ffinlo Costain – Keynote – British Cattle Breeders Club – 23rd Jan 2024

For ecological security, we need ecological efficiency, optimal productivity.

Systems that are not delivering multiple ecological and agricultural outcomes together should be considered inefficient in any future scenario.

Farm systems focused primarily on volume, or volume and emissions reduction, should be considered wasteful.

These systems fail to unlock the ecological potential of the livestock they are rearing, while at the same time loading ecological debt onto the world around them.

Healthy ecology: rich functioning natural capital, integrated with food and fibre production – this is an efficient system, with a cascade of components that can be monetised by farmers, rather than just one.

These are the systems that company contracts are already beginning to demand – and these are the systems that the public and the natural capital market place are prepared to reward.

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Some context.

We are facing into a climate crisis – which threatens ecological insecurity, locally and globally.

The world is changing – and we must too.

The good news is that you're really well placed to play a leadership role – because breeding is as important to ecologically efficient regenerative agriculture as it is to mainstream farming.

As we peer into the coming storm there are two competing futures, in terms of food systems.

The cow is at the centre of them both.

There is the industrialised, land sparing, emissions-centric future promoted by Bill Gates and George Monbiot – with lab-produced protein, cellular meat, and with farming squeezed into ever smaller parcels of land. In this future, land is divided up to deliver conifer forests here, clothing fibres there, hyper-rewilding units there – and in this world, human-edible food is produced in what's left over, with corporate-owned food factories replacing farms to grow petri-dish protein for the masses – and frankly not much space left for grazing cows.

The cow in this future is the villain – recruited into this role by emissions-centric life cycle analyses – which are obsessed-over by many scientists and by the policy-makers and mainstream media that follow them.

And where the cow exists at all, it's been demonized, and shuffled into highly-industrialised fully indoor systems.

Then – and I know there are many systems in between – but policy is driving in two opposite directions…

So then there's the agroecological future – where food is produced in partnership *with* nature, rather than despite it – where land delivers multiple outcomes – food, fibre, forestry and natural capital: together – where nations become more independent and resilient – where we achieve 'ecological security' and 'ecological efficiency' and begin to turn back the most dangerous aspects of our accelerating climate crisis. In this future, the cow; the grazing cow – ideally reared in adaptive multi-paddock systems – is the hero; the beating heart of that multi-function land use, that enables continual regeneration.

At the heart of the agroecological future – the regenerative future – is the knowledge that climate change is only part of the ecological crisis – and that we can't address this emergency while continuing to burn the fossil fuels (no matter how efficiently) that have previously enabled our industries to thrive and grow.

Agroecology accepts that fundamental change is needed. It envisions a new world – but one that thrives on diversity, innovation, localism and community.

To be clear – technology and genetics still play and important role. This is not about going back to the 1970s – it's about reconnecting with nature and applying the knowledge, data, science and monitoring technology we have now to create the sweet spot that delivers excellent productivity for the farmer and for nature.

Meanwhile, at the centre of the industrial, corporate-led Bill Gates future, is the belief that we can sufficiently decouple emissions and production while more or less continuing with business as usual – that climate change can be constrained and reversed through emissions reduction alone.

Well, I'm here to tell you that that future is a lie – and it must be challenged.

That future is doomed ultimately to failure because it's a solution to only one part of the problem.

It fails to understand or embrace the complexity of land use or to unlock the power and potential of rural communities and economies.

As a result, this lie will lead inexorably to ecological breakdown.

This lie is an existential threat to society, a threat to your businesses, and a threat to global security.

Climate change is driving and driven by biodiversity loss. Climate change is driving and driven by desertification and poor soil health.

I've used the term 'ecological security'.

I want to define this – because ecological security will become the singular issue of this century.

And I want to differentiate between 'ecological security' and 'food security' – because in recent months we've seen a renewed focus on 'food security'.

Some of this is welcome – but in terms of the longer-term future, 'food' security is a second order priority. It's not a stand-alone goal.

Our capacity to grow good food forever and to ensure nutrition for our communities depends on restoring the richness and complexity of a nature bursting with life.

