

Our journey towards
sustainability



Foreword

I worked on Norfolk farms as a boy, and though it is not exactly in my blood, it has become something of a passion over time.

Today, I own 36,000 acres of high yielding, good quality farmland in England across Lincolnshire, Oxfordshire, Gloucestershire and Somerset.

Having bought the land, I am fortunate to have been able to invest £130m into Dyson Farming to improve the soil, lay hedgerows, build dry stone walls, and plant trees to name a few.

We approach farming with the same spirit of entrepreneurialism, problem-solving, and sustainability that underpins our global technology business.

Data analytics, new crop rotations, new cover cropping techniques, advanced drones and vision systems, targeted crop spraying and agritech, and renewable energy production are some of the ways we incorporate technology into our farming systems.

Dyson engineers, as well as Dyson Institute undergraduates, are working increasingly closely with the farming business on exciting new ventures. From innovative weed killing to vertical farming, our 'wrong thinking' approach to problem-solving is being applied in new areas and new products.

James Dyson

We grow strawberries in our glasshouse using heat from our anaerobic digester. But growing in the darkest months of the year requires extra help. We've successfully trialled the use of LED light and soon, will be growing our first winter crop. This will mean we have plants fruiting in the glasshouse almost all year round.

Reimagine

Dyson Farming

Carbon sinks

Dyson Farming benefits from a number of carbon sinks that sequester carbon.

We have over 400km of hedgerows, of which we planted 20km, and 550ha of managed woodland. We also grow crops to enable renewable energy generation through our anaerobic digesters and use cover cropping across our fields, which means we grow secondary crops between seasons to ensure the ground is covered to prevent nutrient depletion.



Farming sustainably using a circular farm system

We operate a 'circular farm system'. This means we look to use all of our resources efficiently to benefit the farm, producing wholesome food while also protecting and enhancing the environment.

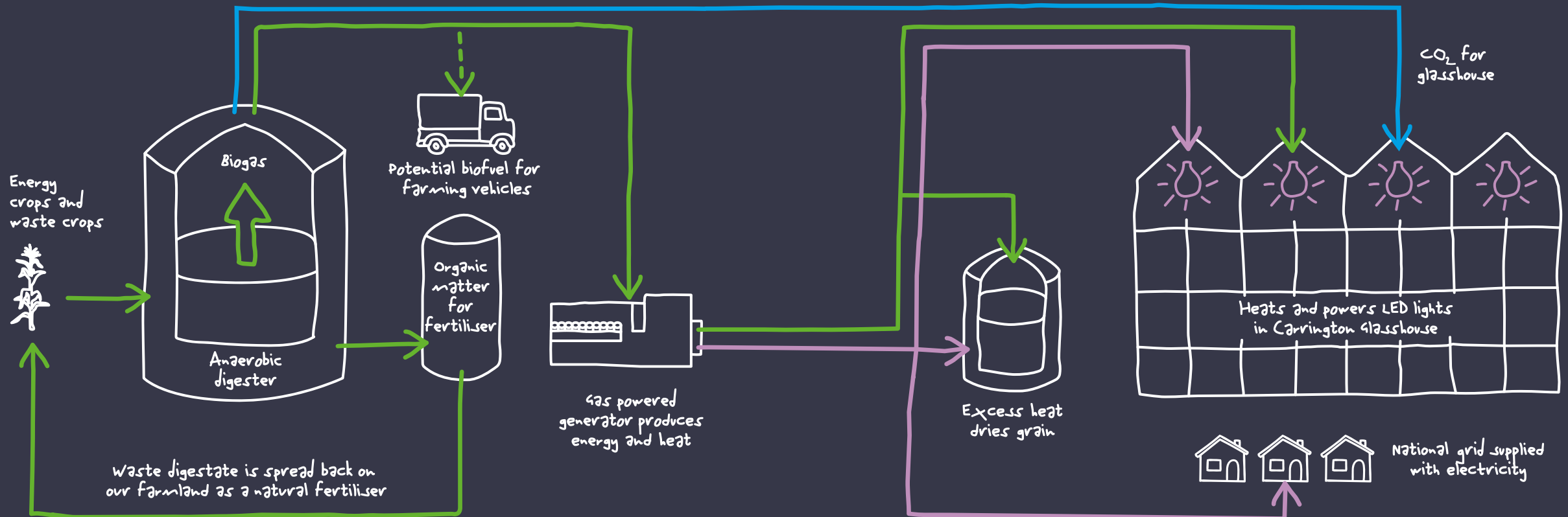
Anaerobic digestion (AD) is the process by which renewable energy is created from biodegradable matter.

