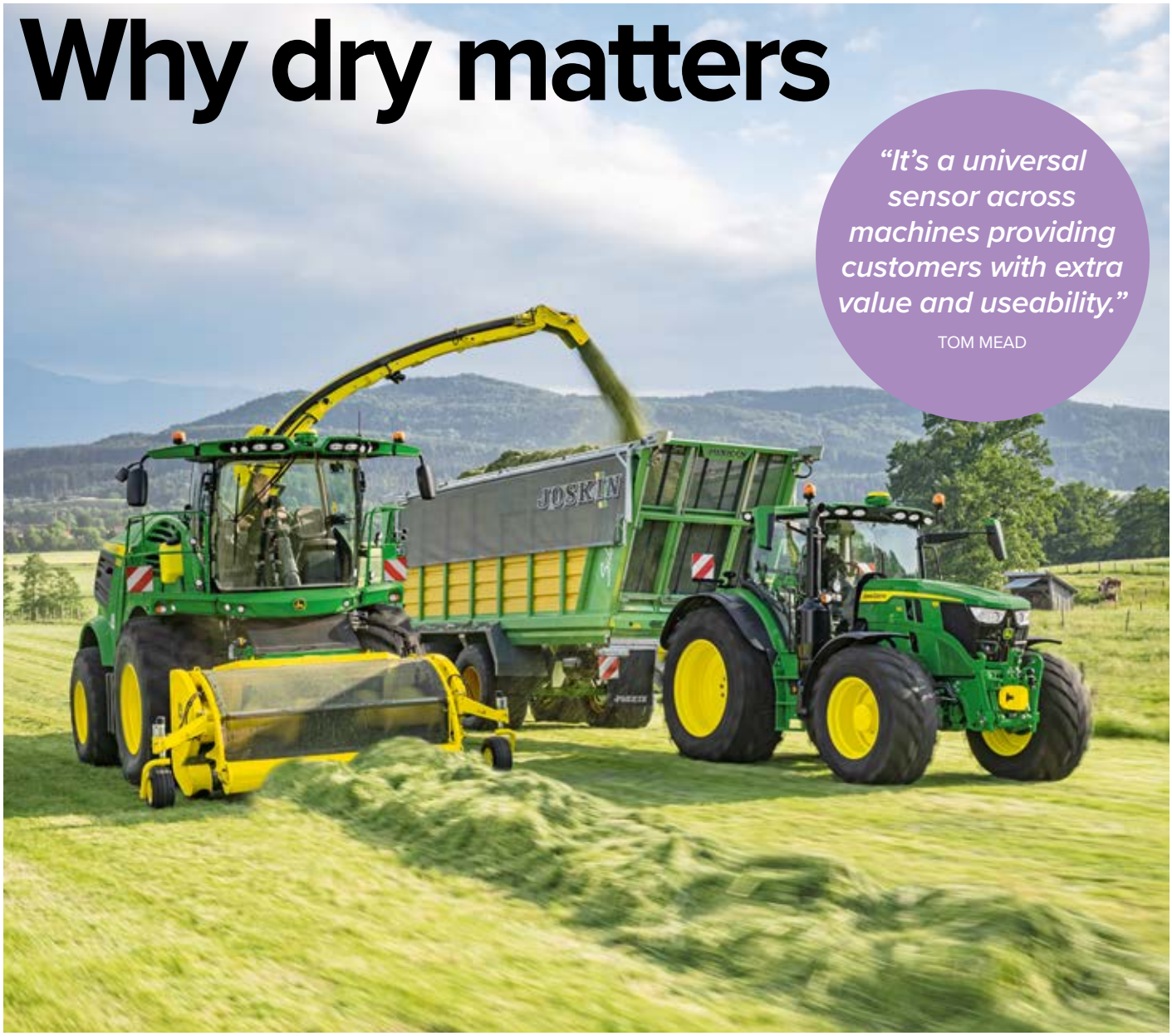
Why dry matters



> *"It's a universal sensor across machines providing customers with extra value and useability."*
>
> TOM MEAD

The times when determining silage quality meant seeing how full the clamp was and testing it afterwards are long gone, with modern foragers able to analyse yield, dry matter and constituents in real-time. *CPM* explores the capability of different machines and what value this can add.

