempt sites were identified in the EA, NIEA and SEPA databases of Paragraph 12 exemptions. The nature of exempt site operations meant that a significant proportion of sites were inactive or not actively engaged in composting. The responses from the postal survey indicated that at least 15% of sites registered as exempt were estimated to be inactive, hence further account needed to be taken of sites providing no response due to being inactive or closed. SEPA data specifically identified that 23% of registered exempt sites were inactive and this figure was then used to scale back the national estimate of active exempt sites to 2104, as described in Section 2.

The distribution of registered exempt sites provided by the regulatory agencies is reported in detail by nation (Table 4.2), noting that 23% of these sites were estimated to be currently inactive. The large proportion of 'other' sites refers to locations difficult to classify on the basis of the descriptions available in the regulator data.

Table 4.2: Number and types of registered exempt sites in the UK in 2009

Category	Number of sites				UK Total
	England	Northern Ireland	Scotland	Wales	
Allotment site	53	0	3	3	59
Community centre	10	0	0	1	11
Depot	46	1	2	2	51
Farm	740	1	19	68	828
Landfill site	57	1	2	6	66
Nursery	59	0	3	2	64
Recycling centre	36	0	1	2	39
School/college	390	0	4	6	400
Other	1053	7	53	102	1215
Total	2444	10	87	192	2733

Sources: EA, NIEA, SEPA.

⁴⁰ The EA in England and Wales, NIEA in Northern Ireland and SEPA in Scotland.

⁴¹ Separate regulations are in force in England and Wales, Northern Ireland and Scotland.

4.2 Site location characteristics of composting activities

Of the 145 permitted sites that participated in the survey, the majority (79%) were located in England, with 16% in Scotland, 4% in Wales and <1% in Northern Ireland. This compares with 77% (England), 17% (Scotland), 5% (Wales) and 2% (Northern Ireland) based on the operator waste returns from the regulators.

Across the UK⁴², the majority of permitted sites responding to the survey (56%) were stand-alone operations (accounting for 49% of waste processed), rather than co-located with other business activities; however, the opposite was true in both Scotland and Northern Ireland. The figures for England paint an interesting picture in that the co-located sites treated proportionally more waste than the stand-alone sites (Table 4.3).

Table 4.3: Number and location of permitted composting sites in Great Britain in 2009 (survey respondents only)

Nation		Site location (number of sites and %)			Total
		Stand-alone	Co-located	Unspecified	
England	Number	70	45	0	115
	%	60.9%	39.1%	0.0%	100.0%
	Total waste processed	1,422,765	1,206,710	0	2,629,476
	% waste processed	54.1%	45.9%	0.0%	100.0%
Scotland	Number	7	11	5	23
	%	30.4%	47.8%	21.7%	100.0%
	Total waste processed	103,353	161,716	62,477	327,546
	% waste processed	31.6%	49.4%	19.1%	100.0%
Wales	Number	4	2	0	6
	%	66.7%	33.3%	0.0%	100.0%
	Total waste processed	32,662	9,596	0	42,258
	% waste processed	77.3%	22.7%	0.0%	100.0%
Great Britain	Number	81	59	5	145
	%	55.9%	40.7%	3.4%	100.0%
	Total waste processed	1,558,780	1,565,959	62,477	3,187,217
	% waste processed	48.9%	49.1%	2.0%	100.0%

Source: operator survey (permitted sites, n = 144, CI = +/-6.5%).

The majority of the exempt composting sites surveyed (61% averaged across the UK) were stand-alone sites (Table 4.4), which was broadly similar to the permitted sites. Notably, the stand-alone sites composted 96% of the waste, implying that there were large differences in the scale of sites at stand-alone (larger) compared with co-located (smaller) sites. Alternatively, it could have been that the co-located sites were on farms and were processing non-wastes that were not captured by the survey.

⁴² The United Kingdom (UK) is the collective name for the countries England, Northern Ireland, Scotland and Wales, whereas Great Britain (GB) refers to England, Scotland and Wales

Table 4.4: Number and location of exempt composting sites in Great Britain in 2009 (survey respondents only)

Nation		Stand-alone	Co-located	Total
England	Number	25	18	43
	%	58.1%	41.9%	100.0%
	Total waste processed	50,899	1835	52,734
	% waste processed	96.5%	3.5%	100.0%
Scotland	Number	0	1	1
	%	0.0%	100.0%	100.0%
	Total waste processed	0	400	400
	% waste processed	0.0%	100.0%	100.0%
Wales	Number	5	0	5
	%	100.0%	0.0%	100.0%
	Total waste processed	4985	0	4985
	% waste processed	100.0%	0.0%	100.0%
GB	Number	30	19	49
	%	61.2%	38.8%	100.0%
	Total waste processed	55,884	2235	58,119
	% waste processed	96.2%	3.8%	100.0%

Source: operator survey (exempt composting sites, n = 49, CI = +/-13%).

Of those permitted/licensed sites that were stand-alone, the majority (61%) were located on a farm, representing 68% of waste processed (Table 4.5). Although these findings were unsurprising, they illustrate the close relationship the composting sector has with agriculture.

Table 4.5: Number and location of permitted stand-alone sites in Great Britain in 2009 (survey respondents only)

Nation		Site location (numbers of sites and %)			Total
		On-farm	Off-farm	Unspecified	
England	Number	41	27	2	70
	%	58.6%	38.6%	2.9%	100.0%
	Total waste processed	932,663	437,906	52,196	1,422,765
	% waste processed	65.6%	30.8%	3.7%	100.0%
Scotland	Number	6	1	0	7
	%	85.7%	14.3%	0.0%	100.0%
	Total waste processed	101,098	2255	0	103,353
	% waste processed	97.8%	2.2%	0.0%	100.0%
Wales	Number	2	2	0	4
	%	50.0%	50.0%	0.0%	100.0%
	Total waste processed	29,535	3127	0	32,662
	% waste processed	90.4%	9.6%	0.0%	100.0%
GB	Number	49	30	2	81
	%	60.5%	37.0%	2.5%	100.0%
	Total waste processed	1,063,296	443,288	52,196	1,558,780
	% waste processed	68.2%	28.4%	3.3%	100.0%

Source: operator survey (permitted sites, n = 81, CI = +/-6.5%).

Of those sites that were co-located with another operation, the majority (66%) were at another waste management facility; this accounted for 77% of the waste processed (Table 4.6). Notably, 46% of sites in Scotland were located at 'other' sites, although this only accounted for 11% of waste.

Two sites (one in England and one in Scotland) were co-located with an AD plant. Whilst this was low, it is anticipated that numbers will increase in future as more integrated composting/AD facilities come on-line.

Table 4.6: Operations with which permitted composting sites were co-located in Great Britain in 2009 (survey data only)

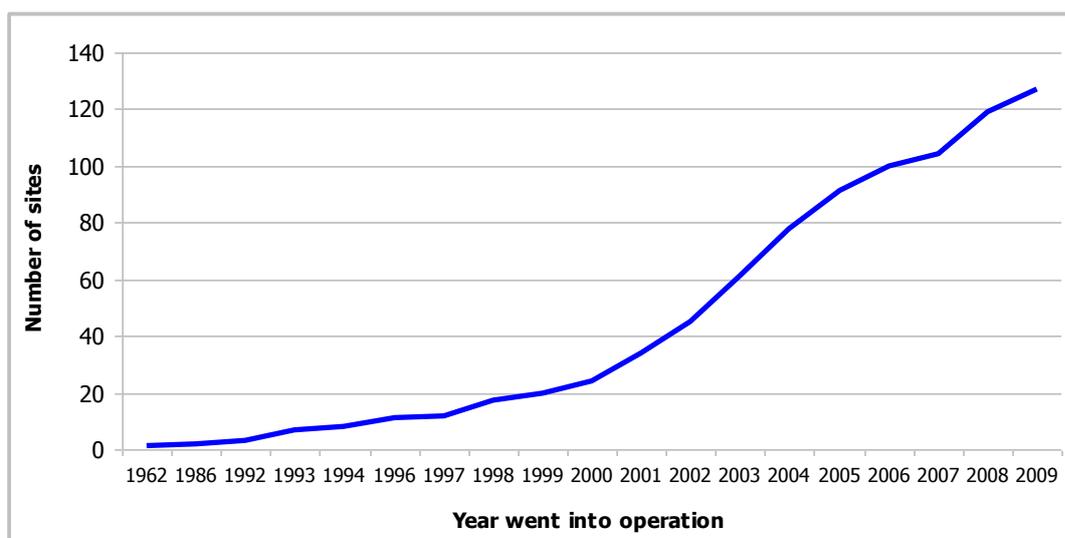
Nation		Type of operation – number of sites, quantity of waste processed (t) and proportion of totals								Total
		Farm	AD facility	Other waste mgt facility	Sewage treatment works	Community enterprise	Food or drinks mfr/ processing	Other	Unspecified	
England	Number	5	0	32	1	0	0	6	1	45
	% number	11.1%	0.0%	71.1%	2.2%	0.0%	0.0%	13.3%	2.3%	100.0%
	Total waste processed	69,317	0	904,628	0	0	0	147,464	85,301	1,206,710
	% waste processed	5.7%	0.0%	75.0%	0.0%	0.0%	0.0%	12.2%	7.1%	100.0%
Scotland	Number	1	1	4	0	0	0	5	0	11
	% number	9.1%	9.1%	36.4%	0.0%	0.0%	0.0%	45.5%	0.0%	100.0%
	Total waste processed	0	47,019	96,257	0	0	0	18,439	0	161,716
	% waste processed	0.0%	29.1%	59.5%	0.0%	0.0%	0.0%	11.4%	0.0%	100.0%
Wales	Number	0	0	2	0	0	0	0	0	2
	% number	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Total waste processed	0	0	9,596	0	0	0	0	0	9596
	% waste processed	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
GB	Number	6	1	39	1	0	0	11	1	59
	% number	10.2%	1.7%	66.1%	1.7%	0.0%	0.0%	18.6%	1.7%	100.0%
	Total waste processed	69,317	47,019	1,198,418	0	0	0	165,903	85,301	1,565,959
	% waste processed	4.4%	3.0%	76.5%	0.0%	0.0%	0.0%	10.6%	5.5%	100.0%

Source: operator survey (permitted sites, n = 58, CI = +/-6.5%).

Numbers may not add up to 100% due to rounding.

The majority of composting sites had been in operation for five years or more, with a mean of 5.3 years (Figure 4.1). Despite composting being relatively well established as an organics recycling treatment method compared with AD, this still suggests that sites were relatively new, considering capital financing is usually amortised over an expected operating period of about 10 years, indicating that a substantial minority of composting sites were still in the first half of their expected operating life.

Figure 4.1: Cumulative number of sites currently operated by 2009 survey respondents, by first year of operation



Source: operator survey (permitted sites, n = 145, CI = +/-6.5%).

4.3 Site capacity

4.3.1 Permitted/licensed sites

Most (43%) of the permitted site capacity was in the 5000-25,000t per year range, with a mean of 17,177t (minimum 9000t and maximum 25,000t). These figures were obtained from the compost site survey, as the data provided by the EA did not specify the actual permitted capacity, simply the tonnage band in which each site fell. The range of permitted capacity is shown in Table 4.7, although actual quantities of waste treated in 2009 may have differed.

Table 4.7: Distribution of permitted composting site waste treatment capacity in Great Britain in 2009

Nation	Number of sites (t per year)					Total
	<5000	5000->25,000	25,000-75,000	>75,000	No data	
England	4	52	44	6	9	115
Scotland	3	7	8	0	5	23
Wales	0	4	1	0	1	6
Great Britain	7	63	53	6	16	145
Proportion	4.8%	43.4%	36.6%	4.1%	11.1%	100.0%

Source: operator survey (permitted sites, n = 145, CI = +/-6.5%).

4.3.2 Exempt sites

There is no equivalent approved site capacity for registered exempt composting sites.. Data on the quantities of waste treated by exempt sites were only available for Scotland, as shown below (Table 4.8). After adjusting for over-reported tonnages (see footnote to table, and estimation method described in Section 2), these data, combined with the actual survey replies, generated an average of 487t annually per exempt site (based on 112 responses). The arithmetic average was much higher than the median input tonnage of 50t per year, on account of the substantial log-normal skew in the statistical distribution of input tonnages (as illustrated for the full national exempt site population distribution in Section 3, Figure 3.2).

Table 4.8: Distribution of wastes composted at exempt sites in Scotland

Quantity of wastes composted split according to band (t)	Number of sites in each band	Proportion of sites (%)	Waste composted (t)	Waste composted (%)
0-5	14	20.8	29	0.1
>5-10	2	3.0	18	0.0
>10-15	2	3.0	28	0.0
>15-20	3	4.5	60	0.1
>20-50	12	17.9	448	0.8
>50-100	10	14.9	778	1.5
>100-500	8	11.9	2109	3.7
>500-1000	6	9.0	4100	7.3
>1000-2500	6	9.0	9034	16.0
>2500-5000	0	0.0	0	0.0
>5000-10,000*	2	3.0	11,930*	21.2
>10,000*	2	3.0	27,785*	49.3
Total	67	100.0	56,319*	100.0

Source: SEPA (census data, CI = +/- 2%; n=67 as input data were only available for 67 out of the 87 sites held on the SEPA database).

* As explained in Section 2, the maximum annual allowable inputs under an exemption are in the range 2100-4300t. These records are therefore believed to overstate the organic waste inputs and were adjusted accordingly in the exempt sites gross-up methodology.

4.4 Composting systems and processes

The majority of permitted composting systems in operation during 2009 were OAW systems (62%) accounting for 53% of waste (Table 4.9). As only materials that do not fall under the scope of the ABPR may be composted in such systems, this has tended to be restricted to botanical parks and gardens waste. Proportionally this estimate of 53% of waste processed in open-air systems is broadly in agreement with the 59% of garden and park wastes (EWC code 20 02 01) composted based on the operator waste returns.

The number of IVC systems in operation (33; 23% of permitted sites) had increased substantially compared with estimates in previous years (22 and 23 in 2008/09 and 2007/08, respectively). This is consistent with data on planning applications reviewed and discussed in Section 3, which suggested that more IVC than OAW plants would be built in future years.

These IVC systems composted proportionally more waste than OAW systems (34kt per IVC site compared to 19kt per OAW site). This probably reflects the greater capital costs of IVC systems, such that economies of scale come into play. On average, the mean quantity of waste composted (permitted and exempt) was 27.9kt per site in 2009.

Table 4.9: Composting systems in operation in the UK in 2009 – sample respondent data and comparative national gross-up

System type	Permitted sites		Exempt sites		Total	
	Number of sites	Quantity processed (t)	Number of sites	Quantity processed (t)	Number of respondent sites	Gross-up quantity processed (t)
Totally enclosed	14	253,577	4	46	18	360,140
IVC – with some activities in open (e.g. maturation)	33	1,124,057	1	8000	34	1,717,447
Windrow open (OAW)	90	1,678,447	26	47,180	116	3,111,493
Windrow under cover	0	0	1	350	1	5434
Continuous block	2	65,141	3	73	5	93,467
Aerated static pile	2	6368	8	2424	10	46,658
Other	1	4001	6	46	7	6389
Unspecified	3	55,625	0	0	3	78,844
Total	145	3,187,217	49	58,119	194	5,419,871

Sources: operator survey (permitted sites, n = 145) and operator survey/SEPA data (exempt composting sites, n = 116) (CI = +/- 6.5%).

The estimates for exempt sites mirrored those for the permitted sites, where 53% of sites were classed as OAW, although this accounted for 81% of waste.

The 'other' processes cited by survey respondents included:

- static aerated membrane covered windrows at a permitted site; and
- New Zealand box-style home composting bins, plastic home composting bins and vermiculture at exempt sites.

The majority of permitted sites (67%) operated different composting systems in series (e.g. subjecting the incoming waste to IVC followed by open-air maturation), rather than as parallel processes (e.g. IVC and OAW as separate processes for different types of waste; Table 4.10). (This question was not asked in the exempt site survey.)

Table 4.10: Configuration of permitted composting sites in the UK

System configuration	Permitted sites	
	Number	Quantity of waste processed (t)
Series	8	293,901
Parallel	1	12,071
Unspecified	3	143,564
Total	12	449,536

Source: operator survey (permitted sites, n = 145, CI = +/-6.5%).

4.4.1 Waste pre-treatment

The majority of permitted sites undertook some pre-processing of feedstocks prior to active composting, with 88% of sites shredding incoming wastes and 61% removing contaminants through hand picking (Table 4.11). This was the first year this level of detail was available; it indicated that most sites were actively managing the incoming feedstocks. However, the number of sites was low compared with those sites having gained or undergoing PAS 100 certification (154; Table 4.19), which would have required some element of feedstock preparation to be carried out.

Table 4.11: Pre-processing of feedstocks at permitted sites prior to active composting

Processing method	Number of sites	Proportion of responding sites (%)
Screening	46	31.7
Shredding	128	88.3
De-packaging	2	1.4
Hand picking	88	60.7
Pulping	0	0.0
Blending/mixing	24	16.6
Other	17	11.7
Unspecified	3	2.1
Total	145	*

Source: operator survey (permitted sites, n = 145, CI = +/-6.5%).

*Percentages do not sum to 100% as more than one processing method could be used.

The 'other' option included:

- additive to aid composting process;
- obtaining processed feedstocks from an MBT plant at another site;
- macerator (for food waste);
- magnets;
- mechanical picking;
- negative aeration windrows;
- screening after sanitisation phase;
- turning;
- watering if necessary; and
- wind sifting (vacuum plastic off).

4.4.2 Biodegradable bags

A total of 24% of sites accepted wastes collected in biodegradable/compostable bags. These were not deemed to be a problem, as the majority of respondents stated that the bags biodegraded sufficiently during the composting process, especially in IVC units. Additionally, screening post-composting helped remove any residues. Conversely, non-compostable bags created problems: one site that received waste in standard plastic bags reported screening costs of in excess of £10/t of inputted waste to remove them.

4.4.3 ABPR

The ABPR⁴³ only permit the composting and AD of catering waste and Category 3 animal by-products in approved premises that meet stringent hygiene and sanitisation (time-temperature) requirements.⁴⁴ The number of composting plants approved during 2009 under the ABPR is shown in Table 4.12. Due to the way in which data were recorded by Animal Health (the statutory body responsible for approving premises), it was not possible to determine the total number of approved premises up to and including 2009.

⁴³ Separate regulation applied in 2009 in England, Northern Ireland, Scotland and Wales, implementing the European Union Animal By-Products Regulation (EC) No. 1774/2002.

⁴⁴ Further information is available at <http://www.defra.gov.uk/foodfarm/byproducts/wastefood/composting/index.htm> [accessed on 16 March 2011].

Table 4.12: Number of composting premises approved under the ABPR during 2009

Nation	Number approved
England	11
Northern Ireland	0
Scotland	3
Wales	5
Total	19

Source: Defra ABPR-approved composting premises list 2009 (census data, CI = +/-2%).

4.5 Origin of wastes and materials recycled

4.5.1 Permitted/licensed sites

For the UK as a whole, the majority of permitted sites (79%) obtained their wastes solely from external sources, as shown in Table 4.13; this was broadly similar for both stand-alone (85%) and co-located (76%) sites. Only one site accepted wastes solely from the site at which it was located or from within the same business group. As previously shown from the survey results (see Section 3), this suggests that the sector relies predominantly upon external sources of wastes, which will presumably attract a gate fee.

Table 4.13: Sources of wastes received at permitted composting sites (respondent data only, not grossed up)

Source of waste	Number of sites	Proportion in each category (%)	Proportion of total number of sites (%)	Quantity of waste processed (t)	Proportion of waste processed in each category (%)	Proportion of total quantity of waste at all sites (%)
Stand-alone sites						
Only from the site at which it is located or from within the same business (or business group)	0	0.0	0.0	0	0.0	0.0
From the site at which it is located or from within the same business (or business group) plus other sources	12	14.8	8.3	258,930	16.6	8.1
Solely from external sources	69	85.2	47.6	1,299,850	83.4	40.8
Total	81	100.0	55.9	1,558,780	100.0	48.9
Co-located sites						
Only from the site at which it is located or from within the same business (or business group)	1	1.7	0.7	800	0.1	0.0
From the site at which it is located or from within the same business (or business group) plus other sources	13	22.0	9.0	283,670	18.1	8.9
Solely from external sources	45	76.3	31.0	1,281,489	81.8	40.2
Total	59	100.0	40.7	1,565,959	100.0	49.1
Unspecified	5	100.0	3.4	62,477	100.0	2.0

Source: operator survey (n=145, CI = +/-6.5%).

Of those permitted sites that received wastes from external sources, the majority (91%) were from multiple sources (Table 4.14), irrespective of whether they were stand-alone (94%) or co-located with other operations (86%). These results accord with the data shown in Table 4.13 which suggested that most sites derived their feedstocks from external sources.

Table 4.14: Suppliers of wastes to permitted composting sites categorised as standalone or co-located sites

	Wastes from single sources		Wastes from multiple sources		Unspecified	
	Number of sites	Proportion of sites (%)	Number of sites	Proportion of sites (%)	Number of sites	Proportion of sites (%)
Stand alone						
On-farm	2	100.0	28	36.8	0	0.0
Off-farm	0	0.0	46	60.5	3	100.0
Unspecified	0	0.0	2	2.6	0	0.0
Total	2	100.0	76	100.0	3	100.0
% standalone sites		2.5%		93.8%		3.7%
Co-located						
AD facility	0	0.0	1	2.0	0	0.0
Community enterprise	0	0.0		0.0	0	0.0
Farm	0	0.0	6	12.0	0	0.0
Food or drinks manufacture / processing	0	0.0		0.0	0	0.0
Other waste management facility	8	100.0	31	62.0	0	0.0
Sewage treatment works	0	0.0	1	2.0	0	0.0
Other	0	0.0	10	20.0	0	0.0
Unspecified	0	0.0	1	2.0	0	0.0
Total	8	100.0	50	100.0	0	0.0
% co-located sites		13.8%		86.2%		0.0%
TOTAL all sites	10	7.2%	126	90.6%	3	2.2%

Source: Operator Survey (139 sites in total received wastes from external sources)

'Other' co-located sites included:

- a bark processing company;
- a site co-located with a farm as well as with another waste management facility;
- a de-packaging unit;
- a haulage yard and transfer station;
- land leased by the council;
- a landfill and restoration (soils) site;
- a nursery;
- an operational landfill site and HWRC site;
- a plant hire company;
- a wholesale market;
- a wood waste processor.

4.5.2 Exempt sites

The majority of wastes composted at exempt sites were from multiple sources (59% at stand-alone and 54% at co-located sites) (Table 4.15). Given the restrictions imposed on sites under the Paragraph 12 exemption (where composting was restricted to the place where the waste was produced or where the compost was spread), it is surprising that such a high proportion of sites accepted wastes from multiple sources, suggesting that the compost would need to be spread on the site where it was produced.

Table 4.15: Suppliers of wastes to exempt composting sites

	Wastes from single sources		Wastes from multiple sources		Unspecified	
	Number of sites	Proportion of sites (%)	Number of sites	Proportion of sites (%)	Number of sites	Proportion of sites (%)
Stand alone						
On-farm	6	85.7	6	60.0	0	0.0
Off-farm	1	14.3	4	40.0	0	0.0
Total	7	100.0	10	100.0	0	0.0
% standalone sites		41.2%		58.8%		0.0%
Co-located						
Farm	1	20.0	0	0.0	0	0.0
AD facility		0.0	0	0.0	0	0.0
Other waste management facility	1	20.0	1	14.3	0	0.0
Sewage treatment works	0	0.0	0	0.0	0	0.0
Community enterprise	0	0.0	1	14.3	0	0.0
Food or drinks manufacture / processing	0	0.0	0	0.0	0	0.0
Other	3	60.0	5	71.4	1	100.0
Total	5	100.0	7	100.0	1	100.0
% co-located sites		38.5%		53.8%		7.7%

Source: Operator Survey (n=49)

The 'other' category included:

- allotments (4);
- a council depot (1);
- a gravel and sand storage site (1);
- a landscape company yard (1);
- a local authority country park (1);
- a military installation (1);
- part of a school (1); and
- a plant nursery (2).

4.6 Wastes composted at permitted/licensed sites

For permitted sites, it was possible to use the regulator waste input data to distinguish the relative quantities of municipal and non-municipal waste entering different types of treatment system (Table 4.16).

OAW accounted for 50% of all waste composted (Table 4.16), with municipal garden and parks waste (EWC code 20 02 01) comprising 33% (1.5Mt) of the overall total (see Appendix B). IVC and wholly enclosed facilities also treated a substantial amount of this type of waste (0.7Mt; see Appendix B), which may have been composted on its own or used as a bulking agent with food and other similar feedstocks. Just under 0.5Mt (40%) of municipal kitchen and canteen waste (EWC code 20 01 08) out of a total of 1.2Mt of municipal waste were composted in totally enclosed and IVC facilities (see Appendix B).

Overall a total of 68kt of mixed municipal waste (EWC code 20 03 01) was composted, at a site classed as 'other' (which was recorded as a static aerated membrane covered windrow) (see Appendix B).

The non-municipal waste fraction only comprised 20% of the total quantity of waste composted (Table 4.16), with agricultural and horticultural wastes (EWC Chapter 02) making up just under 50% of this (see Appendix B). The majority of the agricultural and horticultural waste was composted in OAW systems (0.25Mt). Wastes from wood processing etc. (EWC Chapter 03) were predominantly composted in IVC or totally enclosed systems (12kt) compared to OAW (7kt), although the absolute quantities were low (see Appendix B).

Notably, IVC facilities accepted 94kt of construction and demolition wastes (EWC Chapter 17), compared to 58kt at OAW sites (see Appendix B). It is likely that these wastes were blended with composts to manufacture soil substitutes, rather than being composted *per se* (as discussed in Section 3).

