

Enabling Growth in the New Anglia AgriFood Tech Sector through Skills Development 2017-'25

**New Anglia LEP Sector Skills Plan - AgriFood Tech
Submitted to the New Anglia Food, Drink &
Agriculture Board in September 2017**

NEWANGLIA
Local Enterprise Partnership
for Norfolk and Suffolk



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Introduction

The food chain from farm to fork is the largest manufacturing sector in the New Anglia region and generates more GVA and jobs than any other sector. It is also the largest manufacturing sector nationally and internationally and within both the national and international context, New Anglia is seen as a leader, with progressive companies, world class supply chains and the largest research concentration in Europe.

This sector skills plan is focused on how the industry and employers, working with the LEP and skills providers, can ensure that the sector has the skills needed for future success.

As an international sector, the food chain will be impacted by the UK's decision to exit the EU, but I am sure we can rise to the challenges this presents and the opportunities which this will offer. One thing is for certain, we will only succeed if we are competitive and, in delivering competitiveness, arguably nothing is as critical as the skills and expertise of our workforce.

Recent years have seen an increased focus on the role of new technology in delivering a competitive food chain, from the launch of the UK Strategy for Agricultural Technologies, to increased investment by industry in research and innovation and a growth in both UK and EU innovation funding. In New Anglia we have a world leading research base which is increasingly well connected to the industries it serves both at home and abroad.

We could have developed separate sector skills plans for agriculture, the food chain and the technology base which underpins the food chain. However, given the interdependence of agriculture and food companies and the role which technology plays in both, the New Anglia Food, Drink and Agriculture Board was determined that we would see the challenge as a holistic one, which embraced the whole food chain and which was driven by the need to innovate and embrace technology. I hope you agree that a sector skills plan focused on '**AgriFood Tech**' rises to this challenge.

I want to stress one very important aspect of the Plan. Whilst the LEP and County Councils have helped lead the process to develop the Plan, which I am very grateful to them for doing, it is not their plan: the Plan belongs to the industry and it is essential that employers are prepared to play a full role in delivering the priority actions it identifies. We cannot expect the LEP, Councils or skills providers to address the future skills needs of the industry alone. Unless employers are prepared to invest in skills and help to steer future skills provision we will not be able to deliver the skills needed. So, in closing I want to encourage you all to work with us to meet the skills challenge.

Doug Field

East of England Co-Op & Chair of the New Anglia Food, Drink & Agriculture (FDA) Board

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Executive summary

The food chain is the world's largest sector and one which is growing at a compound growth rate of 6%. New Anglia is a UK leader in this sector and has world-leading research centres which are supporting the technology led growth of the industry. The challenges of meeting the needs of a growing and increasingly wealthy population is also requiring agriculture and the food chain to reduce its environmental impact.

This sector skills plan deals with the skills needed both in the existing workforce and amongst new recruits to rise to this challenge. It also prioritises the skills needed not only in agriculture and food production, but also the skills needed by the technology businesses which support the industry and the research base which drives innovation.

The New Anglia AgriFood Tech sector (excluding food retail and catering) generated 7% of the area's GVA and employed 50,000 staff or 7.4% of the workforce, double the national average. It also accounts for 10.8% of all businesses in the LEP area. However, whilst nationally the sector has grown since 2010 by 5%, in New Anglia employment has fallen by 3%, whereas neighbouring LEP areas to the north and south have both seen growth of +5% and +7% respectively. The sector skills plan must therefore focus on driving growth.

Meeting the growth challenge through skills supply is made more challenging by major strategic changes such as Brexit, increases in wage levels and restrictions on labour supply.

New technology and specifically data, sensors and automation (Industry 4.0), is likely to have a major impact on the industry and will require new skills amongst the existing workforce and new recruits as ways of working change. Securing the tutors, lecturers and assessors needed to facilitate this transition will also be a challenge.

Locally the skills system is good at meeting FE and postgraduate training needs, but has a significant deficit in undergraduate skills provision. This is very relevant to future sector growth as forecasts show that the proportion of sector staff employed in elementary occupations has already fallen from 26% in 2004 to 15% in 2014, with a further fall to 13% predicted by 2024. In contrast the proportion in skilled trades has risen from 40% in 2004 to 58% in 2014 and is expected to reach 59% by 2024. The projections also suggest that the largest demand for new staff, 6,700 over the period 2014-'24, will be for those qualified to QCF4-6, the level at which the New Anglia area has very little training provision currently.

The proposed skills interventions are to establish a New Anglia AgriFood Tech Skills Group, which initially facilitates five targeted skills actions, to:

- **Co-ordinate Sector Careers Promotion;**
- **Develop New Progression Routes to Higher Education in AgriFood Tech;**
- **Develop a new Higher Education Centre to Meet the Shortfall in Technical Higher Education in the Industry;**
- **Develop the Supply of Trainers to Meet the Needs of the AgriFood Tech Sector;**
- **Develop a Workforce Development Programme to Equip the Sector with the Skills Needed for Growth.**

1. The AgriFood Tech Sector in the New Anglia LEP area

The food chain is the largest manufacturing sector in the world, UK and New Anglia region. New Anglia is arguably the most productive farming region in the UK, with the most profitable farms, a dynamic food chain and the largest concentration of agri-food research in Europe.

New Anglia's agriculture has a turnover of £1.65 billion in 2013, 14% of all employees in the LEP area worked in the food and drink supply chain.

