
How AgriTech is key to
reaching net zero food production
BARCLAYS | Eagle Labs

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Innovation and collaboration

There is an ever-increasing requirement for the AgriFood sector to move to net zero carbon emissions. This report looks at how UK agriculture can work with innovators, academics and industry to make this happen. It identifies the challenges of making agriculture more productive and sustainable and considers how innovative technology can create effective solutions.

It is only by working together that we will deliver the innovation and change needed to meet the challenges of climate change. Eagle Labs supports a wide range of tech startups by working with like-minded organisations and building a national community of AgriTech entrepreneurs, farmers, academics, and industry leaders from field to fork.

The engagement of large enterprises throughout the supply chain is something that Eagle Labs seeks to encourage and enable. It is when these retailers, wholesalers and manufacturers plug into the energy and insight of the AgriTech ecosystem that accelerated progress happens. Commercial requirements integrate with disruptive approaches and cutting-edge tech to deliver game-changing products and solutions.

Eagle Labs helps businesses discover these synergies through a range of programmes, accelerators, events and other initiatives. We are always looking to partner with key AgriFood enterprises to help them share their expertise and collaborate with exciting young businesses that have the ambition and ability to deliver a better, more sustainable future.

So, whatever your size, stage, needs or ambitions, do get in touch to find out how you can be part of our growing community.

Roxanne Martin

AgriTech Lead, Barclays Eagle Labs

Executive summary

Tackling climate change is a priority for global and UK agriculture

The reduction in greenhouse gas emissions is a worldwide imperative, and while UK agriculture is at the leading edge of many sustainable practices, it has an important role to play in meeting net zero goals.

The National Farmers' Union has set a target of reaching net zero for agriculture across England and Wales by 2040. Its three pillars to obtaining this goal are: boosting productivity and reducing emissions, farmland carbon storage, and the coupling of bioenergy to carbon capture utilisation and storage.

Some major UK supermarkets have committed to being carbon neutral from their own operations by 2035.

Changes to UK farming must be data driven and economically viable

It is important that agricultural businesses conduct a carbon audit to create a baseline from which they can develop sustainability strategies to demonstrate achievement. Some funding is available to support such audits.

Changes to UK Government payment schemes and subsidies will make sustainable practices increasingly important for farmers. Retailers and other business within the AgriFood supply chain are focusing on improved carbon metrics and will look to farmers to help deliver their net zero ambitions.

Sustainable farming practices also need to be economically viable to allow agricultural businesses to support themselves and allow the production of affordable food. The best approaches and technologies deliver efficiencies for farmers as well as reducing emissions and ensuring greater supply chain resilience.

Innovation is essential and will be most effective when enabled through collaboration

Incremental changes to agricultural processes and practices will not deliver the scale of impact needed to meet net zero goals. The development and use of innovative technology is vital to reaching these targets.

There is a thriving AgriTech ecosystem, supported by the UK Centres of Agricultural Innovation and other organisations such as Barclays Eagle Labs and the School of Sustainable Food and Farming. The involvement of farmers in AgriTech is essential – as innovators, developers and champions, and to ensure that new tech is both practical and commercially viable.

Success will not be possible without collaboration right across the industry. This will involve new ways of working, effective sharing of data and insights, and finding funding and business models that enable the rate and scale of change required.

Funding in AgriTech is increasing and investment criteria are changing

Global venture capital (VC) investment in AgriTech doubled from $2.5bn to $5bn between 2019 and 2020. The subsectors of indoor agriculture, crop protection and inputs management accounted for almost 50% of deals in 2020.

Specialist VC funds with a focus on climate change are looking for investments in AgriTechs that can have a meaningful impact. There is also increased interest from traditional VCs that were previously deterred by the longer timelines and larger deal values often involved in agricultural investments.

Having a foothold in non-domestic markets and demonstrating a route to accelerated growth can be key to securing funding, especially from overseas investors.

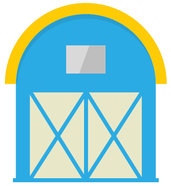
Source. Pitchbook/Finistere Ventures 2020

Farming and AgriTech: the challenges and opportunities of delivering net zero

The challenges posed by climate change are significant...

45%

reduction required in global CO2 emissions by 2030 from 2010 levels. Net zero by 2050. [1]



10%

UK's greenhouse gases generated by agriculture [2]

... leading investors to increasingly focus on AgriTech opportunities.

100%

increase in global VC investment in AgriTech 2019-2020 [5]

$5Bn

Global VC investment in AgriTech in 2020 [5]

Consumers are ready to make more sustainable choices...

