

# A circular approach

“We’ve seen undoubted savings in fertiliser and improvements to soil health that have been huge benefits.”

## On Farm Opinion

**Operating a truly sustainable farming system can only be achieved when all parts of the farm are playing their part towards the end goal, and for one farmer in Cheshire, this circular approach is key. CPM finds out more.**

*By Rob Jones*

**When a new dairy unit was installed at Grosvenor Farms’ Eaton Estate in 2014, it took cow numbers from 1600 up to 2650, and prompted the arable division of the farm to seriously consider how they could best use the 190,000t of manure that was being churned out.**

The 2428ha farm is part of the Duke of Westminster’s estate, and the dairy herd is housed all year round and bedded on sand, which was a key factor when choosing how to process and spread the manure, says Charlie Steer, Grosvenor’s arable manager.

“We had to remove the sand from the manure, so we ended up installing a McLanahan separator to avoid the sand acting like a grinding paste and causing disastrous effects on machinery and potential issues with blocked pipes. In doing so, we could reuse the sand as

bedding in the dairy and then further separate the manure into two types; a fine and fibrous solid, and a liquid.”

“The solid manure is higher in dry matter and acts as a soil improver, as well as providing extra nutrients,” says Charlie. “Whereas the liquid manure is higher in available nitrogen and allows us to apply it to standing crops when the demand is highest.”

This issue with having two different products to spread throughout the year was that the farm had to invest in machinery that was suitable to deal with this newly available fertiliser. There was also a logistical headache to overcome to apply the manures correctly and efficiently — the time spent moving material from one part of the farm to another had to be kept to a minimum, adds Charlie.

### Spreading decisions

“I was aware of the umbilical kit on the market to spread the liquid manure but getting the bulkier organic manures on in the right places and spreading to widths that meet our tramlines proved a bit of a headache.

“The logical approach would be to move the solid manure to the fields you want to spread in for distribution later, but we wanted to avoid double handling for a number of reasons — primarily to reduce soil compaction, but also the potential that large manure heaps have for leaching and the fact we couldn’t store in the same place two years on the trot.”

Soil on the farm is predominantly heavy

clay, around 60%, but there’s the added challenge of the River Dee running through the estate — which means nearly 30% is prone to flooding and is only suitable for growing forage.

“We initially decided to spread the bulkier organic manure all year round (before the rule changes came into play), or for as much of the year as we could feasibly travel on the land. It’s low in available nitrogen, which means we stay clear of spreading limits and it’s great for building up soil organic matter,” explains Charlie.

“This means we load the manure directly from the separator, which equates to around 115t/day and we invested in a ▶



*The expansion of the dairy herd has led to new ways to utilise manure for the arable crops, explains Charlie Steer.*

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The farm has invested in two Bunning spreaders.

► Bunning Lowlander 120 horizontal beater and disc (HBD) muck spreader that could be run on the farm's existing John Deere 6210R."

It allowed the farm to have a wide spreading window as the single-axle flotation tyres helped keep compaction to a minimum in the wetter months, he says.

It also proved to be a cost-effective way to get nutrients onto the field throughout the year and combined with soil mapping,

Charlie says he could target the areas that needed it most.

The spreaders have a pair of 695mm horizontal beaters at the rear of the body that breakdown the material before dropping it onto the two 1.1m diameter spinning discs for distribution.

A 16mm heavy-duty chain and full width slatted floor helps eliminate bridging.

"It was a system that worked well and meant the spreader paid for itself very quickly in fertiliser savings alone," notes

Charlie. "The biggest issue we had was down to the weather not allowing us to travel on the land for extended periods in the year, which caused a build-up of material.

"This created a huge workload bottle neck in the spring once we could get back on the land. The answer was to run a hybrid system of field stacking when it was too wet to travel, along with loading and spreading directly from the separator when we could."

## Increased workload

This meant the significantly increased workload was too much for a single spreader and therefore a second machine was required. Happy with his

first Bunning spreader, Charlie opted for a bigger Bunning Lowlander Widebody 230 HBD to allow him to spread comfortably to 24m.

"Ideally the material needs to be bulkier in order for us to reach 24m with the smaller machine — we simply couldn't defy physics," he explains. "This is why we went for the widebody 230 HBD, which is a different design to the 120 and has the spreading body mounted above the wheels, rather than sat within them, and a bigger 20mm chain for the walking floor."

With this added height and the addition of hydraulic sprung suspension, the spreading width was able to match with

The elevated height of the spreading body helps the rear discs comfortably spread material to 24m.



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## Looking after the soil

As manure spreading takes place as soon as the ground will travel in the new year, particular emphasis is placed on treading as lightly as possible during these months. The farm has cut down on passes with the fertiliser spreader since using this approach.

"We load the spreaders in the field with 360° excavators, rather than loading shovels," explains Charlie. "The reasons for this are two-fold as the shunting back and forwards with a telehandler or loading shovel creates a larger footprint than the muck heap itself and can also lead to soil contamination in the manure."

Although regenerative agriculture has recently become a fashionable term, and Charlie admits much of what they are doing falls under this catch-all phrase, he says that he has never been actively degenerative.

"We've long-used organic manures to feed and boost the health of our soil, we promote biodiversity with around 11% of the farm in stewardship schemes.