By Melanie Jenkins

Having real-time harvest data allows forager operators to make decisions on the spot and can provide farmers with the knowledge to produce the best feed possible for their livestock. Advances in technology from a number of manufacturers are making this increasingly accessible and intelligent.

CLAAS

Claas has a number of different harvest monitoring options available to its forager customers. Its Quantimeter is a yield monitoring system which is the base of the firm's data capturing system on its Jaguar foragers, explains Claas' Conor Trimble.

"The system looks at the volume and speed of the material that's entering the machine and calculates the crop yield which can be used to create maps. It's also possible for the machine to determine accurate additive applications depending on yield."

Additionally, the optional dry matter sensor allows data capture to progress a step further, he notes. "In conjunction with the Quantimeter, this sensor can calculate the dry matter of grass, wholecrop and maize."

It monitors the conductivity, temperature and volume of the crop to calculate and record the dry matter, explains Conor. "The data can then be augmented onto a dry matter map. Having this sensor will also allow the machine to apply additives depending on the crop itself. This permits the operator to vary the rate of additive application to make sure the recommended amount is applied for the correct conditions."

An optional NIR sensor can also be included to provide the same functionality as the dry matter sensor ▶

with the additional benefit of analysing the content of the crop. "Using Near Infrared Spectroscopy the system can give readings for dry matter, starch, fibre, protein, ash, fat and sugar.

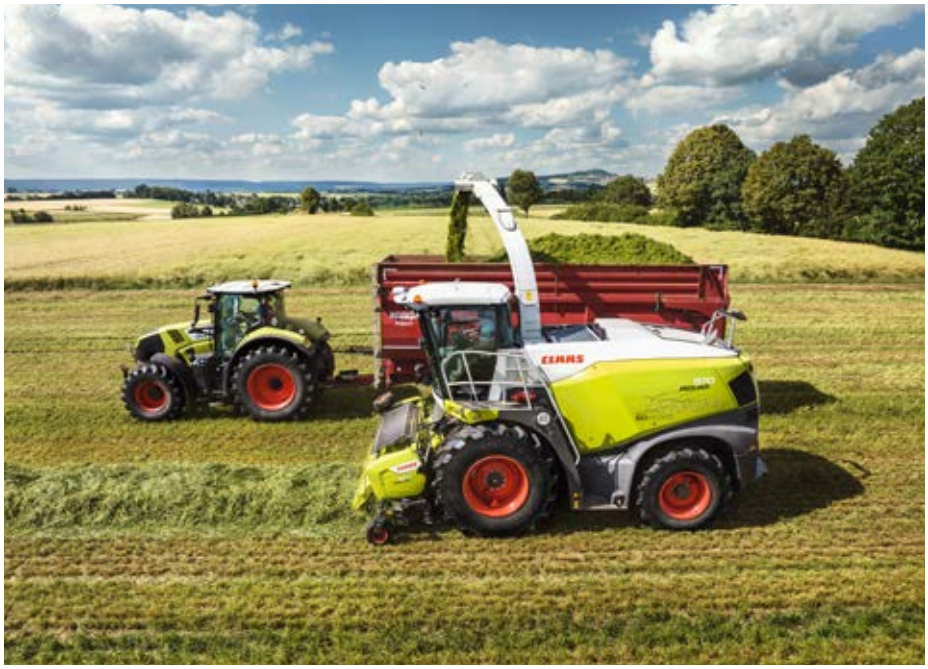
"The information collected by the Quantimeter, dry mater sensor and the NIR sensor is all transferred via telematics to the Claas Connect system," he concludes.

FENDT

Partnering with Polispec, Fendt has worked to provide its latest Katana with an onboard analysis solution, says the firm's Ed Dennett. "This third party optional NIR sensor has calibrations for silage, forage, wholecrop and grains. The mobile unit can be used as part of the Katana and can be removed for portable use on farm, enabling operators to manually analyse forage from a clamp or bales, while also analysing freshly cut material as it's fed into the Katana."