Overall, other than the municipal food waste fraction, there did not appear to be any substantive differences in the waste types accepted for treatment at different types of composting sites.

Table 4.16: Quantities of wastes processed in different types of permitted composting systems in 2009

Waste source	Breakdown of waste sources treated by different treatment options (t)						Total wastes treated (t)	Total waste treated (%)
	Totally enclosed	IVC	OAW	Continuous block	Aerated static pile	Other		
Municipal	408,951	804,381	1,868,402	57,898	5407	457,325	3,602,364	79.7
Proportion of municipal (%)	11.4%	22.3%	51.9%	1.6%	0.2%	12.7%	100.0%	
Non-municipal	86,773	212,876	399,010	7,243	961	208,368	915,230	20.3
Proportion of non-municipal (%)	9.5%	23.3%	43.6%	0.8%	0.1%	22.8%	100.0%	
Total	495,724	1,017,257	2,267,412	65,141	6368	665,693	4,517,594	100.0
Proportion of total (%)	11.0%	22.5%	50.2%	1.4%	0.1%	14.7%	100.0%	

Source: operator waste returns (census returns, CI = +/-2%).

Data are reported for sites in which survey returns indicated the type of system in operation (n = 207).

4.7 Composted products

4.7.1 Quantities

A total of 1.7Mt of composted product was reported by the survey respondents as being manufactured in 2009. Based on the known quantities of wastes obtained from the operator waste return databases supplied by the regulators, it can be estimated that **a grossed-up total of 2.9Mt of compost was manufactured in the UK in 2009.**⁴⁵ These calculations are summarised in Table 4.17.

It should be noted that, as with waste inputs (see Section 4.1.1), the improvement to the permitted site survey technique resulted in the respondent sample capturing 70% of the permitted compost product output, based on comparing survey returns with this national grossed-up estimate. On the same basis, exempt site survey data covered just 6% of the national estimate, although this rose to 11% once the SEPA regulatory data was added.

Table 4.17: Quantities of compost manufactured at permitted and exempt sites in Great Britain in 2009

Nation	Permitted sites		Exempt sites		Total	
	Reported quantity (t)	Estimated quantity (t)*	Reported quantity (t)	Estimated quantity (t)*	Reported quantity (t)	Estimated quantity (t)*
England	1,464,618	2,075,965	26,505	411,476	1,491,123	2,487,442
Scotland	177,181	251,138	300	4657	177,481	255,796
Wales	26,506	37,570	4973	77,204	31,479	114,774
Total	1,668,305	2,364,673	31,778	493,337	1,700,083	2,858,012

Sources: operator survey (permitted sites, n = 145), operator survey (exempt composting sites, n = 116) (CI = +/- 6.5%).

* Grossed up based on operator waste return data supplied by EA, NIEA, and SEPA.

Of the total quantities of compost reported, 29% (0.49Mt from survey respondents) was made out of feedstock containing at least some food wastes (Table 4.18). This equated to 0.73Mt of food waste-derived compost (i.e. compost made, at least in part, from food waste) when grossed up for survey non-respondents. This was greater than the estimated 0.47Mt produced in 2008/09. Of interest is the high proportion of food waste-derived compost manufactured in Wales.

Table 4.18: Quantities of compost derived from food waste feedstocks manufactured at sites in Great Britain in 2009

Nation	Reported quantity (t)	Proportion of total from each country (%)	Estimated quantity (t)*
Permitted sites			
England	406,757	27.8	576,542
Scotland	57,636	32.5	81,693
Wales	25,500	96.2	36,144
Exempt sites			
England	355	100.0	5511
Scotland	0	0.0	0
Wales	0	0.0	0
Total	490,248		699,890

Sources: operator survey (permitted sites, n = 145), operator survey (exempt composting sites, n = 116) (CI = +/- 6.5%).

* Grossed up based on operator waste return data supplied by EA, NIEA and SEPA.

⁴⁵ A scale-up factor of 1.428 was used. This was calculated by applying the known fraction of input tonnage from the respondent sample, as a percentage of the total input tonnage, to gross up the respective output tonnage by the same fraction.

4.8 PAS 100 and CQP certification

Data on the status of compost producers undergoing certification to BSI PAS 100 (2005)⁴⁶ and the CQP⁴⁷ was supplied by AfOR and relates to the calendar year 2009.⁴⁸ During this period, the CQP was formally recognised in England and Wales, with Scotland recognising only PAS 100.^{49 & 50} This sub-section includes data derived from the AfOR certification database, complemented with data derived from the operator survey of permitted composting sites.

BSI PAS 100 sets minimum quality criteria for composts produced from source-segregated biodegradable waste, as well as requiring operators to implement a quality assurance scheme. The CQP sets criteria for the production of quality compost that may be used without the need for waste regulatory control and includes an acceptable input list.⁵¹ AfOR operates an independent third-party certification scheme for both PAS 100 and the CQP, and therefore collates statistics about certification status.

4.8.1 Certification status

During 2009, a total of 154 compost producers were undergoing certification, with 98 being fully certified (Table 4.19). The majority of producers were in England (75%), with 16% in Scotland.

Across the UK, this equated to 55% of all the compost producers identified on the ORSR as undergoing, or having gained, certification. Notably, all of the permitted compost producers in Northern Ireland were participating in the certification scheme.

Table 4.19: Number of compost producers undergoing/having gained certification to PAS 100 and the CQP in 2009

Certification status	Number of producers in each nation				UK Total
	England	Northern Ireland	Scotland	Wales	
Applied to PAS 100	0	2	5	0	7
Applied to PAS 100 & CQP	42	0	2	5	49
Certified to PAS 100	0	3	16	0	19
Certified to PAS 100 & CQP	75	0	1	3	79
Total	117	5	24	8	154
<i>Total number of sites on ORSR</i>	217	5	44	15	281
% of sites undergoing/ having gained certification on ORSR	53.9%	100.0%	54.5%	53.3%	54.8%

Sources: AfOR certification database (census) and operator waste returns.

⁴⁶ BSI, 2005. Specification for composted materials: Publicly Available Specification 100.

⁴⁷ WRAP and the EA, 2008. The quality protocol for the production and use of quality compost from source-segregated biodegradable waste.

⁴⁸ Certification relates to a defined composting process producing specified particle size grade(s) of compost at a stated composting site. Certification of a 'compost producer' therefore means the specific composting process and compost grades assessed.

⁴⁹ SEPA, September 2004. Composting position.

⁵⁰ Northern Ireland formally recognised the CQP in 2010.

⁵¹ For further information on PAS 100 and the CQP, please visit the following websites:
http://www.wrap.org.uk/farming_growing_and_landscaping/producing_quality_compost_and_digestate/index.html or
<http://www.organics-recycling.org.uk/category.php?category=992&name=Compost+PAS+100>

The quantities of waste certified are shown in Table 4.20. Overall, 61% of the waste identified at permitted composting sites was undergoing certification, rising to 97% in Wales.

Table 4.20: Quantities of waste undergoing/having gained certification to PAS 100 and the CQP in 2009

Certification status	Quantity of waste in each nation of the UK (t)				UK Total
	England	Northern Ireland	Scotland	Wales	
Applied to PAS 100	0	70,000	40,100	0	110,100
Applied to PAS 100 & CQP	816,500	0	8500	25,500	850,500
Certified to PAS 100	0	87,000	210,200	0	297,200
Certified to PAS 100 & CQP	1,438,113	0	38,000	25,000	1,501,113
Total	2,254,613	157,000	296,800	50,500	2,758,913
<i>Total quantity of waste on ORSR</i>	<i>3,715,044</i>	<i>253,867</i>	<i>496,560</i>	<i>52,123</i>	<i>4,517,594</i>
% of waste undergoing/ having gained certification on ORSR	60.7%	61.8%	59.8%	96.9%	61.1%

Sources: AfOR certification database (census, CI = +/- 2%) and operator waste returns.

In total, 1.8Mt of input wastes was certified during 2009, which suggests that **just over 1Mt of certified compost was manufactured**⁵² whose use would not be regulated as a 'waste'. **This is 37% of the estimated 2.9Mt of compost manufactured in 2009.** The 2.8Mt of material undergoing or having gained certification represents a significant proportion (61%) of the 4.5Mt of waste estimated to have been processed at permitted/licensed composting facilities.

4.8.2 Types of wastes undergoing certification

The predominant waste composted at certified sites comprised green/woody plant materials, making up 72% of the total quantity of certified waste (Table 4.21).

Table 4.21: Types of waste composted at certified sites in 2009

Waste category	Number of sites	Quantity of waste (t)	Quantity of waste (%)
Green/woody plant materials	75	1,290,213	71.7
Green/woody plant materials & ABPs*	13	313,500	17.4
Green/woody plant materials & paper/cardboard	4	69,000	3.8
Green/woody plant materials & wood waste	3	71,800	4.1
Green/woody plant materials, paper/cardboard & ABPs*	0	0	0.0
Green/woody plant materials, paper/cardboard & wood waste	3	53,800	3.0
Total	98	1,798,313	100.0

Source: AfOR certification database (census, CI = +/- 2%).

*Animal by-products

⁵² This was calculated assuming a mass loss due to decomposition (including rejects) of 0.4; 1t of waste input was assumed to yield 0.6t of compost.

4.8.3 Composting systems at certified sites

According to data from AfOR's composting certification database the predominant composting system type was OAW (77% of sites, representing 72% of waste), which mirrors the predominant composting technique identified in the operator survey (62% of sites accounting for 52% of waste). The types of system used at certified sites are shown in Table 4.22.

Table 4.22: Types of composting system in operation at certified sites in 2009

System type	Number of sites	Quantity of waste (t)	Quantity of waste (%)
Aerated static piles	2	32,500	1.9
IVC	14	326,000	18.1
OAW	75	1,293,752	71.9
Turned continuous block	6	144,261	8.0
VCU*	1	1800	0.1
Total	98	1,798,313	100.0

Source: AfOR certification database (census, CI = +/-2%).

* VCU = Vertical Composting Unit

4.8.4 Compost operators' perspectives on certification

Of the respondents to the operator survey, 81% indicated that they had either applied for or gained certification (Table 4.23). Only 7% stated that they had no intention to apply at all.

Feedback during the telephone interviews indicated that the main benefits of PAS 100 and the CQP were seen to be the confidence they give to end users about the quality of the material. Some respondents saw them as 'necessary to keep up with the market'; it was viewed to be difficult but was the best option.

Table 4.23: Responses to question about certification status in operator survey

Certification status	Number of sites	Proportion of respondents (%)
Applied and working towards certification	24	16.6
Certified	94	64.8
Lapsed	4	2.8
Not yet applied but will in the future	10	6.9
Not yet applied and have no intention to	8	5.5
Unspecified	5	3.4
Total	145	100.0

Source: operator survey (permitted sites, n = 145, CI = +/-5%).

Certified products – grades of compost

The most common type of Principal and Additional Grade (I & II) products listed in the certification database supplied by AfOR was, in both cases, soil improver (84% and 74%, respectively); this is shown in Table 4.24.

Table 4.24: Number of sites manufacturing different certified compost product types in 2009

Product type	Number of sites manufacturing different grades of certified compost		
	Principal Grade	Additional Grade I	Additional Grade II
Soil improver	82	34	8
Mulch	5	4	1
Manufactured topsoil ingredient	1	1	0
Growing medium ingredient	1	1	0
Turf dressing	1	1	1
Unspecified	8	6	0
Total	98	47	10

Source: AfOR certification database (census, CI = +/-2%).

A detailed analysis of the quantities of certified product types was not possible, as the database did not specify the proportions of grades produced. However, of the 74 certified sites that solely manufactured soil improvers, 1.3Mt of input feedstock was processed, indicating that 0.8Mt⁵³ of certified soil improver was manufactured.

Principal and Additional Grades were made up of a range of particle sizes, with no discernible patterns identified (Table 4.25).

Table 4.25: Number of sites manufacturing different certified compost particle size ranges in 2009

Particle size range	Number of sites manufacturing different grades of certified compost		
	Principal Grade	Additional Grade I	Additional Grade II
0-10mm	30	13	5
0-20mm	25	8	2
0-30mm	17	7	0
0-40mm	25	18	3
0-50mm	1	1	0
Total	98	47	10

Source: AfOR certification database (census, CI = +/-2%).

⁵³ This was calculated assuming 1t of input feedstock would yield 0.6t of product.

4.9 Product types

This sub-section deals with the grades and types of all compost products, whether or not from certified processes.

4.9.1 Grades of product

The predominant Principal Grade of compost was 0-40mm, whilst the predominant Additional Grade was 0-10mm (Table 4.26). This suggests that compost producers were creating secondary products with smaller particle size ranges, presumably tailored for different end uses. Notwithstanding, the Additional Grade comprised only 13% of the total mass of compost reported.

Table 4.26: Grades of manufactured compost reported in the operator survey 2009 (respondent data only)

Particle size range	Principal Grade		Additional Grade	
	Quantity manufactured (t)	Proportion (%)	Quantity manufactured (t)	Proportion (%)
Permitted composting sites				
0-10mm	341,142	24.0	82,757	38.5
0-20mm	221,105	15.6	58,846	27.3
0-40mm	713,113	50.2	52,235	24.3
Other	144,404	10.2	21,327	9.9
Total	1,419,764	100.0	215,165	100.0
Registered exempt sites				
0-10mm	5482	21.2	N/A	N/A
0-20mm	6731	26.1	N/A	N/A
0-40mm	10,089	39.1	N/A	N/A
Other	3515	13.6	N/A	N/A
Total	25,817	100.0	N/A	N/A

Sources: operator survey (permitted sites, n = 145) and operator survey (exempt composting sites, n = 49) (overall CI = +/-5%). N/A = Not applicable as this question was not asked in the exempt site survey.

4.9.2 Product categories

The vast majority of reported compost manufactured was soil conditioner (84%), accounting for 1.4Mt (sample returns data only), with other product categories only in the tens of thousands of tonnes (Table 4.27). Data have been grossed up in Table 4.27 by applying the survey proportions to the national grossed-up total estimate presented in Section 3. Notably, the amount of compost used as a growing medium constituent (44kt or 63kt scaled up to account for non-respondents to the survey) was less than the estimated 141kt in 2008/09. Feedback during the telephone surveys indicated that a few operators had started to manufacture compost for growing media, but had decided that it was too onerous from a day-to-day perspective and hence had stopped.

These findings were similar to the number of sites on the PAS 100/CQP certification scheme manufacturing soil improvers (84%), mulch (5%) and growing medium constituent (1%), as shown previously in Table 4.24.

Table 4.27: Quantities of compost reported in the survey from sites and grossed-up estimates in 2009

Product category	Reported quantity (t)	Proportion of total quantity (%)	Grossed-up quantity (t)	Proportion from food waste feedstocks* (%)
Biomass	10,171	0.6	19,353	0.0
Growing medium constituent (before blending)	44,402	2.6	63,384	0.0
Landfill cover	65,752	3.8	110,154	26.6
Mulch	39,126	2.3	67,491	0.0
Soil conditioner	1,442,670	84.0	2,408,625	31.8
Topsoil/subsoil manufacture	28,183	1.6	64,184	1.8
Turf (top) dressing	26,250	1.5	37,558	49.0
Other	47,877	2.8	92,816	33.5
Unspecified	13,654	0.8	19,958	17.6
Total	1,718,085	100.0	2,883,523	29.6

Sources: operator survey (permitted sites, n = 145) and operator survey (exempt composting sites, n = 49) (overall CI = +/-5%).

4.10 Market sectors

By far the largest market was agriculture, with 59% of sites supplying this sector with 59% of all reported compost manufactured (Table 4.28); this was estimated to be 1.8Mt (grossed up). The second largest category was amateur horticulture, with a reported 241kt (14%) of compost supplied (grossed-up estimate 356kt), followed by landscaping at 8% (132kt, grossed-up estimate 247kt). Notably, landfill restoration/daily cover uses accounted for 114kt (7%), grossed up to 178kt.

Table 4.28: Market sectors to which compost manufactured at UK sites was supplied in 2009

Market sector	Number of sites	Proportion of sites (%)	Reported quantity (t)	Reported quantity (%)	Grossed-up quantity (t)	Proportion containing food wastes (%)
Agriculture	115	59.3	1,011,475	58.9	1,750,329	36.7
Biomass	6	3.1	10,383	0.6	14,717	0.0
Forestry	3	1.5	1	0.0	18	13.0
Horticulture (amateur)	51	26.3	241,404	14.1	356,159	23.0
Horticulture (professional)	32	16.5	44,511	2.6	92,202	6.6
Land restoration /daily cover	19	9.8	113,724	6.6	178,122	27.3
Landscaping	56	28.9	131,957	7.7	246,869	2.8
Sports turf	12	6.2	14,028	0.8	25,651	0.0
Other	19	9.8	122,568	7.1	173,778	32.9
Unspecified	7	3.6	28,033	1.6	45,681	10.7
Total	194		1,718,084	100.0	2,883,525	29.6

Sources: operator survey (permitted sites, n = 145) and operator survey (exempt composting sites, n = 49) (overall CI = +/-5%).

The 'other' category included: infrastructure/civil engineering; turf manufacture and soil blending; and stockpiled prior to use as landfill daily cover.

4.10.1 Agricultural crop applications

To analyse the types of agricultural crop to which compost product was applied, data have been aggregated for the relevant agriculture, amateur and professional horticulture market sectors in Table 4.28. Some 2.2Mt of compost product was applied to these market sectors. The main type of agricultural crop to which compost was applied was cereals/combinable crops (552kt reported, 952kt grossed-up), with other arable crops accounting for 15% of all compost (190kt). The 'other' category included organic farming and silage (Table 4.29).

Table 4.29: Types of agricultural crops to which compost manufactured at sites was applied in the UK in 2009

Crop	Reported quantity (t)	Proportion (%)	Grossed-up quantity (t)	Proportion containing food wastes (%)
Biomass	2640	0.2	3742	0.0
Cereals/combinable crops	552,393	42.6	951,814	49.3
Glasshouse-protected crops	3011	0.2	4347	0.0
Grassland	40,782	3.1	129,022	36.2
Orchard fruit	13,360	1.0	19,000	93.6
Other arable (e.g. oil seed rape, peas, beans)	189,830	14.6	306,328	29.9
Plants & flowers	8887	0.7	25,531	0.2
Potatoes	12,714	1.0	18,179	23.2
Soft fruit	12	0.0	186	0.0
Vegetables	40,616	3.1	106,430	7.8
Other	53,548	4.1	95,650	14.6
Unspecified	379,596	29.3	538,466	15.6
Total	1,297,389	100.0	2,198,695	33.1

Sources: operator survey (permitted sites, n = 145) and operator survey (exempt composting sites, n = 49) (overall CI = +/- 5%).

4.10.2 Compost distribution and value

The majority of compost (47%, 812kt) was sold directly to end users (Table 4.30). 18% (314kt) was distributed without charge, whilst similar amounts were used on the composters' own land or sold to third parties (10% and 10%, respectively). Overall, a total of 991kt of compost was sold.

Table 4.30: Distribution of compost manufactured at permitted and exempt sites

Distribution route	Quantity (t)	Proportion of quantity (%)	Grossed-up quantity (t)
Distributed free of charge	313,909	18.3	513,246
Only charged for distribution	12,955	0.8	18,363
Sold directly	812,284	47.3	1,191,545
Sold to third party	178,676	10.4	282,706
Used on own land	176,105	10.2	506,365
Other	79,326	4.6	112,870
Unspecified	144,829	8.4	258,424
Total	1,718,084	100.0	2,883,519

Sources: operator survey (permitted sites, n = 145) and operator survey (exempt composting sites, n = 49) (overall CI = +/- 5%).

Where charges were levied, typical costs are shown in Table 4.31, although a range of prices were quoted. These data were only requested through the personal interviews with permitted site operators and does not therefore cover exempt sites. Collecting data of this sort was difficult for a number of reasons: sales prices were viewed by many respondents as confidential, so they declined to provide data; some companies quoted prices without delivery charges (ex works), whilst some included delivery; and prices varied depending upon customer and the quantities of compost bought. Overall, however, sales prices to agriculture were typically £0-5/t, to horticulture £6-18/t and to landscaping £9-15/t. These estimates are in line with similar figures published by WRAP.⁵⁴

Table 4.31: Charges for compost manufactured at permitted sites in 2009

Sector	Minimum charge (£/t)	Maximum charge (£/t)
Agriculture	0	15
Biomass	0	10
Forestry	ND	ND
Horticulture (amateur)	1	40
Horticulture (professional)	5	15
Land restoration/daily cover	0	15
Landscaping	0	27
Sports turf	1	25
Other	0	15

Source: operator survey (permitted sites, n = 145, CI = +/-5%).

ND = No data.

Based on these returns, it is estimated that the total value of compost (manufactured at permitted composting sites) sold to the various market sectors was in the region of £9M (Table 4.32).

Table 4.32: Estimated sales value of compost from permitted sites applied to various market sectors in 2009

Sector	Typical sales price (£/t)	Grossed up quantity (t)	Total (£)
Agriculture	2.5	1,412,806	3,532,015
Horticulture (professional)	9	54,963	494,667
Horticulture (amateur)	9	341,264	3,071,376
Landscaping	12	180,296	2,163,552
Total		1,989,329	9,261,610

Source: operator survey (permitted sites, n = 145, CI = +/-5%).

⁵⁴ WRAP. 2008. Realising the value of organic waste – Market Situation Report.

Respondents indicated that the greatest potential growth area for compost use was agriculture (52%), with landscaping also showing potential (39%). These are shown in Table 4.33.

Table 4.33: Respondents' views on market sectors offering the greatest potential for growth

Market sector	Permitted sites		Exempt sites	
	Number of sites	Proportion of respondents (%)	Number of sites	Proportion of respondents (%)
Agriculture	76	52.4	10	20.4
Horticulture (professional)	27	18.6	6	12.2
Horticulture (amateur)	32	22.1	8	16.3
Landscaping	56	38.6	11	22.4
Sports turf	12	8.3	1	2.0
Land restoration/daily cover	19	13.1	5	10.2
Biomass	19	13.1	5	10.2
Forestry	7	4.8	2	4.1
Other	17	11.7	0	0.0
Unspecified	8	5.5	21	42.9
Total	145	*	49	*

Sources: operator survey (permitted sites, n = 145) and operator survey (exempt composting sites, n = 49).

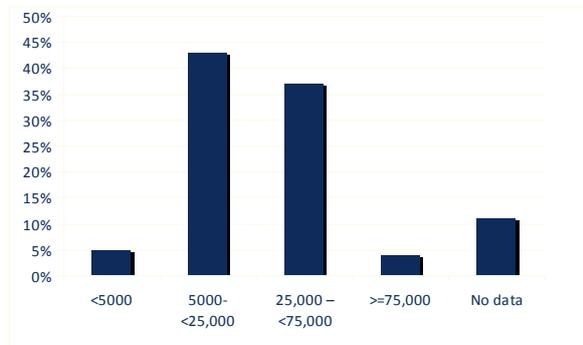
* Numbers do not sum to 100% as multiple answers were possible.

4.11 Discussion and conclusions

Figure 4.2 summarises a number of indicators identified in the 2009 study of the UK's composting sector.

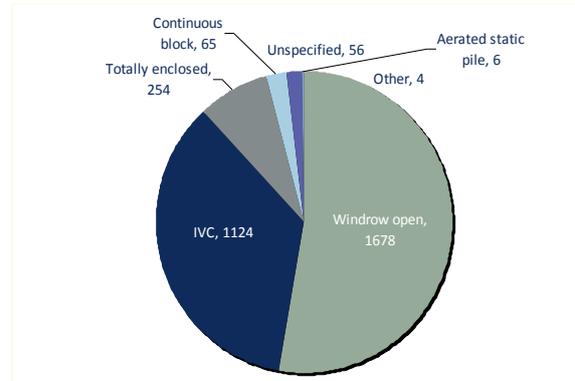
Figure 4.2: The state of composting in the UK in 2009

The majority of UK permitted sites had a capacity of between 5000t and 25,000t per year



(Number of sites falling in each capacity band)(Cited in Table 4.7 plus NI data)

The majority of wastes were composted at permitted sites in OAW



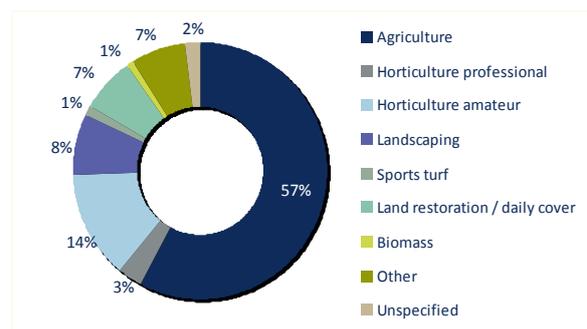
(kt of waste processed by each method)

61% of the waste was composted by producers on the ORSR who were undergoing, or had gained, certification to PAS 100



(Quantity of waste in kt undergoing certification)(Cited in Table 4.20)

Agriculture was the largest market sector, accepting 59% of all compost manufactured



(Proportion of compost by mass)

281 composting sites were identified and entered on the ORSR, with a further 2733 exempt composting sites identified across the UK.

The total value of compost (from permitted composting sites) was in the region of £9M. 2.9Mt of compost was manufactured at permitted and exempt composting sites in 2009, of which the majority was as a soil conditioner.

This discussion summarises the results and conclusions from Section 4 and refers to tables or figures above where relevant. The composting sector in 2009 comprised a majority of OAW systems (62% of permitted operating systems, processing 53% of wastes), with permitted IVC composting and totally enclosed systems accounting for 33% of systems and 43% of input wastes (Section 4.4, Table 4.9). In England and Wales, the majority of permitted sites were stand-alone, although the opposite was true in Scotland, where they were primarily co-located with other activities. Only two sites were co-located with AD facilities. Given the anticipated growth in the AD sector and the interest in diversifying operations shown by composting site operators, it is expected this may increase in the future.

