



AGRITECH IN THE EAST

Summary Paper of the AgriTech
Event at NIAB

June 2024

“Be Part of the Region”

A Unifying Vision for the East of England

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1 INTRODUCTION AND BACKGROUND

This short paper provides an overview of the AgriTech sector in the East of England and a summary of the discussion from a recent event about AgriTech, hosted by the National Institute of Agricultural Botany (NIAB) in Cambridge.

AgriTech (Agricultural technology) is the use of science, technology and digital tools in agriculture, horticulture, and aquaculture. AgriTech can be products, services or applications derived from agriculture, such as automated machinery, supply chain and resource management systems, and genetic engineering of crops.

However, advances in agricultural science and technologies including biotechnology, artificial intelligence and machine learning have led to broader applications than the improvement of farming in terms of yield, efficiency, and profitability. This includes developments in predictive weather patterns, carbon reduction, and preventative health.

A recent report commissioned by the Government Office for Science identifies underpinning technologies and platforms (e.g. in gene sequencing and editing, robotics and AI) that have application beyond human life sciences, in agriculture and animal health. This area of modern industrial biotechnology is an emerging global market in which the UK and the East of England has leading strengths and potential competitive advantage.¹

The UK currently has over 1,200 registered businesses in the emerging 'AgriTech' sector with a combined turnover of over £13bn. Of these, just over 13% are based in the East. Second only to the South East among all regions and nations in the UK. While the sector is currently very small in terms of the number of businesses and employees, it is among the fastest growing sectors in the UK, with an average company growth of 7% per year.

Agri-tech is a key specialism and vital to the future competitiveness of farming in the East and the UK. Research and development into the application of new and innovative technologies, will be increasingly important to ensuring food security and a sustainable farming industry. Yet the sector has not received sufficient investor attention in recent years and the amount of venture capital funding (£1.3bn in total) is not increasing as fast as our other emerging sectors. On average the roles advertised in AgriTech are 13% lower than the UK's average salary.²

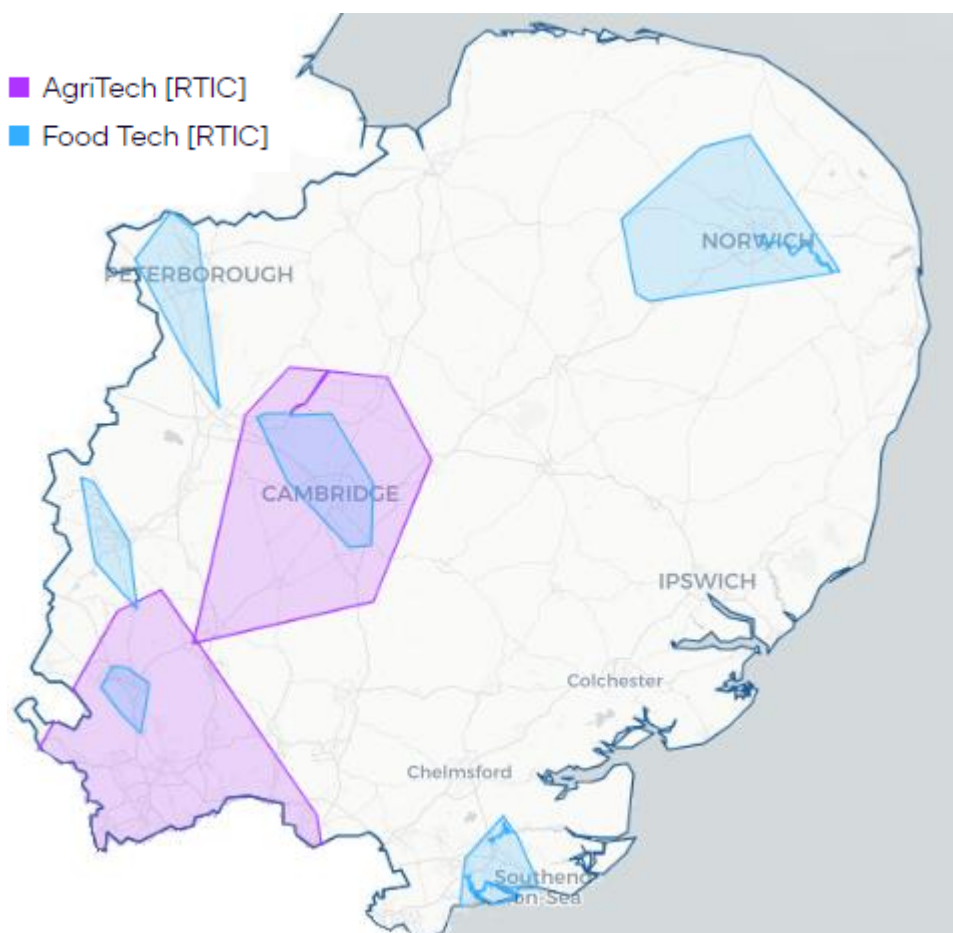
¹ Life sciences beyond human health: modern industrial biotechnology in the UK. Institute for Manufacturing, University of Cambridge 2023