49%

UK consumers bought more seasonal products in 2021 [4]

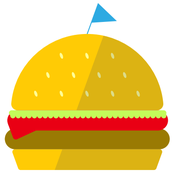
34%

UK consumers chose more sustainable brands in 2021 [4]

... and UK agriculture is focused on meeting net zero. [3]

2040

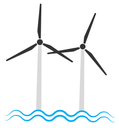
NFU target to reach net zero for agriculture across England & Wales [3]



50%

UK beef has half the carbon footprint of the global average [2]

The National Farmer Union has identified three pillars to reach net zero – AgriTech has an important role in them all.



1.

Boosting productivity and reducing emissions

2.

Farmland carbon storage

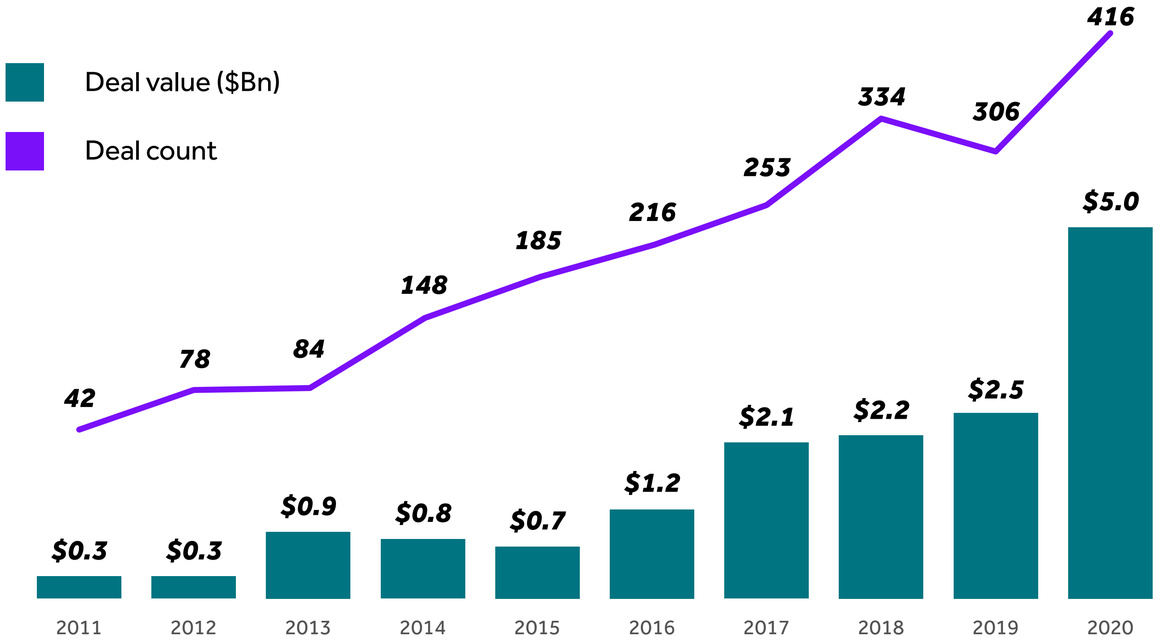
3.

Coupling bioenergy to carbon capture, utilisation and storage

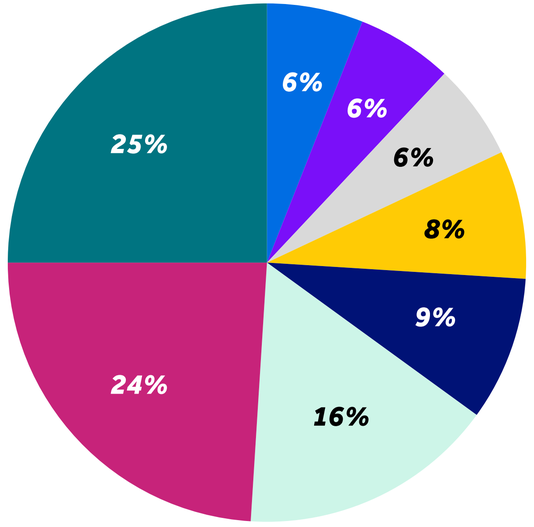
1. United Nations 2021 2. AHDB 3 NFU 4. Deloitte 2021 5. Pitchbook/Finistere Ventures 2020

Investment growth across multiple markets and technologies

Global AgriTech VC deal activity by year [5]



Global AgriTech VC deals – by subsector [5]



- Crop protection & inputs management
- Indoor agriculture
- Animal tech
- Agricultural marketplace & fintech
- Sensors & smart farm equipment
- Plant sciences
- Imagery
- Precision agriculture

5. Pitchbook/Finistere Ventures 2020

Why reducing carbon emissions is at the heart of farming's future

Simon Haley is a Co-Founder of Carbon Metrics and a specialist in strategic and financial business management for farms. Here he explains how carbon management will be increasingly pivotal to UK farming – and what role new technologies need to play.