Data from the NIR sensor, along with operational information such as fuel and time, can be fed back to the farm office and interpreted using management software such as Next Farming. "Reports and yield maps can be generated with such software, but more basic data can be processed and reported in Fendt's own portal shared with other Fendt machines.

"Using FendtONE offboard online portal, Fendt users can store, input and send jobs to machines in Fendt's range using this data to improve fleet efficiency," explains Ed.

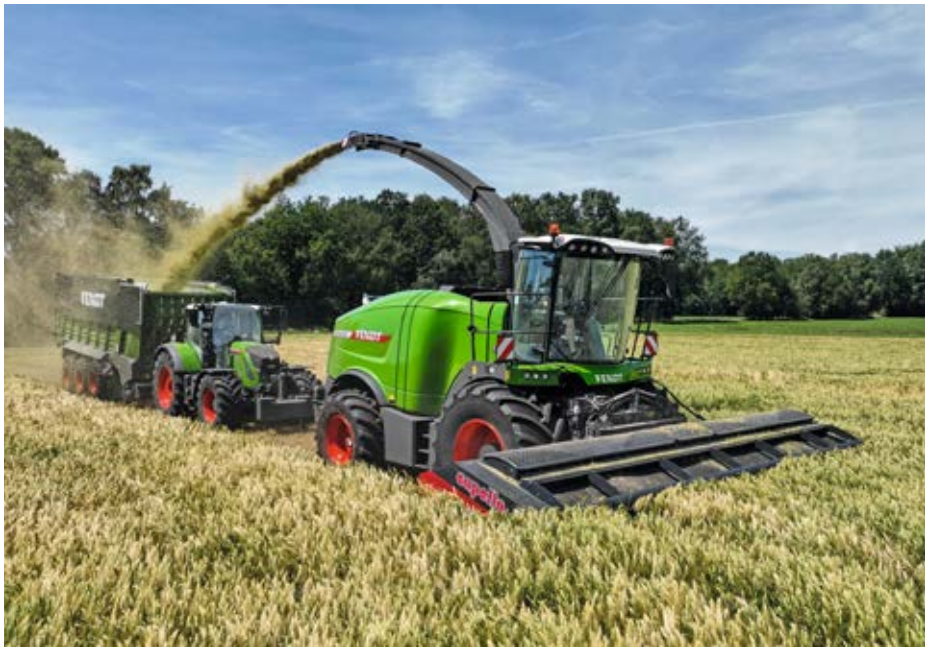


Measure and manage

Claas' Quantimeter system looks at the volume and speed of the material that's entering into the machine and calculates the crop yield.

Using the NIR sensor to ascertain the quality of the crop, and an optional silage additive system, this provides operators with the potential to improve silage quality in the clamp. The silage additive dosing technology is fully integrated into the vehicle and has a tank capacity of 215 litres.

Chop quality and length are handled by six pre-compression rollers on the feed intake, which ensure optimum forage pre-compression. Metal and stone detectors on the first pre-compression rollers prevent damage to the chopping cylinder, these sensors are placed 970mm away from the drum. The crop volume/ throughput can be recorded through the feed rollers with simple calibration once a trailer mass is known. This data is then available for documentation of each job the machine carries out.



New partnership

Partnering with Polispec, Fendt's latest Katana has an onboard NIR sensor to measure for silage, forage, wholecrop and grains.

NEW HOLLAND

Most common in terms of harvest monitoring on New Holland FR forager cruisers is a conductivity sensor within the machines which provides wet and dry matter readings, while GPS determines distribution across a field, explains the firm's Tom Mead.

"The limitation with this is the accuracy provided when compared with using an NIR sensor," he notes. "However, New Holland's NutriSense NIR sensor can be factory ordered or retrofitted across our range of foragers and is capable of providing additional constituent analysis in real-time as the crop flows through the machine. This includes starches, ADF, NDF ash, protein and fat."