² <https://thedatacity.com/rtics/AgriTech-rtic0003/>

2 UNDERSTANDING THE AGRITECH SECTOR

The AgriTech sector is important to the whole of the region with a presence in many local authority districts across the East of England. However, there is clear evidence of a clustering effect in and around Cambridge/South Cambridge, Peterborough, Norwich, Hertfordshire, and South Essex.

Figure 1: Map of Agritech Clusters in the East of England



Source: Department for Science, Innovation and Technology³

Quantifying the size and scope of the AgriTech sector in the UK is not straightforward using standard industrial classifications (SIC codes) and government data sources (e.g. IDBR). This new and evolving sector does not fit easily with existing categories. Assessments are based on best estimates only.

The following analysis for AgriTech in the East of England has been conducted using datasets collected and categorised by the Data City platform. DataCity has categorised AgriTech businesses into various subsectors based on their Real-Time Industrial Classifications (RTICS)⁴.

³ <https://www.innovationclusters.dsit.gov.uk/>

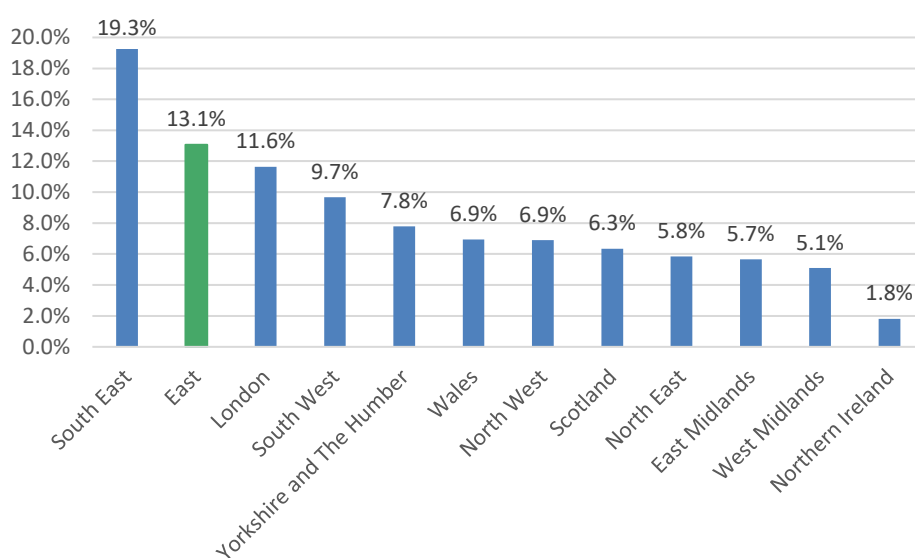
⁴ <https://thedatacity.com/rtics/>

Individual companies can belong to multiple subsectors, depending on the breadth of their operation. It's important to note that according to this classification system some businesses are counted more than once. For example, there are over 1,200 unique AgriTech firms in the UK. Some of these are categorised in several sub-sectors which creates a total count of 2,825 businesses. Consequently, most of the figures presented below relate to business activity and will not always sum up to the number of unique businesses in the region.

