

04: The Circular Economy: Securing UK supply of fertilisers

Anaerobic digestion (AD) has emerged as a strategically important technology during the current energy crisis because it addresses two linked challenges at once: the need for renewable energy and the need for more resilient, home-grown, lower-cost agricultural fertilisers and soil improvers to improve agricultural productivity. While AD is widely recognised for producing biogas that can be used for electricity, heat, or biomethane, its co-product, digestate, plays an equally valuable role as a **bio-fertiliser** – recycling nutrients and replacing the need for imported fossil derived fertilisers and usable alongside compost.

Digestate is produced from the breakdown of food waste, manure, crop residues, and other organic materials in the absence of oxygen. It contains readily available nutrients such as nitrogen, phosphorus, potassium, and organic matter that can be returned to soils. **Compost** produced from garden waste or garden and food waste, and other biodegradable materials contains nutrients and organic matter and benefits soil structure, moisture retention, and biological activity.



At a time when **synthetic fertiliser prices have risen sharply** due to volatile natural gas markets and global supply disruptions, **digestate and compost offer farmers and land managers more circular and locally available alternatives.** By transforming waste into energy and fertiliser or soil improvers, AD and composting reduces dependence on imported fossil fuels and synthetic fertilisers, helping to strengthen food and energy security simultaneously.

In addition to their economic value, **anaerobic digestion** and **composting** contribute to wider environmental and sustainability goals by supporting soil health and reducing net greenhouse gas emissions. The application of digestate and compost can improve soil structure, increase organic matter, boost water retention and microbial activity, which is especially important as farmers face climate-related pressures and rising production costs.

Replacing part of conventional fertiliser use with AD-derived bio-fertilisers or waste-derived compost can also lower the carbon footprint of crop production, since synthetic fertilisers are energy-intensive to manufacture and transport. This helps to decarbonise the agricultural sector, which can be a difficult sector to decarbonise. Furthermore, AD and composting help to divert biodegradable waste from landfill and can reduce methane emissions from unmanaged organic waste streams.



Key components of a **circular bioeconomy**

In the context of the energy crisis, this positions both technologies as key components of a circular bioeconomy in which waste is redefined as a resource, supporting more sustainable food and energy systems. As governments and industries seek integrated solutions to energy insecurity, rising food production costs, and environmental degradation, AD and composting are increasingly seen as vital tools for producing renewable energy and recycling nutrients and organic matter, through the production of sustainable bio-fertilisers and soil improvers.