Although the majority of sites had been in operation for over five years, the mean was only 5.3 years (Section 4.2). As financing of large capital infrastructure sites is generally in the region of 10 years, this suggests that the sector will be reliant upon buoyant revenue streams for at least another five years in order to pay off debt

financing. Even though composted products were sold, the revenue per tonne of product was low (generally in the region of 10-20% of gate fees). This represented only a small fraction (5%) of the total turnover (discussed in Section 3.3.2), suggesting reliance on gate fees as the principal revenue stream. Challenges facing the sector to diversify to accommodate food wastes and competition from alternative service providers may reduce gate fees in the future, potentially leaving vulnerable those businesses that operate solely OAW systems. In addition, pressure from the regulators may mean that the opportunity to expand existing OAW sites or build new ones will become more limited, due to perceived risks associated with bioaerosols and issues of odour.

As identified in this study, a large number of exempt composting operations exist. As these sites generally operate on a lower-cost basis (as discussed in Section 3) and charge lower gate fees, they may undermine the profitability (and hence viability) of permitted sites. Estimates of the total quantities of waste disposed of through 'shred and spread' operations were not specifically itemised and measured in the survey so there is no data on the prevalence of this particular practice. This practice may decline in future years in England as Defra has stated that it will not count towards the 2010/11 National Indicators⁵⁵.

The majority of waste composted was derived from municipal sources, reflecting local authorities' ongoing requirement to divert biodegradable municipal waste from landfill. Although most of this was from parks and gardens, a notable increase in the quantities of separately collected food wastes was observed. This mirrored the increase in the number of IVC facilities compared with surveys in previous years.

The proportion of non-municipal wastes was relatively small (20%) compared to the municipal waste fraction (80%) (Section 4.6, Table 4.16). This suggested that there were large untapped commercial and industrial wastes available for composting businesses to source, especially those operating IVC systems. Diversion from landfill may become increasingly cost-effective for commercial and industrial companies as the Landfill Tax increases above the £40/t in place during 2009/10.

Overall, 61% of wastes identified in the operator waste returns were either certified or undergoing certification to PAS 100 (with or without the CQP), which was equivalent to 2.8Mt (Section 4.8.1, Table 4.20). The principal product was soil conditioner, with an estimated 0.8Mt of certified product manufactured (Section 4.9.2). These data show that the majority of composting sites across the UK in 2009 were engaged in the PAS 100/CQP certification scheme, reflecting the approach to quality embraced by most sites.

Despite this optimism, the sector still appeared to rely upon the agricultural sector as the principal market for its products. Perceived reluctance by some farmers to embrace compost or attach value to it, coupled with its low monetary value (typically £0-15/t), suggests that this may remain a high volume, low value market, although increases in the price of artificial fertilisers may encourage greater uptake in the future.⁵⁶ Notwithstanding this situation, it was still viewed by survey respondents as offering the greatest potential for growth (Section 4.10.2, Table 4.33).

Reluctance on behalf of some processors to manufacture compost for the growing media market meant this sector was in the minority (Section 4.9.2, Table 4.27). Similarly, some operators commented that bagging composts for the amateur horticulture market was a minor sideline, as it did not account for much volume. Diversification into other market sectors therefore did not appear to feature predominantly in the business plans for most sites, although landscaping may offer some potential.

In conclusion, the composting sector across the UK in 2009 composted more wastes than in previous years. However, the dominance of OAW systems appeared to be reducing proportionally as more IVC systems became operational with the capacity to treat separately-collected food wastes. It is envisaged that this trend will continue in the future, although over-reliance on gate fees as the principal revenue source and lack of market diversification may well leave some businesses vulnerable.

⁵⁵ Defra, 2010. National Indicator 192: a consultation on the classification of 'shred and spread'

⁵⁶ The price of artificial nitrogen fertilisers increased substantially during 2007 and 2008, but fell during 2009. This was discussed in the 2008/09 AfOR organics recycling survey, referenced previously.

5 AD

5.1 Survey response and quantity of organic waste inputs to AD processes

Previous annual organics recycling surveys had generated little response from AD operators and very little AD-specific market analysis had been undertaken. It was intended that the 2009 survey should seek to fill this gap in the analysis of UK organics treatment processes.

The AD sector presented a number of particularly demanding challenges for the survey in analysing the results and drawing inferences and generalisations from the respondent sample to the whole population. For this reason, much of this Section is centred on describing the characteristics of the respondent sample, with grossing-up restricted to a small number of key parameters such as total input tonnage and digestate output. This Section therefore starts with a basic description of the available data obtained, scoping out what it covers and what it does not. This is intended to guide the reader into making appropriate judgements as to its interpretation.

A total of 17 operational AD sites were identified during 2009 and entered onto the ORSR. Some AD sites operate exclusively on non-waste feedstocks (e.g. organic materials that arise on site, for instance as food industry by-products, or imported onto site as non-controlled wastes). As this study was specifically about the recycling of organic wastes, rather than being a wider study of the organics treatment industry as a whole, it was necessary to establish, as far as possible, the AD sites that take organic waste inputs, as these comprise the group of sites of specific relevance to this study. Establishing this was not easy. A wide range of data sources were researched in order to identify all possible operational sites (other than those at waste water treatment works, which fell outside the scope of this study) to provide a year 2009 baseline for the emerging AD sector, as set out in Defra's AD framework document (2010). The 17 sites that were logged onto the ORSR were therefore sites to include in the analysis.

Five of these 17 sites were identified in the operator waste returns supplied by the regulatory authorities as taking controlled waste inputs (reporting a total of 45,110t). However, the lack of clarity in the categorisation of AD plants in extant legislation at the time, reflected in the regulator data, meant that they were harder to identify unambiguously within the regulator data set than composting plants.⁵⁷ Thus the five permitted sites taking offsite waste feedstocks were less than the 17 sites identified, as not all sites would have been permitted or would have accepted controlled wastes for treatment.

All 17 ORSR recorded sites were approached for the interview survey following the methods (primarily telephone contact) outlined in Section 2. Of these, a total of eight sites contributed to the survey, including all five that were permitted and for which regulator input tonnages were known, although some survey questionnaires were only partially completed for confidentiality reasons. Because of these low numbers, confidence intervals for this Section have not been reported. No operational sites were identified in Northern Ireland.

The response rates from AD sites are shown in Table 5.1. A total of 105,110t of waste (comprising 45kt identified from the operator waste returns and 60kt identified from the operator survey responses) was processed by the seven sites for which waste input data was available (five sites from the operator waste returns and two sites responding to the operator survey). The mean throughput in 2009 was 15kt per site (minimum 1.6kt; maximum 50kt).

Thus, for the 17 sites identified and entered onto the ORSR, waste input data was available for seven, accounting in total for 105,110t of input waste, with one additional survey respondent not providing data. Unlike the composting survey, where validation data existed to allow data for non-reporting sites to be grossed up, no attempt was made to infer waste inputs for these 10 remaining non-responding sites. This is because there was no reliable way of knowing if any of the 17 sites were taking any waste inputs. They could all have been operating exclusively on materials generated on-site (and therefore not engaged in 'recycling organic waste'). It is also possible that non-permitted sites may have been taking waste inputs not required to be reported to the regulatory agencies. As no reliable method could be established for making this judgment, the study remained confined to reporting and characterising the known inputs to the seven AD sites. It should be noted as a caveat that this reflects the minimum known level of organic waste recycling, with the possibility that more remains undetected.

⁵⁷ Most were classed as 'biological treatment', which also included waste water treatment works.

Table 5.1: Number of AD sites identified in the survey and survey response rates in 2009

	Number
UK	
ORSR	17
Sites taking part in survey	8
Response rate	47.0%
Sites on operator waste returns	5
England	
ORSR	12
Sites taking part in survey	5
Response rate	41.7%
Sites on operator waste returns	4
Northern Ireland	
ORSR	0
Sites taking part in survey	0
Response rate	0
Sites on operator waste returns	0
Scotland	
ORSR	4
Sites taking part in survey	2
Response rate	50.0%
Sites on operator waste returns	1
Wales	
ORSR	1
Sites taking part in survey	1
Response rate	100.0%
Sites on operator waste returns	0

Sources: operator survey, operator waste returns, Ofgem, ADBA, REA and web searches.

The survey sought to establish how long the sites operating in 2009 had been in operation. The majority of the seven sites for which data were available had been in operation for two years or more (Table 5.2).

Table 5.2: Year AD sites went into operation

Year	Number in each year	Cumulative number
1990	1	1
2002	1	2
2005	0	2
2006	2	4
2007	1	5
2008	0	5
2009	2	7
Don't know	1	8

Source: operator survey.

5.2 Treatment capacity

Table 5.3 shows the range of capacity of AD plants across the UK, based on responses to the operator survey. Numbers are small, therefore no attempt has been made to generalise from the data, which is essentially descriptive only of the respondent group.

Table 5.3: Distribution of AD plants according to waste treatment capacity in 2009

Waste quantity band (t per year)	Number of sites				
	England	Northern Ireland	Scotland	Wales	UK TOTAL
0-1000	0	0	0	0	0
>1000-5000	2	0	0	0	2
>5000-10,000	0	0	0	0	0
>10,000-15,000	1	0	2	0	3
>15,000-20,000	0	0	0	0	0
>20,000-30,000	1	0	0	0	1
>30,000-40,000	0	0	0	0	0
>40,000-50,000	1	0	0	0	1
>50,000-60,000	0	0	0	0	0
>60,000	0	0	0	0	0
Total	5	0	2	0	7

Source: operator survey (responding sites only).⁵⁸

The quantities of materials processed at these sites are shown in Table 5.4, with a total of 105,110t of input waste recorded and a mean of 15kt per site in 2009.

Table 5.4: Distribution of the quantities of feedstock digested at AD plants in the UK in 2009

Feedstock quantity band (t per year)	Quantity of feedstock processed in each band (t)				
	England	Northern Ireland	Scotland	Wales	UK TOTAL
0-1000	0	0	0	0	0
>1000-5000	3421	0	0	0	3421
>5000-10,000	0	0	0	0	0
>10,000-15,000	10,383	0	20,660	0	31,043
>15,000-20,000	0	0	0	0	0
>20,000-30,000	0	0	0	0	0
>30,000-40,000	20,646	0	0	0	20,646
>40,000-50,000	50,000	0	0	0	50,000
>50,000-60,000	0	0	0	0	0
>60,000	0	0	0	0	0
Total	84,450	0	20,660	0	105,110

Sources: operator waste returns plus operator survey data (the waste returns data accounted for 45,110t; the survey returns accounted for 60,000t).

⁵⁸ Although eight sites participated in the survey, not all completed all sections of the questionnaire.

5.3 Site location

Of the sites that participated in the survey, five (63%) were stand-alone sites, with three (38%) co-located with other activities. Of the five stand-alone sites, three were located on a farm, with two on dedicated sites. Of the three that were co-located with other enterprises, two were at food or drink manufacturing/processing sites, whilst one was part of an agricultural operation.

Although small in number, these sites illustrate the close intrinsic relationship between AD processes and the agricultural/food processing industries. This is discussed further in Section 5.5.

5.4 AD systems and operating processes

The majority of the eight AD plants known to be in operation and taking waste inputs during 2009 operated continuous, single stage, mesophilic, wet systems. Only one site operated more than two consecutive stages.

Residence times varied from 14 days (minimum) to 50 days (maximum), with a mean of 32 days. These ranges applied to the single-stage wet, mesophilic continuous systems. Residence times in the two-stage systems ranged from 30 days (minimum) to 50 days (maximum), with a mean of 40 days.

Most sites undertook some pre-processing of feedstocks prior to digestion (Table 5.5).

Table 5.5: Feedstock processing methods used prior to digestion in 2009

Processing method	Number of sites*	Proportion of sites* (%)
Blending/mixing	5	62.5
De-packaging	4	50.0
Hand picking	3	37.5
Pulping	3	37.5
Screening	4	50.0
Shredding	3	37.5
Other**	2	25.0
Unspecified	2	25.0
Total	8	

Source: operator survey.

* Totals do not sum as sites have multiple processes.

**Other pre-treatment processing included chopping and removing large solid items before liquid was transferred into the digester.

Biodegradable bags

A total of 37.5% of sites accepted wastes collected in biodegradable bags. One site indicated that they removed these bags by screening, whilst two sites indicated that fragments were found in the digestate.

5.4.1 ABPR-approved AD sites

The ABPR⁵⁹ only permit the composting and AD of catering waste and Category 3 animal by-products in approved premises that meet stringent hygiene and sanitisation (time-temperature) requirements.⁶⁰ It is worth noting that these are referred to as 'biogas' plants in both European and UK national animal by-products legislation.

⁵⁹ Separate regulation applied in 2009 in England, Northern Ireland, Scotland and Wales, implementing the European Union Animal By-Products Regulation (EC) No. 1774/2002.

⁶⁰ Further information is available at <http://www.defra.gov.uk/foodfarm/byproducts/wastefood/composting/index.htm> [accessed on 16 March 2011].

Only three AD plants were approved under the ABPR during 2009, representing 60% of those permitted sites identified in the operator waste returns. Due to the way in which data were recorded by Animal Health (the statutory body responsible for approving premises), it was not possible to determine the total number of approved biogas premises up to and including 2009.

Only 50% of plants had a pasteurisation unit attached to the digester, with all of them treating digestate after digestion.

5.5 Sources of waste inputs digested

From the operator telephone survey it was possible to identify the main sources of waste inputs and to quantify other materials, in addition to wastes, that comprised the feedstock at these plants. The majority of the eight sites that took part in the survey (63%) obtained their feedstock materials from multiple sources (Table 5.6). This is shown for stand-alone and co-located facilities.

Table 5.6: Sources of wastes received at AD sites categorised as stand-alone or co-located sites

Site category	Number of sites receiving waste from a single source	Number of sites receiving waste from multiple sources
Stand-alone		
Off-farm	1	1
On-farm	0	3
TOTAL	1	4
Co-located		
Community enterprise	0	0
Composting facility	0	0
Farm	0	1
Food or drink manufacture/processing	2	0
Other waste management facility	0	0
Sewage treatment works	0	0
Other	0	0
TOTAL	2	1
Total all sites	3	5

Source: operator survey.

The data reported show three of the eight sites located on-farm and receiving waste from multiple sources, and two co-located with food industries and receiving waste from a single source. While these are 'clusters' of results, the numbers are too small for any wider generalisation to be made at this stage on the site characteristics of the AD organics recycling industry. Therefore, from these sites, wider generalisations cannot be made and grossing-up cannot be attempted for the 10 non-responding sites. As numbers increase in future years, a more reliable pattern should begin to emerge.

5.6 Wastes and other materials digested

5.6.1 Controlled wastes

Table 5.7 lists the different types of wastes digested in AD systems. These are taken from the operator waste return databases, which provided data on controlled waste inputs to the five permitted AD sites out of the 17 recorded on the ORSR.

Table 5.7: Quantities of wastes digested in AD systems, according to source, in 2009

Waste source	Waste treated in AD systems (t)	%
Municipal	25,351	56.2
Non-municipal	19,759	43.8
TOTAL	45,110	100.0

Source: operator waste returns (census, CI = +/-2%).

Similar proportions of municipal and non-municipal wastes were digested (56% and 44%, respectively), which was in sharp contrast to the composting sector where the proportions were 80% and 20%, respectively. This implies a reduced reliance on wastes supplied by local authorities and a more diversified business model, sourcing wastes from the commercial and industrial sector.

The regulatory data allows waste inputs to be characterised according to EWC codes. Within the municipal waste input category, the majority (56%; 14kt) comprised biodegradable kitchen and canteen wastes (EWC code 20 01 08), with 25% (6kt) mixed municipal wastes (EWC code 20 03 01). The latter were only accepted at a single site in Scotland.

Waste from markets (EWC code 20 03 02) accounted for 11%, whilst edible oils and fats (EWC code 20 01 26) accounted for 5%. The latter would have provided a high biogas-yielding substrate and it will be interesting to observe whether this fraction increases proportionally in future years.

Wastes from non-municipal sources were split between Chapter 02 wastes (wastes from agricultural, horticultural, hunting, fishing and aquacultural primary production, food preparation and processing) at 47% and Chapter 19 wastes (wastes from waste treatment facilities, offsite waste water treatment plants and the water industry) at 53%. The latter comprised just less than 11kt of 'digestate from anaerobic treatment of animal and vegetable waste' (EWC code 19 06 06) at one AD plant, which may have been incompletely digested material that required further processing.

Chapter 02 wastes (9.2kt) primarily included materials: unsuitable for consumption or processing from the preparation and processing of meat, fish and other foods of animal origin (02 02 03); from fruit, vegetables, cereals, edible oils, cocoa, coffee and tobacco preparation and processing; from tobacco processing; from conserve production (EWC code 02 03 04); from the dairy products industry (EWC code 02 05 01); and from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa) (EWC code 02 07 04).

These data suggest the AD sector was targeting food processors, although the relatively small sample size needs to be taken into account.

5.6.2 Non-waste materials

The operator waste returns supplied by the EA, NIEA and SEPA provided detailed information on the composition and quantities of controlled wastes treated in AD plants. However, unlike the majority of composting operations, not all digested feedstock would necessarily be classified as controlled wastes.⁶¹ For example, energy crops, food manufacturing by-products and animal manures fall into this category. These data are not held centrally by any regulatory authority and therefore had to be obtained through operator survey responses. Based on operator

⁶¹ Controlled wastes are household, commercial and industrial wastes as defined in The Controlled Waste Regulations 1992 (as amended).

responses, it was estimated that a total of 49kt of non-waste feedstock was digested in 2009 (in addition to the 105,110t of waste already reported in the above) (Table 5.8).

Table 5.8: Types and quantities of non-waste feedstock digested in 2009

Feedstock type	Number of sites	Quantity (t)
Energy crops	2	151
Food processing by-products	2	43,000
Manures	3	6050
Total	5*	49,201

Source: operator survey.

*Total number of sites providing data. Numbers do not sum, as some sites digested more than one feedstock.

Thus, 154,311t is the total of waste and other feedstock materials digested in 2009 at the seven sites for which data could be obtained. This consists of: 45,110t reported to the regulators from permitted sites; 60,000t of waste reported from two further sites identified through this survey; and a further 49,201t of non-waste materials reported through this survey. No reliable basis exists for inferring how much, if any, waste has entered the 10 remaining AD sites in 2009.

5.7 Digested products

5.7.1 Biogas and energy outputs

Of the eight sites that completed the survey, the mean quantity of biogas produced in 2009 was 1.3M m³ (minimum 1000m³, maximum 5.5M m³). The proportion of gas used for different applications is shown in Table 5.9.

Table 5.9: Biogas utilisation by survey respondents in 2009

Biogas utilisation	Estimated quantity of biogas (m ³)	%
Direct injection of gas into national grid	1000	0
Heat & electricity (combined heat & power (CHP)): on-site	7,465,747	72
Heat (boiler only): on-site	0	0
Vehicle fuel (e.g. RCV** fleet)	0	0
Other*	2,900,000	28
Total	10,366,747	100

Source: operator survey (n = 8).

*The 'other' category included a reciprocating engine that used the gas solely to generate electricity; heat was not used.

**Refuse collection vehicle

ROCs

A total of 65,523 ROCs were issued by Ofgem and redeemed between January and December 2009 to 12 plants.⁶² Three plants received 1004 certificates but were not redeemed, whilst one plant had 84 certificates that were revoked. The plants where certificates were redeemed had a combined installed generating capacity of 13.6MW (Table 5.10).

⁶² This includes four sites for which no information about waste material feedstocks was obtained.

Table 5.10: Installed generating capacity at AD plants selling ROCs in 2009

	Generating power (kW)
Installed generating capacity (12 plants)	13,599
Mean per plant	1133
Minimum	125
Maximum	3956

Source: Ofgem (n = 12).

On average (mean), each plant exported 2734MWh of electricity, generating 5460 ROCs (Table 5.11). The awarding of 'double ROCs' came into effect on 1 April 2009 and all certificates issued during the calendar year 2009 were in the April-December period. During this time, the buy-out price was £37.19 per ROC, which suggests that the total income generated by the 12 plants was £2,436,800.

Table 5.11: ROCs generated, equivalent electricity and income generated in 2009

	Number of ROCs redeemed	Equivalent energy (MWh)*	Income based on published buy-out price (£)
Total	65,523	32,804	2,436,800
Mean	5460	2734	203,067
Min.	323	162	12,012
Max.	19,733	9867	733,870

Source: Ofgem (n = 12).

* The majority of ROCs were awarded at one ROC per 0.5MWh ('double ROCs'); however, at one site a total of 85 ROCs were awarded per 1MWh.

5.7.2 Quantities and types of whole digestate, liquor and fibre produced

A total of 124kt of whole digestate (including liquor and fibre) was reported as manufactured in 2009 by five responding sites (Table 5.12). This suggests a mean of 15kt of digestate per plant (which accords with the mean estimate of 15kt of waste treated per plant estimated previously). Two sites for which waste input data were available did not provide responses on the quantity of digestate output. An estimate could be derived based on the proportion of waste inputs corresponding to these non-responding sites. Assuming the size profile (input-output) of the non-respondent sites was similar to those contributing to the survey, a grossed-up estimate of 161kt of digestate was manufactured in 2009 for the seven sites where known waste inputs were obtained. On a mass-balance basis, this broadly equates to the total waste plus other material inputs for these sites (estimated at 154,311t in Section 5.6.2). There is no reliable basis for inferring the extent, if any, of waste-derived digestate originating from the 10 sites for which no waste input data was obtained.

Table 5.12: Quantities of whole digestate manufactured from waste-related inputs at AD sites in the UK in 2009

Nation	Number of sites	Reported quantity (t)	Estimated quantity (t)*
England	3	106,033	138,198
Northern Ireland	0	0	0
Scotland	1	15,600	20,332
Wales	1	1900	2476
Total	5	123,533	161,007

Source: operator survey (n = 5).

Where digestate was reported volumetrically, a conversion of factor of 1.04t/m³ or 1t = 0.96m³ was used.⁶³

*A scale-up factor of 1.303 was used. This was calculated by applying the known fraction of input tonnage from the respondent sample, as a percentage of the total input tonnage.

5.7.3 Post-treatment of whole digestate

Site operators were asked if they undertook post-treatment of digestate (Table 5.13). The majority of digestate (60%) was not post-treated, as this was not practised at most sites. Of those that did post-treat digestate, two used screening to remove contaminants, whilst one separated the whole digestate into fibre and liquor fractions using a press.

The quantities of whole digestate, separated fibre and separated liquor for all respondents, including the three undertaking post-treatment, are broken down in Table 5.13. The table shows that a range of different practices were reported on a site by site basis. The small size of the industry in 2009 (and its developmental status) makes it hard to generalise more widely than simply reporting the summary of individual site returns. As time goes on and the industry develops, however, more sites will be active and patterns of site process and post-treatment are likely to become more evident from survey data. It will then be possible to develop a picture of clearly distinct sub-types of AD operation. This insight will show more fully the directions in which the AD waste treatment industry is progressing.

Table 5.13: Quantities of digestate, separated fibre and separated liquor produced by responding sites in 2009

Product	Number of sites	Quantity (t)	Proportion (%)
Untreated			
Whole digestate	4	74,633	60.4
Treated			
Screened	2	47,000	38.0
Separated	1	Fibre	380
		Liquor	80
		Unaccounted	1440
Total	7	123,533	100.0

Source: operator survey.

5.7.4 PAS 110 and ADQP certification

Digestate (and its constituent fibre and liquor fractions) did not benefit from a standard, quality protocol and certification scheme until after 2008. PAS 110⁶⁴ was published in 2010 by WRAP and the BSI, whilst the AD

⁶³ Based on density measurements for manure digestate reported by Anasurion, D.F.D., Bade, O., Körner, I. 2010. Nitrogen recovery from biogas plant digestates via solid-liquid separation and stripping. Paper presented at Ramiran 2010 conference, Lisbon, Portugal.

⁶⁴ BSI and WRAP 2010. Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials.

Quality Protocol⁶⁵ (ADQP) was published in 2009 by WRAP and the EA. The latter is in effect in England, Northern Ireland and Wales, whilst Scotland has a regulatory position statement (as is the case with the CQP⁶⁶). It sets criteria for the production of quality outputs from AD, covering whole digestate, separated liquor and fibre. Like the CQP, if the criteria set in the ADQP are met, then the material may be regarded as being fully recovered and is no longer classed as a waste.

Renewable Energy Assurance Ltd launched its Biofertiliser Certification Scheme (BCS) in January 2009.⁶⁷ The scheme covers whole digestate, separated fibre and liquor, which are collectively termed 'biofertiliser' and certified to PAS 110 and the ADQP (where applicable). As PAS 110 was not published until 2010, it was not possible to certify products during 2009; however, two sites indicated that they had applied and were working towards certification,⁶⁸ whilst three indicated that they would apply in the future (Table 5.14). Although these numbers are low, they are expected to increase in the future as the sector becomes more familiar with PAS 110 and certification, and a greater number of sites are established.

Table 5.14: Certification status of AD plants in 2009

Certification status	Number of sites	Proportion of respondents (%)
Applied and working towards certification	2	25.0
Certified	0	0.0
Lapsed	0	0.0
Not yet applied but will in the future	3	37.5
Not yet applied and have no intention to	2	25.0
Unspecified	1	12.5
Total	8	100.0

Source: operator survey (n = 8).