2.1 Businesses

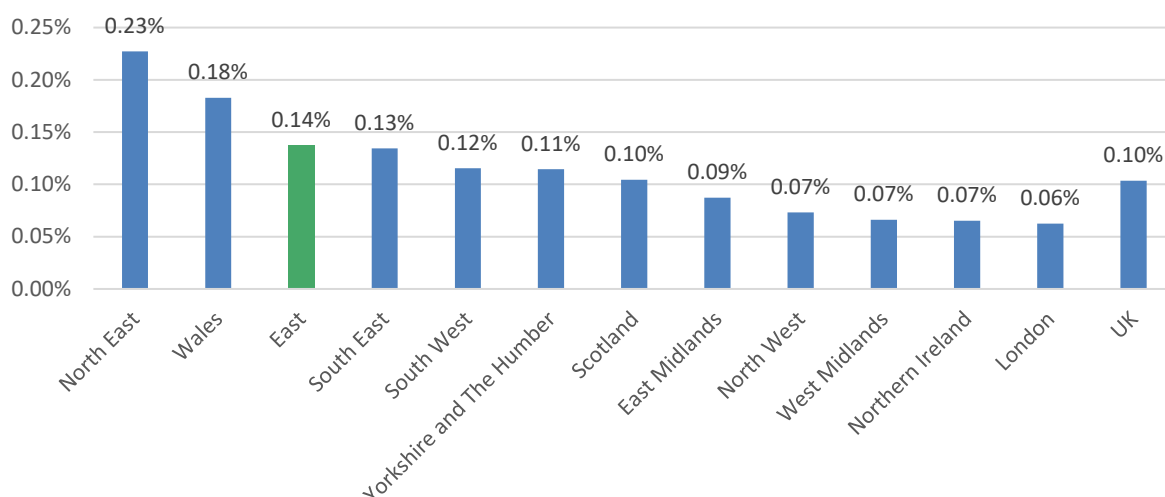
The East of England hosts 369 AgriTech businesses (multiple count across sub-sectors) representing 13% of all AgriTech businesses in the UK.

Figure 2: Percentage of all AgriTech Business in the UK by regions and nations



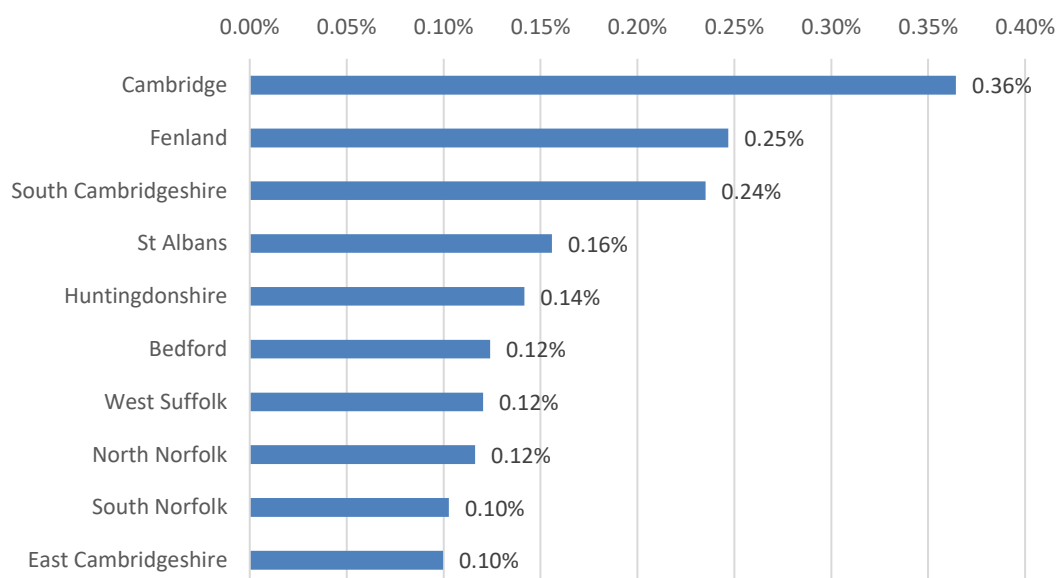
AgriTech businesses constitute 0.14% of the total businesses in the region. This percentage surpasses the national average of 0.10% but ranks below the North East and Wales. The national and regional growth trends suggest that, although the East of England has a relatively significant presence in the AgriTech sector, there are opportunities for the AgriTech business to grow further as a proportion of all businesses.