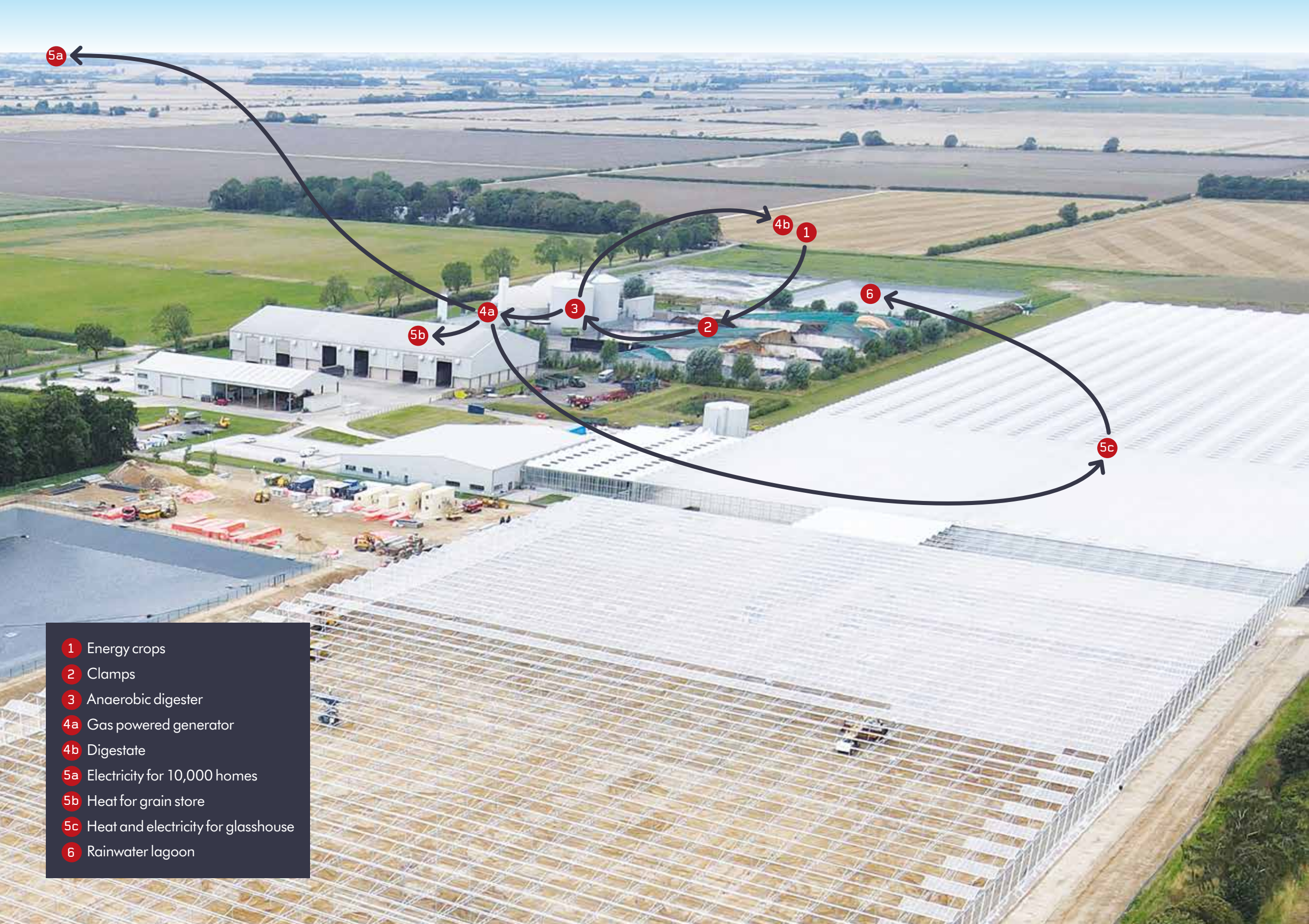
Raw, organic matter is fed into the digester. Once in the digestion chamber or 'stomach' the material is broken down by micro-organisms. The matter is converted into biogas which powers an engine, generating electricity. Our anaerobic digesters produce enough electricity every year to power the equivalent of 10,000 homes.