5.7.5 Destination of the whole digestate, separated fibre and liquor

All of the reported digestate, liquor and fibre were applied to agricultural land. Notably, these products were not used in forestry, soil/field-grown horticulture or land restoration. As there were no sites certified by the BCS during 2009, this meant that all of the solid and liquid outputs would have been applied to land as wastes, which would have been under a land-spreading exemption. The exemption system for spreading organic wastes to agricultural land is an established process, so these findings may reflect the ease of application to farmland.

Agricultural crops

The main type of agricultural crop to which whole digestate was applied was grassland (52%), whilst 43% was applied to cereals/combinable crops (Table 5.15). This compares with compost, where 59% was applied to cereals/combinable crops, but only 3% to grassland. This may indicate the ease with which the liquid digestate can be applied to grassland compared to solid compost; each of these would have involved a different spreading technique.

The relatively small quantities of fibre and liquor from the site undertaking post-treatment were applied predominantly to cereals and other combinable crops. The site did not differentiate the crops to which the separate fibre and liquor fractions were applied.

⁶⁵ EA and WRAP 2009. Anaerobic Digestate Quality Protocol: end of waste criteria for the production and use of quality outputs from anaerobic digestion of source-segregated biodegradable waste. EA

⁶⁶ See http://www.sepa.org.uk/waste/waste_regulation/guidance_position_statements.aspx

⁶⁷ This is wholly owned by REA. Further details can be found at <http://www.biofertiliser.org.uk/>

⁶⁸ This was a pilot study in conjunction with the United Kingdom Accreditation Service.

Table 5.15: Types of agricultural crops to which digestate, fibre and liquor were applied in the UK in 2009

Crop	Digestate		Fibre, liquor and separated products *		Grossed-up quantity of digestate (t)
	Reported quantity (t)	%	Reported quantity (t)	%	
Cereals/combinable crops	52,073	42.8	1330	70.0	69,603
Other arable (e.g. oil seed rape, peas, beans)	6260	5.1	0	0.0	8159
Potatoes	0	0.0	0	0.0	0
Vegetables	0	0.0	0	0.0	0
Orchard fruit	0	0.0	0	0.0	0
Soft fruit	0	0.0	0	0.0	0
Plants & flowers	0	0.0	0	0.0	0
Glasshouse-protected crops	0	0.0	0	0.0	0
Grassland	63,300	52.0	570	30.0	83,245
Biomass	0	0.0	0	0.0	0
Other	0	0.0	0	0.0	0
Total	121,633	100.0	1900	100.0	161,007

Source: operator survey (n = 5).

* The one site reporting on the separation of digestate into liquor and fibre did not disaggregate the crops to which these fractions were applied and some tonnage was unaccounted for. The crops to which product was applied are therefore presented for the aggregate total digestate.

Digestate, fibre and liquor distribution and value

The majority of material (39%) was distributed with only a charge levied to cover transport costs (Table 5.16). Notably, a similar proportion (37%) was used on land owned by the business, which is in line with four of the eight sites identified as being located on a farm (three stand-alone and one co-located).

Table 5.16: Distribution of digestate, fibre and liquor in 2009

Distribution route	Digestate		Fibre, liquor and unaccounted separated products		Grossed-up quantity (t)
	Reported quantity (t)	%	Reported quantity (t)	%	
Distributed free of charge	14,700	12.1	0	0.0	19,159
Only charged for distribution	47,000	38.6	0	0.0	61,257
Sold directly	0	0.0	0	0.0	0
Sold to third party	14,700	12.1	0	0.0	19,159
Used on own land	45,233	37.2	1900	100.0	61,431
Other	0	0.0	0	0.0	0
Total	121,633	100.0	1900	100.0	161,006

Source: operator survey (permitted sites, n = 5).

Grossed-up quantity differs from Table 5.15 due to rounding.

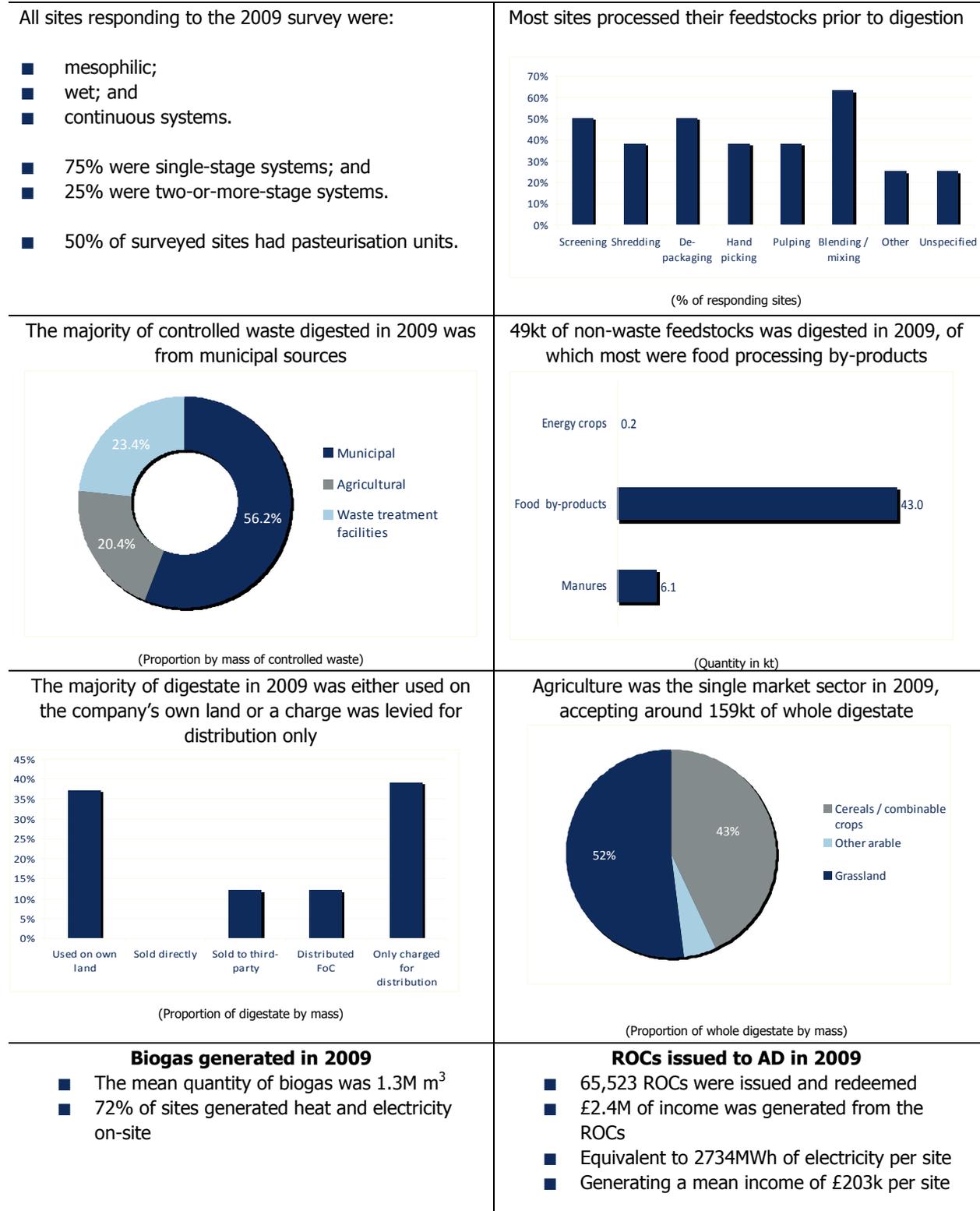
It was estimated that 12% (just under 15kt) was sold to a third party, where a fee of £3/t was charged.

5.8 Discussion and conclusions

Figure 5.1 summarises a number of indicators identified in the 2009 study of the UK's AD sector.

Figure 5.1: The state of AD in 2009

17 AD sites were identified and entered on the ORSR



The following discussion summarises the results and conclusions in Section 5 and refers to the relevant tables or figures above where relevant.

The UK's nascent AD sector was reviewed for the first time in this study. A total of 17 sites were identified and entered into the ORSR, of which five were permitted sites with waste inputs covered by the regulator waste data, and eight contributed to the survey (Section 5.1). There was a general reluctance by operators to participate in the survey, which stemmed from a number of reasons. Some felt that the level of scrutiny they were subjected to in general placed them increasingly 'under the spotlight' and they just wished to get on with running their business; others felt that they had 'first-mover advantage' and did not wish to participate for confidentiality reasons.

A further challenge in surveying this emerging sector is the highly individualised nature of each of the operations. The lack of a single consistent set of operational models makes it hard to ask common survey questions of all operators. In a sense, the survey has amounted to a series of case studies, with an attempt to aggregate the information into tables where consistency of response allows. However, the individualised nature of the processes (such as the site reporting separation of digestate into liquor and fibre) places limitations on the ability to aggregate and gross up this sector.

As the industry grows and develops, this problem should diminish as patterns of consistent processes and practices emerge and can be more readily aggregated. This should be a focus of attention in future surveys of the emerging AD waste recycling sector. Notwithstanding the current constraints, the 2009 survey provided some particularly useful insights into the emergence of this important sector.

The majority of the sites identified were located in England and Scotland (Section 5.1). Of those responding to the survey, the majority (63%) had only been in operation since 2006. Most were stand-alone sites, although two were co-located at food/drink manufacturing sites (Section 5.3). Both treated wastes arising directly from the food or drink manufacturing process, illustrating the opportunities for companies to treat their own organic materials on-site using AD, rather than relying on exporting to third-party processors (Section 5.5).

All of the surveyed sites operated continuous, wet, mesophilic systems, with residence times ranging between 14 and 50 days at single-stage plants, and between 30 and 50 days at two-stage plants (Section 5.4). The predominance of wet mesophilic systems may reflect the extent to which a limited number of supplier companies have penetrated the UK market. It will be interesting to see whether system configurations diversify in the future as other suppliers with established track records in other European countries emerge.

The majority of sites undertook some pre-processing of feedstock (Section 5.4, Table 5.5). The review of wastes digested based on the operator waste returns indicated that a diverse range of non-municipal wastes were treated, of which some would inevitably require de-packaging (Section 5.6). A total of three AD plants in 2009 were approved to digest animal by-products (Section 5.4.1).

Overall, the five sites identified in the operator waste returns accepted wastes in broadly equal proportions from municipal and non-municipal sources (Section 5.6). This contrasts with the composting sector, which was reliant on municipal collections for 80% of its waste. This suggests more diverse business models were being adopted by the AD sector and it will be interesting to note whether this is observed in future years.

Some data were obtained through the operator survey of the types and quantities of non-waste feedstocks processed. As these materials are not controlled wastes they were not listed in the operator waste return databases, hence the operator survey was the only means of collecting these data. The majority of these feedstocks comprised food processing by-products (87%), with manures and energy crops making up 12% and 0.3%, respectively (Section 5.6.2). The very low proportion of energy crops contrasts markedly with agricultural AD plants in other European countries, where energy crops and manures are commonly co-digested in large quantities.⁶⁹ As the AD sector in the UK develops further, this may well change in future years.

The sale of electricity generated from biogas provided a substantial income to those sites registered with Ofgem to receive ROCs. Overall, those AD plants registered with Ofgem had a mean generating capacity of 1.1MW. Income from the sale of ROCs at the published buy-out price in 2009/10 amounted to a mean of £203k per site,

⁶⁹ See, for example, Braun, R., Weiland, P. & Wellinger, A. 2009. Biogas from energy crop digestion. *IEA Bioenergy, Task 37*.

with one site generating £734k (Section 5.7.1). Income from the sale of digestate was found to be low, with a monetary value of only £3/t (Section 5.7.5), which represented only a small fraction of the overall total quantity of digestate produced. Bearing in mind the estimated turnover at the surveyed sites of £105/t (Section 3.3.2), this suggests that the AD sector relies on revenue from both gate fees and the sale of electricity.

Like the composting sector, AD relied upon agriculture as the main receptor for digestate, with 37% applied directly to land owned by the operator (Section 5.7.5). As with composting, this illustrates the close link between the AD sector and agriculture, although the apparent lack of sale of any product may curtail market development. The fact that there was no digestate certified to PAS 110 and the ADQP in 2009 may have been a contributory factor – a situation that may change as sites become certified in the future.

In conclusion, the AD organics recycling sector in the UK was at an early stage in its development in 2009. It appeared to source wastes from a wider range of suppliers than the composting sector, spanning both municipal and non-municipal sources. Non-waste materials were also important additional feedstocks and may indeed be the most prevalent feedstock for those operational AD plants for which no waste input data could be obtained. Income generation largely relied upon gate fees and the sale of electricity, whilst marketing activities for digestate did not appear to be well developed.

6 Summary of key trends in the UK organics recycling industry

To conclude the report, this Section presents long-term trend data based on the key performance indicators, agreed with WRAP, available for comparison between 2009 and surveys from previous years. They form an overview – drawing on and pulling together all data sources – which sometimes combines composting and AD. This overview can only be presented after completion of the market analysis of each discrete sector of the industry, undertaken in previous Sections. These trends have, therefore, been deferred to this point in the report, rather than presented earlier.

Previous Sections have already reported some key trends (such as the financial size of the sector). Analysis of year-on-year trends has not always been possible due to the changed methodology in 2009. Most of the trend tables presented here compare 2009 with 2008/09 data in line with the general aim of 're-benchmarking' the 2008/09 survey to 2009. Even for these more comparable datasets, some of the observed differences between the two years may, in part, be due to improvements in data quality or to differences in data sources in 2009. In very few cases, it has been possible to track key indicators consistently over a longer time series and these are also presented.

6.1 Trends in waste inputs and processing methods

Table 6.1 shows that UK waste inputs to organics recycling processes (excluding MBT) increased by 9% from 2008/09 to 2009. Analysis of the prevalence of the different treatment processes shows that there was an increase in the proportion of waste recycled using IVC methods (up from 17% of input to 38%) compared with OAW (where the share of input tonnage fell from 75% to 56%). Part of this difference may be explained by the improved reporting system for site input tonnages in 2009.

Data were not available on the number of sites approved under the ABPR.

Table 6.1: Trends in total UK organics recycling input tonnages and recycling methods used

Treatment method	2008/09		2009		Change (%)
	Quantity of waste treated (kt)*	Proportion (%)	Quantity of waste treated (kt)**	Proportion (%)	
AD	113	2.2	105	1.9	-0.3
IVC	852	16.7	2078	37.5	20.8
OAW	3816	74.8	3117	56.2	-18.6
Other	321	6.3	242	4.4	-1.9
Total	5102	100.0	5542	100.0	8.6

* Grossed-up survey data.

**Grossed up operator waste returns, plus AD operator survey (exempt composting sites).

6.2 Quantity of compost and digestate products manufactured in the UK

A small headline increase of 3% (89kt) took place in the quantity of compost and digestate manufactured by the UK organics recycling industry from 2008/09 to 2009 (Table 6.2). Proportionally, the estimated total digestate product increased substantially, probably through more comprehensive reporting in 2009. The quantity of compost, by contrast, would appear to have increased by only 1.5%, despite the apparently much larger increase in input tonnages to composting processes. Again this may reflect more accurate data in 2009.

Table 6.2: Quantity of compost and digestate products manufactured in the UK

Product	2008/09		2009	
	Quantity (kt)*	Proportion (%)	Quantity (kt)*	Proportion (%)
Compost	2851	96.4	2884	94.7
Digestate	105	3.6	161	5.3
Total	2956	100.0	3045	100.0

*Grossed-up survey data, based on responses to questionnaires. Data were not calculated from waste inputs, as this method was not carried out in 2008/09.

6.3 Long-term UK trends in compost product types from 2004/05 to 2009

Long-term data are available on compost product quantities and types (excluding digestate). There was an increase of 0.8Mt (40%) in the quantity of compost manufactured in the UK between 2004/05 and 2009, with a steady year-on-year expansion in production (Figure 6.1). Table 6.3 shows trends over the same period by product type. Soil conditioner has consistently and increasingly been the principal product, rising in proportion from 71% in 2004/05 to 84% in 2009.

Figure 6.1: Increase in compost manufactured over five-year period to 2009

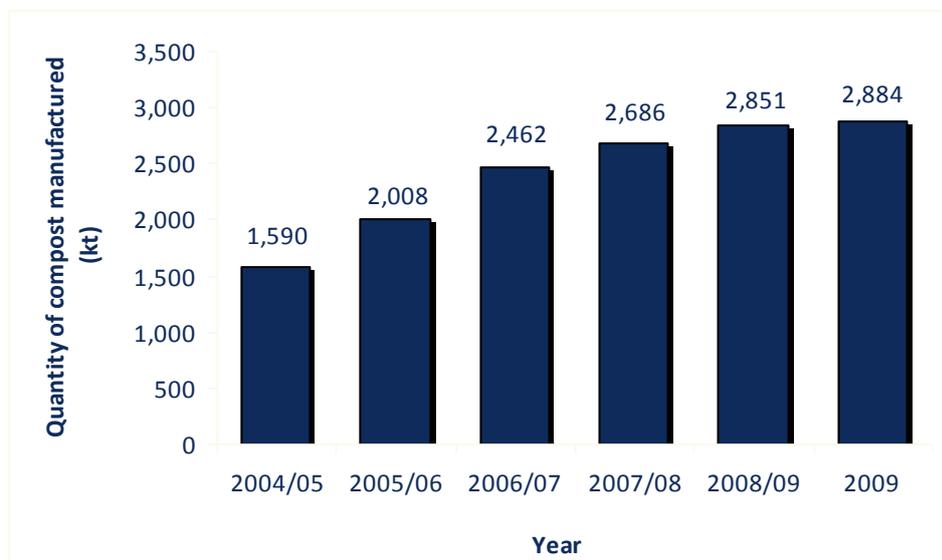


Table 6.3 also shows the trends in other compost product types. Compared to 2008/09, the production of mulch, topsoil/subsoil and growing media would appear to have reduced (from 16% to 7% of product share), in contrast to the overall growth in product described as soil conditioner. The categories biomass and landfill cover were introduced in the 2009 survey and now together account for 5% of the total. This may reflect a change in interpretation by the survey respondents, allocating products they might previously have called 'topsoil/subsoil manufacture' to 'landfill cover'.

Table 6.3: Compost products from source-segregated feedstock manufactured in the UK from 2005/06 to 2009

	Year				
	2005/06	2006/07	2007/08	2008/09	2009
Product type	Estimated quantity of compost (kt)				
Biomass*	-	-	-	-	19
Growing medium	155	184	241	175	63
Landfill cover*	-	-	-	-	110
Mulch	127	73	114	141	67
Soil conditioner	1463	1797	1898	2316	2409
Topsoil/subsoil	138	152	199	144	64
Turf (top) dressing	37	29	34	50	38
Other	88	237	199	22	93
Unspecified	67	-	-	-	20
Total	2073	2462	2686	2851	2884
	Proportion (%)				
Biomass*	-	-	-	-	0.7
Growing medium	7.5	7.4	9.0	6.2	2.2
Landfill cover*	-	-	-	-	3.8
Mulch	6.1	3.0	4.2	4.9	2.3
Soil conditioner	70.6	72.9	70.7	81.2	83.5
Topsoil/subsoil	6.7	6.1	7.4	5.1	2.2
Turf (top) dressing	1.8	1.0	1.3	1.8	1.3
Other	4.2	9.6	7.4	0.8	3.2
Unspecified	3.1	0.0	0.0	0.0	0.7
Total	100.0	100.0	100.0	100.0	100.0

Source: Grossed-up from survey data, based on responses to questionnaire.

*Newly added product type in 2009 survey.

6.4 Compost and digestate products by nation and English regions

The annual organics recycling industry reports have by convention contained a profile of the breakdown of compost and digestate product types by nation and the English regions. However, these have been based only on the actual survey data reported and are not grossed up, as there has been no validated method for doing this by product type at regional level. Analysis of the data, therefore, focuses on proportional product share, rather than on absolute tonnages – assuming that this was broadly representative of regional and national product trends (Table 6.4). Note that data for Northern Ireland has been excluded by agreement with WRAP due to small numbers.

Table 6.4 shows that soil conditioner dominated across the nations as the most prevalent product in 2009, although less so in Scotland where a notable amount of landfill cover was reported. The same pattern was noticeable in 2008/09 but the difference was much less apparent.

Table 6.4: Compost and digestate products by nation in 2009 and 2008/09

	2009					
	England		Wales		Scotland	
	Reported quantity (t)	Proportion (%)	Reported quantity (t)	Proportion (%)	Reported quantity (t)	Proportion (%)
Biomass*	10,171	0.6	0	0.0	0	0.0
Growing medium	44,398	2.8	4	0.0	0	0.0
Landfill cover*	14,750	0.9	2	0.0	51,000	26.4
Mulch	39,126	2.4	0	0.0	0	0.0
Soil conditioner	1,277,008	80.0	30,971	92.8	117,050	60.6
Topsoil	24,181	1.5	502	1.5	3500	1.8
Turf (top) dressing	25,190	1.6	0	0.0	700	0.4
Unspecified	46,757	2.9	0	0.0	1120	0.6
Other	9543	0.7	0	0.0	4111	2.1
Whole digestate	106,033	6.6	1440	4.3	15,600	8.1
Digestate – fibre & liquor	0	0.0	460	1.4	0	0.0
Total	1,597,157	100.0	33,379	100.0	193,081	100.0
	2008/09					
	England		Wales		Scotland	
	Reported quantity (t)	Proportion (%)	Reported quantity (t)	Proportion (%)	Reported quantity (t)	Proportion (%)
Biomass*	0	0.0	0	0.0	0	0.0
Concentrated liquid fertiliser from digestate product	0	0.0	0	0.0	0	0.0
Growing medium	87,977	7.2	0	0.0	0	0.0
Landfill cover*	0	0.0	0	0.0	0	0.0
Mulch	68,406	5.6	1100	7.7	1027	0.7
Soil conditioner	991,301	81.0	11,182	78.0	111,146	77.3
Solid biofertiliser from digestate product	2000	0.2	0	0.0	0	0.0
Topsoil	45,714	3.7	1250	8.7	25,062	17.4
Turf (top) dressing	24,212	1.9	750	5.3	0	0.0
Unspecified	0	0.0	0	0.0	0	0.0
Other	4300	0.4	46	0.3	6549	4.6
Total	1,223,910	100.0	14,328	100.0	143,784	100.0

Source: survey data based on responses to questionnaires. Data were not calculated from waste inputs, as this method was not carried out in 2008/09.

*Newly added product type in 2009 survey.

The quantity of compost product can be grossed-up by nation and by English region, as there are more data points than for individual product items and the results are therefore more reliable when subdivided geographically. The largest quantity of compost was manufactured in the south east of England, followed by the east of England (Figure 6.2 and Table 6.5).

Note the data for Northern Ireland has been omitted under the guidance of the Project Steering Group due to small numbers.

When compared to 2008/09, most English regions have seen a proportional increase in quantity of compost produced.

Figure 6.2: Tonnes of waste inputs from which compost was manufactured in 2009 in the English regions

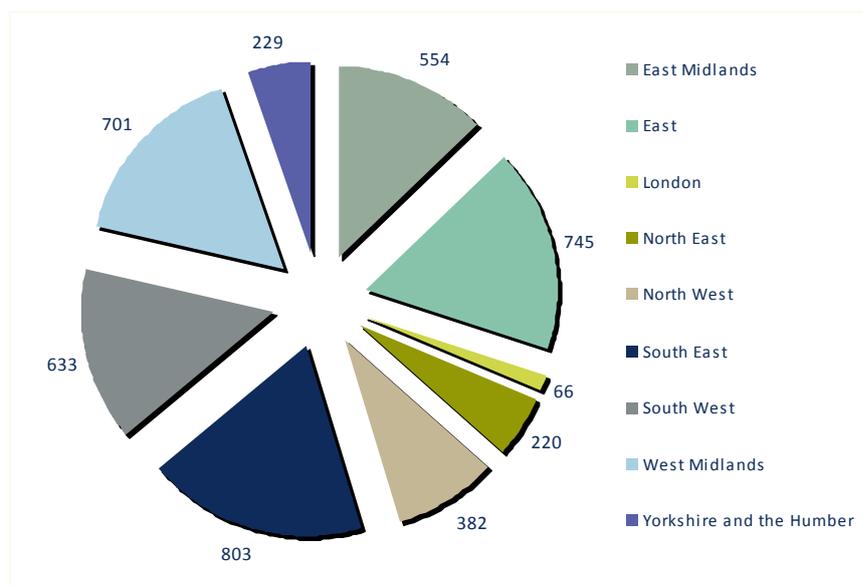


Table 6.5: Quantities of compost manufactured in the English regions and across the UK in 2008/09 and 2009

		2008/09		2009	
		Grossed-up quantity (kt)*	Proportion (%)	Grossed-up quantity (kt)**	Proportion (%)
England Regions	East Midlands	554	11.2	635	12.0
	East	745	15.1	711	13.5
	London	66	1.3	107	2.0
	North East	220	4.4	487	9.2
	North West	382	7.7	536	10.2
	South East	803	16.2	834	15.8
	South West	633	12.8	570	10.8
	West Midlands	701	14.2	389	7.4
	Yorkshire and the Humber	229	4.6	255	4.8
Nation	England	4333	87.5	4524	85.7
	Scotland	555	11.2	491	9.4
	Wales	66	1.3	261	4.9
	Total	4954	100.0	5276	100.0

*Grossed-up survey data.

** Waste operator returns plus grossed-up AD operator survey (exempt composting sites).

6.5 Products containing food wastes

An estimated 0.65Mt of compost was manufactured from feedstocks containing food waste in 2009, representing 27% of the total quantity of compost (Table 6.6). The 2008/09 survey respondents were asked if any of their product contained food waste. If they answered in the affirmative, all the tonnage was allocated to the 'yes' total. Quite a large proportion gave no answer in 2008/09 probably because of the imprecise wording of the question. For 2009, respondents were asked specifically what proportion of feedstock contained food waste, allowing for a more informative response. The figures were calculated for all respondents for that product and the results grossed up to the UK total. These differences in approach mean that comparisons are not appropriate between the two years.