As standard, the sensor is capable of reading values across 10 different crops but individual customers can request to add speciality crops too, says Tom. "Dinamica Generale, who manufactures the NIR sensors, is able to work with customers to

Value adding data

Providing customers with real-time yield and dry matter data

Operating a contracting business in the Scottish Borders, David Wood and his brother Kenny have been using harvest monitoring technology on their foragers since 2016 to provide their customers with up-to-date and accurate information.

While R Wood and Sons offers a number of services from cultivations to drilling, baling and bale chasing, silaging is by far the most significant part of the operation. Covering all of the Scottish Borders, East Lothian and parts of Northumberland, the business runs three foragers which are used to cut grass silage and wholecrop. "We cover around 4050ha of grass and 1010ha of wholecrop for dairy, beef and sheep farms as well as for an AD plant," explains David.

David's father Robert started the business in the mid-1980s, with chopping silage and wholecrop incorporated in 1996. "We started out using a modified combine header before moving to a dedicated wholecrop header in 2002 and a disc bed header in 2005. We now run three foragers, two of which have wholecrop headers."

All three machines are John Deere and include an 8400, an 8500 and a recently purchased wide bodied 9500. "All of the foragers have John Deere's HarvestLab which is something we first invested in in 2016 when it was introduced on the then new 8000 range," explains David.

"John Deere approached a number of its larger customers about the technology at the time and we decided to invest with the idea that it could potentially offer more to our customers. However, we started cautiously because we wanted to prove to ourselves and our customers that it worked before we offered it as part of our service."

Investing in the future

R Wood and Sons first invested in John Deere's HarvestLab on its foragers in 2016, but wanted to test the accuracy of the data before offering it to customers.

To test the accuracy of the technology in terms of tonnage of grass and dry matter, David would compare the HarvestLab data with that produced from some of his customers' weigh bridges and their samples. "Once we'd been able to do this and the results matched up, we knew it was reliable."

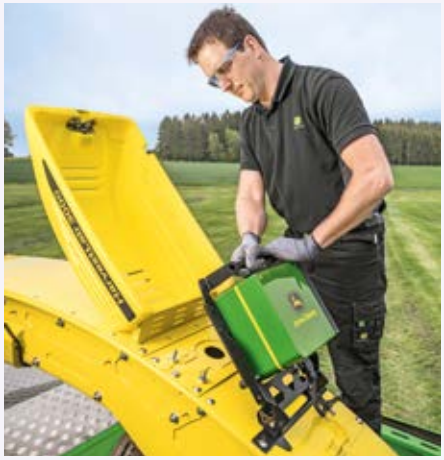
He now finds that if a customer hasn't requested HarvestLab's data by the time he's left their farm, he'll more than likely get a message requesting it the following day. "In the past we'd get asked about how much diesel we'd use but the priority for most of our customers now is to know yield and dry matter content. However, there are other benefits to HarvestLab such as being able to quickly determine if a cut requires another pass with a tedder or comparing the wilting characteristics of one variety of grass against another using the yield monitor."

> *"The priority for most of our customers now is to know yield and dry matter content."*

Using the data collected by HarvestLab, David's customers can far more accurately use additives in their silage based on yield mapping, he adds. "I've noticed that more of my dairy customers are trying to produce the best quality product, so the more data they have to be able to accurately apply additives, the better their silage."

The technology also has the ability to alter chop length depending on the dry matter content going through the forager, says David. "If the crop is drier, it'll automatically shorten the length, and if it's wetter, it'll lengthen in to achieve a better consolidation in the clamp."

Although HarvestLab comes at an additional cost to the base price of a forager, because the data is something his customers want, David has been able to include the cost of providing this extra service in his price per hectare. "It's difficult to quantify how it pays for itself, but it was only last year that I traded in the original machine I had HarvestLab on, so during the lifetime of that forager I'm sure it's covered the initial investment."



Customer service

R Wood and Sons runs three foragers and offers customers the option to receive real-time data on their grass silage or wholecrop using information recorded using John Deere's HarvestLab.

