

Signposting for anaerobic digestion

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Photo of a land restoration site treated with digestate (WRAP)

r³ environmental technology ltd have recently completed two important signposting studies for the use of anaerobic digestion outputs for WRAP¹. The first of these is a recently published² study on *Market expectations and requirements for digestate*. The second is an annotated bibliography providing technical evidence to support digestate use in different UK markets. This will be published later in the year. Each of these studies considered a number of categories of digestate, with a particular focus on digestate produced from source-segregated waste:

- Sewage Sludge digestates (bio solids)
- Waste digestates from source segregated inputs -as described in the Quality Protocol for Anaerobic Digestate (Environment Agency, 2010), including food waste
- Waste digestate from mixed (non-source segregated inputs) in particular from MBT processes
- So called “non-waste” derived digestates produced from manures/purpose-grown crops.

Given the large portfolio of existing agricultural use of digestates studies being supported by WRAP and others, the market expectations work surveyed opinions across a range of non-agricultural sectors (see Table 1). The survey was largely based on telephone and e-mail conversations with selected informed stakeholders. Table 1 summarises the key findings of this work. Unsurprisingly fewer of the sectors surveyed are currently open to digestates from mixed waste sources (either biosolids or outputs from MBT) as these are not eligible for prevailing standards (PAS 110) nor for the AD Quality Protocol.

Digestates from source segregated (or conceivably “non-waste”) origins have a broader range of use, and several sectors seem ready to accept them. The best prospects for non-agricultural use of these digestates would appear to be in land restoration (especially for “soft” end uses such as green space or biomass production), soil manufacture (e.g. for top soil substitutes) and field grown horticulture for vegetables. However, there are barriers to use, in particular related to problems *perceived* with the difficulty in handling these materials, their stability and their water content. In some cases these can be resolved by adapting the management of digestates during their use, for example, in how they are combined with other materials. However, these problems are inter-linked, and could

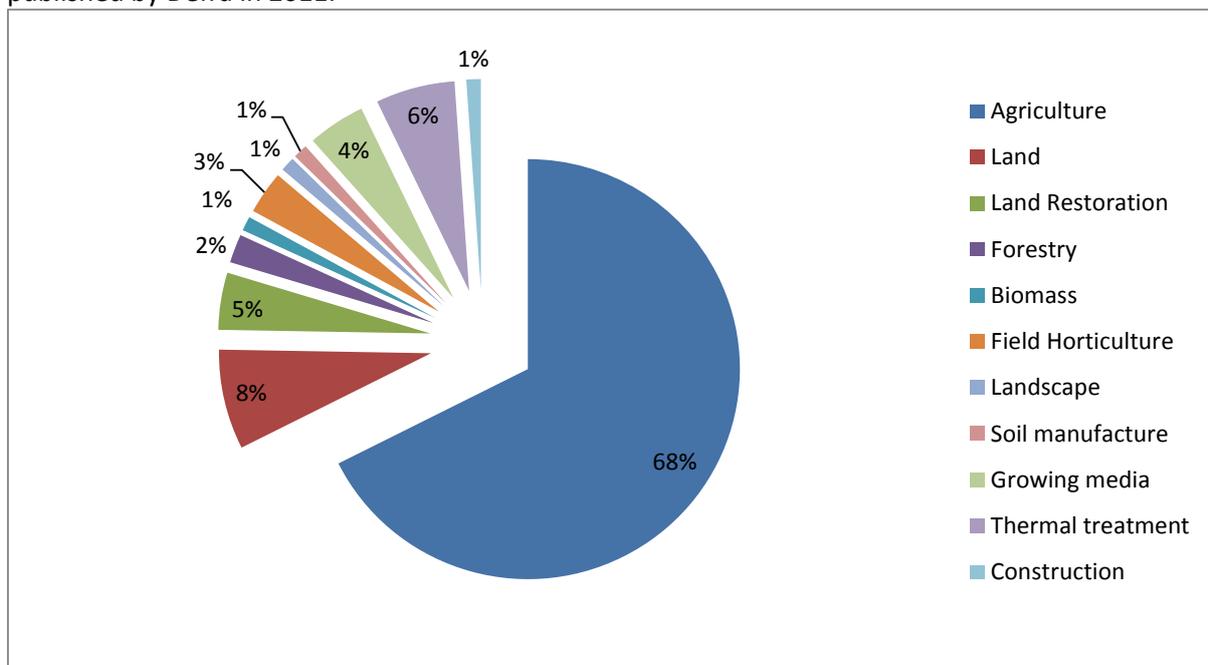
¹ Other contributors to these studies included Ursula Kepp and Alan Whipps and Simon Collett (Pell Frischmann), as well as the many people who took part in the survey work

² www.wrap.org.uk/sites/files/wrap/Market%20expectations%20and%20requirements%20for%20digestate%20report.pdf

potentially be addressed by hybrid processing approaches, such as including a composting “back-end”. Interestingly the sectors more reluctant to use digestates, even from source segregated sources, were often looking for something “a bit more like compost”.