As a result, it would appear that, for soil conditioner, the total tonnage not containing food waste went up from 1591kt to 1759kt. However, the tonnage containing food waste also went up (from 420kt to 650kt), eliminating the unspecified fractions. Given the clearer question this year's survey, it is safest to say that the 2009 data are

likely to present a more accurate picture of the present position and little can be drawn from any apparent changes from 2008/09.

Biomass and landfill cover were not included within this question in 2008/09, hence there are no comparable data in the table.

Table 6.6: Compost products made in the UK in 2008/09 and 2009 from feedstocks that included food waste

Product	Made from feedstocks which included food waste	Estimated quantity (kt)	Proportion of total product (%)	Estimated quantity (kt)	Proportion of total product (%)	Change (%)
		2008/09	2008/09	2009	2009	
Soil conditioner	Yes	420	18.1	650	27.0	8.9
	No	1591	68.7	1759	73.0	4.3
	Unspecified	305	13.2	0	0.0	-13.2
	Total	2316	100.0	2409	100.0	0.0
Mulch	Yes	1	0.7	0	0.0	-0.7
	No	121	85.8	67	100.0	14.2
	Unspecified	18	12.8	0	0.0	-12.8
	Total	141	100.0	67	100.0	0.0
Topsoil	Yes	8	5.6	1	1.6	-4.0
	No	97	67.4	63	98.4	31.0
	Unspecified	38	26.4	0	0.0	-26.4
	Total	144	100.0	64	100.0	0.0
Growing medium	Yes	0	0.0	0	0.0	0.0
	No	136	77.7	63	100.0	22.3
	Unspecified	39	22.3	0	0.0	-22.3
	Total	175	100.0	63	100.0	0.0
Turf (top) dressing	Yes	41	82.0	18	47.4	-34.6
	No	7	14.0	19	50.0	36.0
	Unspecified	1	2.0	0	0.0	-2.0
	Total	50	100.0	38	100.0	0.0
Biomass	Yes	-	-	0	0.0	-
	No	-	-	19	100.0	-
	Unspecified	-	-	0	0.0	-
	Total	-	-	19	100.0	-
Landfill cover	Yes	-	-	25	22.7	-
	No	-	-	85	77.3	-
	Unspecified	-	-	0	0.0	-
	Total	-	-	110	100.0	-
Total – food waste		470	16.6	694	25.1	8.4
Total – non-food waste		1952	69.1	2075	74.9	5.8

Source: operator survey, grossed up.

6.6 Compost and digestate market sectors

Another key performance indicator is the distribution of compost and digestate product to end-market sectors. The survey responses and grossed-up totals are reported in Table 6.7 and Figure 6.3. Agriculture was the largest market sector, accepting 100% of all digestate and 59% of compost in 2009 (compared to 100% and 58%, respectively, in 2008/09). These markets therefore appear to be very stable.

In the UK in 2009, a grossed-up estimate of **1.909Mt of compost plus all digestate was applied to agricultural land**, up from 1.771Mt in 2008/09. A further **448kt of compost product (but no digestate) was applied to horticulture (professional and amateur)**, compared to 419kt in 2008/09. The agriculture and horticulture end markets therefore appear to be the principal markets and show an increased demand year-on-year.

The tonnages going to land restoration and to landfill for daily cover appear to have reduced, from 270kt to 178kt (down from 10% of total product to 7%). Again this trend may simply be a reflection of the change in the question options. In 2008/09, two separate product categories were allowed (land restoration and landfill restoration/daily cover), but these were merged into one category in 2009. Biomass (2.6% of total product) was a new category and the trends in its product share should be tracked in future given the interest in this market.

Table 6.7: Market sectors for compost and digestate in the UK in 2008/09 and 2009

2009	Compost products			Digestate products		
	Grossed-up quantity (kt)	Reported quantity (kt)	%	Grossed-up quantity (kt)	Reported quantity (kt)	%
Agriculture	1750	1011	58.9	159	122	100.0
Biomass	15	10	2.6	0	0	0.0
Forestry	0	0.0	14.1	0	0	0.0
Horticulture (amateur)	356	241	7.7	0	0	0.0
Horticulture (professional)	92	45	0.8	0	0	0.0
Land restoration/ daily cover*	178	114	6.6	0	0	0.0
Landscaping	247	132	0.6	0	0	0.0
Sports turf	26	14	0.0	0	0	0.0
Other	174	123	7.1	0	0	0.0
Unspecified	46	28	1.6	0	0	0.0
Total	2884	1718	100.0	159	122	100.0
2008/09	Compost products			Digestate products		
	Grossed-up quantity (kt)	Reported quantity (kt)	%	Grossed-up quantity (kt)	Reported quantity (kt)	%
Agriculture	1666	836	58.4	105	53	100.0
Energy recovery	7	3	5.2	0	0	0.0
Forestry	1	0.4	9.5	0	0	0.0
Horticulture (amateur)	271	136	12.4	0	0	0.0
Horticulture (professional)	148	74	1.6	0	0	0.0
Land/landfill restoration/ daily cover*	270	135	9.5	0	0	0.0
Landscaping	354	177	0.2	0	0	0.0
Sports turf	45	22	0.0	0	0	0.0
Other	64	32	2.3	0	0	0.0
Unspecified	26	13	0.9	0	0	0.0
Total	2851	1430	100.0	105	53	100.0

Source: operator survey.

*2008/09 survey categories were combined to enable comparisons in this year's report (see text).

Figure 6.3: Market sectors for compost in the UK in 2009 (kt)

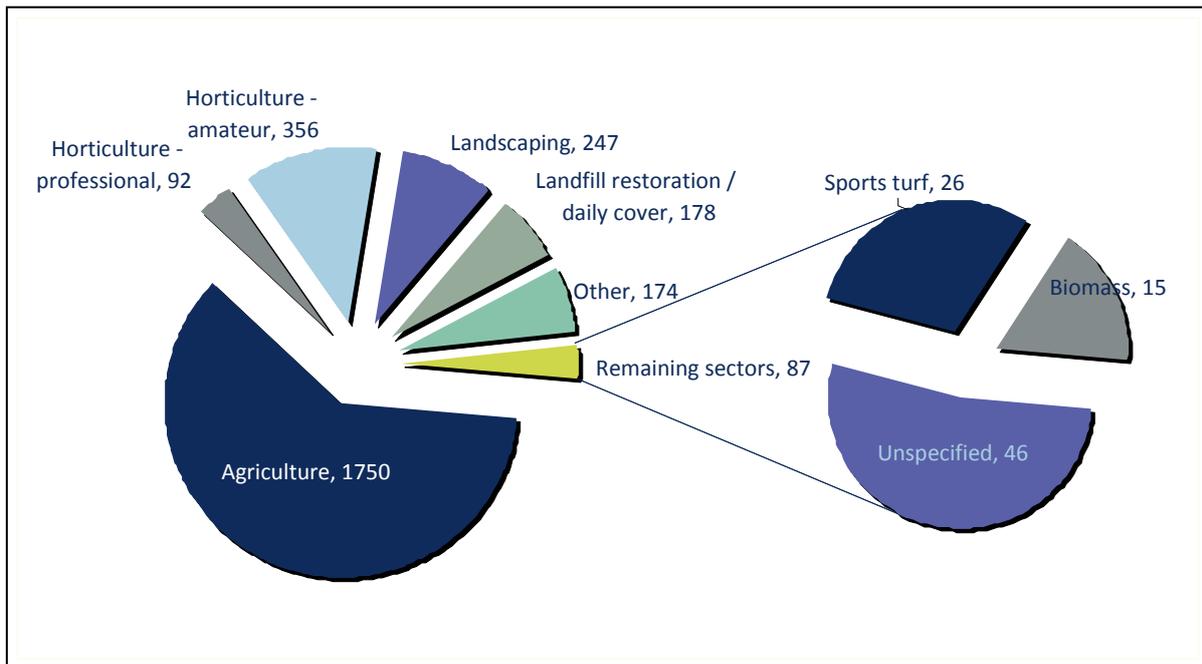
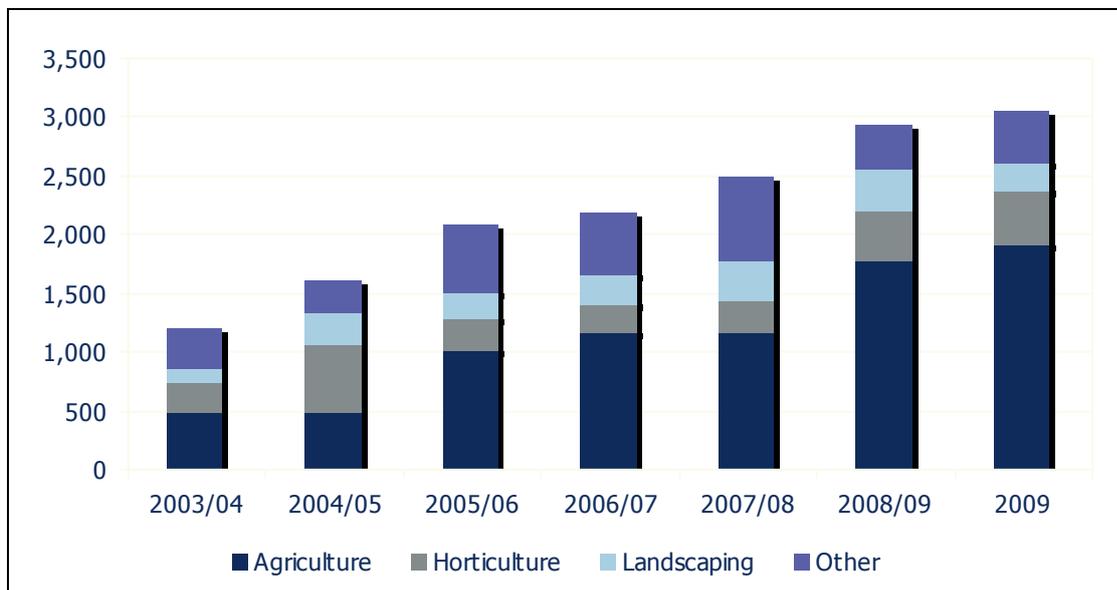


Figure 6.4 shows the long-term growth in the key market sectors from 2003/04 to 2009. Notably, there appears to have been a reduction in the quantities of compost used in landscaping in 2009 compared to trends in previous years. This may have been as a result of under-reporting in 2009, it may be a temporary phenomenon, or it may reflect an emerging trend to be tracked in future.

Figure 6.4: Growth in the key market sectors for compost and digestate in the UK from 2003/04 to 2009



Source: operator surveys.

6.7 Compost market sectors in Great Britain

The established convention in the annual surveys is to report compost market sector data for survey respondents only, as it is not possible to produce a gross-up for the UK disaggregated to the nations or English regions. The analysis is based upon the proportions allocated to end-market sectors, rather than on absolute tonnages as these cannot be grossed up.

The survey data on the proportion of compost sent to different market sectors across the three nations of Great Britain between 2008/09 and 2009 are shown in Table 6.8 (data obtained for Northern Ireland were too minimal to include). Notably, there was a large increase in the proportion of compost used in agriculture in Wales, although this may simply reflect the very low figures for 2008/09, which may have resulted from under-reporting the previous year. By contrast there has been a decrease in the proportion applied to agricultural land in Scotland. A higher proportion of landfill cover product was also found in Scotland in 2009, compared with England and Wales.

Table 6.8: Compost product market distribution in Great Britain in 2008/09 and 2009

2009	England		Wales		Scotland	
	Reported quantity (kt)	%	Reported quantity (kt)	%	Reported quantity (kt)	%
Agriculture	939,240	63.0	26,340	83.7	45,895	25.9
Biomass	8983	0.6	0	0.0	1400	0.8
Forestry	1	0.0	0	0.0	0	0.0
Horticulture (amateur)	216,774	14.5	388	1.3	6602	3.7
Horticulture (professional)	39,678	2.7	4	0.0	4468	2.5
Land restoration/ daily cover*	82,155	5.5	2375	7.5	29,194	16.4
Landscaping	112,706	7.6	2371	7.5	16,880	9.5
Sports turf	11,927	0.8	1	0.0	2100	1.2
Other	55,738	3.7	0	0.0	66,830	37.7
Unspecified	23,922	1.6	0	0.0	4111	2.3
Total	1,491,124	100.0	31,479	100.0	177,480	100.0
2008/09	England		Wales		Scotland	
	Reported quantity (kt)	%	Reported quantity (kt)	%	Reported quantity (kt)	%
Agriculture	769,869	63.5	2850	19.9	61,342	43.3
Energy recovery	3300	0.3	23	0.2	0	0.0
Forestry	420	0.0	0	0.0	0	0.0
Horticulture (amateur)	98,983	8.2	148	0.9	3965	2.8
Horticulture (professional)	70,307	5.8	0	0.0	2672	1.9
Land/Landfill restoration/ daily cover*	87,490	7.2	8218	57.4	35,184	24.8
Landscaping	133,750	11.0	3089	21.6	32,816	23.1
Sports turf	20,826	1.7	0	0.0	1550	1.1
Other	27,965	2.3	0	0.0	4255	3.0
Unspecified	0	0.0	0	0.0	0	0.0
Total	1,212,910	100.0	14,328	100.0	141,784	100.0

Source: operator survey.

*Market sector 'land restoration' and 'landfill restoration/daily cover' were combined into sector 'land restoration' in the 2009 survey. In order to compare the results like to like, the grossed up tonnage of options 'land restoration' and 'landfill restoration/daily cover' in the 2008/09 survey were therefore combined.

6.8 Compost and digestate applied to agricultural crops

Adding agricultural, professional and amateur horticultural end markets together, it is possible to determine the prevalent types of crops to which compost and digestate product were applied. 2358kt of compost or digestate was applied to agricultural crops in 2009, compared with 2190kt in 2008/09 (Table 6.9 and Figures 6.5 and 6.6). The majority of compost and digestate was applied to cereals and other combinable crops in both 2009 and 2008/09.

Table 6.9: Crops to which compost and digestate were applied in 2009 and 2008/09

Crop	2009					
	Compost products			Digestate products		
	Grossed-up quantity (kt)	Reported quantity (kt)	%	Grossed-up quantity (kt)	Reported quantity (kt)	%
Biomass	4	3	0.2	0	0	0.0
Cereals/combinable crops	959	552	42.8	68	52	42.8
Other arable (e.g. oilseed rape, beet, peas)	306	190	14.7	8	6	5.1
Glasshouse-protected crops	4	3	0.2	0	0	0.0
Grassland	129	41	3.2	83	63	52.1
Orchard fruit	19	13.4	1.0	0	0	0.0
Plants and flowers	26	9	0.7	0	0	0.0
Potatoes	18	13	1.0	0	0	0.0
Soft fruit	0.2	0.0	0.0	0	0	0.0
Vegetables	106	41	3.1	0	0	0.0
Other	96	54	4.1	0	0	0.0
Unspecified	538	380	29.0	0	0	0.0
Total	2199	1297	100.0	159	122	100.0
Crop	2008/09					
	Compost products			Digestate products		
	Grossed-up quantity (kt)	Reported quantity (kt)	%	Grossed-up quantity (kt)	Reported quantity (kt)	%
Cereals/combinable crops	1382	554	66.3	36	18	33.7
Other arable (e.g. oilseed rape, beet, peas)	168	84	10.1	0	0	0.0
Glasshouse-protected crops	3	1	0.2	0	0	0.0
Grassland	107	54	6.4	70	35	66.3
Orchard fruit	1	0.4	0.0	0	0	0.0
Plants and flowers	0	0	0.0	0	0	0.0
Potatoes	76	38	4.6	0	0	0.0
Soft fruit	0.3	0.2	0.0	0	0	0.0
Vegetables	77	39	4.6	0	0	0.0
Other	96	48	5.8	0	0	0.0
Unspecified	33	17	2.0	0	0	0.0
Total	2085	836	100.0	105	53	100.0

Source: operator survey.

Figure 6.5: Crops to which compost was applied in 2009

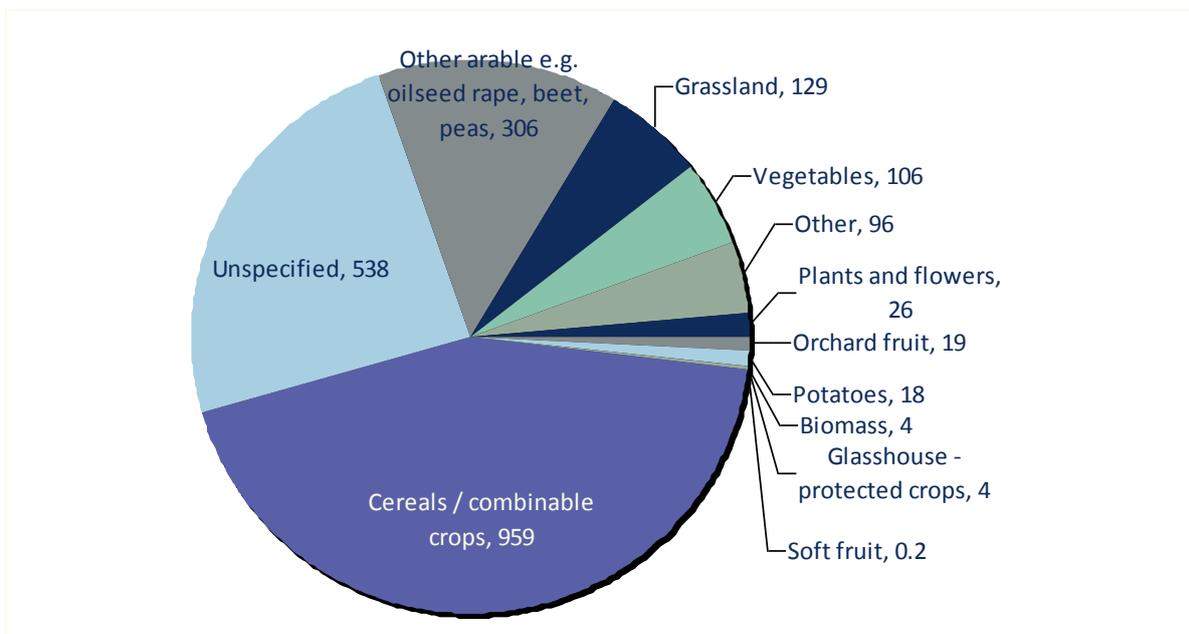
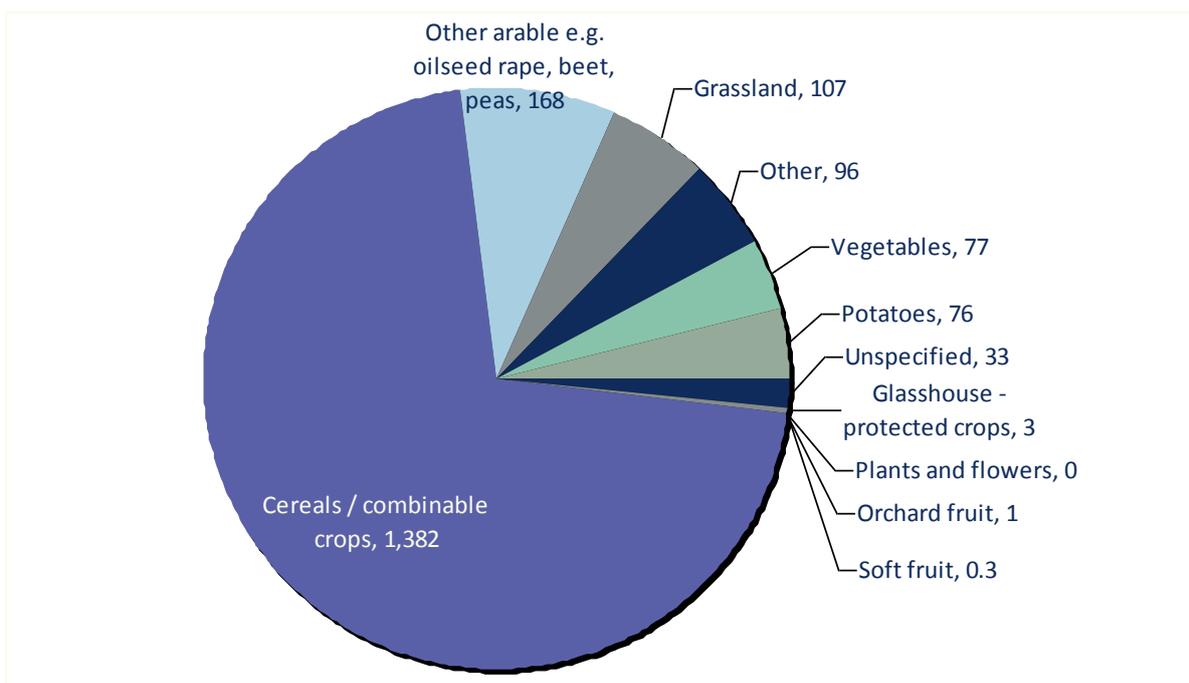


Figure 6.6: Crops to which compost was applied in 2008/09



Crops to which compost and digestate manufactured from food waste were applied are shown in Table 6.10. As explained in Section 6.5, an improved question about food waste in feedstock was used in 2009 compared to 2008/09, therefore results are not directly comparable. The 2009 data are likely to present a more accurate picture of the current situation, with the majority going to arable crops (330kt).

Table 6.10: Crops to which food waste compost and digestate were applied in 2009 and 2008/09

Agricultural crop	Made from feedstocks which included food waste	2008/09		2009	
		Grossed-up quantity (kt)	Proportion (%)	Grossed-up quantity (kt)	Proportion (%)
Biomass	Yes	-	-	0	0.0
	No	-	-	4	100.0
	Unspecified	-	-	0	0.0
	Total	-	-	4	100.0
Cereals/combinable crops	Yes	204	17.9	273	28.7
	No	681	59.7	679	71.3
	Unspecified	255	22.4	0	0.0
	Total	1140	100.0	952	100.0
Glasshouse-protected crops	Yes	0	0.0	0	0.0
	No	3	100.0	4	100.0
	Unspecified	0	0.0	0	0.0
	Total	3	100.0	4	100.0
Grassland	Yes	72	40.7	15	11.6
	No	73	41.2	114	88.4
	Unspecified	32	18.1	0	0.0
	Total	177	100.0	129	100.0
Orchard fruit	Yes	0	0.0	13	68.4
	No	1	100.0	6	31.6
	Unspecified	0	0.0	0	0.0
	Total	1	100.0	19	100.0
Other arable (e.g. oilseed rape, beet, peas)	Yes	6	3.6	57	18.6
	No	137	81.5	249	81.4
	Unspecified	25	14.9	0	0.0
	Total	168	100.0	306	100.0
Plants and flowers	Yes	0	0.0	0	0.0
	No	0	0.0	26	100.0
	Unspecified	0	0.0	0	0.0
	Total	0	0.0	26	100.0
Potatoes	Yes	1	1.3	3	16.7
	No	58	76.3	15	83.3
	Unspecified	17	22.4	0	0.0
	Total	76	100.0	18	100.0
Soft fruit	Yes	0	0.0	0	0.0
	No	0	0.0	0	0.0
	Unspecified	0	0.0	0	0.0
	Total	0	0.0	0	0.0
Vegetables	Yes	2	2.6	3	2.8
	No	73	94.8	103	97.2
	Unspecified	2	2.6	0	0.0
	Total	77	100.0	106	100.0
Total – food waste		285	17.4	364	23.3
Total – non-food waste		1026	62.5	1200	76.7

Source: operator survey.

6.9 Distribution and sale of compost and digestate

In 2009, the majority of compost and digestate products that contained food waste were sold, either directly or onto a third party (Table 6.11). The trend in product sales between 2002/03 and 2009 is shown in Figure 6.7. There appears to be a reduction in tonnage in 2009, but that is because of a sharp increase in the numbers of survey respondents that did not give an answer to this specific question this year. A new option for 'only charged for distribution' in 2009 will also have affected the tonnages reported under the other headings.

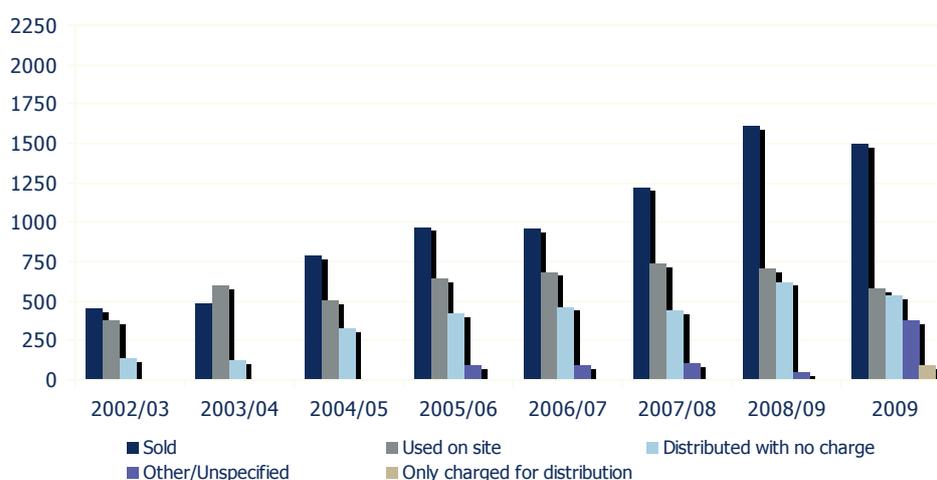
Table 6.11: Distribution of compost and digestate products made from feedstocks with and without food waste in the UK in 2008/09 and 2009

Product distribution	Made from feedstocks which included food waste	2008/09		2009	
		Grossed-up quantity (kt)	Proportion of (%)	Grossed-up quantity (kt)	Proportion (%)
Sold directly to end users	Yes	102	10.0	294	24.7
	No	753	73.6	898	75.3
	Unspecified	168	16.4	0	0.0
	Total	1023	100.0	1192	100.0
Sold onto third parties	Yes	123	21.2	33	10.9
	No	354	60.9	269	89.1
	Unspecified	103	17.7	0	0.0
	Total	581	100.0	302	100.0
Distributed (no charge)	Yes	273	44.5	149	28.0
	No	318	51.9	383	72.0
	Unspecified	22	3.6	0	0.0
	Total	613	100.0	532	100.0
Only charged for distribution*	Yes	-	-	13	16.3
	No	-	-	67	83.8
	Unspecified	-	-	0	0.0
	Total	-	-	80	100.0
Used on site	Yes	50	7.2	11	1.9
	No	567	81.6	559	98.1
	Unspecified	77	11.1	0	0.0
	Total	695	100.0	570	100.0

Source: operator survey.

