Zero bought-in feed for bigger profits and smaller carbon

There are no bought-in feeds and limits on other purchased inputs on the Northumberland farm of Geoff and Alan Bean. This demands a diversity of crops and originality of thinking.

There's no need to dig very deep to find out why the Bean family team is such a formidable farming force. Nor to see how brothers, Geoff and Alan – who began life as sons of a tenant farmer on 90 acres with what they describe as 'a handful of scrappy Swales' – have reached the point at which they farm around 3,500 acres, much of which is owned, in Northumberland's Derwent Valley.

The success of the family team – which also includes Geoff's sons, Wayne and Steven and Alan's son, Robert – can be attributed to much more than hard graft. Also in evidence are intuition, an unerring eye for stock, imaginative thinking, a willingness to try and fail, and a burning desire to be self-sufficient, making sure their farm's operation remains tightly under their own control. In other words, they want to escape the vagaries of the feed and inputs markets; to grasp every margin, however small; and to keep profits on the farm.

"There's nothing worse than seeing a sales rep pulling into the yard in a fancy new car and thinking, 'I have paid for that!'," says Wayne.

There's no question this approach has led to a profitable business, which – purely off the back of its farming enterprises – has expanded to over 1,000 acres owned, around half of which is arable; 300 acres rented and 2,000 acres of common grazing on the fell.

Located due west of Newcastle, the three main farmsteads are Broadoak, Shield Farm and Healeyfield Farm, with grazing on the fells for 800 of their 2,000 ewes at Waskerley Park and Muggleswick Park. Here, the Swaledales are bred to Blue Faced Leicester and the resulting lowland Mules put to Charollais, Texel and Suffolk rams.

Over 200 head of beef are fattened through the system every year, all achieving U and U+ grades (there was one R last year), and – aside from minerals – neither they nor the sheep or lambs, receive any bought-in feed.

The success of this system depends entirely on growing and preserving a suitable complement of high-quality concentrate and forage feeds, and this includes wholecrop bean silage (introduced many years ago as a high protein alternative to soya); crimped cereals (a highly concentrated and rumen-friendly alternative to dry rolled grain); maize silage (grown against agronomists' advice on the margins of its suitability); and fodder beet (grown at an altitude of 900 feet, where others said it would fail).

Also in the rotation, which runs across the gamut of soil types from sand to clay, is kale, which is grown on heavier land unsuited to maize or beans; forage rape; summer wholecrop barley, initially sown experimentally but now established in the rotation; and cereals – wheat and barley harvested moist for crimping and oats for feeding dry to sheep.

Despite the warnings, maize proved to be a resounding success from its very first year with yields of over 17 tonnes per acre. And fodder beet did similarly well, with around 25 tonnes per acre lifted for inclusion in the cattle ration and as winter feed for the sheep.

"The feed benefit of maize was colossal and it really cleared the fields of brome and black grass which were completely clean within two to three consecutive years," says Wayne.

Safesil Pro

The choice was made to use the preservative, Safesil Pro, to stabilise the maize silage, following the success of the product for many years on the wholecrop beans.

"We want to make 100 per cent use of our home-grown feed – there's no point in growing it to waste it," says Wayne. "If we have any surplus, we have the opportunity to sell it to neighbouring farmers."

Michael Carpenter, technical director for Kelvin Cave Ltd, says the ingredients used in the Safesil additives used on the farm have been approved for use in human food, thanks to their safe and proven efficacy against spoilage bacteria, yeasts, fungi and moulds.

"The preservatives' ingredients – sodium benzoate, potassium sorbate and sodium nitrite –have been demonstrated to have the greatest impact on the reduction of a range of spoilage organisms including clostridia in wet silages and yeasts and moulds in drier forage, such as most maize silage," he says *[Journal of Dairy Science, 94:824-831].*

Geoff and Wayne say this is essential for their system which sees maize fed to rearing and finishing cattle throughout the year, and relies on the forage remaining fresh and highly palatable, even when use is slower in summer.

"We also feed maize silage to older ewes, before they go as culls," adds Geoff.

Geoff (right) and his son Wayne Bean.

The TMR is totally home-grown (except for minerals) and includes bean silage and crimped cereals

Switch to crimping cereals

However, an even bigger impact on cattle performance has come from a switch to crimping grain, which was introduced as a salvage measure to save a wet crop in the 1990s and was returned to as a routine from 2007.

"We now consult Kelvin Cave for the best methods of preserving any feed and we're absolutely confident that whenever we take the sheet off the clamp, the crimp will be stone cold," says Wayne. "We know that with heat loss there's also energy loss, which we're not prepared to accept."