What does Carbon Metrics do?
We help professionals and rural businesses understand carbon management and auditing more easily. We assist by analysing and interpreting existing data to generate a targeted management plan to show how Net Zero strategies can be achieved on farm.

What approach do you take with your clients?
For us, your carbon footprint is wrapped up in your business efficiency. The language that every farm and rural business understands is the pounds and pence figure of how much it makes an impact on their bottom line. Essentially, we're putting the financials into the heart of sustainability. If a farm is more productive its carbon footprint relative to its output will normally be coming down – and it should be making more profit too.

How important is it that agricultural businesses move to net zero?
It's vital. From December 2021 the Basic Payment Scheme (BPS) is reducing until it becomes zero in 2028. A lot is uncertain, but what is clear is that reducing carbon will be a key way to ensure subsidy or other financial support in the future, either from DEFRA or their banking provider.

So DEFRA will be driving a lot of this change?
Yes – to a degree. One of the four 'priority outcomes' for DEFRA is to reduce greenhouse gas emissions and increase carbon storage so we can expect to see that as an important part of any future initiatives. If you want to apply for a grant scheme going forwards, then in Scotland for example a carbon audit is a prerequisite. How long before England follows suit?

The current stage of the Future Farm Resilience Fund was launched in 2020 with £10.7m of funding to reward farmers for environmental improvements alongside food production on their land. In addition, the Farming in Protected Landscapes programme in Areas of Outstanding Natural Beauty (AONB), National Parks and the Broads will fund projects that support nature recovery and mitigate the impacts of climate change. Those two current schemes can be used to fund carbon audits and carbon management plans, and there will be other opportunities across the next few years also on similar schemes.

And could carbon emissions be linked to the cost of borrowing?
Absolutely. We know that banks and other financial institutions are increasingly focusing on responsible lending – which probably means sustainable lending from an agricultural perspective. So once again it is important for farmers to know what their emissions are and look for ways to reduce them. In the future, that could potentially lead to a lower cost of borrowing through reduced fees or interest rates.

Who will drive the change towards net zero?
We are seeing supermarkets and food manufacturers committing to more rapid reductions in carbon emissions. For example, Waitrose and Tesco recently announced they aimed to reach net zero by 2035[1]. The hard work for such policies is going to be passed all the way down the supply chain, including to farmers. And they will be incentivised by prices being linked to the carbon emissions of production.

1. edie.net

So the market has a role to play alongside DEFRA?
My feeling is that the government is holding off for now from making reductions in emissions a regulatory baseline, and is leaving it to the commercial market to drive change, believing it's a quicker way to make progress. That means UK farmers are going to be put in the spotlight when it comes to carbon because they're going to be the ones that everyone else relies on to get them to that net zero position.

What about carbon credits and sequestration?
There is a lot of discussion around carbon credits, but the situation is very unclear for the farmer. What will happen to the price of these credits, how long will they last for? And what about the issues around landlords' and tenants' rights? If a tenant increases potential to sequester more carbon and raise credits, then should the landlord be given first refusal to those credits. A great deal needs to be resolved – but as long as we look at these things from a business perspective, we can address these questions more coherently and ensure we have the engagement of the people who manage the farms.

What is the role of AgriTech in reducing carbon emissions?
Technology such as robotic tractors and drones are undoubtedly going to play a greater part in agriculture in the drive to net zero, but the majority of farmers I see are not engaging with that sort of thing yet, at not least on a scale where it will drive wholesale change in how they fundamentally operate their business. For them, the main way AgriTech can make a difference is in understanding the data that is involved in their day-to-day activities and decision making. There are too many software products that don't speak to each other. As a farmer I only want to enter data once ideally and then I need to get maximum value out of it, both in terms of insight and time savings which will then boost my productivity and so help reduce the carbon footprint by association.

Does that include carbon measurement?
Carbon measurement and management should be integrated throughout these systems but at the moment there are numerous agricultural carbon calculators in the marketplace which brings a lack of standardisation in the data. It is important to have some consistency, and for different types of farms to understand what a target baseline should be. A lot of the work we do is to help farmers arrive at a robust evaluation of their current position and develop a carbon management plan that works for their individual circumstances.