The New Anglia AgriFood Tech sector had exports of £479m in 2015, with £300m going to the EU and £179m elsewhere. At 17% of the exports in New Anglia the sector is more important to exports than in any comparator LEP area.

The New Anglia AgriFood Tech sector contains 7,875 companies. Over the period 2010-'16, the number of business units in New Anglia has grown by 7.4% although this is a slower growth rate in business unit numbers than seen in comparator LEPs or the much larger increase seen nationally (+13.3%).

New Anglia has an internationally significant concentration of research and development in both agriculture and food. This research base is also a significant provider of post graduate training with a global reputation and creates a significant market for those with higher level skills and qualifications.

The strength and breadth of the research base is built on a highly skilled, global workforce and attracted to Norfolk and Suffolk by the global reputation of centres such as the John Innes Centre.

A more detailed analysis of the sector is provided in Appendices 1 and 3.

2. Employment

AgriFood Tech sector jobs are not evenly distributed across the New Anglia area. The sector is much more important in the rural districts with over 10% of the workforce in every rural district, but it accounts for less than 2.5% in all three major urban districts of Norwich, Ipswich and Great Yarmouth.

The AgriFood Tech sector workforce is dominated by employment in agricultural production (46% of the workforce) and food processing (35%).

This skewing of the sector towards agricultural production adversely affects the sector's contribution to the economy. Recent data does, however, show that the sub-sectors with the fastest growth rates in employment have been in processing and marketing.

In jobs terms, the AgriFood Tech sector has nearly double the importance in the area as it has nationally.

Against New Anglia averages, many jobs in the AgriFood Tech sector compare well in wage terms with production managers and directors achieving £57,155, scientists £41,127, conservation professionals £34,980, farmers £28,079 and agricultural machinery drivers £25,523. However, food manufacturing operatives at £19,807 and elementary agricultural occupations at £19,776 had wages below the LEP average.

The sector has performed relatively poorly in the last 5 years with staff numbers falling by 3%. This contrasts markedly with a 5% increase in employment across England and a 5% increase in neighbouring Greater Lincolnshire and an increase of 7% in the South East LEP area.

Clearly the national growth in the sector or that seen in neighbouring LEP areas has not translated into growth in New Anglia. Locally the trend is more negative in Suffolk with employment falling by 5% against a 1% fall in Norfolk.

The New Anglia AgriFood Tech sector has been recruiting internationally for many years, whether to attract the best scientists to NRP, or to fill a shortfall in local labour supply for production agriculture. The Food and Drink sector estimates that nationally over 25% of the workforce are migrants. Anecdotally most larger food chain employers report that over 35% of their workforce are currently drawn from overseas, with some putting the figure at over 60% (both directly employed and via labour providers).

A more detailed analysis of current employment is provided in Appendix 4.

3. Current Skills and Training Provision

a) Centres and courses

The provision of New Anglia skills and training for the AgriFood Tech sector includes:

- Easton and Otley College, which is the largest provider locally to this sector with predominantly FE provision, a turnover of just over £20m and 6,000 students across full and part time provision. It is also active in schools provision and has a small (circa 200) HE student cohort. It operates two campuses at Easton near Norwich and Otley near Ipswich.
- Poultec, based at Mattishall near Norwich is a specialist food sector training provider which works nationally with 740 employers and which has 1,000 apprentices and other learners and delivers up to L5. Originally focused on the poultry sector, it has expanded into many other areas and has a good range of provision with a focus on the meat and food sector.
- UK Rural Skills operates nationally, but is based in Norfolk and works with industry owned Rural Training Groups (most set up as Agricultural Training Board groups) to provide tailored short courses and legislative training (e.g. spraying certificates). It provides training to over 500 people in East Anglia each year.
- Whilst UEA does not provide any specific agricultural degree courses it provides a wide range of courses relevant to the industry, including those linked to plant sciences, climate change, overseas development and the environment. In conjunction with JIC it runs post graduate plant science courses and food and nutrition with IFR and the University Hospital, making it one of the largest postgraduate training centres in the UK supporting the food chain.

In addition to full cost workforce development courses provided by Rural Training Groups and Colleges, the New Anglia area was a leader in the delivery of the previous two Rural Development Programme for England skills programmes. Landskills East was managed by Easton and Otley College as a regional 3 year programme and UK Rural Skills, based in Norfolk, formerly ran one of 7 national contracts for agricultural and forestry training under the Rural Development Programme for England skills framework (which DEFRA are not currently operating). It is currently unclear if and when DEFRA will restart these programmes.

Some local companies have also developed their own training provision to meet specific gaps in provision or to address challenges in securing the staff needed. For example Claas UK, based in Suffolk, has developed a 4 year bespoke Agricultural Technician Apprenticeship with Reaseheath College in Cheshire and Barony College near Dumfries. Also in the engineering sector, local John Deere Dealers including Ben Burgess and Doubledays access the national training provision provided by John Deere UK at Langar in Nottinghamshire. Just 2 miles outside the LEP area in Wisbech, the largest independent agronomy company in the UK, Hutchinsons, has established its own agronomy training centre to provide post graduate, professional training to secure a supply of qualified agronomists.

b) Numbers Trained

The New Anglia AgriFood Tech sector has seen a growth in apprentices over the period 2011/12 to 2014/15 from 505 to 665. Particular increases have been seen in agriculture, up by 35, horticulture up by 30, food and drink up by 60 and land based engineering up by 40 (from a zero start position).