Ecological security means mitigating *and* adapting to global heating. We must eliminate fossil fuels from our farm systems, but we must also accept that a significant level of warming is now baked into the system and adapt our societies to cope with the extreme weather that may come every season and every year.

Ecological security means regenerating biological diversity, the fundamental building blocks of nature.

Ecological security means that we must ensure that everyone has access to high quality nutritious meals, and that our food system *properly rewards* producers and *funds* rural development, jobs, infrastructure and, frankly, enjoyment – because without farmers ecological security is impossible.

But 'ecological security', also recognises the interface between ecology, food production and national and global security.

The right to affordable nutrition underpins peace and civil stability – and 'ecological breakdown' is already affecting the food production that depends on it.

If we see a 1.5 and then a 2-degree average rise in global temperatures, which now seems extremely likely, then we should expect to see substantial disruption to harvests and to global food supply chains.

When food is scarce, prices rise, meaning that inequality increases, and simmering resentments can turn rapidly into conflict and even war.

Food scarcity is an accelerant of instability.

Parts of the Arab Spring are widely thought to have been triggered by a spike in the *price* of bread, caused by Russian wheat harvest failure.

Oppressed, but just-about-coping Arab societies, were pushed to the brink of starvation and they rose up into revolution.

The climate crisis – that we're only just beginning to experience – is already affecting global food production, forcing migration and fuelling violence and terrorism.

These impacts will only increase.

And this strain on global food supply chains and international trading relationships will lead to greater national protectionism, military adventurism, conflict arising from migration, rapid price rises and supply chain instability.

The causes of Putin's war in Ukraine are complex and it would be foolish to overstate any single strategic impulse, but Russia's economy is currently built on fossil fuels and climate mitigation policies will increasingly turn these resources into stranded assets – unusable; worthless.

But Russia also exports grain. In 2020, Russia was the fourth largest cereal producer in the world; Ukraine the ninth. If Russia takes Ukraine, it increases its control over this strategic asset by around a third.

Throughout this war we've seen grain exports disrupted and weaponised.

This violent, attempted land grab – not to mention the financial speculation that it's sparked – has fuelled conflict and famine once again in North Africa, and exported painful food price rises and inflation around the world.

In the Gaza war, starvation is arguably being used as a weapon – Gaza's entire population of 2.2 million people is in food crisis, as defined by Integrated Food Security Phase Classification – 50% are in food

emergency, and around a quarter of Gaza's population is already experiencing catastrophe.

The conflict is expanding. In the Red Sea, Houthi attacks have essentially closed the Suez Canal. Shipping is diverting around the Cape of Good Hope, adding hundreds of millions of dollars in extra time and cost.

The Suez Canal accounts for 15% of seaborne global trade – the impact that this will have on inflation everywhere, the cost of living and on poorer people's ability to feed themselves is again called into question.

And this is simply a tip-of-the-tongue taste of what's almost certainly to come.

Conflict levels will increase if ecological insecurity deepens. Competition for basic commodities will rise and prices will follow. Trade routes will become more vulnerable to increasingly extreme weather… migration levels will rise… and these combined factors will place ever greater pressure on richer nation states… increasingly in competition with each other for basic commodities.

Our reliance on global trade makes us vulnerable – we need to rebuild natural resilience.

So now, just as nations are turning to renewables for greater energy security – we must turn to regenerative farming for ecological security.

We need to prioritise the health of our soils.

Soil function – the restoration of Earth's natural systems – the redesign of our food supply chains – these must become national security priorities.

Because ecological efficiency and national security are two sides of the same coin.

Regeneration is essential.

And the cow – managed by the agroecological farmer – is the ecosystem engineer that makes this possible.

So let me tell you the story of a cow in a regenerative adaptive multi-paddock system.

This cow eats herbs and legumes and leaves and other green things – and then, because it has four sections in its stomach, it'll transform this plant matter into compost super-fast, in a matter of hours.

And when this comes out of its back end… it falls on the ground and gets trampled.

And that trampling spreads the manure, moving the nutrients around.

At the same time, the hooves of this heavy animal are breaking up the surface of the soil – allowing those nutrients to get inside.