Are you hopeful for agriculture's journey to net zero.
There are a lot of challenges, but reducing carbon makes financial sense and that is key. It will improve access to subsidies and could reduce the cost of borrowing. It will improve productivity and ensure the best possible price, whether selling to the local butcher or a national supermarket supplier. It's essential that farmers understand that and are given the right advice and guidance. Technology will have an increasing part to play in the journey to net zero – and it will succeed best where a joined-up approach delivers tangible benefits to a farmer's bottom line. Ultimately those farms which will enjoy greatest success with technology input will be those that have clear strategies for its implementation.

Innovation and collaboration: at the heart of the drive for net zero food production

Trisha Toop, Chief Technical Officer at Agri-EPI, considers the challenges and opportunities that face farmers and AgriTechs in their journey to greater sustainability.

What service does Agri-EPI provide?
We are one of the AgriTech centres set up by the UK government via Innovate UK to help facilitate the move towards sustainable agriculture. Our focus is on precision engineering and precision agriculture – we help ensure that the tech being developed is commercially relevant to UK and global farming.

How big is the ecosystem you work with?
We have over 200 members including producers, AgriTechs and companies right up the supply chain to major supermarkets such as Tesco. The ecosystem includes a satellite network of 25 farms where we can test the technology and get very honest feedback from the farmers.

How important is the drive to net zero in the work you do?
Sustainability has always been central to our agenda though I worry slightly about the focus on 'net zero' as a phrase. There's a risk we concentrate entirely on carbon at the expense of the sustainability of the rest of the system.

So we need to understand sustainability in a broad sense?
Absolutely. Reducing greenhouse gases is clearly essential, but for the farmers and tech businesses we work with, it is vital that change happens in an economically sustainable way. Farmers are being told they need to move to net zero but are concerned about their economic baseline. Our role is to make the link between the farms and the tech so that what goes out to the farms is both environmentally sustainable and economically viable – and that can be a challenge.

Are food producers under increased pressure to reduce their emissions?
Yes, there's definite pressure. The large players are trying to pass a lot of the sustainability change further down the line to agricultural systems. That's putting a lot of pressure on the part of the system that has the least financial bandwidth. These aren't going to be small changes. A virtual system redesign is required – and it's a very complicated system. I think we're going to see agriculture change more in the next 10 years than it has since the first agricultural revolution in the 17th century. The impetus for change will be faster than is comfortable for many elements of the supply chain.

What will the role of technology be in this change?
Technology will enable the change to happen. We can't keep doing the same things – and incremental change will simply not be enough. Technology is the only way we can make the huge gains that we need. And the AgriTech centres are how we can facilitate that delivery.

Is there a healthy environment of innovation among AgriTech startups?
Some of the innovations I've seen coming out of the small startups blow my mind! The large organisations are working on solutions too, but there isn't one silver bullet for sustainability. We need all the innovations and tech coming out of the SMEs – that's what really excites me.

And what is the role of data in this drive for better practice and lower emissions?
Data is vital but it is a massive challenge. We're gathering a huge amount of data from our satellite farms but even with data specialists it's not easy to turn that into useful information. There's a massive job to be done to unify and share data while respecting different stakeholders' IP. But we need to get away from traditional, siloed ways of looking at data. That was business as it used to be, and now we need to create businesses and solutions for the future – and that will demand new approaches. It is only by enabling greater cooperation between all stakeholders that we can deliver reductions in emissions, greater overall sustainability and a healthy economic future for our farmers.

Supporting sustainability in farming

Sophie Throup is Head of Agriculture, Fisheries and Sustainable Sourcing at Morrisons. Here she explains what she looks for in an AgriTech and discusses the vision for the School of Sustainable Food and Farming.

How important is the drive to net zero to your business?

It's really important. We're British farming's single biggest customer and have 20 of our own manufacturing sites, so have very close connections with farmers. We also know that the environment is very important to our customers, so we wanted to play a full part in helping reduce climate emissions while also creating products that customers want to buy from British farmers.

We have an overall corporate goal to be net zero by 2035 but have also set a very stretching ambition to work with the farmers who supply us directly to reach net zero in our manufacturing by 2030.

How can you help farmers reach these goals?
We didn't want to set a target then walk away so we've been looking at the practical steps we can take to help farmers make the necessary changes. That involves stimulating innovation, improving knowledge and boosting funding. As a farmer myself I understand that the overall ambition can be daunting – it's a question of looking to see what can be done now that's going to make a difference.

