



Dŵr Cymru
Welsh Water

Biosolids

A cost effective and sustainable fertiliser, providing a valuable source of nutrients and organic matter.



dwrcymru.com



Hello,

Did you know that Welsh Water is responsible for providing over three million people with a high-quality supply of drinking water and for taking away the waste water that is produced? Here at Welsh Water, we are fully committed to delivering the best quality service at the least possible cost. As part of this service, we recycle biosolids to agricultural land as a sustainable and cost-effective fertiliser. Biosolids is the term used to describe treated sewage sludge.

This booklet contains further information on how biosolids can benefit your farming system. Welsh Water is responsible for finding suitable land, managing the process from initial contact to delivery and keeping records of where you have applied biosolids on your land. We are available throughout the process for advice and ongoing support.

This booklet also outlines the legislation surrounding biosolids recycling and the services that we provide.

If you would like to know more, please get in touch with a member of the team.

Where to find out more:

For further details please contact one of our Agricultural Scientists:
South West Wales — Jenna Thompson: 07387 259022
South East Wales & Hereford — Tom Powell: 07387 258999
North Wales — Shaun Thomas: 07795 445258



biosolidsenquiries@dwrcymru.com
www.dwrcymru.com/biosolids

What are Biosolids?

Biosolids are the final treated product of wastewater treatment processes. Biosolids can be used as a sustainable soil enhancer and offer many benefits over chemical fertilisers. They are a valuable source of organic matter, plant nutrients and trace elements.

How are biosolids produced?

Sludge is turned into biosolids using a number of complex treatments including screening, water removal, lime stabilisation and anaerobic digestion.

Most wastewater is produced via an anaerobic digestion process, which involves fermenting it in heated tanks. This reduces the water content of the sludge and makes it virtually pathogen free. Methane gas produced during the digestion process is captured and used for renewable energy and heat.

As a result of these treatment processes, biosolids are easily transportable, less odorous and almost 100% pathogen free. Biosolids are supplied as a 'cake' that can be spread using a muck spreader.

Safe and easy to use — Biosolids Assurance Scheme

In order to meet the requirements for safety, quality and environmental management, the process has to meet strict audit requirements that have been set out within the Biosolids Assurance Scheme Standard (BAS). The BAS Scheme has been developed to provide reassurance to the food chain stakeholders that the recycling of biosolids to agricultural land is a safe and sustainable practice. Within the BAS, Regulations are supported by Codes of Practice, to ensure that best practice methods are applied throughout the treatment and recycling process.





What are the benefits of biosolids?

- Improves soil quality – biosolids provide a valuable source of organic matter which supports soil fertility, water holding capacity, biological activity and diversity above and below ground.
- A 1% increase in soil organic matter can lead to a 10% increase in soil water holding capacity.
- Improves soil structure – helping to reduce the risk of soil erosion, and can lead to increased crop yields.
- Plant nutrients – biosolids provide additional soil nutrients that aren't always supplied in manufactured fertilisers, including nitrogen, phosphorous, sulphur, magnesium, potassium and other trace elements
- Better value for money than manufactured fertilisers – some nutrients, like phosphate, are finite resources; biosolids provide these without the need for expensive, energy intensive mining processes.
- Environmental benefits – recycling biosolids uses less energy than intensive mineral fertiliser production, providing a sustainable alternative that reduces carbon footprint.



What's in our biosolids?

The nitrogen, phosphate and potassium present in biosolids are less soluble than those in farm yard manure and manufactured fertilisers which means they remain in soil longer and are less prone to leaching. The table below illustrates the nutrients present in our biosolids.

The Nutrient Management Guide (RB209) typical nutrient values of Organic Manures per ton of material

	Dry solids content	Nitrogen (N)		Phosphate (P ₂ O ₅)		Potash (K ₂ O)		Sulphur (SO ₃)		Magnesium (MgO)
		Total	Available	Total	Available	Total	Available	Total	Available	Total
	(%)	(kg/t)		(kg/t)		(kg/t)		(kg/t)		(kg/t)
Enhanced Digested cake	25	11.0	1.7	11.0	5.5	0.6	0.5	8.2	1.6	1.6
Farm Yard Manure	25	6.0	0.6	3.2	1.9	9.4	8.5	2.4	0.4	1.8
Poultry Manure	20	9.4	3.3	8.0	4.8	8.5	7.7	3.0	1.8	2.7
Compost (Green/Food waste)	60	11.0	0.6	4.9	2.5	8.0	6.4	5.1		3.4
Cattle Slurry	6	2.6	0.8	1.2	0.6	2.5	2.3	0.7	0.2	0.6
Digestate (Food based, whole)	4	4.8	2.6	1.1		2.4		0.7		0.2

Source: AHDB RB209 2017 (Where applicable, values are for Summer application). Nutrient values of DCWW Biosolids may differ from figures provided in the table. Your DCWW representative can provide a specific analysis when required.