Whilst both England (+80%) and the East of England (+50%) have seen an increase in AgriFood Tech apprenticeships in the last decade, this trend has been much stronger in the New Anglia area with apprentice numbers rising by nearly 150%.

The Edge Apprenticeships programme originally funded by UKCES with Anglia Farmers, Fram Farmers and Easton and Otley College, helped to increase agri-apprenticeship numbers by engaging new employers and additional students.

The learning from this programme has supported the development of the new Trailblazer Apprenticeships for the sector; and the development of this skills plan although the Edge Apprenticeship Programme is no longer active.

Nationally the number of HE students in agriculture and related subjects has increased in the last decade, with HESA¹ data showing the following trends:

		2011/12	2015/16	5 year Trend
Postgraduate	Full time	1,340	1,795	+34%
	Part time	850	1,635	+92%
First degree	Full time	6,305	9,280	+47%
	Part time	360	305	-15%
Other HE	Full time	3,305	2,780	-16%
	Part time	5,105	3,235	-37%
Total		17,280	19,025	+10%

New Anglia has a net outflow of students to access Higher Education across many disciplines, with HEFCE data showing that whilst the outflow has fallen from over 10,500 in 2008-09 to 8,500 in 2013/14, it is still much higher than comparator LEP areas. Over half of those who leave New Anglia to study went to London, Cambridgeshire and Essex.

More specifically in the AgriFood Tech sector, there is a long standing flow of HE students from New Anglia to specialist national land based providers such as Writtle University College, Harper Adams University, Royal Agricultural University and other Universities with significant agricultural provision such as Newcastle and Nottingham.

¹ HESA, students by subject of study

As well as developing additional local provision to reduce the outflow of students from New Anglia, it was argued strongly by consultees that new high quality and flexible provision for HE in AgriFood Tech should also seek to attract students from other parts of the UK to come to New Anglia to study. Hopefully some of these would then develop their careers in Norfolk and Suffolk and help to address the challenges local employers face with recruitment.

In the food sector, the National Centre for Food Manufacturing (University of Lincoln), is only 10 miles outside the LEP area and as the largest national provider of FE and HE provision to food processing trains a large number of New Anglia students. Poultec also offers courses for the food chain up to L5.

The AgriFood Tech sector nationally is unusual in its provision of HE, because whereas typically only 12% of HE provision is delivered by FE institutions across all subjects, in AgriFood Tech this rises to 50%. Where this works well, this helps to ensure good progression from FE to HE provision in this subject area as students can readily see the progression routes from FE to HE.

Easton and Otley College is currently working on a plan to develop new progression routes by developing an integrated curriculum covering Levels 3, 4 and 5, to aid progression opportunities. Poultec and the National Centre for Food Manufacturing at Holbeach both offer provision which bridges these levels.

Feedback suggests that employers would welcome the merging of the interface between FE and HE as they do not recognise the FE/HE division.

c) Anticipated Changes in Skills Provision

Consultees feel that the introduction of the Apprenticeship Levy from April 2017 is potentially very significant for parts of the industry. Whilst in agriculture very few employers have a large enough payroll to be affected directly by the Levy, in the ancillary sectors and food processing most staff are employed in companies who will be affected. What is currently unclear is how levy payers will respond, although anecdotal evidence is suggesting most are keen not to see the Levy as a tax that they pay, but to increase their apprenticeship provision (perhaps through upskilling their existing workforces) so that they fully utilise the levy.

Given that for many larger employers the levy rate is set at a level which would necessitate apprenticeship provision which was orders of magnitude higher than they have supported before, evidence suggest some will decide to focus on higher level apprenticeships (L4+), where costs per learner are higher. This could also support the move to Higher Apprenticeships linked to degree qualifications and address the industry's growing need for higher level skills.

Consultees also noted that the requirement in the new apprenticeship model for smaller, non-levy-paying employers to contribute towards the training costs for an apprentice, may discourage some employers from participating.

4. Skills Supply Challenges

The sector will continue to develop rapidly in the next decade. Arguably it will also be the major UK sector most affected by the decision to leave the EU. Brexit will impact on the sector through: changes from the CAP to a UK agricultural policy (CAP support represents approximately 75% of net farm income); trade – Europe is the largest trading partner for the sector for both imports and exports; skills supply with estimates suggesting approximately 20% of the current workforce are EU migrants; and, most agrifood policy has been based on EU decisions for over 40 years.

It is too early to speculate in detail about what a final post Brexit deal for the agrifood sector will contain, but regardless of the outcome, three challenges will be important to the future growth and success of the industry:

- Challenge 1 - Meeting changes in consumer need and demand – in local, UK and international markets consumers continue to change the food choices they are making, both in terms of the foods they choose and how they choose to consume them (e.g. online purchases, eating out of the home). This will create increased demand for added value, processed foods;
- Challenge 2 - Competitiveness in production – the food market is already international with the UK only meeting approximately 50-60% of its domestic demand for food from UK production. Brexit could help develop new trade deals and drive exports or help companies in the UK replace imports, but this will only be achieved if UK production is competitive in its cost base and use of resources;
- Challenge 3 - Supply chain focus – the food chain is complex with numerous companies involved from research and input suppliers, through farmers and growers, food processors and distribution companies, to food retail and catering. Driving efficiency in supply chains is essential to future success of the industry.