Figure 3: AgriTech as a proportion of all businesses by regions and nations



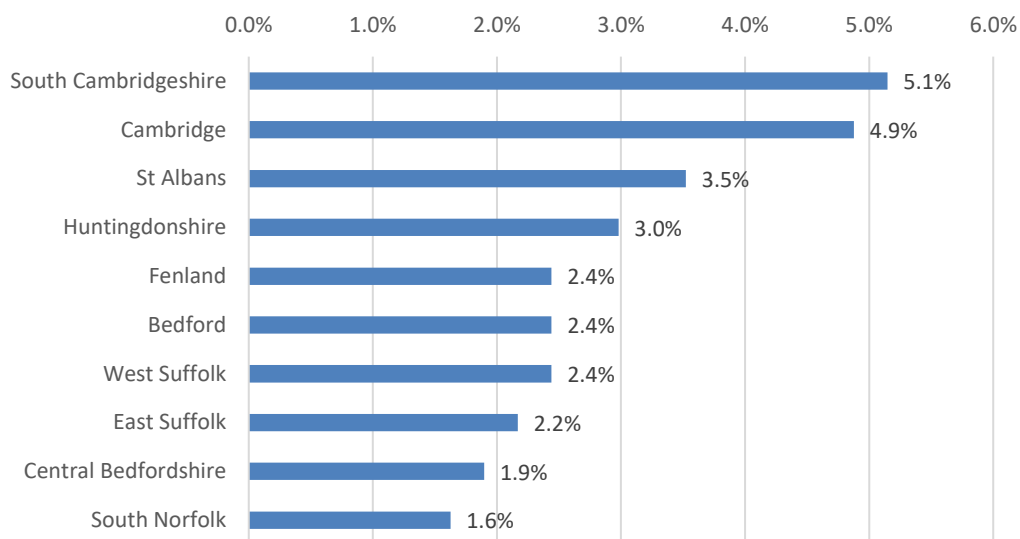
Upon closer examination of the ratio of AgriTech businesses at the district level in the East, it is notable that only 4 local authorities (Cambridge, Fenland, South Cambridgeshire, and St Albans) surpass the regional benchmark of 0.14%. For example, 0.36% of all businesses in Cambridge fall within the AgriTech sector. See Figure 3, below.

Figure 4. AgriTech businesses as a proportion of all businesses in each authority (Top 10)



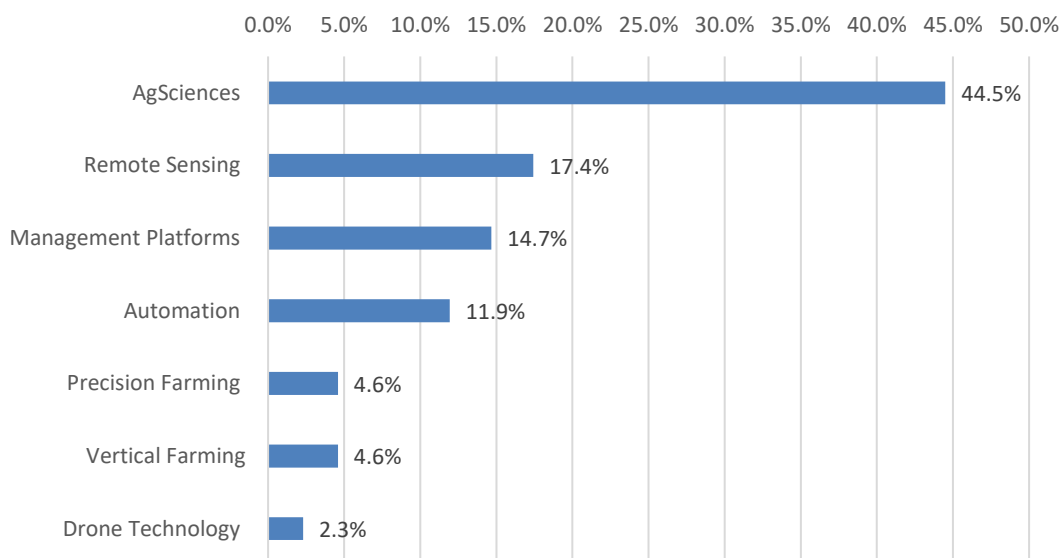
The geographical distribution of AgriTech businesses in the East appears relatively scattered, with only South Cambridgeshire, Cambridge, and St Albans having a percentage over 3% of the total AgriTech businesses in the region. Further details are provided in Figure 4 below.

Figure 5: AgriTech businesses in local authorities as a proportion of all AgriTech business in the East (Top 10)



Data City have categorised the AgriTech in terms of constituent sub-sectors, see Figure 5 below. Among these AgSciences claims the largest ratio of businesses in the East at 44.5%, which is the most prominent sector in term of turnover. Nationally, there are just 31% of all companies in this sector responsible for 69% of all turnover. This relatively larger share in higher value activity reflects the research capabilities and assets in the region and suggests the potential for future growth.