How do biosolids give better value for money?

- Nitrogen is present in both readily available and slow release forms, providing a consistent supply throughout the crops' growth cycle.
- Phosphate, a finite resource, is provided in biosolids without the need for expensive, energy intensive mining processes. Biosolids can potentially provide the phosphate needs for 2 years of crops, saving money over using manufactured fertilisers.
- Potassium, present in biosolids, is an essential element needed to complement nitrogen if high levels of crop production are to be achieved.
- Sulphur, required for grass growth in similar amounts to phosphorous, is supplied in biosolids.
- Magnesium levels in biosolids can prevent the deficiency symptoms often seen on light sandy acid soils.
- Trace elements are especially important where soil has low organic matter or leached sandy soils where trace elements are depleted. Biosolids provide a valuable source of boron, copper, zinc, iron, sodium, manganese, aluminium and molybdenum.



Where can biosolids be applied?

The Safe Sludge Matrix table below explains how, when and where biosolids are suitable to use. These have been agreed by UK water and wastewater operators, major retailers and regulators to ensure biosolids are used safely and correctly on agricultural land. It also explains the minimum time periods that must elapse between application and harvest. Depending on the treatment process used, our biosolids are classified as either conventional or enhanced. Conventional biosolids must be incorporated into the soil, whereas enhanced may be applied onto the land without ploughing in.

Crop Group	Untreated Sludges	Conventionally Treated Sludges	Enhanced Treated Sludges
Fruit	✗	✗	✓
Salad	✗	✗ (30 months harvest interval applies)	✓
Vegetables	✗	✗ (12 months harvest interval applies)	✓
Horticulture	✗	✗	✓
Combinable & Animal Feed Crops	✗	✓	✓
Grass Grazed & Forage Harvested	✗	✗ (Deep injected or ploughed down only) ✓ (No grazing in season of application)	✓

10 month harvest interval applies (for Fruit, Salad, Vegetables, Horticulture)

3 week no grazing and harvest interval applies (for Grass Grazed & Forage Harvested)

Source: <http://adlib.everysite.co.uk/resources/000/094/727/SSMatrix.pdf>



Biosolids Nutrient Management Matrix

The biosolids Nutrient Management Matrix below determines when and how regularly a field can receive biosolids based on the Phosphorus Index of the soil and applying biosolids at a rate of 250 kg/ha total N which will typically supply 200-400 kg/ha phosphate – P₂O₅ (depending on the type of biosolids being used). Following reviews by ADAS and Bangor University this agreement has been created between Water UK (representing Water and Sewage Operators in England and Wales), the Environment Agency and Rural Payments Agency to provide the 'best' agronomic and environmental balance for recycling all types of biosolids (e.g. digested cake/liquid, thermally dried, lime stabilised, composted) to agricultural land. The Matrix should be used to complement, and not replace, nutrient management planning for both nitrogen and phosphate on farms where biosolids are used, and will be effective for applications from 1 January 2014.

ADAS soil P Index	Maximum potential application of lime stabilised biosolids ^a	Maximum potential application of all other biosolids types
0/1/2	250kg/ha total N in any twelve month period	250kg/ha total N in any twelve month period
3	250 kg/ha total N in any twelve month period – application 1 year in 4 on sandy soils and 1 year in 2 on all other soils	250 kg/ha total N in any twelve month period – application 1 year in 2 on sandy soils ^b
4	250 kg/ha total N in any twelve month period – application 1 year in 5 on sandy soils and 1 year in 3 on all other soils	250 kg/ha total N in any twelve month period – application 1 year in 4 on sandy soils ^c and 1 year in 2 on all other soils
5 and above	No application	No application

^aLime addition rate >5% w/w on a dry solids basis

^bComposted biosolids can be applied annually and ^ccan be applied 1 year in 2

Notes:

- Soil extractable P analysis must be less than 5 years old (0-15cm soil sampling depth on arable land; 0-7.5cm on grassland).
- Soil types based on Cross Compliance soil categories.
- No biosolids applications directly in front of legumes (e.g. peas, beans), except for composted biosolids which is very low in readily available N.
- Septic tank sludge is not included within the scope of the Matrix.