Skills, innovation and new ways of working will be essential to deliver success in all three areas. These sector specific challenges are also happening at a time of profound changes in the wider economy and technology, with developments such as the Internet of Things (IoT) and Industry 4.0, set to revolutionise how people work as reported in the NCUB report on AgriFood Tech sector skills in 2015².

Given New Anglia's productive agrifood sector, world class science base and sophisticated supply chains, it should aim to be at the forefront of these changes.

Locally major developments such as the £81m investment in the Quadram Institute to create a new national centre for dietary health, will position the region at the forefront of food innovation and address the first challenge of meeting changing consumer needs.

The development of three proposed Food Enterprise Zones, one in Norfolk and two in Suffolk, will help address challenges 2 and 3 by helping make the sector more competitive through supply chain efficiency.

² NCUB (2015), Leading Food 4.0: Growing Business-University Collaboration for the UK's Food Economy

Feedback from industry shows a desire to focus on growth, exports and the potential to change how land and resources are used to create more value in the food chain e.g. by focusing on high value crops and livestock enterprises, innovative production systems and added value food production. To create more value the AgriFood Tech sector in New Anglia was seen by consultees to need to focus on:

- Growing the skills to support high GVA parts of the sector e.g. more food processing, horticulture and intensive livestock production and the commercialisation of the science and technology to underpin competitive production in these sectors.
- Exports to Europe given the proximity of New Anglia to the Continent and major port facilities in both Norfolk and Suffolk which can help the region access the markets there.

Within this industry context the top six issues for skills development were identified to be:

a) Labour Substitution Through Automation

The industry is rapidly adopting new technology enabled by digital technology, sensors, data analysis, robotics and control systems. This may reduce the workforce needed for the same level of output and could thus be expected to cost jobs, but will also address key local weaknesses by raising labour productivity and creating higher skilled, higher paid jobs. If this development improves competitiveness of the New Anglia AgriFood Tech sector it may also lead to growth of the sector through import substitution and growth in exports. It could also help the industry address challenges created by a lack of supply of labour, rising wage costs and potential further restrictions on supply post Brexit. However, this will create skills challenges including:

- Skills for engineering, soft robotics, artificial intelligence (AI), data are growing in importance and more supply will be needed to meet industry needs;
- An agile workforce with higher level technical skills will be needed given the speed of change in the industry;
- There will be a need for applied research and skills in new disciplines such as acoustics and vibration sensors to identify problems early in mechanised systems to allow timely remedial action to be taken.

The skill set that unites all these areas is the need for skills in the collection, manipulation, presentation and use of data. Employers reported that current maths performance is poor for those entering the industry from school and, that even those with degrees in data focused disciplines, often struggled to apply their knowledge to business problems.

The need for data skills supports AgriFood Tech companies in assessing markets, driving production efficiency and managing their businesses.

The growth in demand for technical and data skills will also need to be underpinned by a supply of soft skills in leadership, management and project working, to enable

new production systems or the use of data to support decisions to be integrated into the workplace.

b) Meeting Existing Skills Shortages in Industry

The reliance on migration, which has met many industry skills needs in the last 20 years for both basic and increasingly highly skilled workers, is seen as a key strategic weakness. Whilst employers accept that this means we need to train more UK staff, most felt that this would not meet future skills needs given that many sectors are facing this challenge and there simply are not enough unemployed or under-employed UK nationals to fill all the jobs available. A need for continued supply of overseas labour was therefore seen as essential. This is backed up by national research and policy documents produced by amongst others the NFU, CLA and Food and Drink Federation (FDF), all of whom have argued for continued access to migrant labour to meet industry needs for highly skilled staff.

Notwithstanding the demands of automation, feedback also showed a continued challenge for employers in meeting the supply of basic skills for the AgriFood Tech sector. Farmers reported that they find it hard to secure skills to address fundamental challenges such as soil management, irrigation and the use of modern technology.

The supply of business management skills including benchmarking, supervision and HR skills were seen as challenges at a time when the industry needs to ensure it is more attractive to new recruits and thus needs to focus on improved staff management and progression. Employers also accepted that this meant they needed to be more involved in apprenticeship provision.

It was noted that most of the workforce business management training was delivered by RDPE skills funding and now this funding support is unavailable, it has stopped. Legislative training has continued, as it is compulsory, but has little impact on growth and productivity.

Employers also reported problems with a lack of 'practical' focus in new recruits and would like to see more technical short courses for the existing workforce in winter. Many argued for a focus in Colleges on producing highly qualified operators and to fill gaps such as staff who are skilled in working with livestock.

Employers continued to rank communication skills, numeracy, literacy and the right attitude very highly. Problems in these basic areas are seen as fundamental without which the more advanced skills needed are difficult to apply effectively.

c) Meeting the Demand for Research and Development Staff

The world leading AgriFood Tech R&D base in New Anglia is very dependent on a global recruitment base and this could create challenges post Brexit with potentially increased constraints on migration. The R&D sector needs the ability to recruit the best staff from across the world to attract leading researchers and restrictions on migration would seriously erode its capacity to conduct world leading research.

As well as the need for scientists, R&D centres need enhanced commercialisation skills to address the big challenge on translation of science into practice and need access to staff with specific knowledge exchange and commercial skills.

There is potential to increase local recruitment to the R&D base, for roles from laboratory staff through to researchers and commercial roles, but these roles all require degree or postgraduate qualifications and thus a better supply chain of STEM skills from local schools and colleges. It was also noted that the research sector is not working together on this challenge as much as it could.

