

# Sustainable forages in the face of increasing climate change

Fourth generation dairy farmer Ian Baggs knows what it is to farm in an area affected by climate change. So he dedicated his Nuffield Scholarship to exploring alternative forages that can thrive in changing conditions. Natalie Noble reports.

Situated near Wareham, close to the Dorset coast, the Purbeck Ridge casts a rain shadow across the lower parts of Ian Baggs' farm which also serves as a river floodplain each winter. As elevation increases his soils – a combination of sand and gravel – turn dry, and drought plagues his grazing platform.

“With the increasing climate volatility, with warmer wetter winters, and hotter drier summers, it's a real challenge to grow enough forage to feed our cattle,” explains Ian. “And that represents a challenge to the sustainability of our business, especially when writing big cheques for purchased maize.”

Experiencing drought in four of his first five years of coming home to farm, and after numerous reseed failures to typical ryegrasses, in 2019 he decided to experiment with herbal leys. Growing a control ryegrass on one side of a field and a herbal ley with a moderate inclusion of chicory on the other side, the results were promising, with increased dry matter tonnage and great palatability.

**“Grazing is the most sustainable form of feeding cattle.”**

“I thought: ‘If I didn't know about these legumes, trefoils, and different grasses like timothy, cocksfoot, and fescues, what else don't I know about,’ and that inspired the application for a 2021 Nuffield Scholarship.”

Ian doesn't shy away from the reality of changing climatic conditions in the UK. “In the future we could progress to the extremes of weather typically associated with countries closer to the equator,” he says. “We need to learn lessons today to prepare ourselves.”

“The aim of my scholarship was to explore alternative forages that



**Ian Baggs was awarded a Nuffield scholarship to explore alternative forages that will thrive in a changing climate**

will thrive in these new climatic conditions, raise production, sequester atmospheric carbon, and build moisture retention in our soils.”

## Learnings

So what did he learn on his travels? He first points to the commercial irrigation of forage crops for dairy cattle across swathes of California, US; Tasmania and Victoria, Australia; and the Canterbury Plains, New Zealand – without which farmers could not sustain a dairy sector.

While we may think these countries are frivolous with water, they're not, says Ian. Strategic cropping allows for best use of water resources by growing more water-efficient crops like maize and lucerne, which use one and two megalitres of water, respectively, to grow one tonne of dry matter (DM), compared to the three megalitres required for one tonne of DM from permanent pasture.

Observing ‘flood irrigation’ of permanent lucerne showed strategic cropping in action.

“The result of that irrigation is 28-35 days later they have reliably de-risked their cropping with a good stand of a moisture-efficient crop that will yield significant tonnes of dry matter,” he says. “And lucerne is a tremendous crop; it's high in protein, a natural nitrogen fixer, and has good root structure.”

“With high land prices, maybe there's a need in strategic locations for investment in irrigation in the UK. And with lucerne's qualities, in the right context, maybe we should consider this crop more.”

Visiting the dry lands of the Canterbury Plains, Ian saw the use of diverse cover crops, as grass-to-grass reseeded, being mob grazed by dry cattle and beef animals. But what he found most relatable was on a spring block-calving dairy grazing platform where cows were strip grazed between morning and afternoon feeds. “The benefits reported were increased organic matter, increased rooting depth and reduced compaction, as well as aiding social licence to farm.”

“Both the team and passers-by love seeing the cattle grazing, and all the pollinators that the diversity of the sward attracts, something that is not quantified.”

**“We need to learn lessons today to prepare ourselves.”**

Another example was a very dry farm – just 450mm of annual rainfall with no irrigation licence - grazing summer brassicas to conserve green feed from the springtime when there's more moisture, into the summer, to extend the rotation and cut costs.

This farm ran a flying herd of second lactation and upwards cattle to counteract its main constraint of DM tonnage. “Mature cows are more efficient at converting every tonne

*Continued on page 54*

Continued from page 52

of DM into milk solids,” explains Ian. “The farmer’s message was to plan your business strategically to optimise use of your most constrained resource.”

Mob grazing was another observation from his travels, and Ian learned important lessons on one dairy farm which was mob grazing lactating dairy cattle on a standing crop of hay as a buffer feed between morning and afternoon green feeds, again, to eke out the rotation.