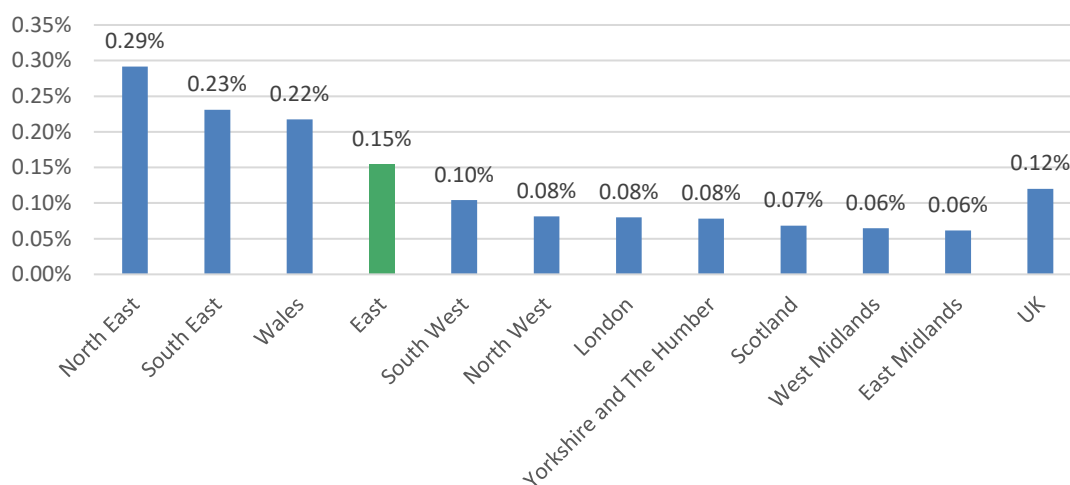
Figure 6: Percentage of business in each subsector of AgriTech in the East



2.2 Employees

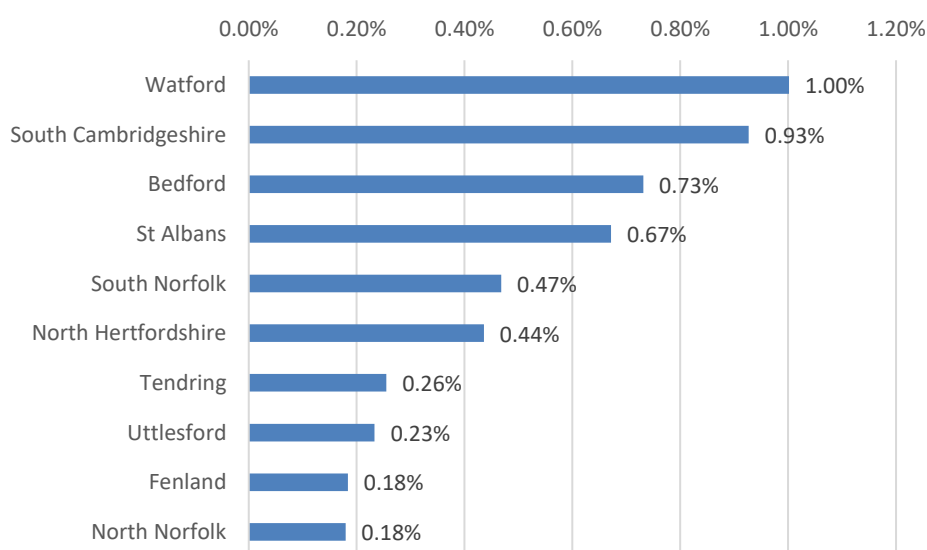
The East of England has 4,371 AgriTech employees, constituting 0.15% of the regional workforce. This percentage slightly exceeds the national average of 0.12% but ranks below the North East, South East and Wales. It is evident that the percentage of employees is currently very small in all regions. Nationally, growth in the sector has not been matched by wage growth, with average vacancies advertised below average wages. This could suggest that the sector is not sufficiently attractive to skilled labour, which is limiting growth. However, this may not be the case in the East, with a higher proportion of employees in higher value agscience related activity.

Figure 7: Percentage of AgriTech Employees in all regions and nations



Looking at the ratio of AgriTech employees at the district level, 10 areas in the East have a percentage of AgriTech employees exceeding the regional benchmark (0.15%). See Figure 7, below.

Figure 8: AgriTech employees as a proportion of all employees in local authorities (Top 10)



The geographical distribution of all AgriTech employees in the East appears relatively concentrated around South Cambridgeshire, Watford, and Bedford which collectively contribute 47% of the total AgriTech employees in the region. See Figure 8 below.