We will capture our biogas and use the fuel to power our fleet of lorries and other vehicles, further reducing our carbon footprint.

Excess hot air from the process of anaerobic digestion is used to heat our glasshouse – to produce strawberries out of season, and large grain stores – to control moisture levels and therefore maintain food quality and prevent waste.

Excess CO₂, generated by our anaerobic digesters, will also be captured and fed into the six-hectare glasshouse which sits adjacent to the powerplant. CO₂ is a key component needed to grow healthy strawberry plants capable of producing high-quality fruit.





- 1 Energy crops
- 2 Clamps
- 3 Anaerobic digester
- 4a Gas powered generator
- 4b Digestate
- 5a Electricity for 10,000 homes
- 5b Heat for grain store
- 5c Heat and electricity for glasshouse
- 6 Rainwater lagoon

The UK's food security problem

The UK imports around 46% of the total food it consumes each year*. Food security is an increasingly critical factor in food production, reliance on imports can be bad for the environment, with the air miles associated, with it but is also disrupted by geo-political events.

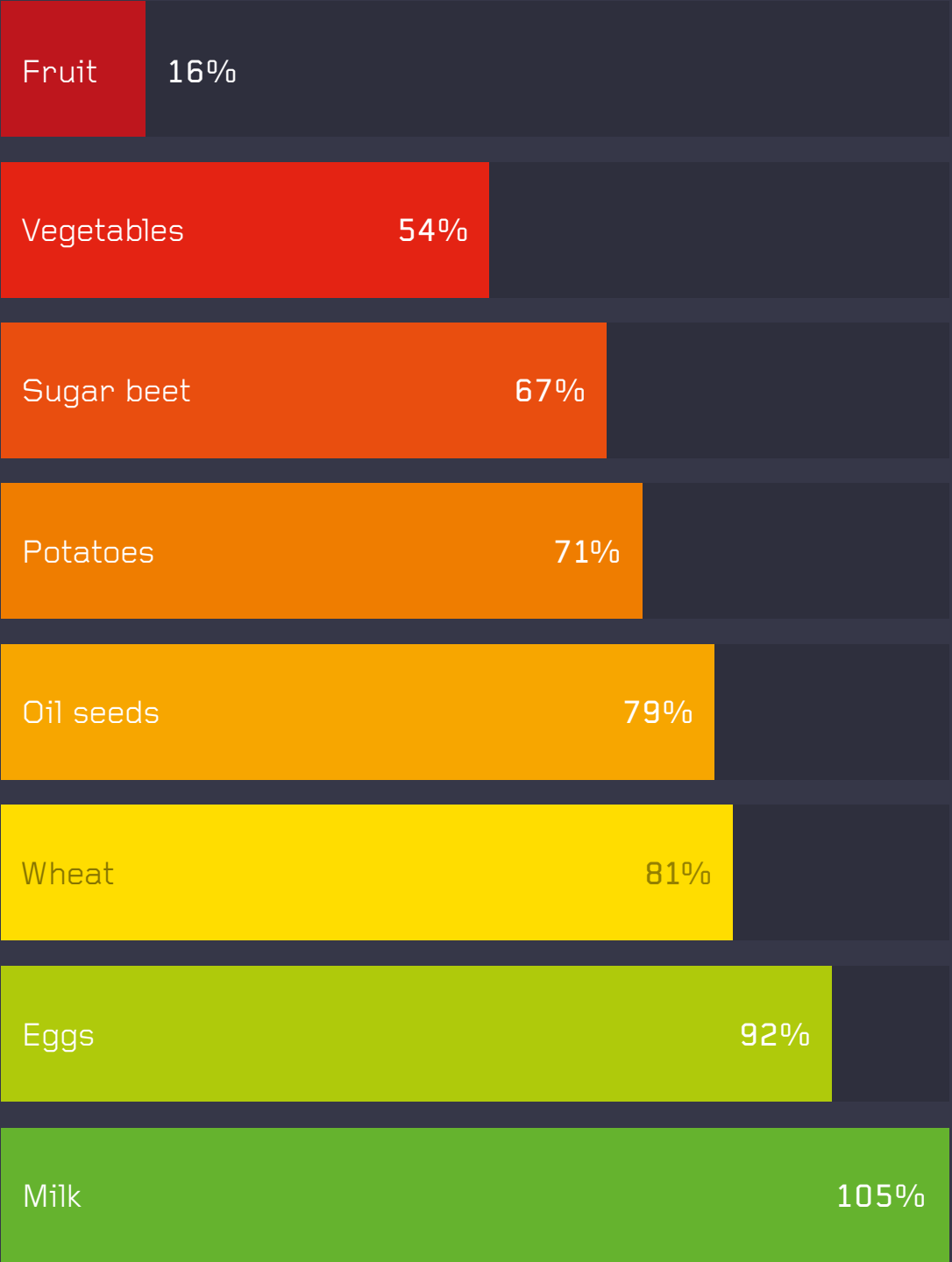
The importance of food security is a key reason why James Dyson invested in the future of British agriculture, and he has called for the UK to become a net exporter of food within a decade. Technology allows us to be improve harvests.