The Life Sciences and Bioeconomy Sector Skills Plan considers this challenge in more detail.

d) Young People and Progression

There are recognised challenges in equipping young people for entry level jobs in the industry given the problems created by the rapid increase in the 'tickets' which are needed. For example young people cannot tow with 4x4s without doing extra tests as the basic driving licence does not now cover it. Also, recently telehandlers have been classified as commercial vehicles and not farm vehicles which means they cannot be used to tow a trailer without an extra test (cost £700-800 per person).

The AgriFood Tech industry is still struggling with the concept of Foundation Degrees and prefers HNDs/HNCs with more practical content. The development of Higher Apprenticeships can address this, but have not yet been developed in this sector locally. More generally there is felt to be a need for new models of HE provision which are responsive and fleet of foot in meeting industry and young people's needs.

There is a real challenge in regards to the loss of young people out of the New Anglia area to study at HE level who then never return. Whilst this is seen as an issue across all sectors, it was flagged as a specific concern for the AgriFood Tech sector. Consultees noted that *'Skills delivered locally are more likely to retain future staff than those delivered beyond the region'*.

New Anglia is seen as an area which has low aspirations for HE participation. As one consultee noted *'Young people need to be encouraged to strive for excellence. Good enough just isn't. There needs to be a change from school level upwards'*.

Progression rates from FE to HE study are a big challenge and this is even more acute in some, often rural and remote New Anglia communities in which the AgriFood Tech sector is important but which lack a tradition of HE participation. In New Anglia, FE provision in AgriFood Tech is strong as is postgraduate training, but there is a big gap in undergraduate provision which disrupts local progression opportunities.

Another consultee noted that *'at secondary school level we have to promote manufacturing as a career of choice across all sectors'*, arguing that at present the sector is not well served by the way it is presented in schools. They further argued that this can be addressed through carefully designed curriculum materials which show how the manufacturing sector uses the skills developed in maths, physics etc.

Employers felt that the industry needed to work with training providers to link to schools, develop internships and other innovative experience models and potentially to offer knowledge exchange programmes of the types used in the USA.

e) Attracting Talent to the Industry

Across all parts of the sector, the image of the industry remains an issue in terms of its ability to attract new staff, either as young people or as career changers later in life. Employers felt that the industry lacked cohesion, often did not project itself as attractive and often lacked ambition. It was also noted that SMEs often struggle to engage in skills provision as they often lack professional HR support.

It was considered essential for the industry to present a single coherent voice for the whole supply chain, stressing the multitude of different opportunities in the sector, excellent career progression possibilities and how training and skills can help to facilitate growth in a career.

Research into current careers promotion for the industry by the Royal Norfolk Agricultural Association in 2016³, found that the largest challenges were that there were too many initiatives, all of which were small and difficult to sustain and that most were focused on the relatively easy target of engaging primary age school children. This finding was born out by the consultees for this plan, who argued strongly that the focus needs to be on secondary schools, ideally before GCSE choices are made and continue through to working with schools to promote curriculum linked materials on the agrifood sector to support GCSEs and A Levels.

Whilst the need to promote the industry was seen as a national need, it was stressed that delivery had to be local and promote the industry as *'as an interesting, well paid futuristic industry'*. It has to stress for example that *'[it] is no longer a low skilled job. Good understanding of computers/satellite, good literacy and numeracy skills, and good spoken English are all vital. We ask them to drive machinery worth £400,000+, handle chemicals and communicate with our customers'*.

Employers also recognised that the industry needs to address working conditions and improve the rewards it provides as well as improving staff support and management.

f) Meeting the Demand for Trainers and Academics

The consultation also raised concerns about how the sector can ensure that it has a supply of committed and highly qualified trainers, lecturers and academics. It was noted that recruitment to 'teaching' roles in the sector is challenging, that trainers are in short supply and many are old or close to retiring.

³ RNAA (2016), Food, Farming and Countryside Education: developing new approaches for schools in Norfolk and Suffolk

There is seen to be a particular problem with growing areas of demand, such as engineering, where the shortage in industry has raised wage levels and made it even harder to recruit trainers.

Furthermore, providers reported that changes to the way assessors are used by awarding bodies, such as City and Guilds, is putting additional strain on the system by attracting some tutors to move across into these roles and will exacerbate the challenges of securing tutors.

Providers reported that tutor supply in some topic areas was the largest barrier to growth they faced in being able to meet the demand from students and employers.

Skills providers noted that this is a national problem with other areas of the country also reporting particular problems with agricultural and engineering tutor recruitment. However, it was stressed that there is no national structure to address this weakness and therefore it is important to take local action.

One potential solution is to attract older skilled workers to a new career in teaching, but the current systems make it expensive and time consuming (often more than a year) to qualify. For those with relevant industry experience it was felt that we need to the process more accessible so they pass on their valuable skills.

Other providers reported that they actively sought to retain some of the students they have trained as tutors.

It was also suggested that working with larger employers to release experienced staff on a part time basis, possibly as part of Corporate Social Responsibility (CSR) programmes, could be fruitful in helping to support training delivery by contextualising courses with real life examples. However, it was recognised that this is not a substitute for a sufficient pool of talented and committed tutors.

More broadly on provision, cuts to FE funding mean that there is now a major challenge with maintaining FE provision because agriculture is not being classified as a STEM subject and therefore funding has been halved for some courses, with L2 Agriculture now funded in the lowest band at £1,500 per learner per year, which is lower than business administration. This is surprising given that all AgriFood Tech provision at HE level is science based (FDSc and BSc) and this decision at FE level does not therefore either equip FE agriculture students for progression or provide the funding needed to meet industry course needs.