And then – because this cow is in an adaptive multi-paddock system – after three or four days of pretty concerted grazing, this cow and the rest of that herd all move on to another paddock – and they won't come back to this paddock for 3 or 4 or even 5 months.

And the ground is left to rest and recover.

What happens next is thrilling.

The earth – the sward with its grass and herbs and legumes – has been covered in a super-rich layer of compost.

And that makes the sward grow taller – much taller – perhaps three or four feet instead of one.

And it makes the roots grow deeper – breaking up the earth and creating life beneath the ground.

This high-functioning grassland, stimulated by regeneratively managed cows, is astonishing stuff.

Now, when it rains, all that tall grass slows the flow of the rainfall towards the ground.

And the deep roots mean that the soil, particularly at the surface, has become soft – allowing more of that rain to get inside.

And then the earth holds the water in a soil carbon sponge, which is like a great reservoir beneath the ground – and then releases it as the plants demand it, allowing green growth throughout the year.

And this grassland, because its sward, its biomass is greater, delivers faster transpiration – the transfer of water from liquid into gas – and this transpiration produces hydroxyl ions, which are the laundry process of the sky.

In fact, high-functioning grassland can produce many, many times the hydroxyl clean-up capacity needed to break down the biological methane that our regeneratively grazing cows have been producing – but these hydroxyls also clean and filter other pollutants and gases, such as particulate carbon and carbon monoxide, from the atmosphere as well.

And of course, because this transpiration is moving water from the ground into the sky, clouds form – and white clouds high up in the atmosphere are super important for reflecting some of the sun's energy back out into space (and therefore helping to regulate the Earth's temperature) – and then, because of the busy action of the hydroxyl ions, when the clouds gather and darken and finally burst – the water that falls as rain has been laundered, and is clean and fresh.

Let's go back to the ground.

Because in this high-performing pasture, stimulated by grazing cows, when the sun shines, the soil is protected – the ground is so well covered that the earth inside the sward stays at about 20 degrees C even in a heatwave – while if the land was bare, it could reach temperatures of 60, even 70 degrees centigrade.

And because the ground is cooler – it re-radiates much less heat back out into the atmosphere.

So just by keeping the earth covered well, our cow has delivered a cooling effect.

And what's happening inside the sward itself?

Well, the dunging and trampling of our herd has unlocked nutrients and other processes in the soil. Seeds that may have been dormant for decades are newly awakened. The sward itself becomes more diverse, growing dozens of different plants, which attracts a greater diversity of insects… more butterflies and bees… and then more birds…

As life attracts life.

Biodiversity thrives.

And cascades upwards through the soil, and outwards across the fields and hedgerows – as snails and spiders and beetles become food for bigger creatures that import seeds from wilder places, like river-banks and woodlands, on their feathers, their fur and in their poo.

And because the sward is tall, the roots go deep – penetrating the earth – and as these roots thrive and die and thrive again, they create millions of tiny pathways. Mycorrhizal fungi spreads – arthropods and bacteria work away below ground creating invisible cities – bustling and bursting with ecology – and all this leads to a great acceleration in the production of soil organic matter as these creatures live out their life cycles, predating on each other, excreting, reproducing, moving, tunnelling deep and shallow beneath the earth's surface.

Nature's complexity and resilience is gradually restored.

And as soil organic matter grows – as the sward's biomass builds – this captures carbon from the air, and then sequesters it, locking it inside the ground.

All these processes – because of a cow.

So, what has our cow achieved?

Well, there's carbon being absorbed from the atmosphere.

All that tall grass and ground cover are helping to increase transpiration and reduce temperatures.

Hydroxyls are cleaning the air.

When it rains the soil carbon sponge and deep roots hold more water, reducing run-off and avoiding flooding downstream – and then when that water is released it helps to produce, not only food for micro-organisms and arthropods, but green grass for our cow – and for everything in between.

The whole food web is supported.

Our cow… an ecosystem engineer… helps to tie nature's processes back together.

Now let me tell you a different story.

About a cow in a fully indoor fossil-fuel reliant farm system.

On a dairy farm our cows have been bred for volume – and by tweaking the diet of this cow, we can reduce the amount of methane she produces while still pumping out 10,000 plus litres per year.