Figure 9: AgriTech employees in local authorities compared to all AgriTech employees in East (Top 10)

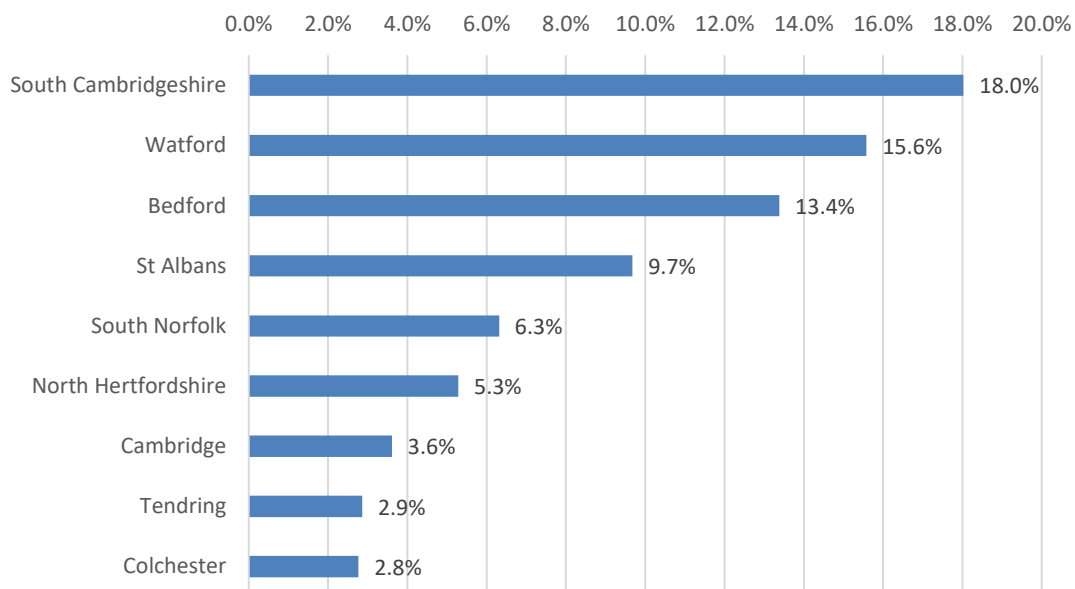
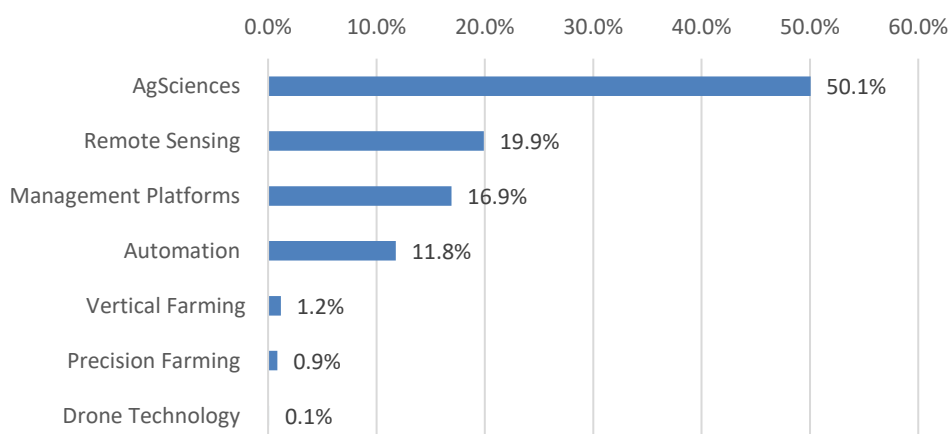


Figure 9 offers more detailed information about the percentage of employees in each subsector in the East. For example, AgSciences claims the largest ratio in the East at 50.1%, shedding light on the concentration of workforce within specific AgriTech subsectors in the region.

Figure 10: Percentage of employees in each subsector of AgriTech in the East



3 HEADLINES FROM THE AGRITECH EVENT AT NIAB

In March 2023 the Eastern Powerhouse held an event, hosted by NIAB. The purpose of the event was to discuss the key policies needed to support and unlock the full potential of the AgriTech sector in the East of England. The following is a summary of the discussion.

3.1 Panel Members:

- George Freeman MP former Minister for Science, Research, and Innovation
- Prof. Mario Caccamo, CEO, NIAB
- Dr. Belinda Clarke Director, Agri-TechE
- Dr. Louise Sutherland, Director, Ceres Agri-Tech
- Daniel Zeichner MP.

3.2 Opening Remarks

George Freeman introduced a three-part structure for discussion, to cover:

- Technologies
- Challenges for the sector in East and the UK
- Financing.

In his opening remarks George Freeman stated that AgriTech is about doing more with less. For a long time, there was an assumption that agriculture in the UK is not a problem. But food security has been heightened by Ukraine, and bureaucratic problems post Brexit are slowing progress. The UK needs better relations with the EU – divergence is quickening; and better planning – the national land use framework needs reform.