Source: http://www.adas.uk/Downloads/Biosolids_Nutrient_Management_Matrix.pdf



Our services to farmers

We can help you to get set up and ready for using biosolids by:

Soil testing – before spreading every field must be tested. Every five years the land is tested for pH, phosphate, potassium and magnesium. Every 10 years the soil is also tested for cadmium, chromium, copper, mercury, nickel, lead, zinc, fluoride, arsenic, selenium, molybdenum. This ensures fields are suitable for using biosolids.

Guidance on utilising biosolids in your farm system – we will advise on suitability and timings regarding incorporation into cropping and grazing systems to ensure compliance with regulations outlined by our regulators.

Agronomic Advisory Service – Welsh Water has in-house Fertiliser Advisor Certification and Training Scheme (FACTS) qualified advisors and offers free no obligation advice on incorporating biosolids into your farms nutrient management plan. Please contact your local Agricultural Scientist for further information.

Year round availability – our biosolids are available all year round, delivered to farm.

Stockpiling – biosolids can be stockpiled on farm in preparation for when you are ready to spread.

Biosolids can be stockpiled on farm (for a maximum of 12 months) in preparation for when you are ready to spread.

DCWW Biosolids Purpose statement

We will provide a responsible efficient biosolids service while continually improving relationships with all our customers.

By –

- Ensuring a Safe Happy Healthy working environment for our staff and contractors
- Going above and beyond legal regulatory requirements through maintaining 100% biosolids Assurance Scheme (BAS) compliance
- Creating lasting relationships with internal and external customers, to be seen as trustworthy and reliable
- Delivering on customer promises
- Be efficient in what we do, whilst being innovative and future focused
- Change perceptions by promoting biosolids and engaging with all stakeholders

In order to earn the trust of our customers every day.



Biosolids to land process

1

Farmer contacts DCWW Biosolids Team – farm visit arranged.



2

Farm visit to assess suitability of farm for biosolids.



3

Farmer provides maps and indicates which fields need soil sampling.



4

Biosolids team carry out soil sampling and field risk assessment for required fields.



5

Soil results reported to farmer indicating which fields can receive biosolids and application rates, biosolids order placed.



6

Tipping site assessed for suitability by haulage contractor.



7

Biosolids delivered.



8

Regular stockpile inspections to monitor stockpile stability by DCWW until biosolids spread – complete spreading required within 12 months of delivery.



9

Once spreading is complete, DCWW arrange farm visit to record spreading dates and tonnage applied. Future biosolids requirements are also discussed.





Frequently asked questions:

How long can biosolids be stored for?

Biosolids can be stockpiled for a maximum of 12 months.

Are there any restrictions on grazing after spreading biosolids?

Yes, a no graze/no cut period of three weeks must be observed post application.

What distance must be observed between biosolids and water courses?

Biosolids cannot be spread or stored within 10m of a watercourse. Where springs, boreholes or wells are present; stockpiles must not be within 250m and a no spread zone of 50m must be observed.

How often can biosolids be spread?

Biosolids can be applied to a field once in 12 months.

What do we look for in the soil samples?

Soil sampling analysis includes pH, P, K, Mg. We also sample for heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc and fluoride.

Data Protection — Privacy Notice

In order to provide you with our biosolids products and services, we will need to collect and process information relating to you and information relating to your farm property. All information captured will be stored in DCWW systems dedicated to biosolids management. Should your application be successful, we will retain this information for future delivery and soil analysis purposes.

Personal Data that we collect

— Name, Address, Email address, Telephone number and other contact information.

How we use your Personal Data

— To provide you with the services you want and dealing with any queries or complaints you may raise. Occasionally we will send out a biosolids newsletter.

How long we keep your Personal Data

We will keep your Personal Data for as long as you are a customer of DCWW biosolids. After you stop being a customer, we may keep your data for up to 20 years, in order to meet the legal requirements for records retention:

- Records of Soil Samples must be maintained for a minimum period of 20 years (Sludge Regulations).
- Records of element additions to soil must be maintained for a minimum period of 10 years to enable average annual addition rates to be calculate and reviewed.