What role do you see innovation and technology playing in reaching net zero?
Best practice and efficient operations are important, but we can't just tweak what we have always done to address that global environmental challenge that faces us as a generation. We need really innovative ways of thinking about problems. For example, we work with a business called Better Origin that takes food waste from one of our fruit packing sites and uses it as feed for insects that hens then eat so they don't need to be fed so much soya. That process is improving sustainability and lowering emissions at every stage. It also reduces cost – and we always need to consider the importance of producing affordable food.

And what role do you see farmers playing in the evolution of such innovation?
Farmers are natural entrepreneurs and have really great insight and innovative ways to solve some of these problems. They are also a crucial part of the development process. When they buy in to a new idea it can really speed things up and spread the word. We see that acceleration as part of our role too, accelerating things to get to that point of a validated commercial offer as soon as possible.

Morrisons is a founding supporter of the School of Sustainable Food and Farming at Harper Adams University. Why did the business get involved?
The major changes that are needed to meet the sustainability challenge require a systems change and different ways of thinking. The School of Sustainable Farming will help students at Harpers Adams but also students, farmers and business across the country by sharing core skills, research and development into sustainable farming. We wanted to provide very practical support for commercial farmers while also accelerating innovation and creating an effective network of collaboration.

How do you see the R&D activity of the school working alongside its educational role?
Research can sometimes happen without getting translated into changes in practice. We are trying to set up a virtuous circle where the practical findings of research are shared via workshops and webinars. There is then feedback from the farmers that helps insights and practices to be constantly improved.

What are some of the key things you look for when evaluating an AgriTech business or innovative approach?
It is often really important that it delivers on more than one level. As well as lowering emissions, is it going to make a farm more economically sustainable or reduce the need to buy in fertiliser? Will it make the farmer's life easier or provide other benefits? The best business offer multiple benefits.

The School of Sustainable Food and Farming is a partnership between Morrisons, McDonalds UK, NFU and Harper Adams University. Learn more **here**.

Why sustainability and resilience go hand in hand

Phil Bicknell is Head of Business Development at the Centre for Innovation Excellence in Livestock (CIEL) and was previously Chief Economist and Head of Food and Farming at NFU. He also has a small beef herd. Here he considers how the drive to net zero can improve resilience – and the part that AgriTech can play.

What is CIEL's purpose and how does it work with its stakeholders?

The government set up four AgriTech Centres of Agricultural Innovation in 2017. CIEL is focused on livestock innovation while the others focus on precision engineering, data and the arable sector. We are all aiming to get the right technology put into practice on farms more quickly. For CIEL, that has involved investing about £70m to ensure we have got the right research facilities across our 12 academic partners. The National Pig Centre at Leeds and the Centre for Dairy Science Innovation at Nottingham are two of the highest profile facilities.

The research is very commercially focused and is about addressing the challenges that UK agriculture faces. Our network of 70 industry members includes large retailers, animal feed suppliers, health and welfare business as well as innovative startups that have a great idea and want to make a broader impact.

How important is the move to net zero for UK agriculture?
Everybody is looking at the sustainability agenda and net zero is a thread that pulls together a lot of different areas that were already a focus, such as improvements in animal health and animal performance. For example, improving productivity to make better use of land has a positive impact in reducing your carbon footprint. In some of the rhetoric around rewilding and tree planting, my concern is that the potential from improving productivity doesn't get enough consideration. And of course net zero is at the forefront of government thinking and increasingly consumers' thinking too.

How do you see the relationship between sustainability and resilience in agriculture?
Many resilience challenges, particularly around supply chain, became apparent in 2021. Difficulties in getting product off farm, processed and onto shelves became headline news, with pork being the highest profile example. That demonstrated how complex our food supply chains can be and was a reminder that simplistic solutions will not work in the drive to improve both resilience and move us to net zero.

For example, reducing livestock numbers in the UK would present the real risk of offshoring if consumption was maintained, and that could have a greater overall negative impact on emissions.

Livestock farming is worth billions to UK industry – but businesses need to be profitable, particularly if they are going to invest in improvements. The positive thing is that there are lots of win-wins that improve the bottom line while reducing CO2 emissions. For example, I have 40 beef cattle and have been experimenting with rotational grazing which means I can make more effective use of my grassland, keep the livestock out longer and need to produce less fodder to feed through the winter. That's saving money while making me more sustainable and resilient.