Another recent study for WRAP has investigated “enhancement technologies” to improve the usability of digestates³. This looked at a wide range of technologies and treatment options for a range of digestates. This identified that treatments intended to directly produce fertilisers from digestates were the subject of intensive development across Europe. The market expectations study confirmed the UK market potential for these outputs.

Both the market expectations and bibliography studies found that use of a market sectoral approach in understating opportunities for digestate use by WRAP is highly innovative from a European perspective, where work has tended to focus solely on the movement of digestates or digestate products to agriculture. However, the development of sectoral interests needs to be supported by a strong evidence base, not least since experience is dominated by agricultural use. The bibliography identified over 170 technical resources (published up to October 2012) and provided an outline description for each. These were “mapped” against known research needs to support digestate use published by Defra in 2011.



The pie chart above summarises how well the published information available addresses the needs of a range of possible digestate market sectors, and reveals that this is dominated by information on agricultural use (note the “land” sector refers to bibliography entries where the exact use to land is not well described.) Overall the study found that the amount of research specifically on the use of digestate is currently quite small, and there is very little research for sectors outside agriculture. However, the last two years have seen a steep increase in the number of publications.

The bibliography did not list reports produced by WRAP, and as such its findings validate the importance of WRAP’s current research programme supporting digestate use in the UK. Links to published reports arising from this programme are provided in the bibliography, whilst forthcoming reports are signposted.

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www.wrap.org.uk/sites/files/wrap/Digestates%20from%20Anaerobic%20Digestion%20A%20review%20of%20enhancement%20techniques%20and%20novel%20digestate%20products_0.pdf

Overall the potential and interest for sustainable use of digestates and other products of anaerobic digestion within the UK is high. However, WRAP's work to support this remains work in progress, and these two studies have identified several areas where more effort may be needed. It is also clear that while the UK has much to learn from a number of our EU partner countries, its targeted market orientated approach has much to teach them as well.

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Table 1 Review of respondents to digestates (whole, solid and liquor) for crop end-uses: awareness, attractiveness, ease of use and barriers

Group	Sub-group	Awareness of digestates in sector	Attractiveness of digestates to sector	Ease of use	Existing applications	Possible applications	Barriers
Field grown horticulture	Vegetables	✓✓	✓✓	✓✓✓	Possibly on some vegetables	Soil improver (whole or solid)	xx
	Trees (top fruit nursery stock)	✓	✓	✓✓✓		Soil improver (whole or solid)	x
	Soft fruit	✓	✓	✓		Liquor	xxx
Land restoration	Biomass	✓✓	✓✓✓	✓✓✓	Trial	Soil improver (whole or solid)	x
	Forestry	✓✓	✓✓	✓✓✓	Trial	Soil improver (whole or solid)	x
	Industrial spoil reclamation	✓✓✓	✓✓✓	✓✓✓	Trial	Soil improver (whole or solid)	x
	Urban green space	✓✓	✓	✓✓✓		Soil improver (whole or solid)	x
Forestry	Conventional forests	✓	✓	✓✓		Soil improver (whole or solid)	x
Amenity	Landscape	✓✓	✓	✓✓		Soil improver (whole or solid)	xx
	Grass parks/(roadsides)	✓	✓	✓✓		Liquor	xx
Liquid feed for Sports Turf	Pitches	✓	✓✓	✓✓	Trial	Liquor	x
	Fine turf -golf	✓	✓	✓✓	Trial	Liquor	xx
Soil manufacture	Amenity	✓✓✓	✓✓	✓✓	Trial	Solid	x
	Land restoration						
Container production horticulture	Professional & Amateur	✓✓✓	✓	✓		Constituent of peat free growing media	xx
Dried fertiliser pellets	Various Horticulture	✓	✓✓✓	✓		Dried product	x

Key

Awareness (excluding digestate trial managers)

- ✓ some respondents were not aware of AD outputs.
- ✓✓ Respondents foresaw possible digestate applications in their sector with prompting.
- ✓✓✓ Respondents were aware of products or trials in their sector using digestates.

Attractiveness

- ✓ Some major barriers to or concerns over digestate use foreseen by some respondents.
- ✓✓ Potential applications (after discussion).
- ✓✓✓ Products could readily be used.

Ease of use

- ✓ Niche opportunities, specialist users, pre-treatment of digestate needed.
- ✓✓ Wider opportunities but needing pre-treatment of digestate.
- ✓✓✓ Potential or actual applications no pre-treatment needed.

Barriers

- x Some barriers mentioned.
- xx Many barriers mentioned.
- xxx "Show-stoppers", i.e. no use possible.