5. Future Skill Needs

a) Anticipated Trends in the Key Determinants of Future Skills Demand

Consultee Feedback

In addition to the meetings held to develop this plan, an online consultation received 36 responses from employers. Consultees saw the largest future demand for employees to be in professional and higher technical roles (72%); skilled manual and lower technical (69%); supervisory (39%); and, middle/senior management (36%). In contrast only 8% foresaw an increase in the demand for unskilled staff.

Interestingly, consultees rated basic skills (literacy and numeracy), management and supervisory skills, team working and communication skills more highly than the need for technical skills and ICT skills. This suggests that employers continue to require employees who can work in and lead teams and have the basic skills needed to learn and apply new ideas. This mirrors work conducted by Farmers Weekly in 2016⁴ which identified communication skills supported by technology awareness as the main attributes which employers were looking for in new recruits.

Scale of the Food Chain

As shown above, at the national level the AgriFood Tech sector has been growing, with particularly strong growth being seen in LEP areas to the North and South of New Anglia. In contrast New Anglia has seen its workforce in this sector decline recently and it has seen a slower rate of new business creation than elsewhere. It is not clear why, given its strong industrial base and world class research sector in AgriFood Tech, it should have underperformed in this way.

Looking forward, at national level continued growth in agrifood demand coupled to a global market which is growing at a compound growth rate of 6% is expected to lead to continued growth in the AgriFood Tech sector.

Clearly if New Anglia could take a larger share of this growth, it would be expected that its workforce and skills demand in the sector would be higher than the current East of England Forecasting Model suggests (see below).

b) Projections for Future Skills Needs

UKCES Working Futures (see datapack) and the East of England Forecasting Model foresees continued change in the future skills needs of the AgriFood Tech sector.

The East of England Forecasting Model is based on previous trends and because employment in this sector has fallen locally (in contrast to the growth seen nationally), is projecting that this trend will continue in the next decade.

Furthermore these projections suggest that the gradual trend seen in employment away from elementary (manual) work and process and plant operatives, which had fallen from 45% of the workforce in 2004 to 39% in 2014, will continue, reaching only

⁴ Farmers Weekly (2016), Grow 2016: Farmer's Weekly Guide to Careers in the Agricultural Industry

37% of the workforce by 2024. In contrast the proportion employed in associate professional, technical, professional and managerial roles will grow from 18% in 2004 to 20% by 2024.

At sub-sector level the largest changes in workforce structure are expected in agriculture, where UKCES report that the proportion of staff employed in elementary occupations has already fallen from 26% in 2004 to 15% in 2014, with a further modest fall to 13% predicted by 2024. In contrast the proportion in skilled trades has risen from 40% in 2004 to 58% in 2014 and is expected to be 59% by 2024.

When looking at projections for future demand for skills it is clear that demand is focused on higher skills levels, with a net demand over the period 2014-'24 of:

- +600 for QCF8 (Doctorate);
- +6,700 for QCF4-6 (HNCs, FD and degrees);
- +2,000 for QCF3;
- +2,500 for QCF2;
- no net increase in demand for QCF 1;
- and a net fall in demand for those with no qualifications.

This suggests that continued recruitment at QCF levels 2 and 3 is needed, but that there is a need to support more of these new entrants to progress to QCF4+ where the larger increase in demand for labour is projected to be.

Given the current weak supply of L4-6 provision for the AgriFood Tech sector locally this projected future labour demand profile will not be met without substantial interventions.

c) Immediate Pressures

The industry reported that it has major short term issues in meeting skills supply which have been exacerbated by the decision to leave the EU. This is already having an effect on the willingness of migrants to travel to the UK to work in the industry. Furthermore, anecdotal evidence from some employers is reporting that the uncertainty this is creating in migrant workers minds about their long term future in the UK and the fall in the value of £ relative to the Euro, is already leading to some long standing migrants moving to jobs in other EU states. This is increasing the long standing challenge in securing the local workforce needed in food manufacturing, on farms and particularly for short term jobs such as harvesting.

To address these issues the industry has been arguing for the return of the Seasonal Agricultural Workers Scheme (SAWS) or an equivalent, but this has been rejected by the government. However a report by the EFRA Select Committee (April 2017)⁵, has supported the industry view that there is a real risk to the industry: *'the best guess is that there are 75,000 temporary migrant workers employed in UK agriculture and horticulture'* but that this is *'below the sector's annual need of 80,000 seasonal*

⁵ EFRA Select Committee (2017), Feeding the Nation: Labour Constraints, Seventh Report of Session 2016-17

*workers and further below the expected demand of 95,000 by 2021*⁶. The report further noted that the British Meat Processors Association research shows that 63% of the workers in their sector were from other EU states.

The EFRA Select Committee noted that Ministers evidence stressed that as well as reforms to the tax and benefits system to make work pay, there is a need to look at: greater automation; increased skills and qualifications; increasing apprenticeships in the sector; and, changing perceptions of the industry from a young age to make it more attractive to potential workers – all themes identified locally by the consultees for this plan.