But the big benefit he identified from this setup was natural reseeding of grazing pasture. “Hundreds of kilos of free seed was dropping down onto the soil and being trampled in by the cattle – and when the autumn rains come, the most fantastic reseeding you could wish for. It’s a very sustainable way of ensuring sward longevity and increasing the organic matter and biology of the soil.”

However, the whole is greater than the sum of its parts – and visiting an organic dairy farm on New Zealand’s North Island, Ian saw how diversity can be part of a holistic approach to adaptation. This profitable and sustainable business was producing 360kg of milk solids/cow per lactation with no purchased feed (forage or concentrate), and no artificial fertiliser or sprays.

**“Diversity is strength.”**

Points of interest on this farm included strategic tree and hedgerow planting; along trackways and across grazing for cattle to browse and to act as shelter and shade, while providing habitat and corridors for nature.

The farmer also considered the medicinal and ecological benefits of species being planted – willow as an anti-inflammatory, walnut to repel flies, rosemary as an early season food source for pollinators, as well as fruit and nuts for wildlife. And the diversification of income was also of interest, with a free-range chicken business running on the same block of land as the dairy grazing platform. “Diversity is strength,” notes Ian.

Back on his home farm, Ian has combined the lessons learned from his Nuffield study with his knowledge of his land, soils, and cattle to assess and make changes to his own farming practices to build resilience and better prepare his farm for the future.

“If you believe like me that grazing is the most sustainable form of feeding cattle, then block calving goes



**Ian presented his findings from the US, Tasmania and Victoria in Australia, and New Zealand to a packed room**

hand-in-hand with that,” he says. “This is emblematic of our shift from all-year-round calving to block calving, with our heifers front-end loaded.”

He has also paid close attention to breeding; looking to breed smaller, lower maintenance cows that are strong, healthy, and fertile with maximum return from forage. “The cow is the tool to do the job – and the job is converting tonnes of dry matter to milk solids.”

When it comes to grazing, he continues to experiment with herbal leys using mixtures comprising three grasses, three legumes, and three herbs as a minimum. “They insulate you from artificial fertiliser prices, they are deep rooting and drought tolerant – which is crucial on our grazing platform – and the cattle enjoy them,” he says.

And their benefits extend to the silage, with ryegrasses that are heavily reliant on moisture and nitrogen out and diverse red clover in. “I can see no reason for people not to add a couple of kilos of red clover to every silage ley – when you cut the stuff it looks like a salad bar.”

He’s also changed how he utilises the grazing. Once every two to three years he grows a big crop of grass and grazes the standing hay with dry cattle, R2 heifers or beef cattle. “It adds organic matter but most important to me is the seed drop,” he says. “Some people complain that herbal leys don’t persist – but a lot of the problem is that they are not allowing the plant to complete its full and

natural lifecycle.” Maize feels like a contentious subject from a sustainability perspective, but Ian relies heavily on it as a forage crop because of its excellent conversion properties. He acknowledges this is an area he needs to continue to improve, so has done away with his plough and now subsoil power harrows in a single pass, then goes straight in with a disc-drill.

In addition, he chooses early-maturing varieties, and after harvest a cover crop drill goes in with a diverse mix of cereals, legumes, and brassicas. Ian outwinters stock on these crops, supplemented with bale grazing, to keep cover on the ground, cycle nutrients and reduce his requirement for artificial nitrogen. His confidence in experimentation

and outcomes continues to grow – whether successful or not. But the proof of the pudding is in the eating, and Ian recalls recently moving strip grazed cattle.

“I noticed that chicory was dominant in the new strip, and looking ahead plantain was dominant, then further on again – where the soil isn’t so dry – I noticed that the grasses were more dominant.”

“If I had planted a monoculture of ryegrass I wouldn’t have had the diversity in species to respond to those different soil conditions within the same field, and would no doubt have had losses and a significant reduction in DM tonnage as well as compromised soils. There’s strength in diversity. I can’t express that enough.”



**Ian Baggs receiving his Nuffield scholar scroll from trustee Jim Baird**