Our strawberries are grown in a glasshouse adjacent to our anaerobic digester, from which we capture the heat to help the plants grow in the colder months. These harvest in Spring, Autumn and Winter and offer consumers a new option when usually all that is on the shelves are strawberries from Spain and North Africa.

In 2022 a team of Dyson engineers developed and implemented a new approach to irrigating the six-hectare glasshouse with CO₂. This is the first of many projects that will see the technology and farming businesses work together in research and development.

About 54% of the food on our plates is produced in the UK*, including the majority of grains, meat, dairy, and eggs. Self-sufficiency is about 54% in fresh vegetables, and 16% in fruit.

Percentages of key foods the UK consumes which are homegrown



We grow high quality British strawberries out of season

We're running trials of robots in the glasshouse which use vision technology to select the best strawberries and place them into punnets. We also use robots to kill mould using UV light and distribute insects to eat aphids. We also have LEDs to enhance daylight over the winter and irrigate the plants through Dyson-designed systems. The work reflects the fact that Dyson is supercharging its robotics ambitions more broadly, recruiting 700 robotics engineers across disciplines including computer vision, machine learning, sensors and mechatronics over five years. The plan: to bring the technology into our homes, and perhaps our fields, by the end of the decade.

Reduced food miles

The 15-acre glasshouse in Carrington, supports the advancement of high-tech, sustainable farming in the UK, reducing food miles that come from imported strawberries outside the usual growing season.

15% more growth

The hanging gutters, which hold the plants, 'swing' from side to side to allow 15% extra crop to be grown in the same area. The glasshouse has 832 rows of strawberries, which produce 750 tonnes of strawberries each year.

Improved taste

Climate and CO₂ levels are accurately controlled for the best growing conditions.

Consistent quality

Precision picked only when perfectly ripe.

Sweet taste

We grow our out-of-season strawberries to a high standard, achieving brix (sweetness) levels of +9%. This is usually typical to just British summer strawberries.

Farm to fork

The site also has a pack house and cold store facilities allowing Dyson Farming to pick, chill, pack and deliver fresh fruit to the end customer as quickly as possible.

Extending the British growing season

The anaerobic digesters produce gas which drives turbines to produce electricity. From this process, heat is captured and used to warm the glasshouse.

Pest control

UV light robots control fungal disease and biological colonies restrict pest infestation.

Natural resources

Rainwater is harvested from the glasshouse roof, stored in a lagoon and used to irrigate the plants as and when needed.