Whilst in the R&D sector the driver of overseas recruitment is different, focused as it is on the desire to attract the best skills in the world to create globally leading teams of scientists, the same political pressures are being felt in this sector as in agrifood production companies.

d) Other Future Skills Supply Challenges

Implicit in much of the feedback received from consultees and industry reports is a recognition that technology and political changes are and will continue to affect the AgriFood Tech industry and thus its demand for workforce and skills.

Major changes are anticipated in relation to:

- Employment conditions - with all the main political parties now committed to the National Living Wage (NLW)⁶, apprenticeship levy and similar costs. This will increase the cost of employing staff and, all things being equal, lead to increased incentives for employers to focus on using technology to drive labour efficiency. As we are currently only 1 year into the planned 4 year first phase of the introduction of the NLW and the apprenticeship levy has only just started, it is too early to be definitive on how much change this will lead to. However feedback from employers suggest these additional costs are already leading to change. Unpublished analysis by Martin Collison (SkillsReach Associate) for Greater Lincolnshire LEP (2016) suggests that the NLW will increase wage costs in the UK food chain by £7-10 billion per annum by 2020.
- Technology and Industry 4.0 – driven by both changes in employment conditions and potential restrictions on labour supply, the demand for automation will increase. This requires more staff with STEM skills across engineering, data and managerial functions to design, install, operate and maintain more technically advanced production systems.

⁶ Some political parties and many lobby groups are arguing that the proposed increase to £9 per hour by 2020 set out by the current Government does not go far enough and thus the political pressure to increase wages could be expected to intensify

6. Sector Skills Plan Delivery

a) Priorities for Action

As a major contributor to the New Anglia economy the AgriFood Tech sector needs to rise to the well documented and broadly recognised challenges it has in attracting the skills needed in the future.

Consultees raised a long list of suggested areas for intervention, but it is recognised that to be delivered successfully there is a need to focus on a relatively small number of priority areas which command industry support and which will have a major impact on the sector. The ability to align these areas with the potential for public sector intervention is also desirable, but unless the industry is willing to invest and support the actions proposed they are very unlikely to be deliverable.

The following section therefore sets out one overarching area and five targeted subsequent interventions which it is believed are needed to help meet the future skills supply needs of the industry.

The overarching action is to:

- Establish a New Anglia AgriFood Tech Skills Group (working title);

The proposed subsequent skills interventions are to:

- Co-ordinate Sector Careers Promotion;
- Develop New Progression Routes to Higher Education in AgriFood Tech;
- Develop a new Higher Education Centre to Meet the Shortfall in Technical Higher Education in the Industry;
- Develop the Supply of Trainers to Meet the Needs of the AgriFood Tech Sector;
- Develop a Workforce Development Programme to Equip the Sector with the Skills Needed for Growth.

The action plan set out below, which initially focuses on these six areas, should be kept under constant review by the proposed New Anglia AgriFood Tech Skills Group. As actions are delivered, the Skills Group should seek to consult with industry, using its members existing contacts to refresh and add to the action plan.

b) Proposed Future Skills Interventions

Intervention 1 – Establish a New Anglia AgriFood Tech Skills Group

Rationale: there is a need to develop a more co-ordinated approach to planning interventions to promote the supply of skills for the New Anglia AgriFood Tech sector.

Action to be Taken:

The AgriFood Tech industry will work with the New Anglia LEP to develop a Group focused on the skills needs of the industry which can act as a sub group of both the New Anglia Food, Drink and Agriculture (FDA) Board and the LEP Skills Board.

Its functions will be to:

- Act as an expert panel to advise the LEP Skills Board and FDA on the skills needs of the AgriFood Tech sector in the New Anglia area;
- Promote the potential for skills intervention with the AgriFood Tech sector by seeking ideas for potential project interventions led by industry;
- Develop ideas for and act as a champion for interventions (funding and strategic investments) which could be developed to equip the New Anglia AgriFood Tech sector with the skills needed to facilitate sector growth.

The group will be action focused, avoid being a 'talking shop' and focus on scoping and promoting a limited number of priority actions (including initially the other 5 proposed interventions in this plan). It will have clear KPIs and focus on industry needs and the areas in which industry co-investment can be secured.

In delivering its work, the group will seek to represent the whole AgriFood Tech sector. However, it is recognised that industry members are much more likely to be interested in supporting actions on a case by case basis, rather than attending regular meetings.

The Task and Finish group for this plan therefore recommended that initially the group should, whilst meeting 3-4 times per year, focus on securing a core membership including training providers, industry representative bodies and the LEP, with employers invited to attend meetings which directly relate to projects in which they would be partners rather than expecting them to be regular attendees.

Leadership: it is important for the Skills Group to have an independent, industry based chair who is able to commit time to promoting the skills needs of the industry and acting as a bridge between the New Anglia FDA Board and LEP Skills Board.

When: the proposed group should be fully established by the 1st September 2017, with an intermediate target to agree a set of terms of reference with both the LEP Skills Board and FDA Board by 1st August 2017.

Resources and support: the group should explore with the LEP and other stakeholders how secretariat and co-ordination / engagement support (e.g. organising meetings, providing administrative support, booking venues, employer consultations) can be provided across New Anglia.

Intervention 2 – Co-ordinate Sector Careers Promotion

Rationale: it is widely recognised that careers promotion needs further investment to attract the staff needed to grow the New Anglia AgriFood Tech sector, but that at the current time there are too many uncoordinated initiatives and interventions.