Belinda Clarke (Director, Agri-TechE) stated that the UK is now 2nd in the world for investment in food tech. But AgriTech and food tech is more than just farming and agriculture. It involves data science, material manufacture and AI. These tech specialisms and expertise can address global challenges, like climate change. Food production and security need not run counter to the reduction of carbon emissions from agriculture - both goals should be pursued at the same time. But integration and connectivity of the regulatory frameworks are not there yet. AgriTech E is building the ecosystem: science, research, and translational activity to make places to live and to grow businesses. All this resides in the East - Defence, Automation, AI, Genetics, Machinery.

Daniel Zeichner argued that long term Industrial strategy is needed to drive development in the sector. This should have a regional structure – something which was lost post 2010, with the abolition of the regional development agencies. There is a real need to create a pathway through regulation to enable innovation in AgriTech and food production and to address the

planning system which is hugely problematic for innovators. There is a huge overlap between political parties on these issues.

Dr Louise Sutherland, Director, Ceres argued that University spin outs are among the most long lasting and successful startups and that that collaborating between different intersections and universities is key to innovation. Ceres operates a loose definition of the East involving universities in Lincolnshire, Hertfordshire, Reading, Cambridge and UEA, working with NIAB and the John Innes Centre. Research is leading to early-stage drug discoveries and pollen therapeutics. The programme is taking academics on a translational research journey, a process involving patents, licensing, Investment in research, pitch to investment.

There is lots of discussion about how to make AgriTech investable to bring together regulation, with innovative ideas and investment capital - 26 companies are looking for investment in the £20m range. But there is no one size fits all solution to the challenges. There are very different narratives across the globe e.g. UAE sovereign funds are interested in the problems relating to desert conditions and water scarcity and therefore looking at vertical farming. Nova Scotia is a very different climate and research here is looking at countering the effects of crop disease, for example, potato blight.

3.3 Comments and thoughts from floor

On the diversity of the sector

There was some discussion about food production and why the big players are not coming down the supply chain e.g. British Sugar, Sainsburys. Is there a food industry asking for farmers to adopt AgriTech?

Other comments suggested focusing on food production misses the bigger picture. AgriTech is not just food production. Farmers use machines and chemicals but the production of these are industries in their own right, related to but apart from producing food.

Discussion turned to advances in AgriTech and how this can help other sectors – e.g. construction materials, bio energy, engineering biology, life science, agri/bio-chemicals, carbon capture and reduction of emissions.

The carbon footprint of the construction and textile industries are massive, and present huge opportunities for the sector to solve. The role of AgriTech in the wider environmental piece is opaque and needs to be more clearly expressed.

On regulation

The discussion centred primarily on the problems of regulation although it was recognised that regulation is necessary to minimise risks and that regulation can facilitate not just limit innovation.

Greater connectivity between different sub-sectors in AgriTech and related biotech is needed to improve the regulatory framework. Examples of problems with regulation include:

- Regulation of gene editing doesn't include microorganisms
- Legislation framework around growing hemp – chemical property is 0.2% in UK (0.3% EU)
- It takes 5 years to get an import order into Europe – like waiting 5 years for a passport.

One suggestion was that we need a regulatory dashboard board and detailed plans to establish what is deliberately or unintentionally blocking progress, to make regulation less process and more outcome driven.

The agrifood sector is a highly regulated sector, making innovation of new products complex. For example, there is no distinct regulatory pathway for cell-cultured meat to be placed on the market, this would need to be authorised as a 'novel food' which derives from retained EU law. There is not currently any detail on what a post-Brexit regulatory framework will look like and when it will be introduced. (Stevens & Bolton, 2022).

Greater incentives and regulatory permission for increased exports is needed. There is also an open question as to whether regional expertise is required to enable the sector to find a route to international markets and enable growth in trade and export capability.

On funding

Discussion centred on whether there was a shortage of funding in the sector compared with Whitehall bureaucracy and the need to change the way government works.

The Mansion House Reforms were raised as a significant statement of intent by Government to drive venture capital and private equity investment in technology, science, biotech and other innovative sectors to support growth of the UK economy. It was noted that pensions capital flow has reduced from over 50% in 1997 to 6% currently.

Concern expressed that finance for start-ups is more difficult to access than the large amounts of capital available for scale-ups. It was suggested that the question for investing in innovation is "Why now?" What are the triggers for investment? Why did biomedicine take off when it did? What are the equivalent triggers for agritech? We need better data to understand these opportunities. Red, green, amber ratings.

Selling things early is a problem – too distance from customers. Being a long way from a market that will adopt early and well (the NHS has not been great in this respect) encourages innovators to sell early and UK assets are lost to foreign investment (e.g. the US).