On the climate mitigation balance sheet this looks good, right – more litres, fewer emissions – but there's nothing natural here – our cow rarely experiences a field – all her energy is going into milk production – and then after three or four lactations (or fewer) she's gone – and all she's done is produce milk…

What about all that wasted potential to deliver ecological function? This is the epitome of ecological inefficiency – and it drives ecological insecurity.

And what of grain-based finishing systems for beef cattle? If you think about a beef feedlot in the USA – thousands of cows penned in the middle of the desert – there isn't a tree or a blade of grass – all the feed and water has to be imported – all the grain almost certainly comes from petrochemical-reliant arable monocultures, perhaps from places that used to be rainforests. These systems are staggeringly ecologically inefficient.

So *feed* is a critical part of this story.

If a cow isn't feeding itself – grazing outside on a deep sward – then that feed has to come from somewhere – and that somewhere is nearly

always a system dependent on petrochemicals, a system that's eroding soil health and soil carbon instead of building it.

The vast majority of soy, for example, comes from intensive arable systems. Fossil fuels are used in the clearance of the land, and in production and transportation. And even more carbon is emitted through soil disruption.

Maize is shallow-rooted, requiring fertilisers and pesticides to produce it at scale.

Rye grass and oats, usually grown in relative monocultures, lead to poorer soil ecology and poorer infiltration.

If feed is home-produced then clearly transport emissions are lower, but to grow high energy grasses and cereals *without cattle* delivering sunlight, water and nutrient cycling – farmers need to use petrochemicals and machinery.

Let's think about climate adaptation for just a moment. This winter we've faced horrendous flooding – but if all farmers were regenerative – if we had a nationally active soil carbon reservoir – there would have been little to worry about.

Dig down in a field of rye grass and the water will have infiltrated a matter of inches – then go to a regenerative adaptive multi-paddock ruminant system – and the water volume in the soil will be phenomenal, held in biodiversity and carbon rich soil carbon sponges, perhaps 2 or 3 metres deep in the ground.

The most industrialised indoor systems farm cattle *despite* nature – focussed simply on volume and emissions reduction.

All that ecological waste and inefficiency.

And... after all, emissions are only part of the problem.

So let's talk about emissions – and in particular, let's talk about methane.

A focus on methane emissions reduction is what's helped to justify the expansion of these high-tech systems. *Carbon tunnel vision* and so-called 'sustainable intensification' go hand-in-hand.

B*ut methane is the single biggest source of greenhouse gas emissions in agriculture, right?*

Yes – but there's very little global warming coming from those methane emissions.

If that's where our focus lies, we're asking the wrong climate questions, directed by outdated science and policy.

A cow burp – in a short natural cycle – is not the same as fossil methane from oil and gas extraction which has taken millions of years to form.

But let's be really clear – this is no kind of denialism – the carbon dioxide emissions from burning fossil fuels can exist for a thousand years, warming our atmosphere.

But methane… is a short-lived gas, with a half-life of about 10 years.

After 20 years almost all of its warming impact – which begins as a burst and then peters out – has disappeared.

So, imagine a herd of a hundred cows – actually it could be a hundred or it could be a million – and after 20 years – providing their number has not increased (and actually that it's dwindled just a little, by 0.3% each year) – while their methane emissions continue, there is no new warming from that herd – each emission is simply replacing another.

There was a pulse of warming when that herd was first established way back when – but there is no additional ongoing warming from that herd.

So, what does that mean for the UK? Well, our cattle numbers have reduced over the last 20 years – we're already below net zero warming in terms of cattle methane… And we need to articulate this repeatedly for policymakers and the media.

Every tonne of fossil methane that comes out of the ground – that's additional – it has a powerful warming impact.

But ruminant emissions have been naturally cycling for millennia – and well-managed ruminant systems help to produce the hydroxyls that break methane down and complete the carbon cycle.

And the science *is* gradually catching up.