*Newly added option in 2009 survey.

Figure 6.7: Changes in sales and distribution of product from 2002/03 to 2009



6.10 PAS 100 certification

The number of sites and quantities of compost manufactured at sites either working towards, or having gained, certification to BSI PAS 100 are shown in Table 6.12. However, these data were difficult to express, as the data shown in the main body of the report in 2009 (Section 4) were derived from the database supplied by AfOR, whereas in previous years the data were derived from survey responses. The data shown in Table 6.12 were therefore re-calculated so that both years were based on operator survey responses. This means they were derived from comparable sources but, as a consequence, the 2009 results presented here differ from those shown previously in Section 4. Please also note that the estimates of the quantity of certified compost in 2009 derived from the survey returns differ from those in the AfOR database.

Overall, on a like-for-like basis, the proportion of fully certified PAS 100 site processes has not increased notably. However, the tonnage of product arising from fully certified site processes would appear to have decreased by nearly 25%, from 2021kt in 2008/09 to 1642kt in 2009, despite an increase in the number of sites fully certified. This difference could have derived from an over-estimate of the tonnages for fully certified sites in 2008/09, where respondents were allowed to self-report their site status, making the gross-up method less accurate than in 2009 when this was known definitively.

Table 6.12: Certification status of sites and quantities of wastes in 2008/09 and 2009

Certification status	2008/09		2009	
	Number of sites	%	Number of sites	%
Fully PAS 100 certified	84	47.5	94	48.5
Working towards PAS 100 certification	17	9.6	24	12.4
Not certified	76	42.9	76	39.2
Total	177	100.0	194	100.0
	Quantity of product (kt) *	%	Quantity of product (kt) *	%
Fully PAS 100 certified	2021	71.6	1642	57.0
Working towards PAS 100 certification	362	12.8	383	13.2
Not certified	438	15.6	859	29.8
Total	2821	100.0	2884	100.0

*Grossed-up survey data.

6.11 Conclusions

The 2009 survey indicated that the quantity of compost manufactured in the UK continued to grow, in line with trends identified in previous surveys (Figure 6.1). IVC showed the greatest increase in the quantity of waste treated, compared with 2008/09 data (Table 6.1). These data indicate that composting in the UK in 2009 continued to expand, becoming more technologically sophisticated by relying proportionally less on OAW and more on IVC. No change was observed in the quantities of waste digested anaerobically; however, this is anticipated to increase substantially in future years in response to government policies.

The estimated quantities of compost certified to PAS 100 increased between 2008/09 and 2009 (Table 6.12), although reporting differences between the two surveys precluded any detailed analysis. Overall, the majority of composts manufactured were used as a soil conditioner (Table 6.3), with agriculture comprising the key market sector for both compost (59%) and digestate (100%; Table 6.7). Food waste-derived products continued to increase, representing 25% of the total quantity of compost in 2009 (Table 6.6). This may well be in response to local authority separate food waste collections and is in line with the observed increase in IVC.

Cereals and other arable crops were the crops to which the majority of compost was applied, although this contrasted with digestate, the majority of which was applied to grassland (Table 6.9). This may reflect the differing business models adopted by composting and AD operators. It will be interesting to observe whether this difference is observed in future years.

In conclusion, the composting sector continued its growth, in line with surveys conducted in previous years. The 2009 survey has, for the first time, mapped the nascent AD sector, which is expected to grow significantly in future years. A robust baseline thus exists for this important technology.

Glossary

ADBA	Anaerobic Digestion and Biogas Association
AfOR	Association for Organics Recycling
Anaerobic digestion (AD)	Process of controlled decomposition of biodegradable materials under managed conditions where free oxygen is absent, at temperatures suitable for naturally occurring mesophilic or thermophilic anaerobic and facultative bacteria species that convert the inputs to biogas and whole digestate.
Animal By-Products Regulations (ABPR)	The Animal By-Products Regulations 2005 (SI 2347/2005) provide for the application of EU Regulation (EC No. 1774/2002) in England. This controls the collection, transport, storage, handling, processing and use or disposal of animal by-products in EU member states, including catering wastes. Similar legislation applies in Scotland and Wales. The England Regulations were amended with effect from 2 May 2009 by the Animal By-Products (Amendment) Regulations 2009 (SI 2009/1119).
Compost Quality Protocol (CQP)	Published in March 2007, this sets criteria for the production of quality compost from source-segregated biodegradable waste (biowaste) and was effective in England and Wales in 2009. Compliance with the criteria in the CQP is considered sufficient to ensure that the product may be used without risk to human health or the environment and therefore without the need for waste regulatory control.
Confidence interval (CI)	Defines the error bands around a statistic. A 95% CI around a sample average includes the average for the whole population from which the sample was drawn 19 times out of 20 (assuming the statistical model used to construct the CI is valid).
Continuous block	Continuous block composting is an approach used to compost large volumes of material, employing minimal process management: large piles are formed, with new material added at one end and compost harvested at the other. Composting relies largely on passive aeration with turning often achieved through the use of a side turner which slowly moves the table a windrow's width down the pad at a time, starting from one end. Continuous block composting is commonly used for non-putrescible materials, such as woody green wastes, and may take a number of months to produce a composted product.
Controlled waste	Controlled wastes are household, commercial and industrial wastes as defined in The Controlled Waste Regulations 1992 (as amended).
Dedicated composting/biological treatment site	A site used solely for the purpose of recycling organic materials, for example through a composting, aerobic or AD process. It differs from other non-dedicated sites, which may carry out other activities, such as farming, dry recyclable processing or landfilling.
Digestate Quality Protocol (DQP)	Published in September 2009, this sets end-of-waste criteria for the production and use of quality outputs from AD of source-segregated biodegradable waste. It was effective in England and Wales in 2009. Compliance with the criteria in the DQP is considered sufficient to ensure that the product may be used without risk to human health or the environment and therefore without the need for waste regulatory control.
EA	Environment Agency

EWC Code	European Waste Catalogue Code
HWRC	Household Waste Recycling Centre
In-vessel composting (IVC)	A term used to describe a wide range of composting systems where the composting feedstock is contained in a purpose-built structure for the active composting stage, allowing a higher degree of process control and environmental protection than OAW. Many IVC sites incorporate an element of windrow composting for maturation of the material following the sanitisation stages. At present, IVC is primarily used for feedstocks that fall under the provision of the ABPR.
Mechanical biological treatment (MBT)	A generic term for an integration of several processes treating mixed wastes, such as Materials Recovery Facilities, sorting and composting or AD.
Mechanically turned windrow	Composting method where the feedstock is formed into long piles and physically 'turned' (lifted into the air and allowed to drop back down either using a dedicated machine or a materials handling vehicle) to allow stale air, moisture and trapped heat to escape, and fresh air to enter. Windrow composting may be carried out either outdoors (open air) or under a cover (such as a geotextile membrane), or in a shed or building.
NIEA	Northern Ireland Environment Agency
Ofgem	Office of the Gas and Electricity Markets
On-farm composting	A composting activity that is carried out on a farm. It may be an ancillary process to complement existing agricultural activities, or a stand-alone business that is simply located on designated agricultural land.
Open air windrow (OAW)	Mechanically turned windrow located outdoors (in the open air), as opposed to under a cover or in a building.
Organic waste	Waste of animal or plant origin which, for recovery purposes, can be decomposed by micro-organisms, other larger soil-borne organisms or enzymes.
PAS 100	Publicly Available Specification 100, which is the British Standards Institution specification for composted material published in 2005 (the relevant edition in effect in 2009).
PAS 110	Publicly Available Specification 110, which is the British Standards Institution specification for whole digestate, separated liquor and separated fibre derived from the AD of source-segregated biodegradable materials, published in February 2010.
REA	Renewable Energy Association
SEPA	Scottish Environment Protection Agency
Source-segregated feedstock	Feedstock kept separate from other waste types so as to reduce contamination and facilitate treatment. It is referred to as 'separate collection' in the Waste Framework Directive (2008/98/EC).
Static pile with aeration	Form of composting where the materials are turned infrequently and the fresh air is introduced into the pile through a forced aeration system. This may be either through channels in the ground or through a perforated pipe laid within the compost. Aeration may be either positive (pushed through the composting mass) or negative (sucked through the mass).

Thermophilic aerobic digestion (TAD)	Method of treating slurries or liquid suspensions of organic wastes where the materials are pumped into a tank and air is forced through, encouraging the growth of thermophilic bacteria that then digest the waste. The process is typically shorter than composting and AD.
Unit of mass	Expressed in metric tonnes (t) = 1000kg 1kt = 1000 tonnes 1 Mt = 1 million tonnes = 1,000,000 or 10^6 tonnes
Unit of volume	Expressed in metres cubed (m^3), which is equivalent to 1000 litres.
Unit prefixes	SI units and prefixes have been used: k (kilo) = 1000 M (mega) = 1,000,000

Appendix A

Survey questionnaires and briefing letters

National Organics Recycling Survey: ADBA Survey Briefing

Further to our recent notification of the WRAP-funded National Organics Recycling Survey, this Briefing Note confirms the survey has now been launched. As I stated in my previous email, we are determined that the work of ADBA members should be fully captured in this survey.

What you need to do now ...

The survey is in two parts.

Firstly there is an online business survey. The link to the survey can be found [here](#).

This should only take a couple of minutes and asks for simple business data for the calendar year 2009 or the nearest equivalent period for which you have readily-available information. Please note, the information requested relates only to those aspects of your business that have to do with the processing of organic wastes – other activities such as agriculture, landfill waste management etc are not included.

Please complete this information within the next 7 calendar days if possible.

The second part of the survey covers operational activities on-site. This will be done through a telephone interview. Site managers will be contacted by expert analysts from M·E·L Research, the consultancy firm appointed by WRAP to carry out the survey. Site managers can be expected to be contacted shortly, over the month of February. This year it should only take a few minutes to provide the information they need. Unlike previous years, there is no need now, for data on materials entering the site.

The information will just cover the types of system in operation, the outputs and end products. Again the year of interest in the survey is for sites operational in the calendar year 2009 or the nearest available period for which you have data.

Confidentiality assurance

We have been very particular in ensuring that the commercial interests of our members are fully protected during this survey. The Confidentiality Statement assures all participants that the information they provide will be held in strict confidence for WRAP by the survey agency M·E·L Research, who are a verified, quality-assured Research and Evaluation Framework Supplier for WRAP. Data will be analysed by M·E·L Research, and aggregated and anonymised for the purposes of reporting. No individual firm will be identifiable in the data and report published by WRAP and ourselves arising from this survey.

We want to establish a really strong and accurate baseline position which truly reflects the position our industry has reached, and sets a marker against which future growth, and the needs to support that growth, can be measured.

National Organics Recycling Survey: AFOR Survey Briefing

Further to our recent notification of the Annual Organics Recycling Survey, this Briefing Note confirms the survey has now been launched. As I indicated in the previous notification, WRAP has changed the approach to make the survey simpler, less repetitive, and more appropriate for individual members.

What you need to do now ...

The survey is much simpler now, and is in two parts.

Firstly there is a very short online business survey. The link to the survey can be found [here](#).

This should only take a couple of minutes and asks for simple business data for the calendar year 2009 or the nearest equivalent period for which you have readily-available information. Please note, the information requested relates only to those aspects of your business that have to do with the processing of organic wastes – other activities such as agriculture, landfill waste management etc are not included.

Please fill this in within the next 7 calendar days if possible.

The second part of the survey covers operational activities on-site. This will be done mainly through a telephone interview, although there's an email self-completion form for any operators who prefer this. Site managers will be contacted during February by researchers from M-E-L Research, the consultancy firm appointed by WRAP to carry out the survey. This year it should only take a few minutes to provide the information they need. Unlike previous years there is no need now, for data on materials entering the site.

The information will just cover the types of system in operation, the outputs and end products. Again the year of interest in the survey is for sites operational in the calendar year 2009 or the nearest available period for which you have data.

Confidentiality assurance

We have been very particular in ensuring that the commercial interests of our members are fully protected during this survey. The Confidentiality Statement assures all participants that the information they provide will be held in strict confidence for WRAP by the survey agency M-E-L Research, who are a verified, quality-assured Research and Evaluation Framework Supplier for WRAP. Data will be analysed by M-E-L Research, and aggregated and anonymised for the purposes of reporting. No individual firm will be identifiable in the data and report published by WRAP and ourselves arising from this survey.

Please take note that it is imperative for the commercial benefit of our industry, that members take full part, so that we can all show the full impact that the growth in organics recycling is now making in the UK. We will also use the information to represent the sector to government and the other key stakeholders.

National Organics Recycling Survey: REA Survey Briefing

Further to our recent notification of the WRAP-funded National Organics Recycling Survey, this Briefing Note confirms the survey has now been launched. As I stated in my previous email, we are determined that the work of REA members should be fully captured in this survey.

What you need to do now ...

The survey is in two parts.

Firstly there is an online business survey. The link to the survey can be found [here](#).

This should only take a couple of minutes and asks for simple business data for the calendar year 2009 or the nearest equivalent period for which you have readily-available information. Please note, the information requested relates only to those aspects of your business that have to do with the processing of organic wastes – other activities such as agriculture, landfill waste management etc are not included.

Please complete this information within the next 7 calendar days if possible.

The second part of the survey covers operational activities on-site. This will be done through a telephone interview. Site managers will be contacted by expert analysts from M·E·L Research, the consultancy firm appointed by WRAP to carry out the survey. Site managers can be expected to be contacted shortly, over the month of February. This year it should only take a few minutes to provide the information they need. Unlike previous years, there is no need now, for data on materials entering the site.

The information will just cover the types of system in operation, the outputs and end products. Again the year of interest in the survey is for sites operational in the calendar year 2009 or the nearest available period for which you have data.

Confidentiality assurance

We have been very particular in ensuring that the commercial interests of our members are fully protected during this survey. The Confidentiality Statement assures all participants that the information they provide will be held in strict confidence for WRAP by the survey agency M·E·L Research, who are a verified, quality-assured Research and Evaluation Framework Supplier for WRAP. Data will be analysed by M·E·L Research, and aggregated and anonymised for the purposes of reporting. No individual firm will be identifiable in the data and report published by WRAP and ourselves arising from this survey.

We want to establish a really strong and accurate baseline position which truly reflects the position our industry has reached, and sets a marker against which future growth, and the needs to support that growth, can be measured.



Material change for
a better environment



Monday, February 21, 2011

Dear [Site Manager]

Annual Survey of Composting on Registered Exempt Sites

We're writing to you as an organisation that is registered to carry out composting of waste materials. Your site has been selected to be included in the 'Annual Organics Recycling Survey', which we are carrying out on behalf of WRAP – the agency that helps better waste management. We would very much appreciate your input to this.

Please can you fill in the enclosed survey form. It should only take a few minutes. The information required relates to the calendar year 2009, or the nearest time period you can provide. **Please return the form within the next 7 days if possible, last posting date 4th March 2011.** If you would like to do it by email, we will send you a form if you email your request to compost@m-e-l.co.uk.

Why is this survey important?

Composting activities are becoming increasingly important in the UK as a way of preventing organic wastes being disposed to landfill. It is important that a national picture is gained every year, to track the UK's progress in increasing composting and improving the recycling of organic materials.

By completing this survey **you are playing an important part in this national effort, and it's vital that this is fully captured in the annual survey, to make sure that the work of people like yourself is properly acknowledged.** The survey results will also be used to help identify further ways in which organisations like yours can be supported in continuing and developing your composting activities.

The information requested covers the types of composting system in operation, the inputs of waste, and the compost outputs and end products generated. It should only take about 5 minutes to complete.

Confidentiality assurance

Please be assured that your replies and personal details are fully protected during this survey. All responses will be held in strict confidence for WRAP by ourselves at M·E·L Research, the survey agency who are a verified, quality-assured Research and Evaluation Framework Supplier for WRAP. Data will be analysed by M·E·L Research, and aggregated and anonymised for the purposes of reporting. No individual organisation will be identifiable in the data and report published by WRAP arising from this survey.

If you have any queries about completing this survey, please do call our research assistant Sophi Dangerfield, she is available on freephone 0800 073 0348.

Many thanks for your time, in anticipation of your help in this important national survey.

Dr Robert Pocock
Chief Executive



Material change for
a better environment

UK Organics Recycling Industry Business Survey 2009

Welcome to the annual organics recycling survey. The survey is administered by M·E·L Research on behalf of WRAP. It is a follow-on from previous WRAP/AfOR surveys.

This business survey has only six questions, and we anticipate it will only take five minutes to complete. Any data you provide will be completely confidential. Nothing will be published in a form that identifies you or your sites. The data will be stored electronically by M·E·L and WRAP for analysis purposes.

The survey covers all processes for composting, anaerobic digestion, in-vessel composting (IVC) or other biological treatment technologies, and also includes treatment of residual waste, for example through mixed biological treatment (MBT). It covers the calendar year 2009 or the nearest equivalent period for which you have readily-available information.

Q1 Complete Contact Details and General Information about your Business, to confirm you actively operated organics recycling processes in the UK during 2009

Company Name	
Company Address	
Company Postcode	
Contact Name	
Contact Position	
Contact telephone	
Contact Email	

Q2 Which of these best describes the principal business activity of your company?

- | | |
|---|---|
| <input type="checkbox"/> Composting company | <input type="checkbox"/> Agricultural company |
| <input type="checkbox"/> Anaerobic digestion company | <input type="checkbox"/> Horticultural / landscaping company |
| <input type="checkbox"/> Composting and anaerobic digestion company | <input type="checkbox"/> Community group / not-for-profit company |
| <input type="checkbox"/> Water treatment company | <input type="checkbox"/> Local authority |
| <input type="checkbox"/> Solid waste treatment / disposal company | <input type="checkbox"/> Other (please describe in the box below) |
- _____

Q3 How many separate organics recycling sites did your company operate in the UK in 2009?

Please note by 'site' we mean the location where you have operated one or more specific organics recycling processes in 2009.

- One site only
- More than one site (please specify the numbers of sites in the box below)
- _____

Q4 Please give the financial turnover for the organics recycling activities of your company for 2009.

Please include turnover for all the organics recycling sites operated by your company in the UK in 2009. Include the annual turnover specifically from the organics recycling/ treatment aspects of your business (including production, distribution and sales) in 2009? *(Please exclude turnover from other business activities such as agricultural or landfill operations)*

Please provide the actual figure in the box below if possible. Alternatively you can indicate general turnover by ticking one of the pre-coded options.

--

- | | | |
|--|--|--|
| <input type="checkbox"/> Less than £10,000 | <input type="checkbox"/> £500,000 - £1 million | <input type="checkbox"/> £8 million - £10 million |
| <input type="checkbox"/> £10,000 - £50,000 | <input type="checkbox"/> £1 million - £3 million | <input type="checkbox"/> £10 million - £15 million |
| <input type="checkbox"/> £50,000 - £100,000 | <input type="checkbox"/> £3 million - £5 million | <input type="checkbox"/> £15 million - £20 million |
| <input type="checkbox"/> £100,000 - £500,000 | <input type="checkbox"/> £5 million - £8 million | <input type="checkbox"/> More than £20 million |

Q5 Please record how many **full time equivalent staff** were engaged in 2009, specifically on the organics recycling aspects of your company (including production, distribution and sales).

Please include employees at all organics recycling sites operated by your company in the UK in 2009. *(Please exclude employment in other business activities such as agricultural or landfill operations)*

Please provide the actual full-time-equivalent total of employees in the box below if possible. Alternatively you can indicate general employment band by ticking one of the pre-coded options.

--

- | | | |
|--------------------------------------|----------------------------------|--|
| <input type="checkbox"/> Less than 1 | <input type="checkbox"/> 11 - 20 | <input type="checkbox"/> 75 - 100 |
| <input type="checkbox"/> 1 - 5 | <input type="checkbox"/> 21 - 50 | <input type="checkbox"/> More than 100 |
| <input type="checkbox"/> 6 - 10 | <input type="checkbox"/> 50 - 75 | |

Q3 Finally, have you opened, or do you have definite plans to open, any new composting/anaerobic digestion/biological treatment sites after 31 December 2009? *(Please include only those sites for which the necessary investment and required permits are already in place)*

- Yes
 No

Please specify site names and locations

Site 1	
Site 2	
Site 3	

Site 4	
Site 5	

You have now completed the organics recycling business survey. Thank you very much for your time.

We will be conducting a second site-specific survey, which will be done mainly through a telephone interview, although there is an e-mail self-completion form for any single-site operators who prefer this. Site managers will be contacted during February by researchers from M·E·L Research, the consultancy firm appointed by WRAP to carry out the survey. Once again it should only take a few minutes to provide the information they need.

We have been very particular to ensure that your commercial interests are fully protected during this survey. All information provided will be held in strict confidence. Data will be analysed by M·E·L Research, and aggregated and anonymised for the purposes of reporting

Please click the "Submit" button now.

UK Organics Recycling Industry Annual Survey 2009

Permitted Anaerobic Digestion Site

Contact Details

Name		Telephone	
E-mail		Title	
Company Name		Company Postcode	
Site Name		Site Postcode	

Location of the Site

Q1 First of all, is the site.....? *(Please select one option only)*

- A stand alone facility *(Please go to Q1a)*
 Co-located at a site with another activity *(Please go to Q1b)*

Q1a If stand alone, is it...? *(Please select one option only)*

- On a farm *(Please go to Q2)* Off-farm *(Please go to Q2)*

Q1b If Co-located with another operation, is it located with a...? *(Please select one option only)*

- Farm Community enterprise
 A composting facility Food or drinks manufacture / processing
 Other waste management facility Other - Please specify
 Sewage treatment works _____

Q2 Does the facility receive wastes...? *(Please select one option only)*

- Only from the site at which it is located or within the same business (or business group) *(Please go to Q3)*
 From the site at which it is located or within the same business (or business group) **plus** other sources *(Please go to Q2a)*
 Solely from external sources *(Please go to Q2a)*

Q2a If the site does receive wastes from external sources, is this...? *(Please select one option only)*

- From a single provider From multiple providers

Type of Facility

Could you tell me the type of system the site is using at the moment?

- Q3a System type (Temperature)** Mesophilic Thermophilic
Q3b System type (Phase) Wet Dry
Q3c System type (Configuration) Continuous Batch

Q3d System type (Configuration) Single stage Two stages

Q4 Who are the system supplier(s)? Please provide the manufacturer's name(s) if possible and also the technology provided

Q5 What is the typical residence time in reactor in terms of days? This may be a single figure or a range e.g. x to y days. (Write in numbers, e.g. "5" or "6 to 10")

Q6 Pasteurisation? Yes (Please go to Q6a) No (Please go to Q7)

Q6a If YES, is it...? Pre digestion Post digestion

Q7 Pre-processing of feedstocks

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> Screening | <input type="checkbox"/> Pulping (e.g. screw or hydropulper) |
| <input type="checkbox"/> Shredding | <input type="checkbox"/> Blending / mixing |
| <input type="checkbox"/> De-packaging | <input type="checkbox"/> Other (Please specify below) |
| <input type="checkbox"/> Hand picking | _____ |

Feedstocks

Q8 What was the maximum permitted capacity of this site in 2009 ? _____ tonnes per annum

Q9 What was the quantity of wastes treated in 2009? _____ tonnes per annum

**Q10 What was the quantity of non-waste feedstocks processed? (Tonnes per annum)
Please split according to type of feedstock e.g. manures, energy crops, agricultural by-products, sewage sludge etc.**

Q11 Were any feedstocks delivered in biodegradable bags? Yes (Please go to Q11a) No (PLEASE GO TO THE NEXT SECTION)

Q11a If YES, what steps are you taking to deal with them?

Outputs - Biogas

Q12 What was the total biogas gas yield in 2009 (m3)? _____ m3

Q13 What is the proportion of different gas use, including On-site & off-site uses? (WRITE IN NUMBERS)

Heat (boiler only) - on site _____ %
Heat & electricity (combined heat & power, CHP) - on-site _____ %
Direct injection of gas into national grid _____ %
Vehicle fuel (e.g. RCV fleet) _____ %
Other (Please specify below) _____ %

Q14 What is the net rated capacity of generator (Biogas combustion on site)?

MW _____
MWe (optional) _____
MWth (optional) _____

Q15 How much electricity was generated? _____ MWh

Q16 How much electricity was exported? _____ % or MWh

Q17 How much heat was generated? _____ MWh

Q18 How much heat was exported? _____ MWh

Q19 Finally, how much gas was exported (Direct injection into grid)?
_____ m³ or MWh

Outputs - Solid & Liquid

Q20 What is Quantity of whole digestate produced? _____ tonnes or m³

Q21 Is the whole digestate post-processed? Yes (Please go to Q21a) No (PLEASE GO TO NEXT SECTION)

Q21a If YES, how?