Our collaboration with the Wild Trout Trust and the Environment Agency to re-meander Dunston Beck to improve water quality and reintroduce trout. The land around the restored section of the beck is grazed by sheep.

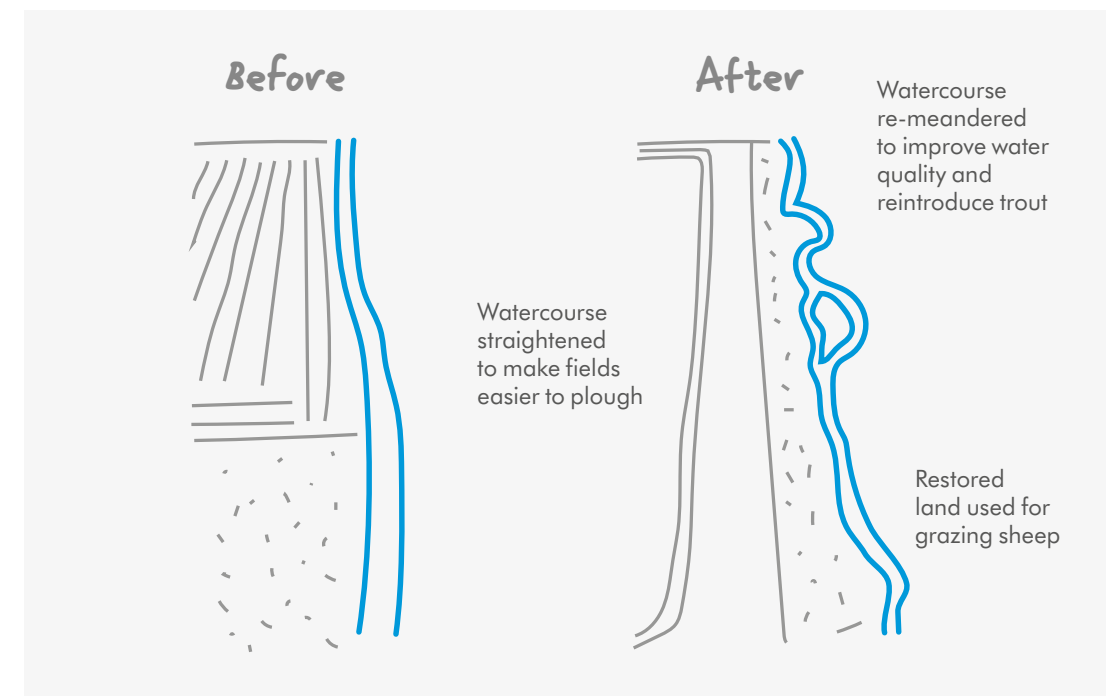
Improving our water resources

We monitor water quality across our land to understand the impact of agricultural activities on surrounding land.

Lincolnshire is famously flat, with nutrient rich soil, which is why it's deemed Grade 1 farmland. One of the first and most important jobs we undertook when we acquired the Lincolnshire farms, was to overhaul the water-logged land. Drainage ditches which were clogged with years of debris were cleared, and the dykes they flow to were restored. We continue to manage the drainage across our land and are part of a wider co-operative of landowners where we each ensure our farmland remains clear and drains free flowing.

The land is also criss-crossed by watercourses many of which had been straightened historically to make fields efficient to plough. However, we've identified a number of watercourses that would benefit wildlife from being restored to a natural state such as the Dunston Beck which has created a better habitat for a growing trout population.