What role does AgriTech have in delivering low carbon farming?
Technology has got a huge part to play. At the moment we are seeing different rates of adoption across different livestock sectors and that often comes down to business size and fragmentation, so pig and poultry are generally further ahead than beef and sheep, for example. At CIEL we have done a lot of work to assess different carbon mitigation measures. We've looked at how proven the technology is, how effective it is, as well as its cost and practicality. And we've done it sector by sector to help farmers understand the different options that are available.

Can you give any examples of AgriTechs aiming to improve both sustainability and productivity?
N2-Applied is a business with a technology that reduces odour and emissions from manure management, for example of pig and poultry farms. Critically it also improves the nitrogen value of that nutrient and so creates a more efficient, sustainable fertiliser. And with fertiliser prices currently skyrocketing that improves resilience and financial performance too.

Breedr is an AgriTech that is capturing daily live weight gains for beef herds. They use that data to help farmers finish their cattle earlier and saves money and has a carbon saving too. It is practical technology that delivers tangible results – and that is key to adoption.

Right across the ecosystem we are seeing businesses concentrating more on how their product can enable the move to net zero alongside its other benefits, and that's a real positive.

How do you see the relationship between AgriTechs, farmers and enterprise evolving?
It's only going to get deeper. For example we're seeing the likes of Morrisons and McDonalds collaborating with Harper Adams University around AgriTech and sustainability. The sustainability agenda is a focus for everyone – and startups are a key part of that.

As an industry we need to tap into the funding streams that are available. As well as concentrating on environmental targets, the government is putting money into research and development to drive productivity. The challenge for everyone from AgriTechs to big business is to tie those two things together and at CIEL we enable the collaboration to make that happen.

Case studies: Key challenges and how innovators are tackling them

Agreed Earth

Founded
2021

Founders
Kelly Price
Sarah Power
Reed Walker

Helping farmers transition to – and profit from – sustainable practises

How is it helping in the drive towards net zero?
We connect farmers to the resources they need to transition and profit. Satellite data for decision support is one element, but our real differentiator is harnessing the human element, as farmers learn best from other farmers. We're harnessing and harvesting the extensive knowledge that farmers who have been doing regenerative practises already possess. We help to digitise and scale this knowledge so that others can utilise and benefit from it. And we're rewarding the farmers who generate and share the knowledge.

How will agriculture and sustainability change in the next 2 years?
A revolution in agriculture is well underway. Farmers are hitting walls as productivity stagnates or declines while the price of chemical inputs continues to rise. At the same time, countries and companies are being pressured to decarbonise, and as agri-food/land use system is the source of a quarter of the world's greenhouse gas emissions, it's a natural target. These two tailwinds will be driving ever more movement towards – and investment in – sustainable agriculture and the companies that enable it.

What role will AgriTechs play in reducing emissions?
Sustainable agriculture's role in fighting the climate crisis is two-fold: first, by helping farmers reduce chemical inputs, emissions will be reduced because those chemicals are very energy-intensive to produce/apply. Second, by no longer applying so many chemical inputs and (in many cases) reducing or no longer tilling the soil, we can allow the soil microbes to flourish again, thus adding fertility (carbon) back to the soil, turning it into a carbon sink. Thus, sustainable agriculture has a 2-sided emissions impact. The biggest role for AgriTech is in identifying what sustainable practises - or sequence of practises - lead to the best outcomes in certain situations. Whereas conventional agriculture is very simple – whatever problem you wish to solve, you simply apply more chemicals – regenerative/sustainable agriculture harnesses nature to solve problems, and nature is inherently complex. Thus, so is the dataset needed to predict outcomes. This will help farmers avoid yield drop, which gives them both a better return financially as well as the confidence that these practises work and they should stick with them.

ALVÁTECH Water Revolution

Founded
2019

Founders
Zac Gazit
Yuval Chen

Enabling farmers to use saline water to grow crops and improve soil health

What does the business do?
Scarcity of water for irrigation and reducing soil fertility affects tens of millions of farmers worldwide. The salinity of both water and soil is also constantly increasing due to climate change. ALVÁTECH's sustainable technology enables farmers to use saline water to grow crops and at the same time improve their soil health and reduce the amount of water and fertilisers they use. The devices are solar powered, chemical free and farmer friendly with no maintenance. The technology is principally of use in more arid environments than found in the UK. It is being used in 24 countries worldwide, including the cultivation of avocados in Israel, olives in India and grapes in Abu Dhabi.

How is it helping in the drive towards net zero?
Net zero involves reducing greenhouse gas emissions as well as absorbing carbon dioxide from the atmosphere. ALVÁTECH technology reduces emissions by growing crops more efficiently and using solar power so machinery is used less to work the fields and pump water. It also allows carbon dioxide to be returned to the land by reviving soil health and improving soil biodiversity. Reducing water use is also a key element of sustainability.