"We have recently restored 34 ponds around the estate, which have become great new habitats for flora and fauna, along with consistently improving the drainage on the farm to allow machinery to travel better."

Grosvenor's tramlines and avoid the spreading outfit needing to run down crop with intermediate bouts.

Along with the different design, Charlie made sure the spec of the bigger 23t 230 Lowlander was high to keep output consistent throughout the year.

"As the 230 HBD was a tandem axle machine, we opted for the rear steering axle to help negotiate headland corners, which has been useful for reducing scuffing and crop damage when turning."

Other handy additions included a GPS rate-controller for accurate distribution of the material and Charlie says he can tie this into the soil mapping on the farm, too. There's also ISOBUS controls, weigh cells, LED light package, slurry door indicator and a good-sized toolbox for any tools that could be needed.

"We've been really impressed with the build quality of the two machines, especially given the workload we put through them in a year. They are simple to setup and the guys like using them, and being British built, it means the backup is there if we need it," says Charlie.

"It's easy to adjust the position of the rear canopy to alter the drop point, along with tweaking the blades on the discs through any of the five positions to fine tune the spread pattern."

## Spring application

Keeping the spreaders busy in the spring is key as spreading is governed by the growth stage and height of the crop, so being able to tread lightly means the ability to get on the ground earlier in the year, he adds.

Other restrictions such as applying



Solid manure from the separator is either loaded directly into the spreaders or stockpiled around the farm.

organic fertiliser to milling wheat before a certain growth stage can also curtail spreading.

"Our oilseed rape crops don't get too much of the solid manure fertiliser in the spring due to the bigger leaf area leading to material sitting on leaf after spreading. When the arable crops are too tall, we'll switch to the grassland," says Charlie.

"Application rates vary between the soil and crop requirements, but due to regular testing, we know exactly what we are spreading. Our solid manure has around 0.5kg of P/t and 1.5kg of K/t, so it would take a lot of spreading before any limits are reached."

Before spreading begins, a tray test is carried out which has been devised from cut down plastic cans. Charlie says this is very similar to how the farm tests the



A rear steering axle has helped limit crop damage when turning.

granular fertiliser spreader and allows him to work out the material's coefficient and be confident it's reaching the full width.

"Output of the spreaders is determined by a multitude of factors, not least how far away the manure stack or separator is ▶

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The Lowlander 230 HBD is pulled by Grosvenor's John Deere 6250R.

► from the fields, but a comfortable day with the Lowlander 230 HBD can see 800t put through the beaters, with the record standing at over 1000t shifted in one day," he recalls

## Circular economy

The farm has ambitions to minimise the use of bought-in fertiliser and this approach has allowed substantial savings of over £80,000 in artificial nitrogen outlay in a normal year. This has an even greater significance this year due to the price of fertiliser tipping over £700/t, says Charlie.

## Farm Facts

Grosvenor Farms, Eaton Estate, Chester Farm

- **Arable area:** 2347ha
- **Cropping:** 2144ha
- **Soil type:** Heavy clay
- **Mainline tractors:** Case-IH Quadtrac STX 620 and STX 450; John Deere 7310R; John Deere 6250R; and a selection of John Deere 6155Rs
- **Combine:** Claas Lexion 780TT
- **Cultivation equipment:** Quivogne Tinemaster, Simba X-Press 10m, Vaderstad Rapid 8m drill
- **Spreaders:** Bunning Lowlander 120 HBD; Bunning Lowlander 230 HBD

## Bunning Lowlander widebody 230 – the spec

- Spreading mechanism: horizontal beater and spinning disc (HBD)
- Spread width: 30m
- Max carrying capacity: 23t
- Cubic meters level fill: 16m<sup>3</sup>
- Cubic meters heaped: 26m<sup>3</sup>
- Floor drive: hydraulic
- Floor chain size: 20mm
- PTO speed: 1000rpm
- Axle: tandem
- Standard tyre size: 650/55 R26.5

As the farm is split 50/50 between grass and cereals, there have been bigger benefits by using the spreaders on the forage land with 83% of nutrient requirements coming from organic manure alone with zero artificial fertiliser used.

The recent rule changes have affected Grosvenor, and the farm now doesn't spread on autumn stubbles unless drilling grass or OSR in the following crop. There have also been implications for the liquid manure as it now must be pumped further to the fields from the lagoons, rather than spreading on land nearby.

"We used to test the material daily to know what we're applying but we found there is little change from day to day, so this is now a weekly task," says Charlie. "As the cows' input has remained the same, there's little change to the output, but it does mean we know exactly what is in our manures and we can target specific areas accordingly."

Another sizeable benefit of the Bunning Lowlander 230 HBD is the variable rate spreading, which allows Charlie to vary P and K requirements using the yield map from the combine along with the soil mapping that is carried out during the year.

"When we started soil mapping, I noticed there were indices in our fields that we simply weren't addressing by just applying muck as a kind of waste disposal job," comments Charlie. "Now we know what the manure consists of, and we have the machinery able to spread it accurately,

we can target certain areas of the field and specific crops with the manure in spring when the crop requires it.

"We're most efficient when loading the Bunning spreaders directly from the separator and being able to maximise the spreading window. This is where we have seen undoubted savings in fertiliser and improvements to soil health, both which have been huge benefits," says Charlie. ■



The rear door has five settings for drop point adjustment depending on the material.

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