- The revised metric, GWP*, has been accepted by the Intergovernmental Panel on Climate Change (the IPCC).
- The old metric, GWP100, over-valued the global warming impact of stable ongoing emissions, by short-lived gases such as methane, by a factor of 3 to 4.
- And soon to be published research into carbon drawdown in the USA, has found that 12 tonnes of carbon is being sequestered per hectare per year in soils in adaptive multi-paddock ruminant systems – more than compensating for the methane emissions from the cattle on those farms. And, while it's not a competition – that's double the sequestration rate of standard British woodland.

Methane from ruminants – it makes a difference – but it's not a primary cause of global warming.

Let's come back to the cow.

Some farmers are worried that if they transition to regenerative practices their yield will fall.

Let me say a few things.

The metric that should matter to farmers is *profit* and not production.

Regenerative farmers have been able to slash their input costs, adapt their herd genetics and deliver highly robust, healthy animals that boost their farm profitability. While the *food yield is* lower than in highly industrialised systems, it's usually comparable and often better than the yield in conventional seasonal systems.

And the world already produces more than enough food for 10 billion people – but we waste so much of it.

Food waste is part of ecological inefficiency.

A third is simply thrown away – and then if you factor in obesity and overweightness as unnecessary calorie consumption – often linked to the over-consumption of ultra-processed foods – then around half of all food produced on the planet is wasted.

I'm going to start to bring things to a conclusion.

I've only scratched the surface – but I've tried to communicate that an industrialised future is doomed to failure because it's built on narrow outcomes, distortions and incomplete science.

That fossil-fuel dependent future is also dangerously ecologically inefficient – because it's sought to decouple beef and dairy production from the magnificent ecological outcomes that cattle can deliver.

I've outlined the importance of regeneration and described the astonishing ecological value of cattle in well-managed agroecological systems.

I've explained that a failure to choose the right future; a failure to mitigate the climate crisis and ecological breakdown, is a threat to society, a threat to farm businesses, and a threat to global security.

So where does cattle breeding fit in?

Well – that's for you to decide.

You've got all the skills – you've got more knowledge in this area than anyone's ever had – you *can* choose to lead in this emerging and new market of breeding for regeneration.

The world's changing – so we need to change too.

Breeding is as important to regenerative agriculture as it is to mainstream farming – but regenerative outcomes and values are different.

Instead of low methane cows, rapid growth and high production – regenerative farmers look for resilience, intelligence, good nurturing and mothering skills – they need stock that are easy to handle – that are robust and healthy – can self-medicate from diverse leys and hedgerows – cows that can thrive on rougher forage and in outwintering systems – smaller-framed animals that produce lower volume but higher nutritional quality and remarkable natural capital functioning.

Our news channel, 8point9, exists to support a practical, investable and inclusive transition to agroecological land use – and in recent days I've interviewed four regenerative farmers for you, with fascinating breeding stories. I hope you'll take a moment to watch these videos – or to listen to them as podcasts.

* Rob Havard from Phepson Angus has established a thriving regen breeding business.

* Phyllis van Amburgh has concentrated on developing her herd epigenetics.

* Sophie Wilson from Starveall Dairy and Silas Hedley-Lawrence from FAI Farms both bought breed cows to start their regen transition – and then worked to develop their own herd genetics on their farms.

If you go to 8point9.com you can click on the '8.9 TV' tab and watch the short videos…

Or you can visit the Farm Gate podcast channel and look for last week's Newsweek programme.

Rob Havard was also a special guest on our *Wheat from the Chaff* podcast – which is also available on 8point9.com and on the Farm Gate podcast channel – which is available wherever you get your podcasts.

I want to leave you with this thought.

You're really well placed to play a leadership role as this new world emerges.

A world of ecological efficiency and ecological security.

We don't yet know every outcome that we'll need to breed for – but the farmers I've interviewed give us some clues.

You and the British Cattle Breeders' Club are sitting on an exceptional depth of skills, and a history of delivering for what the market needs.

We're now emerging into the end game for volume-focussed emissions-centric production.

It may not quite feel like it yet – but it cannot continue because the flawed logic on which its economic model is built is crumbling.

Ecological security demands a fundamental transition to agroecological agriculture – food, fibre, climate and nature: together.

And you have the skills and the knowledge to ensure your own success and to support this ecological transformation.

Thank you.