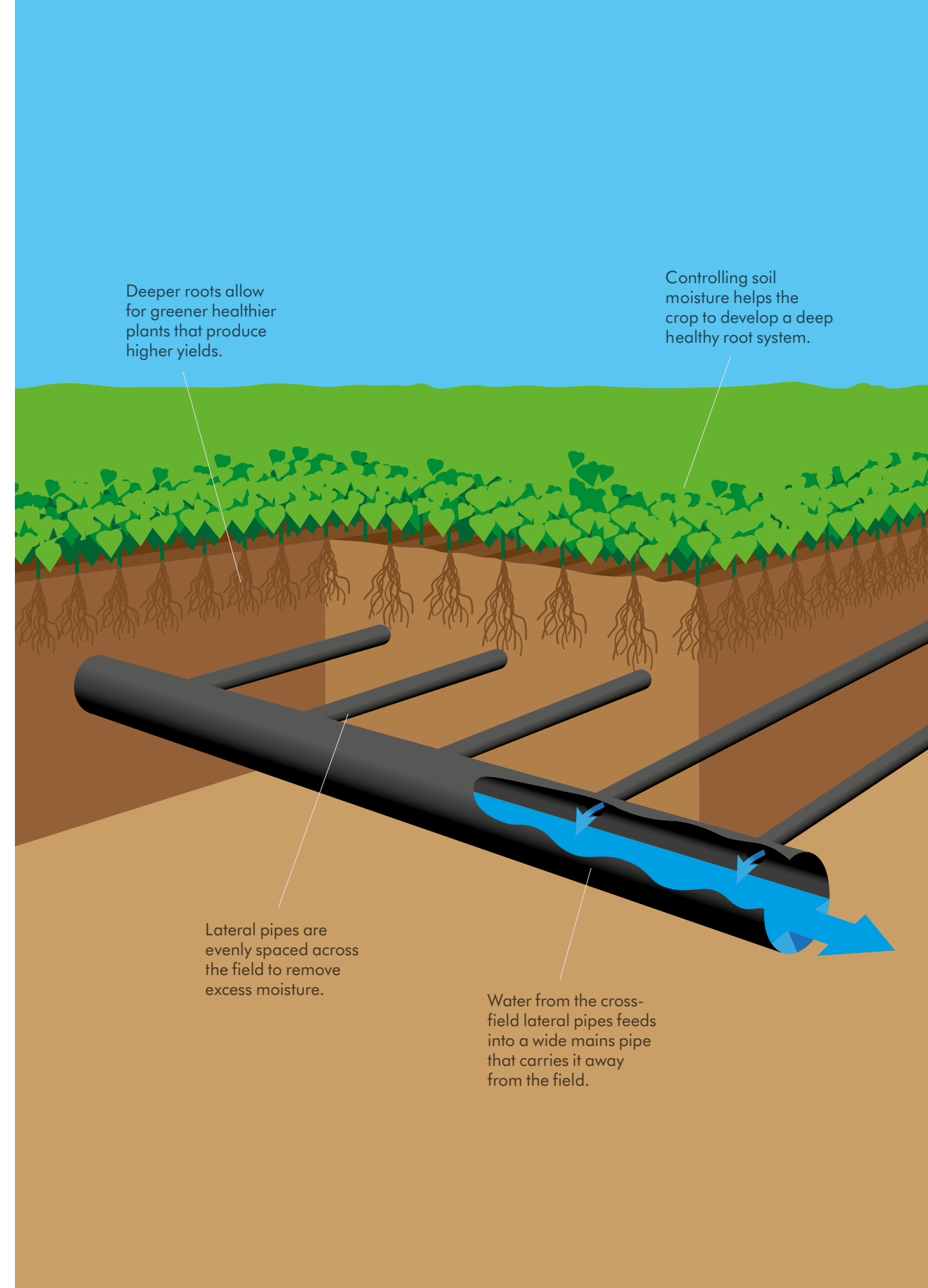
Our land in North Lincolnshire also includes a significant wetland site, covering 100ha. This is a key habitat for breeding waders and so we manage the land to encourage the population to flourish through strategic cattle and sheep grazing throughout the season.



The importance of healthy soil

The care put into how our food is grown and reared is paramount. Everything starts with soil health. Years of over-farming the land meant much of what was acquired by Dyson was lacking in nutrients. Inefficient land drainage leads to lower yields or ruined crops. We have cleared ditches and excavated deep to install new pipes to provide drainage channels across our fields. Working with the land to restore the balance has meant stronger crops with higher yields and healthy livestock.

We continue to trial new combinations and ways to cover crop, which protects and enhances the nutritional quality of the soil. Leaving soil bare means it is over-exposed to sun and rain which strips it of organic and mineral richness.