What changes do you see in agriculture and sustainability in the next two years?
There will be a focus on increasing efficiency and improving resources management, including water usage, soil restoration and smart fertilisers. This will involve much progress with software and sensors – and also practices such as high-density crops, hydroponics, vertical farming and further moves to plant protein. Data gathering, analysis and proving impact in the field will be important, and more farmer-friendly formats and practices are required. Moves will continue to make solar and renewable energy an integral part of agriculture until it becomes the standard.

What role will AgriTech play in reducing emissions?
AgriTech is approaching net zero and sustainability from multiple directions and that is exactly what is needed. Companies like ALVÁTECH are enabling better use of existing resources along with reducing the need for ploughing and tilling. Using technology to gather and analyse information and develop special crop types will be important, as will controlling the growing process using greenhouses and hydroponics. Tech that enables improved soil conditions and carbon capture will also play an important role. It's an important and exciting time for AgriTech.

Deep Branch

Founded
2018

Founders
Peter Rowe
Robert Mansfield
Bart Pander

Using microorganisms to convert clean CO2 into high-quality ingredients

How is the business helping in the drive towards net zero?
Deep Branch is a carbon dioxide recycling company. We enable global sustainable animal nutrition by using microorganisms to convert clean CO2 into high-quality ingredients.

How will agriculture and sustainability change in the next 2 years?
The sustainability of animal farming and broader concerns regarding the reduction of emissions are two of the biggest problems of our time. By 2050 the world's carbon emissions must be net-zero to avoid the increasing impacts of climate change, yet by this point, our planet's population is predicted to increase by a third. With the average consumption of animal products increasing, it's thought that the output of animal farming will have to double to meet demand.

This means that we will need to see huge changes in agriculture to deliver sustainability.

What role will AgriTechs play in reducing emissions?
AgriTechs will play a vital role. Of the total emissions associated with the average person, approximately one quarter comes from diet and the majority of those emissions are associated with animal products. Although at Deep Branch we recognise the best way to reduce dietary carbon intensity is to reduce meat consumption, we're pragmatic in recognising that not everyone sees it this way. With a growing population and a limited amount of arable land, we can't produce enough protein to feed ourselves or the animals that we eat with the current means of protein production. At Deep Branch, we're tackling this problem through the development of Proton™, our single-cell protein.

We have partnered with two multinational animal feed producers to co-develop Proton™-based feeds for use in aquaculture and poultry. Over the next two years, we'll be scaling our output and working together to finalise feed formulations for an anticipated 2023 market launch. Rather than relying on the conventional protein sources of protein, fishmeal and soy, which are often shipped from South America, Proton™-based feeds can be produced from locally sourced ingredients with 90% less carbon intensity.

We believe innovation will only continue to move toward producing food sustainably, rather than cheaply, as initiatives and conversations about repairing the environment become increasingly important – meat, too, can move into a position where it is carefully grown. This is where we see AgriTech come in: developing innovations that can be used across the value chain to improve efficiency, profitability, and sustainability.

Recycled Crop Nutrients

Founded
2020

Founders
George Coldstream

Processing industrial waste streams into fertiliser products

How is the business helping in the drive towards net zero?
We are looking at industrial waste streams involving fertiliser nutrients, agricultural crops and animal waste. These waste streams are generally in the form of ashes that farmers cannot make use of. We are processing the ashes into granular and pelleted agricultural and horticultural fertiliser products that farmers and growers can then apply.

Many chemical fertilisers are imported and can be very expensive. Such fertilisers may not contain the wide range of nutrients that help crop growth and improve soil structures. The ash products that we are developing are multi-nutrient products with a range of benefits that make them a more sustainable choice. For example, power stations and anaerobic plants have been built in recent years with inadequate consideration of their waste streams. This results in ashes going to landfill. We are working with several operators to convert their waste streams into fertiliser products, helping both them and the agricultural end user achieve their net zero goals.

What changes do you see regarding agriculture and sustainability in the next two years?
Subsidies are obviously going to play a key role. Farmers are now more concerned for their soil health as they transition to more sustainable farming practices. They are looking for more natural products that contain a wider range of nutrients that are going to improve their soil structures and crop health. This will enhance soil carbon storage while reducing carbon emissions.

What role will AgriTechs play in reducing emissions?
Cutting edge AgriTech research, complemented by traditional facilities, is key in helping UK agriculture to become the most digitally enabled farming industry in the world. Achieving this will involve bringing all parties together.