He says storing both wheat and barley in the same clamp means it's particularly important to achieve a stable fermentation, as there must be no deterioration on exposure to air when the sheeting is moved for the addition of the second crop.

Equally impressive has been the cattle performance – the 90 or so youngstock weaned from the spring-calving Limousin suckler herd each November and the 200+ head bought from Hexham Market, aged 12 to 15 months, throughout the year.

"The main thing we've noticed when they're on the crimp is less acid – we don't get loose muck, bloated and lethargic animals and there's just no sign of acidosis," says Wayne. "The animals are also much less wild; they're contentedly lying and chewing the cud."

This means animals bought from Hexham can go straight on to the total mixed ration on their first day on the farm, whereas before – when on dry, rolled barley – they would have been gradually eased on to the feed.

This not only meant more work but also a drop in performance which is no longer experienced on the updated TMR.

"We think it's knocked three to four months off finishing compared with the previous [dry rolled grain and soya-based] ration, and the grades are better and more consistent," says Wayne.

The increase in performance comes as no surprise as crimp has repeatedly been shown in trials to perform better than dry rolled grain.

"We know this is because crimp is safer for the rumen and more digestible, which explains why the family finds the cattle adapt so easily and grow so well," adds Michael Carpenter.

Wayne also remarks on further benefits of crimp, ranging from ease and low cost of storage – without the need for dryers or a dry grain store – to early harvest of the 25 per cent moisture crop. This makes extra time for autumn cultivations and catch crops, and helps with blackgrass and other weed control.

Catch crops

Any opportunity of gaining an extra crop in the farm's rotation is taken as it arises, seen when maize is followed by winter barley (harvested early for crimping), followed by forage rape (direct drilled or min-tilled for autumn grazing by lambs), before returning to winter wheat and giving three crops in two years.

A similar approach was seen with the introduction of summer wholecrop barley which is drilled in July and harvested in October, producing a bonus wholecrop of around 3.5 tonnes/acre, before fodder beet is sown the following spring.

With the family of the view that everything has to be tried, mistakes will be made and lessons learned, Geoff says: "You have to try it for yourself. If it doesn't work, you can try again or pack it in."

"You have to try it," agrees Wayne. "It's not going to grow in the bag."

In further efforts to cut the use of bought-in products, the team have also slashed their fertiliser use. This has naturally fallen since the introduction of beans (they receive no fertiliser), with the following crop requiring a reduction in nitrogen of around 20-30 per cent. This has helped secure favourable rents on neighbouring land, where the beans are valued not only for the nitrogen they return to the soil but for improvements to soil health and drainage.

However, the largest impact on fertiliser has been made by the establishment of a trade with a nearby AD plant, whose liquid digestate is now routinely spread on the fields.

Buying a slurry tanker with dribble bar in response to the product's availability, the team now only buy bagged fertiliser for inaccessible parts of the farm.

As well as being cost-effective, Wayne remarks: "It's got to be more environmentally friendly as it comes from less than 20 miles away."

In fact, as with every practice undertaken by the Beans, it is carefully assessed for its impact on the farm'sbottom line.

"We estimate that the yearly benefit of growing our own feeds is at least £50,000 to £60,000 and with such a diversity of crops, when the tables turn – as they always do in farming – what we save on each crop can be very different from one year to the next," says Wayne.

"We don't see the point in not striving to be the most efficient we possibly can," he adds, remarking that their food miles must be amongst the lowest in the industry. "Inefficiencies will not only hit our carbon footprint, which will inevitably become more important, but they will also hit our profits at the end of the day."

Wholecrop beans

As long-term growers of beans, the Bean family are working with Kelvin Cave Ltd as part of the NCS (Nitrogen Efficient Plants for Climate Smart Arable Cropping Systems) Project, and hope to further increase the crop's profitability on their farm, and lower their carbon footprint.

Michael Carpenter, KC's technical director, says: "We've worked with the family for many years and knew they would be well-placed to take part in trials we are carrying out as part of this Innovate UK Project.

"The overarching aim of NCS is to replace soya with home-grown proteins and cut greenhouse gas emissions and the Bean family is already a long way down this road.

"We hope our work on this and other farms will help us improve the accuracy of bean silage analysis, making it more consistent and reliable for the industry.

"We also want to demonstrate that beans are a worthwhile crop to grow and help establish a best-practice blueprint for bean preservation, storage and incorporation into ruminant diets," he says.