Sharing your Personal Data

As part of normal operations, we engage third party Contractors to provide us with services, such as the delivery of biosolids to your farm; we need to share your data with them in order to:

- Provide address details of the farm location for the delivery of biosolids

We also share your personal data with other third parties because we are under a Legal, Statutory or other obligatory reason to do so, or because we believe that sharing your personal data will help us to manage your account in the best way possible for you, for example:

- National Resources Wales, or the Environment Agency in England, whom we engage regarding Waste Exemption certificates and the Storage of Waste (S3 Storage of Sludge).
- We provide Local Authorities with Grid References relating to the fields where biosolids are used.

If you have any concerns with how your personal information is processed or your data protection rights, please contact us to discuss [Agricultural Compliance Technician: biosolidsenquiries@dwrcymru.com].

You can also contact DCWW's Data Protection Officer at

DataProtectionOfficer@dwrcymru.com



Biosolids Application to Agricultural Land

Dwr Cymru Welsh Water (DCWW) are certified to the biosolids Assurance Scheme Standard (BAS) and as such are obliged to ensure that application and incorporation of biosolids to agricultural land are undertaken appropriately in order to minimise the risk to health of humans, animals and plants and to protect the environment.

The following regulations must be observed and adhered to when spreading biosolids on agricultural land:

1. Application of biosolids to Agricultural land must be carried out in accordance with the following:
 - a. The Sludge (Use in Agriculture) Regulations
 - b. Biosolids Nutrient Management Matrix
 - c. Safe Sludge Matrix
 - d. Nitrate Vulnerable Zone Regulations
 - e. Code of Good Agricultural Practice Guidelines
 - f. Biosolids Assurance Scheme Standards.
2. Do not exceed the application rate provided in the BAF 009 – Land Suitability and Spreading form issued by the DCWW representative. Biosolids may only be applied to fields that are listed in the BAF 009 form as suitable for spreading.
3. Ensure biosolids are not applied to land that is waterlogged, frozen hard or snow covered.
4. Ensure biosolids will not be applied within:
 - 50 metres of an identified spring, well or borehole used for human consumption or for dairies.
 - 10 metres of a surface water course (or within 6 metres if precision liquid application equipment is used).
 - An Environment Agency or Natural Resources Wales identified Groundwater Source Protection Zone 1.

5. Biosolids must be applied at a suitable distance from domestic, public, recreational and industrial properties so as not to cause odour nuisance.
6. Do not apply on land with a slope greater than 12° if there is a significant risk of nitrogen getting into surface water.
7. Do not apply biosolids within 10m of an environmentally sensitive area such as a Site of Special Scientific Interest, Special Area of Conservation or Scheduled Ancient Monument.
8. Ensure that a competent person, using an appropriate, well maintained spreader applies biosolids to land.
9. Ensure that the person spreading biosolids has read and understood the spreading guidelines.
10. Where applicable, ensure biosolids are incorporated into the soil within 24 hours of application (or as soon as is reasonably practicable thereafter).
11. Where enhanced biosolids are surface applied to grassland, the area must not be grazed or harvest forage crops for three weeks post application.
12. Biosolids must not remain in temporary field storage for a period greater than 12 months.
13. Once spreading of biosolids is completed the BAF 009 Land Suitability and Spreading Form must be completed to show dates and amounts spread and returned to the DCWW representative.

Tried and tested:

"I have used biosolids on my land for many years. I first used the product when I was farming in Lincolnshire, and later in Carmarthenshire. I've now been using the biosolids at Trehenry in Brecon for four years, after meeting with one of the biosolids team from Welsh Water. I think it is a great product, and many of my neighbours have asked what I have been putting on my grass and subsequently started using biosolids themselves. I use Welsh Water as I have confidence that the product that they deliver will comply with all waste regulations."

Martin Thomas,
Trehenry, Brecon

"We have been using biosolids for many years. We have not bought any phosphate fertiliser in the last 9 years; all our field indexes are superb, all down to the biosolids and the relationship with Welsh Water.

This year we applied to a growing crop of winter barley. Our spreaders are totally GPS with weigh cell capability which allows us to record the application as applied. We direct drill all our crops, biosolids are applied onto the stubble following our 24 metre tramlines to avoid compaction, then incorporated while drilling...an easy cost saving process"

Chris Harry Thomas,
Arable farmer and precision farming consultant, Gower Peninsula.





Where to find out more:

For further details please contact one of our Agricultural Scientists:

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