He'd originally hoped to be able to provide a further service of analysing silage that came out of the clamp, but because feed companies do this for free, there wasn't a marketable opportunity.

More recently he's been approached to work with someone who's using historical data to build an AI which will calculate feed rations. "All of our data is stored in Operations Center and this goes back to when we started with Harvest Lab in 2016, so we have plenty of information."

He also values the communication between Operations Center and his machines, which automatically transfers field boundaries and identifies where a machine is. "I can send an operator out at the start of the season, the system recognises where they are and uploads the data – it's very user-friendly."

Other than one hardware issue in 2019 whereby one of the lenses in the technology was moving, HarvestLab has consistently performed. To pinpoint the issue at the time, David ran both foragers side-by-side and could determine that the dry matter and sugar readings were coming through inaccurately.

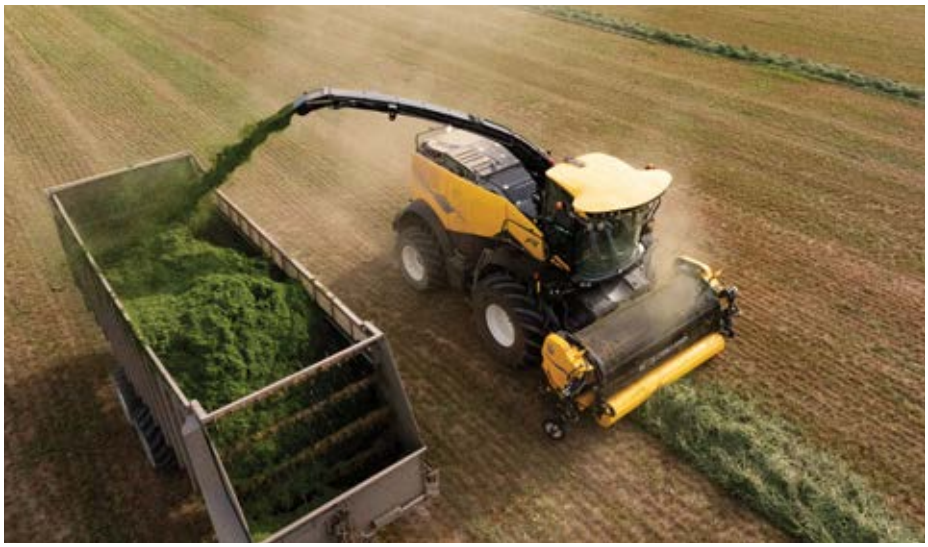
One feature David would like to see in future is the ability for the technology to read the constituents of wholecrop. "We can read the constituents for maize and grass but not wholecrop yet," he concludes.

adjust the sensor's calibration so it can be used on additional crops."

Operators can access data from the sensor as a live read out on the forager's screen, or a report can be generated at the end of operations which will be sent to New Holland's FieldOps management system. "FieldOps receives this data in the same way it would for machinery data and it can break down the information into individual fields, analyse the constituents in a crop, or generate more in-depth reports," explains Tom.

The NutriSense NIR sensor isn't limited to being fitted to New Holland foragers, it can be switched between manufacturers' combines and can be used to measure slurry applications as well, he says. "This means it's a universal sensor across machines, providing customers with extra value and useability."

It's also possible to automatically adjust the chop length depending on the moisture, says New Holland's Cian O'Leary. "Active Length of Chop, or ActiveLOC, can be set up in the toolbox menu so the forager will change the chop length dependent on the configuration set by the operator."



Useable data

New Holland's FieldOps receives crop data and it can break down the information into individual fields, analyse the constituents in a crop or generate more in-depth reports.

Additionally, customers can select to include an on-board additive tank and the flow rate can be adjusted from the cab's display screen, he adds.

New for 2025 is a CropSpeed sensor located on the underside of the spout which measures the ejection of material, explains Cian. "The operator can adjust the sensitivity of this and if it falls below the CropSpeed ejection, the feedrolls automatically stop to reduce the chance of a blockage."