Screened to remove contaminants Combustion
 Aerobic treatment (composting) = maturation Reverse osmosis
 Separated into fibre & liquor Other (Please specify below)
 Pelletised _____

Q22 How was the digestate separated into fibre and liquor?

Centrifuged
 Press
 Other (Please specify below)

Q23 What is Quantity of separated fibre? _____ tonnes or m³

Q24 What about the Quantity of separated liquor (m3)? _____ m³

Q25 Is the liquor de-nitrified? Yes No

Use of Products - Digestate

Q26 Where was the whole digestate applied? (WRITE IN NUMBERS)

Agriculture	_____	%
Forestry	_____	%
Soil/field-grown horticulture	_____	%
Land restoration	_____	%
Other (Please specify below)	_____	%

Q27 If whole digestate was used in agriculture, what was the main agricultural crop? (WRITE IN NUMBERS)

Cereals / combinable crops	_____	%
Other arable e.g. oil seed rape, peas, beans	_____	%
Potatoes	_____	%
Vegetables	_____	%
Orchard fruit	_____	%
Soft fruit	_____	%
Plants & flowers	_____	%
Glasshouse protected crops	_____	%
Grass land	_____	%
Biomass	_____	%
Other (Please specify below)	_____	%

Q28 How was the whole digestate distributed? (WRITE IN NUMBERS)

Used on own land	_____	%
Sold directly	_____	%
Sold to third-party	_____	%
Distributed free of charge	_____	%
Only charged for distribution	_____	%
Other (Please specify below)	_____	%

Q29 IF SOLD, how much was charged for the whole digestate (ex works)? This may be a range.

- £ _____ per tonne Only charging for delivery
 £ _____ per m3 Other e.g. spreading

Use of Products - Fibre

Q30 If made, how was the separated fibre applied?

- Agriculture _____ %
 Forestry _____ %
 Soil/field-grown horticulture _____ %
 Land restoration _____ %
 Other (Please specify below) _____ %

Q31 If the separated fibre was used in agriculture, what was the main agricultural crop?

- Cereals / combinable crops _____ %
 Other arable e.g. oil seed rape, peas, beans _____ %
 Potatoes _____ %
 Vegetables _____ %
 Orchard fruit _____ %
 Soft fruit _____ %
 Plants & flowers _____ %
 Glasshouse protected crops _____ %
 Grass land _____ %
 Biomass _____ %
 Other (Please specify below) _____ %

Q32 How was the separated fibre distributed? (WRITE IN NUMBERS)

- Used on own land _____ %
 Sold directly _____ %
 Sold to third-party _____ %
 Distributed free of charge _____ %
 Only charged for distribution _____ %
 Other (Please specify below) _____ %

Q33 IF SOLD, how much was charged for the separated fibre (ex works)? This may be a range.

- £ _____ per tonne Only charging for delivery
- £ _____ per m3 Other e.g. spreading

Use of Products - Liquor

Q34 If made, where was the separated liquor applied?

Agriculture _____ %

Forestry _____ %

Soil/field-grown horticulture _____ %

Land restoration _____ %

Other (Please specify below) _____ %

Q35 If the separated liquor was applied in agriculture what was the main agricultural crop?

Cereals / combinable crops _____ %

Other arable e.g. oil seed rape, peas, beans _____ %

Potatoes _____ %

Vegetables _____ %

Orchard fruit _____ %

Soft fruit _____ %

Plants & flowers _____ %

Glasshouse protected crops _____ %

Grass land _____ %

Biomass _____ %

Other (Please specify below) _____ %

Q36 How was the separated liquor distributed? (WRITE IN NUMBERS)

Used on own land _____ %

Sold directly _____ %

Sold to third-party _____ %

Distributed free of charge _____ %

Only charged for distribution _____ %

Other (Please specify below) _____ %

Q37 IF SOLD, how much was charged for the separated liquor (ex works)? This may be a range.

£ _____ per tonne Only charging for delivery

£ _____ per m3 Other e.g. spreading

Quality

Q38 Regarding certification (of the digestate / liquor and or fibre) by the Biofertiliser Certification Scheme run by the Renewable Energy Assurance Ltd, is the site:

Applied & working towards certification

Not yet but will in the future

Certified

No yet and have no intention to apply

Lapsed

Q39 IF CERTIFIED, which year was the certification achieved? _____

Q40 IF CERTIFIED OR WORKING TOWARDS CERTIFICATION, why did you start to produce quality assured (i.e. PAS 110) digestate?

Q41 IF LAPSED, why are you no longer producing quality assured (i.e. PAS 110) compost?

Q42 IF NOT YET BUT WILL IN THE FUTURE, why is it that you do not currently produce quality assured (i.e. PAS 110) digestate?

Q43 IF NOT YET AND HAVE NO INTENTION TO APPLY, why is it that you do not produce quality assured (i.e. PAS 110) digestate and have no intention to apply?

Regulatory & Business Status

Q44 Was the site operating under a waste management license or permit during 2009?

Yes No

Q45 ABPR approved during 2009? Yes No

Q46 When did the site become operational? (Please write in MM/YYYY) _____ / _____

Q47 Turnover at site during 2009? (£) _____

Q48 Numbers of full-time employees during 2009? _____

Q49 Are there any plans to expand or develop this site further?

- Increase capacity
- Develop new site(s)
- Diversify operations at site e.g. include anaerobic stage, biomass
- Other – please specify

Q49a Could you tell me the reasons for that?

--

Q50 What is the rateable value of the site? (£) _____

Q51 What do you believe to be the greatest challenge in next 2-5 years?

- Regulatory compliance
- Gate fees
- Markets / outlets for products
- Fuel for 'Energy from biomass' facilities
- Other – please specify below

Q52 Could you tell me why that is?

Regulatory compliance:	
Gate fees:	
Markets / outlets for products:	
Fuel for 'Energy from biomass' facilities:	
Other:	

Q53 What do you believe to be the greatest opportunities?

--

Business Behaviour Questions (Telephone interviews only)

Q1 To what extent do you use market intelligence to make changes in your business strategy?

Q1a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q1b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q1c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Q2 To what extent have you used information, for example on your monthly costs and sales, to make strategic business decisions?

Q2a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q2b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes

- I do this behaviour rarely

Q2c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
 I do a lot of what I can in this area
 I do some of what I can in this area
 I do a little of what I can in this area
 I do the minimum in this area

Q3 To what extent have you implemented systems to monitor and improve the management and/or strategic direction of your business?

Q3a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
 Questionable - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
 Not verified - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
 Verified - if the respondent can provide a current, relevant example

Q3b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
 I do this behaviour sometimes
 I do this behaviour rarely

Q3c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
 I do a lot of what I can in this area
 I do some of what I can in this area
 I do a little of what I can in this area
 I do the minimum in this area

Q4 To what extent do you seek out and sell to people who are willing to pay a higher price, even if that means changing your own systems and processes to meet their needs?

Q4a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example

- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q4b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q4c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Thank you very much. That is the end of the survey.

WRAP is just about to undertake some work to further understand the current market conditions for the organics recycling sector and is very keen to get the perspective of operators. The work will help to inform WRAP's work towards increasing the amount of organic waste recycled through composting.

Would you be willing to be contacted in the next few weeks to provide you with more information about this work? You can then decide whether you would like to take part.

- Yes
 - No
-
-

UK Organics Recycling Industry Annual Survey 2009

Permitted Composting Site

Contact Details

Name	Telephone
E-mail	Title
Company Name	Company Postcode
Site Name	Site Postcode

Location of the Site

Q1 First of all, is the site.....? *(Please select one option only)*

- A stand alone facility *(Please go to Q1a)*
 Co-located at a site with another activity *(Please go to Q1b)*

Q1a If stand alone, is it...? *(Please select one option only)*

- On a farm *(Please go to Q2)* Off-farm *(Please go to Q2)*

Q1b If Co-located with another operation, is it located with a...? *(Please select one option only)*

- Farm Community enterprise
 An AD facility Food or drinks manufacture / processing
 Other waste management facility Other - Please specify
 Sewage treatment works _____

Q2 Does the facility receive wastes? *(Please select one option only)*

- Only from the site at which it is located or within the same business (or business group) *(Please go to Q3)*
 From the site at which it is located or within the same business (or business group) plus other sources *(Please go to Q2a)*
 Solely from external sources *(Please go to Q2a)*

Q2a If the site does receive wastes from external sources, is this...? *(Please select one option only)*

- From a single provider From multiple providers

Type of Facility Used

Q3 Could you tell me the type of system the site is using at the moment? *(Please select all the options that apply)*

- Totally enclosed Continuous block composting
 IVC - with some activities in open (e.g. maturation) Aerated static pile

- Windrow open
 Windrow under cover

- Other – please specify

Q3a IF MORE THAN ONE SYSTEM IS USED, Did you operate those systems in parallel, or in series (e.g. IVC then windrow). *(Please select one option only)*

- In parallel *(Please go to Q3b)* In series *(Please go to Q4)*

Q3b IF THEY ARE IN PARALLEL, what was the % split of feedstocks?

Q4 Who are the system supplier(s)? Please provide the manufacturer's name(s) if possible and also the technology provided

Q5 What is the typical composting period in terms of days or weeks? Please break it down by difference phases if need be.

Q6 Pre-processing of feedstocks *(Please select all the options that apply)*

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> Screening | <input type="checkbox"/> Pulping (e.g. screw or hydropulper) |
| <input type="checkbox"/> Shredding | <input type="checkbox"/> Blending / mixing |
| <input type="checkbox"/> De-packaging | <input type="checkbox"/> Other - please specify |
| <input type="checkbox"/> Hand picking | _____ |

Feedstocks

Q7 What was the maximum permitted capacity of this site in 2009? _____ tonnes per annum

Q8 What was the quantity of wastes treated in 2009? _____ tonnes per annum

Q9 Were any feedstocks delivered in biodegradable bags?

- Yes *(Please go to Q9a)* No *(Please go to Q10)*

Q9a If YES, what steps are you taking to deal with them?

Outputs of Compost

Q10 What was the quantity of compost produced in 2009? _____ tonnes or m³

Q11 What proportion (%) of the products produced contain some food waste? _____ %

Q12 What is the principal grade of compost produced, e.g. 0 - 40 mm? *(Please select one option only)*

- | | |
|---------------------------------|---|
| <input type="checkbox"/> 0-10mm | <input type="checkbox"/> 0-40mm |
| <input type="checkbox"/> 0-20mm | <input type="checkbox"/> None of these – please specify mm range below
_____mm |

Q13 How much of the Principal Grade was produced? _____ tonnes or m³

Q14 What is the additional grade of compost produced, e.g. 0 - 40 mm? *(Please select one option only)*

- | | |
|---------------------------------|---|
| <input type="checkbox"/> 0-10mm | <input type="checkbox"/> 0-40mm |
| <input type="checkbox"/> 0-20mm | <input type="checkbox"/> None of these – please specify mm range below
_____mm |

Q15 How much of each additional compost grade was produced?

_____ tonnes or m³

Q16 What other grades were produced?

Destination of Compost

Q17 What product types were manufactured? (Please write in % of total compost produced by mass or tonnes or m³)

		Please indicate the unit		
		%	Tonnes	m ³
Soil conditioner	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mulch	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Top soil / subsoil manufacture	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Growing medium constituent (before blending)	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turf (top) dressing	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biomass	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landfill cover	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other – please specify below		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
------------------------------	--	--------------------------	--------------------------	--------------------------

Q18 Which products were made from feedstocks which included food waste? *(Please select all the options that apply)*

- | | |
|---|--|
| <input type="checkbox"/> Soil conditioner | <input type="checkbox"/> Turf (top) dressing |
| <input type="checkbox"/> Mulch | <input type="checkbox"/> Biomass |
| <input type="checkbox"/> Top soil / subsoil manufacture | <input type="checkbox"/> Landfill cover |
| <input type="checkbox"/> Growing medium constituent (before blending) | <input type="checkbox"/> Other |

Q19 Where was the compost applied? (Please write in % of total compost produced by mass or tonnes or m³)

		Please indicate the unit		
		%	Tonnes	m ³
Agriculture	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horticulture professional	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horticulture amateur	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landscaping	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sports turf	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land restoration / daily cover	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biomass	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forestry	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify below	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q20 Which of these sectors accepted food waste-derived compost? *(Please select all the options that apply)*

- | | |
|--|---|
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Land restoration / daily cover |
| <input type="checkbox"/> Horticulture professional | <input type="checkbox"/> Biomass |
| <input type="checkbox"/> Horticulture amateur | <input type="checkbox"/> Forestry |
| <input type="checkbox"/> Landscaping | <input type="checkbox"/> Other |
| <input type="checkbox"/> Sports turf | |

Q21 If the compost was used in agriculture / horticulture, what was the main agricultural crop? (Write in % of total compost produced by mass or tonnes or m³)

		Please indicate the unit		
		%	Tonnes	m ³
Cereals / combinable crops	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other arable e.g. oil seed rape, peas, beans	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potatoes	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vegetables	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Orchard fruit	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soft fruit	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plants & flowers	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Glasshouse protected crops	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grass land	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biomass	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify below	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q22 Which of these sectors accepted food waste-derived compost? (Please select all the options that apply)

- | | |
|---|---|
| <input type="checkbox"/> Cereals / combinable crops | <input type="checkbox"/> Soft fruit |
| <input type="checkbox"/> Other arable e.g. oil seed rape, peas, beans | <input type="checkbox"/> Plants & flowers |
| <input type="checkbox"/> Potatoes | <input type="checkbox"/> Glasshouse protected crops |
| <input type="checkbox"/> Vegetables | <input type="checkbox"/> Grass land |
| <input type="checkbox"/> Orchard fruit | <input type="checkbox"/> Other |

Q23 How was the compost distributed? (Write in % of total compost produced by mass or tonnes or m³)

		Please indicate the unit		
		%	Tonnes	m ³
Used on own land	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sold directly	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sold to third-party	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distributed free of charge	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Only charged for distribution	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify below	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q24 IF THE COMPOST WAS SOLD, how much was charged for the compost (ex works)?
This could be a range.

		£ per tonne	£ per m ³	Only charging for delivery	Other e.g. spreading
Agriculture	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horticulture professional	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horticulture amateur	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landscaping	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sports turf	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land restoration / daily cover	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biomass	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forestry	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify	_____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q25 Which compost market sectors do you believe offers the greatest potential for growth? *(Please select all the options that apply)*

- | | |
|--|---|
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Land restoration / daily cover |
| <input type="checkbox"/> Horticulture professional | <input type="checkbox"/> Biomass |
| <input type="checkbox"/> Horticulture amateur | <input type="checkbox"/> Forestry |
| <input type="checkbox"/> Landscaping | <input type="checkbox"/> Other (please specify below) |
| <input type="checkbox"/> Sports turf | |

Quality

Q26 Is the site certified or working towards compost certification through the AfOR scheme? *(Please select one option only)*

- | | |
|--|--|
| <input type="checkbox"/> Applied & working towards certification | <input type="checkbox"/> Not yet but will in the future |
| <input type="checkbox"/> Certified | <input type="checkbox"/> No yet and have no intention to apply |
| <input type="checkbox"/> Lapsed | |

Q27 IF CERTIFIED, which year was the certification achieved? _____

Q28 IF CERTIFIED OR WORKING TOWARDS CERTIFICATION, Why did you start to produce quality assured (i.e. PAS 100) compost?

Q29 IF LASED, why are you no longer producing quality assured (i.e. PAS 100) compost?

Q30 IF NOT YET BUT WILL IN THE FUTURE, why is it that you do not currently produce quality assured (i.e. PAS 100) compost?

Q31 IF NOT YET AND HAVE NOT INTENTION TO APPLY, why is it that you do not produce quality assured (i.e. PAS 100) compost and have no intention to apply?

Basic Information of the Site

Q32 When did the site become operational? (Please write in MM/YYYY) ____/____

Q33 What was the turnover at site during 2009? £ _____

Q34 How many full-time employees were working at site during 2009? _____

Q35 Are there any plans to expand or develop this site further? (Please select all the options that apply)

- Increase capacity
- Develop new site(s)
- Diversify operations at site e.g. include anaerobic stage, biomass
- Other – please specify

Q35a Could you specify the reasons for that?

Q36 What is the rateable value of the site? £ _____

Q37 What do you believe to be the greatest challenge in next 2-5 years? *(Please select all the options that apply)*

- | | |
|---|--|
| <input type="checkbox"/> Regulatory compliance | <input type="checkbox"/> Fuel for 'Energy from biomass' facilities |
| <input type="checkbox"/> Gate fees | <input type="checkbox"/> Other – please specify _____ |
| <input type="checkbox"/> Markets / outlets for products | |

Q38 Could you tell me why that is?

Regulatory compliance:	
Gate fees:	
Markets / outlets for products:	
Fuel for 'Energy from biomass' facilities:	
Other:	

Q39 What do you believe to be the greatest opportunities?

Business Behaviour Questions (Telephone interviews only)

Q1 To what extent do you use market intelligence to make changes in your business strategy?

Q1a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q1b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q1c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Q2 To what extent have you used information, for example on your monthly costs and sales, to make strategic business decisions?

Q2a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q2b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q2c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Q3 To what extent have you implemented systems to monitor and improve the management and/or strategic direction of your business?

Q3a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q3b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q3c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Q4 To what extent do you seek out and sell to people who are willing to pay a higher price, even if that means changing your own systems and processes to meet their needs?

Q4a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q4b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q4c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
 - I do a lot of what I can in this area
 - I do some of what I can in this area
 - I do a little of what I can in this area
 - I do the minimum in this area
-

Thank you very much. That is the end of the survey.

WRAP is just about to undertake some work to further understand the current market conditions for the organics recycling sector and is very keen to get the perspective of operators. The work will help to inform WRAPs work towards increasing the amount of organic waste recycled through composting.

Would you be willing to be contacted in the next few weeks to provide you with more information about this work? You can then decide whether you would like to take part.

- Yes
 - No
-

UK Organics Recycling Industry Annual Survey 2009

Permitted Thermophilic Anaerobic Digestion Site

Contact Details

Name		Telephone	
E-mail		Title	
Company Name		Company Postcode	
Site Name		Site Postcode	

Location of the Site

Q1 First of all, is the site.....? *(Please select one option only)*

- A stand alone facility *(Please go to Q1a)*
 Co-located at a site with another activity *(Please go to Q1b)*

Q1a If stand alone, is it...? *(Please select one option only)*

- On a farm *(Please go to Q2)* Off-farm *(Please go to Q2)*

Q1b If Co-located with another operation, is it located with a...? *(Please select one option only)*

- Farm Community enterprise
 A composting facility Food or drinks manufacture / processing
 Other waste management facility Other - Please specify
 Sewage treatment works _____

Q2 Does the facility receive wastes...? *(Please select one option only)*

- Only from the site at which it is located or within the same business (or business group) *(Please go to Q3)*
 From the site at which it is located or within the same business (or business group) **plus** other sources *(Please go to Q2a)*
 Solely from external sources *(Please go to Q2a)*

Q2a If the site does receive wastes from external sources, is this...? *(Please select one option only)*

- From a single provider From multiple providers

Q3 What is temperature the material is heated to? (WRITE IN NUMBERS)

--

Type of Facility

Q4 Could you briefly describe the system used for me? e.g. Number of vessels; External or autogenic heating

Q5 Who are the system supplier(s)? Please provide the manufacturer's name(s) if possible and also the technology provided

Q6 What is the typical residence time (In-vessel) in terms of days? (Write in numbers, e.g. "5" or "6 to 10")

Q7 Pre-processing of feedstocks

Screening

Shredding

De-packaging

Hand picking

Pulping (e.g. screw or hydropulper)

Blending / mixing

Other (Please specify below)

Feedstocks

Q8 What was the maximum permitted capacity of this site in 2009 ?

_____ tonnes per annum

Q9 What was the quantity of wastes treated in 2009? _____ tonnes per annum

Outputs

Q10 What is Quantity of whole digestate produced? _____ tonnes or m³

Q11 What proportion of the products produced contain some food waste? _____%

Q12 Is the whole digestate post-processed? Yes (Please go to Q12a) No (PLEASE GO TO NEXT SECTION)

Q12a If YES, how?

Screened to remove contaminants

Aerobic treatment (composting) = maturation

Separated into fibre & liquor

Pelletised

Combustion

Reverse osmosis

Other (Please specify below)

Q13 How was the digestate separated into fibre and liquor?

- Centrifuged
- Press
- Other (Please specify below)

Q14 What is Quantity of separated fibre? _____ tonnes or m³

Q15 What about the Quantity of separated liquor (m3)? _____ m³

Q16 Is the liquor de-nitrified? Yes No

Use of Products - Digestate

Q17 Where was the whole digestate applied? (WRITE IN NUMBERS)

- Agriculture _____ %
- Forestry _____ %
- Soil/field-grown horticulture _____ %
- Land restoration _____ %
- Other (Please specify below) _____ %

Q18 If used in agriculture, what was the main agricultural crop? (WRITE IN NUMBERS)

- Cereals / combinable crops _____ %
- Other arable e.g. oil seed rape, peas, beans _____ %
- Potatoes _____ %
- Vegetables _____ %
- Orchard fruit _____ %
- Soft fruit _____ %
- Plants & flowers _____ %
- Glasshouse protected crops _____ %
- Grass land _____ %
- Biomass _____ %
- Other (Please specify below) _____ %

Q19 How was the whole digestate distributed? (WRITE IN NUMBERS)

Used on own land _____ %
Sold directly _____ %
Sold to third-party _____ %
Distributed free of charge _____ %
Only charged for distribution _____ %
Other (Please specify below) _____ %

Q20 IF SOLD, how much was charged for the whole digestate (ex works)? This may be a range.

£ _____ per tonne Only charging for delivery
 £ _____ per m3 Other e.g. spreading

Use of Products - Fibre

Q21 If made, how was the separated fibre applied?

Agriculture _____ %
Forestry _____ %
Soil/field-grown horticulture _____ %
Land restoration _____ %
Other (Please specify below) _____ %

Q22 If the separated fibre was used in agriculture, what was the main agricultural crop?

Cereals / combinable crops _____ %
Other arable e.g. oil seed rape, peas, beans _____ %
Potatoes _____ %
Vegetables _____ %
Orchard fruit _____ %
Soft fruit _____ %
Plants & flowers _____ %
Glasshouse protected crops _____ %
Grass land _____ %
Biomass _____ %
Other (Please specify below) _____ %

Q23 How was the separated fibre distributed? (WRITE IN NUMBERS)

Used on own land _____ %
Sold directly _____ %
Sold to third-party _____ %
Distributed free of charge _____ %
Only charged for distribution _____ %
Other (Please specify below) _____ %

Q24 IF SOLD, how much was charged for the separated fibre (ex works)? This may be a range.

- £ _____ per tonne Only charging for delivery
 £ _____ per m3 Other e.g. spreading

Use of Products - Liquor

Q25 If made, where was the separated liquor applied?

Agriculture _____ %
Forestry _____ %
Soil/field-grown horticulture _____ %
Land restoration _____ %
Other (Please specify below) _____ %

Q26 If the separated liquor was applied in agriculture what was the main agricultural crop?

Cereals / combinable crops _____ %
Other arable e.g. oil seed rape, peas, beans _____ %
Potatoes _____ %
Vegetables _____ %
Orchard fruit _____ %
Soft fruit _____ %
Plants & flowers _____ %
Glasshouse protected crops _____ %
Grass land _____ %
Biomass _____ %
Other (Please specify below) _____ %

Q27 How was the separated liquor distributed? (WRITE IN NUMBERS)

Used on own land _____ %
Sold directly _____ %
Sold to third-party _____ %
Distributed free of charge _____ %
Only charged for distribution _____ %
Other (Please specify below) _____ %

Q28 IF SOLD, how much was charged for the separated liquor (ex works)? This may be a range.

- £ _____ per tonne Only charging for delivery
 £ _____ per m3 Other e.g. spreading

Quality

Q29 What quality management controls do you have in place to ensure quality products are produced?

Regulatory & Business Status

Q30 Was the site operating under a waste management license or permit during 2009?

- Yes No

Q31 ABPR approved during 2009? Yes No

Q32 When did the site become operational? (Please write in MM/YYYY) _____/_____/_____

Q33 Turnover at site during 2009? (£) _____

Q34 Numbers of full-time employees during 2009? _____

Q35 Are there any plans to expand or develop this site further?

- Increase capacity
 Develop new site(s)
 Diversify operations at site e.g. include anaerobic stage, biomass
 Other – please specify

Q35a Could you tell me the reasons for that?

Q36 What is the rateable value of the site? (£) _____

Q37 What do you believe to be the greatest challenge in next 2-5 years?

- | | |
|---|--|
| <input type="checkbox"/> Regulatory compliance | <input type="checkbox"/> Fuel for 'Energy from biomass' facilities |
| <input type="checkbox"/> Gate fees | <input type="checkbox"/> Other – please specify below |
| <input type="checkbox"/> Markets / outlets for products | _____ |

Q38 Could you tell me why that is?

Regulatory compliance:	
Gate fees:	
Markets / outlets for products:	
Fuel for 'Energy from biomass' facilities:	
Other:	

Q39 What do you believe to be the greatest opportunities?

Business Behaviour Questions (Telephone interviews only)

Q1 To what extent do you use market intelligence to make changes in your business strategy?

Q1a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q1b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q1c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Q2 To what extent have you used information, for example on your monthly costs and sales, to make strategic business decisions?

Q2a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q2b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q2c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Q3 To what extent have you implemented systems to monitor and improve the management and/or strategic direction of your business?

Q3a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q3b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q3c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
- I do a lot of what I can in this area
- I do some of what I can in this area
- I do a little of what I can in this area
- I do the minimum in this area

Q4 To what extent do you seek out and sell to people who are willing to pay a higher price, even if that means changing your own systems and processes to meet their needs?