We are working to reduce, and in some cases eliminate, chemicals and pesticides across the farms. We use cutting-edge robotic vision technology to target spray weeds in fields whether in bare soil or hidden among green crops. This allows us to move away from blanket spraying and cut our chemical consumption.





A composite breed from Hereford, Angus, Simmental and Gelbvieh cattle

First bred in Nebraska US in the 1970s

Known for their high fertility, good feet, docile nature, genal good health and quality beef

80% of our herd are stabiliser cows

We practice 'regenerative farming' which supports soil health through five measures: minimising soil disturbance, keeping the surface covered, keeping living roots in the soil, crop diversity, and livestock integration.

Grazing livestock on arable land at intervals is one of the ways we do this. Manure from livestock and gentle grazing reinvigorates the soil without compromising soil structure.

Precision farming allows us to protect wildlife

We farm using sustainable methods to encourage wildlife and cultivate our environment. Our combine harvesters and other field-based equipment use technology to work the land with accuracy to the nearest mm. We use a combination of GPS and a beacon system, which provide precision accuracy for each row of planting and working. Drones survey the fields from above to assess crop health and maturity, with this data, combine harvesters are programmed to avoid rare ground nesting birds such as the Marsh Harrier. As a result of using this technology, nesting sites are subject to less disturbance and kept intact.



Protecting the land and habitats

Knowing what assets we have in detail, allows us to effectively manage the land and encourage biodiversity. We catalogue all environmental features across our land which has included counting 11,700 trees. Planting new trees, removing invasive species and creating habitats for wildlife, enhances natural regeneration in our woodlands.

Hedgerows and dry stone walling also form a key part of the managed countryside, providing habitats for insects and small mammals – and corridors for them to travel along, hidden from predators. We've repaired and restored over 10km in Gloucestershire, which is famous for dry stone walls. We manage nearly 400km of existing hedgerows plus 20km of new planted hedges. And 17.5km of laid hedges – a way of encouraging thicker growth to contain livestock without the need for fencing.



We built a 230m litre reservoir at Nocton to maintain the balance of secure water across the estate, throughout the year. A specially designed lip around the edge of the reservoir means that water is always available for wildlife. The reservoir is surrounded by 15ha of wildflowers, so it's a haven, too, for pollinating insects like bees and butterflies.

On top of extensive rights of way, an additional 17km of permissive access has been made available to the general public to enjoy the land.



Nurturing biodiversity

We work with other organisations and charities to share best practices and feed data into national networks to build a picture of wildlife numbers and other initiatives across the UK.

Since 2018, we have recorded the numbers of 20 species of rare birds on Dyson Farming land. Through our work to improve the habitats and nesting opportunities for rare birds, we have seen numbers of Red Listed Species including yellow wagtail and corn bunting increase.

111 barn owl boxes have been erected across our land. They are monitored annually, and we saw 74 chicks and eggs in 2021. Barn owls, once in decline across the UK, are flourishing on Dyson farmland. Stable predator numbers are a good indication of the health of local eco-systems.

We are working to develop technology to monitor pollinators in uncontrolled environments – measuring benefits of environmental stewardship features within the landscape.

We have seen the local bat population of Barbastelle and Pipistrelle bats increase since we erected 25 bat boxes, which we monitor annually. However, through our woodland management and rerouting walkers and their dogs away from Nocton Wood, we have found many bats are happy to make their homes in the trees.



Sustainability has been at the heart of Dyson from the very start. We are led by engineers, and their approach – to do ‘more with less’ – has been evident in our products and technology, from the first Dyson vacuum cleaner, the DC01, right through to our latest launches.

But it doesn’t end with what we make. We strive to be sustainable in everything we do – in how we manufacture those products, to the buildings we restore to use for our research and development. We are sustainable in our charitable endeavours, including the James Dyson Award which dedicates an entire category to sustainable innovation. And we are sustainable in how we produce food, using the latest agriculture technology, at Dyson Farming, in harmony with environment.

This is one of four instalments that summarise what we have achieved in sustainability, and where we will go next.

Other instalments:

Rethink: Products and technology

Renew: Buildings and manufacturing

Reshape: Education and medical research