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Profitable machines

Savvy spending

With industry projections indicating a downturn in machinery spend, CPM finds out how growers can be savvier with both existing and new purchases.

By Charlotte Cunningham

On the surface, shiny new kit, decked out in all the latest technology, can offer growers the opportunity to enhance profitability of their operations via greater efficiencies.

However, with changes to the structure of UK farms putting a tight band around margins, for some businesses they may find just as great a return by looking at what's already inside the shed. This is according to Harry Henderson, formerly of AHDB and now technical manager at BASIS, who says the past 12 months in particular have marked a step change for machinery sales and purchases.

“Up until this year, machinery spend has been quite buoyant,” he says. “Order books have been pretty full, seed drill manufacturers have even been able to put prices up. However this year, there has been quite a marked reduction globally in demand for farm machinery – especially in the UK.

So what's driving this? “Despite years of warnings, I think SFI, ELMs and all of those other changes since Brexit have caught up with a lot of growers and hit home,” says Harry. “Couple this with global events impacting input prices and wet

autumns reducing yield, it's no wonder that machinery spend has been reined in.

“Major global manufacturers have made reductions too, and there have been a number of redundancies within the industry.”

This is amid a backdrop of rising machinery prices. Looking at the figures in more detail, the 2025 55th edition of the Nix Farm Management Pocketbook highlights that in 2023, machinery costs and tractor prices rose by 2% and 3% respectively – with a 180-220hp tractor now estimated to cost between £127,094 and £167,825.

Re-evaluation

The impact of this has been a shift in attitudes towards machinery replacement policies, he says. “I think many farmers are now taking a look in the shed and evaluating what they've got and considering how what is already there can be made more profitable.”

In terms of looking after existing kit, good maintenance is key to extend the lifespan and profitability of the machine, advises Harry. “Poor maintenance is unfortunately all too common. A classic example is when you see a combine parked up in the middle of winter and can smell that mousey-smell around it because it hasn't been cleaned and the mice have got into it. That can be fatal to a combine and replacing a wiring loom can cost tens of thousands of pounds. It's absolutely imperative that combines – and all machinery – are cleaned before storing. It might take time at the end of a busy harvest, but failure to do so can really sting you in the long-term.”

When new purchases are required, Harry says it's vital to budget in detail before signing on the dotted line. “If you're worried that it might be too expensive to repair,

then it's worth considering if you're buying too expensive of a machine anyway and can't really justify the maintenance costs.

“Something else to keep in mind is that machinery costs will probably continue to go up, so when you make a new purchase, ensure you factor in the cost of the eventual replacement which will probably be quite a lot more. This may lead you to consider if a contractor is a better option.”

Graham Redman, author of the Nix Farm Management Pocketbook and partner at The Andersons Centre, concurs. “The most important starting point is calculating what the investment is going to generate you – is it going to add to your bottom line? Is it going to make you more profitable? Or is it just replacing something you think you require because you've had one before? ▶



This year, there has been quite a marked reduction globally in demand for farm machinery – especially in the UK, says BASIS' Harry Henderson.



Somerset farmer Charles Quick is launching a self-designed retrofitted system this autumn which will enable RTK autosteering on any tractor.

► “Can you repair your existing machine or keep it going for just one more season? That might save you a lot of money and you can then replace it the following year,” he suggests.

“Consider how much any purchase is going to be used. If it’s something that’s likely to be used every day, then it’s a different acquisition and calculation compared with kit which you might only use three times a year.”

Graham adds that it’s important to look at the specification in detail too and be realistic about the requirements of the farm – rather than just including upgrades because they come at a good price.

In light of this change in mindset, Harry says there’s a huge space in the market for technology which can be added to transform the existing capabilities of machinery. “It’s a very good idea. Something like RTK easily adds 10% productivity to the tractor –

Box 3 – key features



‘Box 3’ – marketed by Charles’ business, CSEQ Technologies – is a streamline system comprising the control box, hydraulic valves, antenna and a Windows tablet which comes pre-loaded with the software.

- Canbus capable – meaning easy ‘plug-and-go’ installation on steer-ready tractors
- Hydraulic proportional valve, safety valve and wheel angle sensor included for non-Canbus tractors
- 4 x 12v section outputs enabling easy control of sprayers, drills and spreaders
- Workswitch input to allow control mapping from the implement’s position
- External inertial measurement unit (IMU) for easy installation
- 2 x Power over Ethernet (PoE) ethernet ports for future expansion
- Pre-configured Windows tablet and full wiring loom included
- Integrated 4G modem with dual SIM slots enabling the receiving of RTK corrections across multiple networks and avoids dead-spots
- L1/L2 RTK receiver across four constellations - GPS, Galileo, GLONASS and BeiDou which delivers accuracy down to 2cm.

compared with a manual-steered machine – so it’s a bit of a no-brainer, particularly if you can put it on an older machine.”