The global investment focus on net zero and AgriTech

Chris Neumann is a partner at Panache Ventures. He has extensive experience of the North American investment market and has worked with many UK startups as part of Eagle Labs Global Connect missions.

How important is net zero to US and global investors?

Net zero is becoming increasingly important to the investment community and the world in general. In recent years we've seen more funds that are focused specifically on carbon reduction and climate change. Those investors are looking to find and fund startups that are going to have a meaningful impact.

Beyond these specialist funds, we're seeing an increasing willingness of generalist VCs to invest in companies that are focused on climate change. Historically, those companies were very capital intensive, so they didn't really fit into the model of traditional Venture Capital (VC) – but we're seeing more of an appetite from those traditional VCs to jump in and get involved. Beyond that, many VC investors – the limited partners that fund VCs – are pushing funds to look more at Environmental, Social

and Governance (ESG) opportunities in general, and net zero and climate change businesses in particular.

What attention is being paid to AgriTechs by investors?
Agriculture is a significant producer of carbon emissions, so there's a lot of effort to find ways to minimise that footprint: everything from limiting emissions from cows, to reducing water and fertilizer use for crops. We're seeing a pretty meaningful focus on AgriTech with significantly larger investment into agricultural technologies by tech VCs than we've ever seen before.

How international is the investment activity around AgriTechs?
Contrary to what people might expect, the majority of AgriTech funding doesn't come from Silicon Valley. Silicon Valley is a little far away from a lot of the agricultural producers. In the US, we see more of that funding coming from, and going to, middle America. We're also seeing far more of an appetite to invest in international companies, because this is a global problem. And the solutions are coming from all over the world, not from San Francisco.

What are investors looking for from AgriTechs?
Agriculture is, in general, a more slowly moving and traditional industry. Practices are based on the way things have been done for many years and new technologies are often adopted more slowly. So, when looking at startups, investors want to understand how the business is going to be able to grow and have an impact on a faster timescale than might historically be the case for agriculture. This is similar to other traditional industries – like construction and manufacturing – where the startups that are able to succeed and have a real global impact are the ones who figure out how to grow quickly, despite the inherent resistance of the industry that they're selling into.

How can UK AgriTechs improve their chances of securing overseas investment?
The biggest piece of advice I can give is to have clients in the country that you're looking for investment from. US investors, for example, are going to be far more interested in an AgriTech company that has sold or deployed their product into American farms than a company that has only sold or deployed in the UK. That's because of inherent scepticism and legitimate concerns that the solution may be specific to the home country.

Conclusion

The road to net zero can only be achieved by working together towards this common goal.

In this report we've heard from trade associations about what they're doing to get to net zero and from some exciting AgriTech startups with sustainability and improving the food supply chain at the heart of their business.

While there are some excellent initiatives, we think more collaboration is going to be the key driver to net zero.

Our dedicated AgriTech team is passionate about connecting AgriTech talent with farmers, academics, large food producers and retailers and to help power the industry reach its goals.

Get in touch to find out more about our AgriTech programme and how you can get involved.

Barclays Eagle Labs

The beating heart of the UK entrepreneurial ecosystem.

At Barclays Eagle Labs our mission is to connect the UK's entrepreneurial ecosystem through a network of business incubators, expertise and support.

We have created a community of top innovators, industry experts and mentors designed to support ambitious entrepreneurs and startups looking to scale as well as helping transform organisations and empower future skills.

Our Eagle Labs Agritech team works with many industry partners to bridge the gap between emerging AgriTech innovation and the food supply chain in order to help solve the challenges that being more environmentally sustainable brings.

In the face of emerging technologies and disruption across all industries, there has never been a better time to connect the startup community to each other, to central and local government, academia and corporates to exchange ideas, partner and innovate.

Find out more at labs.uk.barclays.

Get in touch

We're keen to partner with other organisations, public and private, to support a more sustainable food supply chain from field to fork. We would love to hear from you to explore opportunities and understand how we can collaborate.

Please get in touch if you're interested in opening a physical incubator space; want to run a growth programme; or would like to access virtual support, expertise and a national network.

Through our Eagle Lab Farm in partnership with University of Lincoln, we support the development of emerging technology in agriculture. We help organisations embrace new and emerging innovations and technologies, to help the UK agriculture become the most digitally enabled farming community in the world.

Meet the AgriTech team

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Before you go

Want to collaborate, tour one of our Labs, or find out about some of the great projects we're working on? ***Contact us***. We'd love to hear from you.

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