Q4a Interviewer to code one of the following

- Verified** - if the respondent can provide a current, relevant example
- Questionable** - if respondent provides an obscure example (these data will be sensed checked by a senior member of the research team)
- Not verified** - if the respondent cannot provide an example of the behaviour or the example that they provide does not indicate the behaviour in question
- Verified** - if the respondent can provide a current, relevant example

Q4b Now thinking about this behaviour area, which statement best describes the frequency with which you undertake behaviour in this area:

- I do this behaviour every time there is the opportunity to
- I do this behaviour sometimes
- I do this behaviour rarely

Q4c Which statement best describes the extent to which you undertake this behaviour on each occasion:

- I do all I reasonably can in this area
 - I do a lot of what I can in this area
 - I do some of what I can in this area
 - I do a little of what I can in this area
 - I do the minimum in this area
-

Thank you very much. That is the end of the survey.

WRAP is just about to undertake some work to further understand the current market conditions for the organics recycling sector and is very keen to get the perspective of operators. The work will help to inform WRAP's work towards increasing the amount of organic waste recycled through composting.

Would you be willing to be contacted in the next few weeks to provide you with more information about this work? You can then decide whether you would like to take part.

- Yes
 - No
-

UK Organics Recycling Industry Annual Survey 2009

MBT Site

Contact Details

Name		Telephone	
E-mail		Title	
Company Name		Company Postcode	
Site Name		Site Postcode	

Location of the Site

Q1 First of all, is the site.....? *(Please select one option only)*

- A stand alone facility
- Co-located at a site with another activity (Please specify below)

Type of Facility Used

Q2 Could you specify the type of system the site is using at the moment? *(Please select one option only)*

- Aerobic bio-drying
- Aerobic IVC
- Anaerobic digestion
- Other (Please specify below)

Q3 Who are the system supplier(s)? Please provide the manufacturer's name(s) if possible

--

Q4 Is physical processing (e.g. screening) carried out before or after biological treatment? *(Please select one option only)*

- Before
- After
- Both

Feedstocks

Q5 What was the maximum permitted capacity of this site in 2009? _____ tonnes per annum

Q6 What was the quantity of wastes treated in 2009? _____ tonnes per annum

Output of Compost

Q7 What outputs were created? (Please write in % of total compost produced by mass or tonnes or m³)

		Please indicate the unit		
		%	Tonnes	m ³
CLO	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RDF	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biogas	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify below	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7a If CLO was created, what outlets were the CLOs used?

7b If CLO was created, did they generate a revenue or did they entail a cost?

- Revenue
 Cost

Q8 If CLO was created, how about the end use of CLO? (Please write in % of total compost produced by mass or tonnes or m³)

		Please indicate the unit		
		%	Tonnes	m ³
Spread to land - restoration / remediation	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spread to land - landfill cap / restoration	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disposal to landfill	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disposal to incineration	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exported	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify below	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Regulatory & Business Status

Q9 When did the site become operational? (Please write in MM/YYYY) ____/____

Q10 What was the turnover at site during 2009? £ _____

Q11 How many full-time employees were working at site during 2009? _____

Q12 Are there any plans to expand or develop this site further? *(Please select all the options that apply)*

- Increase capacity
- Develop new site(s)
- Diversify operations at site e.g. include anaerobic stage, biomass
- Other – please specify below

Q13 What is the rateable value of the site? £ _____

Q14 What do you believe to be the greatest challenge in next 2-5 years? *(Please select all the options that apply)*

- Regulatory compliance
- Gate fees
- Markets / outlets for products
- Fuel for 'Energy from biomass' facilities
- Other – please specify below

Q15 Could you tell me why that is?

Regulatory compliance:	
Gate fees:	
Markets / outlets for products:	
Fuel for 'Energy from biomass' facilities:	
Other:	

Q16 What do you believe to be the greatest opportunities?

--

Thank you very much. That is the end of the survey.

UK Organics Recycling Survey 2009 – Registered Exempt Composting Sites

Contact Details

Name:	Telephone:
E-mail:	Title:
Company Name:	Company Postcode:
Site Location:	

Location of the Site

Q1 First of all, is the site.....? *(Please select one option only)*

- A stand alone facility *(Please go to Q1a)*
 Co-located at a site with another activity *(Please go to Q1b)*

Q1a If stand alone, is it...? *(Please select one option only)*

- On a farm *(Please go to Q2)* Off-farm *(Please go to Q2)*

Q1b If co-located with another operation, is it located with a...? *(Please select one option only)*

- Farm Community enterprise
 An AD facility Food or drinks manufacturer / processing
 Other waste management facility Other - Please specify below
 Sewage treatment works

Q2 In 2009 did the facility receive wastes? *(Please select one option only)*

- Produced on site *(Please go to Q3)*
 Produced on site plus other external sources *(Please go to Q2a)*
 Solely from external sources *(Please go to Q2a)*

Q2a If the site does receive wastes from external sources, is this...? *(Please select one option only)*

- From a single provider From several different providers

Type of Composting System Used

Q3 Could you tell me the type of composting system the site was using in 2009? *(Please select all the options that apply)*

- Windrow open In-Vessel Composting - Totally enclosed
 Windrow under cover IVC - with some activities in open (e.g. maturation)
 Continuous block composting (Table composting) Other – please specify below
 Aerated static pile

Feedstocks

Q4 How much waste went into the composting operation on this site in 2009?

_____ tonnes

Q5 Please give an approximate breakdown of where the organic waste inputs came from, in 2009? (Please write in EITHER tonnes, OR % of the total AND ALSO indicate if they were generated on site)

	Please give EITHER...		Generated on site
	Tonnes	OR %	✓
Municipal waste inputs (i.e. household waste and any other waste collected by or on behalf of local authorities)			
Garden waste from civic amenity/bring sites			<input type="checkbox"/>
Garden waste only from kerbside collection			<input type="checkbox"/>
Garden and food waste from kerbside collection			<input type="checkbox"/>
Food waste only from kerbside collection			<input type="checkbox"/>
Council parks / gardens waste and garden waste from educational institutes			<input type="checkbox"/>
Council-collected food waste from retailers / catering establishments			<input type="checkbox"/>
Other municipal waste – please specify below			<input type="checkbox"/>
Non-municipal waste inputs (i.e. commercial / trade / industrial wastes not collected by or on behalf of local authorities)			
Landscape / grounds maintenance			<input type="checkbox"/>
Forestry / timber / bark / by-products			<input type="checkbox"/>
Food waste from retailers / catering establishments			<input type="checkbox"/>
Food waste from other commercial establishments			<input type="checkbox"/>
Food waste from industrial establishments			<input type="checkbox"/>
Other non municipal waste – please specify below			<input type="checkbox"/>

Outputs of Compost Products

Q6 What was the quantity of compost produced at this site in 2009?
(Please write in EITHER on a weight (tonnes) OR volumetric (m³) basis)

_____ tonnes OR _____ m³

Q7 What proportion (%) of the compost products produced contained some food waste?

_____ %

Q8 What is the principal grade of compost produced, e.g. 0 - 40 mm? (Please select one option only)

0-10mm

0-40mm

0-20mm

None of these – please specify the mm range below

Q9 How much of the Principal Grade was produced?
 (Please write in EITHER on a weight [tonnes] OR volumetric [m³] basis)

_____ tonnes OR _____ m³

Product Type and Destination of Compost

Q10 What types of compost products were produced from your site in 2009?
 (Please write in EITHER % of total compost produced by mass, OR tonnes, OR m³)

	Please write in				
	%	OR	Tonnes	OR	m ³
Soil conditioner					
Mulch					
Top soil / subsoil manufacture					
Growing medium constituent (before blending)					
Turf (top) dressing					
Biomass					
Landfill cover					
Other – please specify below					

Q11 Which products were made from feedstocks which included food waste? (Please select all the options that apply)

- | | |
|---|--|
| <input type="checkbox"/> Soil conditioner | <input type="checkbox"/> Turf (top) dressing |
| <input type="checkbox"/> Mulch | <input type="checkbox"/> Biomass |
| <input type="checkbox"/> Top soil / subsoil manufacture | <input type="checkbox"/> Landfill cover |
| <input type="checkbox"/> Growing medium constituent (before blending) | <input type="checkbox"/> Other |

Q12 Where was the compost used? (Please write in % of total compost produced by mass, OR tonnes, OR m³)

	Please write in				
	%	OR	Tonnes	OR	m ³
Agriculture					
Horticulture professional					
Horticulture amateur					
Landscaping					
Sports turf					
Land restoration / daily cover					
Biomass					
Forestry					
Other – please specify					

Q13 In 2009 which of these sectors accepted food waste-derived compost from your site? *(Please select all the options that apply)*

- | | |
|--|---|
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Land restoration / daily cover |
| <input type="checkbox"/> Horticulture professional | <input type="checkbox"/> Biomass |
| <input type="checkbox"/> Horticulture amateur | <input type="checkbox"/> Forestry |
| <input type="checkbox"/> Landscaping | <input type="checkbox"/> Other |
| <input type="checkbox"/> Sports turf | |

Q14 If the compost was used in agriculture / horticulture, what were the agricultural crops?
(Please write in EITHER % of total compost produced by mass OR tonnes OR m³)

	Please write in				
	%	OR	Tonnes	OR	m ³
Cereals / combinable crops					
Other arable e.g. oil seed rape, peas, beans					
Potatoes					
Vegetables					
Orchard fruit					
Soft fruit					
Plants & flowers					
Glasshouse protected crops					
Grass land					
Biomass					
Other – please specify below					

Q15 In 2009 which of these sectors accepted any compost derived from food wastes from your site? *(Please select all the options that apply)*

- | | |
|---|---|
| <input type="checkbox"/> Cereals / combinable crops | <input type="checkbox"/> Soft fruit |
| <input type="checkbox"/> Other arable e.g. oil seed rape, peas, beans | <input type="checkbox"/> Plants & flowers |
| <input type="checkbox"/> Potatoes | <input type="checkbox"/> Glasshouse protected crops |
| <input type="checkbox"/> Vegetables | <input type="checkbox"/> Grass land |
| <input type="checkbox"/> Orchard fruit | <input type="checkbox"/> Other |

Q16 How was the compost distributed?

(Please write in EITHER % of total compost produced by mass OR tonnes OR m³)

	Please write in		
	%	OR	Tonnes OR m ³
Used on own land			
Sold directly to the end-user			
Sold to a third-party			
Distributed Free of Charge			
Only charged for distribution			
Other – please specify below			

Q17 Which compost market sectors do you believe offers the greatest potential for growth? (Please select all the options that apply)

- | | |
|--|---|
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Land restoration / daily cover |
| <input type="checkbox"/> Horticulture professional | <input type="checkbox"/> Biomass |
| <input type="checkbox"/> Horticulture amateur | <input type="checkbox"/> Forestry |
| <input type="checkbox"/> Landscaping | <input type="checkbox"/> Other |
| <input type="checkbox"/> Sports turf | |

Basic Information about the Site

Q18 When did the site become operational? (Please write in MM/YYYY) _____

Q19 What was your business turnover at the site during 2009, from composting activities?
£ _____

Q20 How many full-time-equivalent employees were working on composting there during 2009?

Q21 Do you plan to apply for a licence/permit for the site?
 Yes (Which year? _____) No (Please go to Q10)

Q22 Are there any plans to expand or develop this site any further? (Please select all the options that apply)

Increase capacity

Develop new site(s)

Diversify operations at site e.g. include anaerobic stage, biomass

Other – please specify

Q22a Could you specify the reasons for that?

Q23 What do you believe to be the greatest challenge for your composting activities, in next 2-5 years?

Q24 And what do you believe to be the greatest opportunities for composting?

Thank you very much. That is the end of the survey.

Appendix B

Supplementary tables

Note: Since the scope of this report covers the whole range of composting, AD, TAD and MBT processes, the tables in this appendix include a range of mixed waste inputs that are not acceptable under the PAS 100 or PAS 110 specifications.

Table B1: Breakdown of the quantities of wastes processed in 2009 at permitted composting, AD, TAD and MBT plants according to EWC code derived from operator waste returns

Municipal waste chapter category	EWC Codes	Breakdown of waste sources treated by different treatment options (tonnes)				Total quantity of wastes treated (tonnes)	Proportion of municipal waste treated	Proportion of total quantity of controlled waste treated
		Composting	AD	TAD	MBT			
20 02 Garden and park wastes (including cemetery waste)	20 02 01 – biodegradable waste	2,522,296	400	2,346	141,725	2,666,767	66.1%	53.2%
Other 20 02	20 02 02 – soil and stones	38,733	0	0	0	38,733	1.0%	0.8%
	20 02 03 - other non-biodegradable wastes	1,708	0	0	0	1,708	0.0%	0.0%
20 01 Separately collected wood	20 01 38 – wood other than 20 01 37 (Not containing dangerous substances)	113,072	182	0	0	113,254	2.8%	2.3%
20 01 Separately collected food waste	20 01 08 – biodegradable kitchen and canteen waste	546,969	14,120	0	3,580	564,670	14.0%	11.3%
20 01 Separately collected oil & fat	20 01 25 – edible oil and fat	1	1,301	0	0	1,302	0.0%	0.0%
	20 01 26* - oil and fat other than those mentioned in 20 01 25	3	0	0	0	3	0.0%	0.0%
20 01 Separately collected paper & cardboard	20 01 01 – paper and cardboard	4,350	69	0	0	4,419	0.1%	0.1%
20 01 Other municipal waste separately collected	20 01 02 – glass	5,850	0	0	0	5,850	0.1%	0.1%
	20 01 41 – wastes from chimney sweeping	27	0	0	0	27	0.0%	0.0%
	20 01 99 – other fractions not otherwise specified	4,497	0	0	0	4,497	0.1%	0.1%
20 03 Other municipal wastes	20 03 02 – waste from markets	11	2,759	0	323	3,094	0.1%	0.1%
	20 03 03 – street-cleaning residues	46,001		0	3,458	49,459	1.2%	1.0%
	20 03 04 – septic tank sludge	12		0	57	69	0.0%	0.0%
	20 03 06 – waste from sewage cleaning	0		0		0	0.0%	0.0%
20 03 Mixed municipal wastes	20 03 01 – mixed municipal waste	67,866	6,353	0	141,099	215,317	5.3%	4.3%
20 03 Other municipal wastes	20 03 07 – bulky waste	250,088	167	0	113,337	363,592	9.0%	7.2%
20 03 Other municipal wastes	20 03 99 – municipal wastes not otherwise specified N/A	879		0		879	0.0%	0.0%
Total municipal waste	Total of all Chapter 20 codes	3,602,364	25,351	2,346	403,580	4,033,641	100.0%	80.4%

Non-municipal waste chapter category	EWC Codes	Breakdown of waste sources treated by different treatment options (tonnes)				Total quantity of wastes treated (tonnes)	Proportion of non-municipal waste treated	Proportion of total quantity of controlled waste treated
		Composting	AD	TAD	MBT			
01 mine and quarry wastes	All entries under this chapter heading	21,423	0	0	0	21,423	2.2%	0.4%
02 wastes from agricultural, horticultural, hunting, fishing and aquacultural primary production, food preparation and processing	All entries under this chapter heading	449,785	9,213	13,027	0	472,025	48.0%	9.4%
03 wastes from wood processing and the production of paper, cardboard, pulp, panels and furniture	All entries under this chapter heading	22,127	0	29	0	22,156	2.3%	0.4%
04 wastes from the leather, fur and textile industries	All entries under this chapter heading	1,297	0	0	0	1,297	0.1%	0.0%
06 wastes from inorganic chemical processes	All entries under this chapter heading	4,213	0	0	0	4,213	0.4%	0.1%
07 wastes from organic chemical processes	All entries under this chapter heading	5,034	0	0	0	5,034	0.5%	0.1%
08 wastes from the manufacture, formulation, supply & use of coatings (paints, varnishes & vitreous enamels), adhesives, sealants and printing inks	All entries under this chapter heading	2,522	0	0	0	2,522	0.3%	0.1%
10 wastes from thermal processes	10 01 21 - sludges from on-site effluent treatment other than those mentioned in 10 01 20	3,190	0	0	0	3,190	0.3%	0.1%
11 wastes from chemical surface treatment and coating of metals and other materials	11 01 10 - sludges and filter cakes other than those mentioned in 11 01 09	534	0	0	0		0.0%	0.0%
12 wastes from shaping and surface treatment of metals and plastics	All entries under this chapter heading	17	0	0	0	17	0.0%	0.0%
13 oil wastes (except edible oils, 05 and 12)	All entries under this chapter heading	0	0	0	0	0	0.0%	0.0%
15 waste packaging; absorbents, wiping cloths, filter materials and protective clothing n.o.s.	All entries under this chapter heading	11,299	0	4	0	11,303	1.1%	0.2%
16 wastes not otherwise specified in the list	All entries under this chapter heading	4,846	0	1,300	0	6,146	0.6%	0.1%
17 construction and demolition wastes (including road construction)	All entries under this chapter heading	228,711	0	0	0	228,711	23.2%	4.6%
19 wastes from waste treatment facilities, offsite waste water treatment plants & the water industry	All entries under this chapter heading	160,231	10,546	0	34,431	205,207	20.9%	4.1%
Total non municipal waste	Sum of chapters listed above	915,230	19,759	14,360	34,431	983,779	100.0%	19.6%
TOTAL INPUT WASTE		4,517,594	45,110	16,706	438,010	5,017,420		100.0%

Source: Operator Waste Returns (n= 219, CI =/-2% as census reported statistics)

Table B2: Breakdown of the quantities of EWC Chapter 02 (agricultural, horticultural etc) wastes processed in 2009 at permitted composting, AD, TAD and MBT plants derived from operator waste returns

Chapter category	EWC codes	Breakdown of waste sources treated by different treatment options (tonnes)				Total wastes treated (tonnes)	Proportion of total quantity of Category 02 waste treated
		Composting	AD	TAD	MBT		
02 - wastes from agricultural, horticultural, hunting, fishing and aquacultural primary production, food preparation and processing	02 01 01 - sludges from washing and cleaning	22,907		215		23,122	4.9%
	02 01 02 - animal-tissue waste	2,788				2,788	0.6%
	02 01 03 - plant-tissue waste	189,006		473		189,479	40.1%
	02 01 06 - animal faeces, urine & manure, effluent, collected separately and treated off-site	7,830				7,830	1.7%
	02 01 07 - wastes from forestry	16,910				16,910	3.6%
	02 01 08* - agrochemical waste containing dangerous substances	272				272	0.1%
	02 01 10 - waste metal	29				29	0.0%
	02 01 99 - wastes not otherwise specified	1,394				1,394	0.3%
	02 02 01 - sludges from washing and cleaning	76,587	86			76,673	16.2%
	02 02 02 - animal-tissue waste	8,523	264			8,787	1.9%
	02 02 03 - materials unsuitable for consumption or processing	10,871	2,683	5,937		19,491	4.1%
	02 02 04 - sludges from on-site effluent treatment	13,692		2,700		16,392	3.5%
	02 02 99 - wastes not otherwise specified	17,130				17,130	3.6%
	02 03 01 - sludges from washing, cleaning, peeling, centrifuging and separation	4,261		697		4,958	1.1%
	02 03 03 - wastes from solvent extraction	17				17	0.0%
	02 03 04 - materials unsuitable for consumption or processing	58,940	5,114	2,997		67,051	14.2%
	02 03 05 - sludges from on-site effluent treatment	2,232	18			2,250	0.5%
	02 03 99 - wastes not otherwise specified	327				327	0.1%
	02 04 01 - soil from cleaning and washing beet	208				208	0.0%
	02 04 02 - off-specification calcium carbonate	43				43	0.0%
	02 04 03 - sludges from on-site effluent treatment	435				435	0.1%
	02 04 99 - wastes not otherwise specified	51				51	0.0%
	02 05 01 - materials unsuitable for consumption or processing	972	318	9		1,299	0.3%
	02 05 02 - sludges from on-site effluent treatment	7,229				7,229	1.5%
	02 06 01 - materials unsuitable for consumption or processing	1,342	67			1,410	0.3%
	02 06 03 - sludges from on-site effluent treatment	297				297	0.1%
	02 06 99 - wastes not otherwise specified	7				7	0.0%
	02 07 01 - wastes from washing, cleaning and mechanical reduction of raw materials	3,246				3,246	0.7%
	02 07 02 - wastes from spirits distillation	178				178	0.0%
	02 07 03 - wastes from chemical treatment	37				37	0.0%
	02 07 04 - materials unsuitable for consumption or processing	293	662			955	0.2%
	02 07 05 - sludges from on-site effluent treatment	1,714				1,714	0.4%
02 07 99 - wastes not otherwise specified	16				16	0.0%	
TOTAL		449,785	9,213	13,027	0	472,025	100.0%

Source: Operator Waste Returns (CI = +/-2% as census reported statistics)

Table B3: Breakdown of the quantities of EWC Chapter 17 (construction and demolition) wastes processed in 2009 at permitted composting, AD, TAD and MBT plants derived from operator waste returns

Chapter category	EWC codes	Breakdown of waste sources treated by different treatment options (tonnes)				Total quantity of wastes treated (tonnes)	Proportion of total quantity of Category 17 waste treated
		Composting	AD	TAD	MBT		
17 Construction & demolition wastes	17 01 01 - concrete	699				699	0.3%
	17 01 07 - mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	13,069				13,069	5.5%
	17 02 01 - wood	11,465				11,465	4.8%
	17 02 02 - glass	4,244				4,244	1.8%
	17 03 02 - bituminous mixtures other than those mentioned in 17 03 01	6				6	0.0%
	17 05 04 - soil and stones other than those mentioned in 17 05 03	94,937				94,937	39.7%
	17 05 05* - dredging spoil containing dangerous substances	18				18	0.0%
	17 05 06 - dredging spoil other than those mentioned in 17 05 05	2,136				2,136	0.9%
	17 05 08 - track ballast other than those mentioned in 17 05 07	40				40	0.0%
	17 06 05* - construction materials containing asbestos	8				8	0.0%
	17 08 02 - gypsum-based construction materials other than those mentioned in 17 08 01	14,075				14,075	5.9%
	17 09 04 - mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	98,338				98,338	41.1%
	TOTAL	239,034	0	0	0	239,034	100.0%

Source: Operator Waste Returns (CI = +/-2% as census reported statistics)

Table B4: Breakdown of the quantities of EWC Chapter 19 (waste treatment facilities) wastes processed in 2009 at permitted composting, AD, TAD and MBT plants derived from operator waste returns

Chapter category	EWC codes	Breakdown of waste sources treated by different treatment options (tonnes)				Total quantity of wastes treated (tonnes)	Proportion of total quantity of Category 17 waste treated
		Composting	AD	TAD	MBT		
19 wastes from waste treatment facilities	19 01 12 - bottom ash and slag other than those mentioned in 19 01 11	5				5	0.0%
	19 02 03 - premixed wastes composed only of non-hazardous wastes	3,957				3,957	1.9%
	19 02 06 - sludges from physico/chemical treatment other than those mentioned in 19 02 05	6,281				6,281	3.1%
	19 02 09* - solid combustible wastes containing dangerous substances		163			163	0.1%
	19 02 10 - combustible wastes other than those mentioned in 19 02 08 and 19 02 09	37				37	0.0%
	19 05 01 - non-composted fraction of municipal and similar wastes	19,248			372	19,620	9.6%
	19 05 02 - non-composted fraction of animal and vegetable waste	89				89	0.0%
	19 05 03 - off-specification compost	8,523			2,890	11,412	5.6%
	19 05 99 - wastes not otherwise specified	11,466				11,466	5.6%
	19 06 03 - liquor from anaerobic treatment of municipal waste	23				23	0.0%
	19 06 06 - digestate from anaerobic treatment of animal and vegetable waste		10,383			10,383	5.1%
	19 08 01 - Screenings	11				11	0.0%
	19 08 05 - sludges from treatment of urban waste water	13,983				13,983	6.8%
	19 08 09 - grease and oil mixture from oil/water separation containing edible oil and fats	38				38	0.0%
	19 08 14 - sludges from other treatment of industrial waste water other than those mentioned in 19 08 13	2,901				2,901	1.4%
	19 08 99 - wastes not otherwise specified	563				563	0.3%
	19 09 01 - solid waste from primary filtration and screenings	429				429	0.2%
	19 09 02 - sludges from water clarification	214				214	0.1%
	19 09 04 - spent activated carbon	10				10	0.0%
	19 09 06 - solutions and sludges from regeneration of ion exchangers	5				5	0.0%
	19 09 99 - wastes not otherwise specified	4,580				4,580	2.2%
	19 10 01 - iron and steel waste	344				344	0.2%
	19 10 04 - fluff-light fraction and dust other than those mentioned in 19 10 03	16				16	0.0%
	19 11 06 - sludges from on-site effluent treatment other than those mentioned in 19 11 05	1,221				1,221	0.6%
	19 12 01 - paper and cardboard	176				176	0.1%
	19 12 05 - glass	452				452	0.2%
	19 12 07 - wood other than that mentioned in 19 12 06	37,853				37,853	18.4%
19 12 08 - Textiles	100				100	0.0%	
19 12 09 - minerals (for example sand, stones)	10,612				10,612	5.2%	
19 12 12 - other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	37,092			31,169	68,261	33.3%	
TOTAL		160,231	10,546	0	34,431	205,207	100.0%

Source: Operator Waste Returns (CI = +/-2% as census reported statistic)

**Waste & Resources
Action Programme**

The Old Academy
21 Horse Fair
Banbury, Oxon
OX16 0AH

Tel: 01295 819 900
Fax: 01295 819 911
E-mail: info@wrap.org.uk

Helpline freephone
0808 100 2040

www.wrap.org.uk