Accelerated access (as per the medi-sector) is needed for the agri-tech sector. Environmental targets could drive this development – accelerating progress towards meeting net/zero by 2030/40/50.

We need a national mission with an investment pathway! Finance continuum vital. In the East this could mean a regional investment fund. Government should make the east the test ground for this approach.

What can the East do?

Big ideas are needed that can make transformation happen. But we need to build on existing arrangements across the East.

A shared narrative between CPCA and devolved arrangements in Norfolk and Suffolk is needed to pull together the assets that are already there.

A shared vision needs to be achievable. It needs to understand the speed at which different sub-sectors work e.g. it takes 20 years to breed a new seed.

The East – with 110 PHDs in AgriTech and robotics - should be a global AgriTech cluster. It should be the UK gateway to trade with Europe.

4 SUMMARY

AgriTech is an emerging global industry and a small but important sector in the East of England. The East has the second highest proportion of AgriTech businesses among all regions and nations and a competitive advantage in 'AgriScience' relative to the UK as a whole. This sub-sector accounts for almost 70% of all turnover in the UK.

AgriTech is key to food production, but it is not just about food, for example. Developments in plant genome sequencing can improve biodiversity, reduce carbon, and develop new crops that can provide health benefits by reducing the risks of heart attack or diabetes.

AgriTech businesses in the UK face several funding challenges, including high initial costs for start-ups, long development cycles leading to commercialisation, uncertainty relating to market acceptance and regulatory approvals, as well as a lack of investor awareness. To truly transform the sector, there is a greater need for public and private sector investment, to further enable innovation and growth.

It is hoped that the Mansion House reforms will provide for better investment opportunities while the new AgriTech Catapult will help to stimulate growth in the sector, although none of the constituent centres are currently based in the East. There is an argument for creating a regional hub drawing expertise from: the East of England Agri-Tech Growth Initiative; Agri-Tech East; the National Institute of Agricultural Botany (NIAB); the University of Cambridge Department of Plant Sciences; and the John Innes Centre.

These institutions and initiatives - along with devolved authorities in Cambridgeshire and Peterborough (Norfolk and Suffolk) - play a crucial role in driving innovation and technological advancements in AgriTech in the East of England and beyond. Greater levels of collaboration and synergy across the region could help scale up activity. A regional hub could help the sector to develop a shared vision and policies - with understandable and translatable regional targets for jobs, productivity, CO2 reductions - that will attract talent and investment required to break new ground. A regional hub could potentially host a regional investment fund.

Skill shortages in AgriTech in the East may need to be addressed. To enhance understanding, a deeper exploration into the specific industries contributing to the AgriTech workforce, skill shortages, skill gaps, and potential barriers could provide more reliable insights for targeted strategies to bolster employment of this sector in the East of England. There is a data requirement to better understand the sector including the need for improved labour market intelligence as well as funding data about private investments.

There is a need to get investors and politicians excited about the industry. To address the disconnect in the food industry between farmers, processors and customers to improve the distance to market, as well as the planning and regulatory barriers.

Partners in the East should co-create a vision for AgriTech in the region and generate a set of achievable asks that can provide the pathway for accelerated growth in the sector.

ATTENDEE LIST

Jen Bromley	CSO	Vertical Future
Rosemary Bryson	Head of Marketing and Communications	CHAP
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Holden Cooke	Director	East sustainability
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Peter Craven	Potato Research Development	NIAB
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Simon Darby	Head of Public Affairs	PLMR
Andrew Dear	Head of Technical Support	British Sugar
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Bob Eyre	Director	Eyre Trailers LTD
Joe Faulkner	Partner	KPMG
Andy Forbes	Head of Development	Lifelong Education Institute
Alistair Gale	Chief Executive	UK Flour Millers
Ed Gemell	Leader	CLIMATE PARTY
Nicola Harrison	Director	NIAB
Raisa Ilyas	Technical and Regulatory Officer	British Poultry Council
Maria Kolesnikova-Allen	Commercial Application Scientist	LGC Biosearch Technologies
Satish Kumar Eeda	Senior Technician	NIAB
John Latham	Partner	Waltham Hall Farms and NIAB Trustee
Rudy Maor	Royal Society entrepreneur in residence	John Innes Centre
Jurgita Margelyte	Manager	M Brock Ltd
Jennifer Powers	Policy Director	Meld Energy
Nadia Radzman	Research associate	Sainsbury Laboratory Cambridge University
David Rayner	Partner	Birkett Long LLP
Prashant Shah	COO	O2H LIMITED
Lydia Smith	Head Innovation Farm and Hub	NIAB
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