Entrepreneurial spirit

In a bid to add value to existing machinery, an entrepreneurial Somerset farmer has designed and developed exactly that – a retrofitted system which is claimed to enable RTK autosteering on any tractor.

With a 140ha arable and fruit farm near Taunton, Charles Quick says that while there was a requirement for autosteering on farm, the hectareage couldn’t justify purchasing new machinery just for that

feature alone. So he set about designing his own technology – drawing on the learnings from his degree in agriculture and computer science – which would allow him to turn his pre-existing tractors into precision kit. “It was surprisingly easy,” he laughs.

So how exactly does it work?

‘Box 3’ – marketed by Charles’ business, CSEQ Technologies – is a streamline system comprising the control box, hydraulic valves, antenna and a Windows tablet which comes pre-loaded with the software. “I started designing it back in 2018 and at that point it was just a bunch of wires in a cab. From that, I developed prototypes and tested them out on local farms, slowly building up to what we have today.”

If your tractor is steer-ready, Box 3 today is pretty much a case of ‘plug-and-go’ into a diagnostic connector and away you go, he explains.

With a hydraulic system, if your tractor isn’t steer-ready, then it’s a slightly more complex process – though Charles says it’s still something that a farmer with a small workshop could fit themselves in a few hours. “From the hydraulic side of things, you’re given a suitable valve, which you tee into the steering lines. In terms of electronics, a micro-controller controls the steering valve and reads various inputs from the tractor, such as steering angle.” ►



The software that powers the kit is AgOpenGPS – a global network of GPS guidance software built by farmers.



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▶ A linked tablet PC takes the GPS information from the RTK receiver, maps it all out and that generates a target steering angle which is sent to the micro-controller and in turn, controls the valve to move the wheels at the desired angle. Accuracy is estimated at about 2cm.

While the system is able to be used across the majority of tractors, Charles says the only limitations are those which don't have power-steering. "Anything from the 1960s onwards essentially."

The software that powers the kit is AgOpenGPS – a free and open-source piece of software built by farmers. Charles has also set up a supporting RTK correction network. "The Qnet RTK network is made up of base stations, spaced such that each one covers approximately a 30km radius," explains Charles. "If you are in a new service area for us, along with the purchase of a Box 3 you will be offered a free base station if you are willing and able to support it with a wired internet connection, electricity – approximately 5W – and a clear view of the sky."

At present, the service area is predominantly focused on the South West, though Charles says he hopes to expand this area as the product is launched. "In return for hosting a base station, you will receive one free RTK signal for use with your Box 3, or any other GPS receiver supporting NTRIP. All our base stations are cross-referenced against the Ordnance Survey, ensuring accuracy with 'ground truth'."

Seamless accuracy

"You can also seamlessly switch between



The system has been in development since 2018, designed initially as a cost-saving alternative to buying a new tractor on Charles' farm.

base stations while retaining centimetre-level accuracy. Each base station connects to our central server, which then sends your receiver the nearest available correction signal. This allows for roaming across our entire service area, and resilience in case of an outage at one base station."

While typically access to a NTRIP signal would cost over £500, however, by setting up his own network, Charles has been able to bring this cost down to £120 a year. "If you would like to use our RTK without buying a Box 3 system, we will send you base station with a free signal, but you must also purchase at least one RTK subscription alongside – or convince your neighbour to buy one," he laughs.

RTK signals are strictly for use on one machine at a time, meaning multiple boxes users will require multiple signals.

Access to the software – and any updates or future functionality – is

completely free and will remain free, says Charles. Growers will purely have to pay the one-off charge for the kit. Cost-wise, the kit comes in just shy of £3,000 – £2,950 – which Charles believes offers a much more attractive return on investment than a new tractor. "It gives options to smaller farmers, particularly, that we wouldn't get otherwise. Enhancing the productivity of an existing tractor – which is probably already paid off – can be a really cost-effective technique to make machines more profitable."

The first kits are expected to be available to purchase from November this year, and growers can register an expression of interest on the website now. ■

Calculating costs

To help growers get a better handle on their machinery costs, Harry recommends using AHDB's costing calculator.

"When we think about costs, it's all about looking at how we can enhance productivity, preserve yield, and extend the life of the kit as much as possible."

The online tool can calculate the cost of machinery on a per hectare or per hour basis and can also be used to be used to compare the costs of owning equipment with the cost of hiring it or getting in a contractor. Different machinery systems can also be compared, and repair costs can be calculated for budgeting purposes.



For those tractors which are steer-ready installing the new Box 3 system is simply a case of 'plug-and-go'.

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