Action to be Taken: promoting the AgriFood Tech industry as a career of choice requires all the actions being taken by industry, major employers including the research centres and providers e.g. Easton and Otley College, to pool their activity into one comprehensive programme. The programme should be developed so that it targets the 12-18 age group who currently have relatively little interaction with the sector on careers, especially beyond the age of 14. Building on the mapping work undertaken by the Royal Norfolk Agricultural Association (RNAA) in this area in 2015/16, the coordination of careers advice should:

- Promote careers at all levels of the sector from entry level to post graduate and across the full breadth of the AgriFood Tech sector, by telling a coherent story, which explains the highly skilled, well paid and dynamic careers which are on offer in the sector;
- Attract older people to transfer into the sector and explain the routes available to them (including linking to programmes for former armed forces personnel);
- Align industry and learning provider investment with the funding committed by the agrifood charitable sector across New Anglia;
- Build on the existing work by Easton and Otley Schools liaison team and schools engagement and work carried out by Norwich Research Park and Edge Careers;
- Influence the school curriculum by engaging with teachers and using examples which can be linked to curriculum content e.g. Easton's dynamometer in physics.

The development of a coordinated programme should seek to ensure that it engages with every secondary school and college in Norfolk and Suffolk to promote the careers available in the AgriFood Tech sector.

Leadership: the RNAA are willing to lead this work with the research base, industry, SAA and major providers including Easton and Otley College supporting this co-ordination role.

When: the careers promotion coordination function should be established by 1st January 2018, with bids for further resources to target additional support for engaging with secondary schools submitted by June 2018.

Resources and support: resource needs for co-ordination are comparatively modest, circa £50,000 per annum, and will be initially secured via the RNAA Trustees who have committed to coordinating the existing investments being made in careers promotion in the sector. This will focus initially in Norfolk before being extended to Suffolk. Links should also be made to existing projects such as 'icanbea' (SAA involved) and the New Anglia Enterprise Advisors network. The industry should consider moving some of the current investment in primary school provision across to the secondary level where it can have more impact. The existing substantial investments made by Norfolk and Suffolk charities and trusts should also be co-ordinated to create longer term, more sustainable interventions.

Intervention 3 – Develop New Progression Routes to Higher Education in AgriFood Tech

Rationale: progression from FE to HE in the AgriFood Tech sector needs to be improved to meet the large predicted increase in the demand for L3-6 qualified ‘technical’ staff. The existing workforce will also need to upgrade their qualifications as the demand for lower level skills falls and new technology is introduced, but the existing workforce and their employers find it very difficult to release them for traditional full time HE study.

Action to be Taken: to facilitate improved rates of progression from the strong local provision of FE AgriFood Tech courses to local HE provision in these subjects new, flexible and industry linked modes of delivery need to be established jointly facilitated by providers and industry. Furthermore, this new provision should help the existing workforce to upgrade their skills to meet the changing nature of work in the industry, in particular the widely anticipated increase in levels of technology. This intervention will focus on:

- L3, 4 and 5 to facilitate progression routes to develop skilled technical staff with the applied skills needed by a changing industry where technology adoption is the norm;
- Developing a Higher (degree) Apprenticeship (HA) route in AgriFood Tech to respond to the opportunities from the Apprenticeship Levy;
- Integrating HA routes into linked provision which includes HNCs/HNDs and degrees;
- Exploring the potential for new undergraduate provision which combines multiple work placements with academic study (as Management Development Services have successfully used at postgraduate level for over 20 years);
- Working with A Level and L3 FE providers to develop progression routes from other STEM subjects into the AgriFood Tech sector;
- Developing e-learning and flexible modes of part-time study to help the existing AgriFood Tech workforce upgrade their qualifications.

This intervention would link to intervention 4 which will create a new HE centre focused on developing the physical facilities to support an increase in the supply of L4-6 AgriFood Tech qualified staff. Links to the National Centre for Food Manufacturing which already offers this type of L4-6 provision for the food processing sector should also be explored.

Leadership: the industry will work with Easton and Otley College to develop, trial and roll out new models of HE undergraduate technical provision which are responsive to industry needs and flexible in delivery.

When: the development of new HE routes should be completed by June 2018 with the aim to trial them from September 2018, ready for full rollout in 2019/20 to align with the proposed new HE centre (see intervention 4).

Resources and support: the resources required are mainly a commitment of time by staff at Easton and Otley College in conjunction with industry partners to develop proposals for new models of technical HE pathways. The potential to develop a major ESF/ERDF project to support interventions 3 and 4 should be explored with the LEP by summer 2017.

Intervention 4 – Develop a new Higher Education Centre to Meet the Shortfall in Technical Higher Education in the Industry

Rationale: the New Anglia area has a strong supply of FE and postgraduate provision for the AgriFood Tech sector, but a significant shortfall in L4-6 undergraduate provision. Given that the largest demand for new recruits will be at L4-6 in the next decade this lack of local provision has to be addressed.

Action to be Taken: local provision of HE to meet the technical needs of the AgriFood Tech industry at levels 4-6 (HNC to Bachelors degree) requires dedicated investment, but should be seen as part of a wider LEP need to increase undergraduate provision to retain talented young people in the New Anglia area.

The area also needs to attract young people from other areas to study in the New Anglia to help meet industry needs but needs competitive facilities and provision to do this. The proposal is to create a new HE Centre with a local University providing validation services and support (with the potential in the future for the centre to offer its own degrees if this is considered desirable).

The physical Centre would focus on providing the facilities and staff to:

- Facilitate FE to HE progression in a breadth of disciplines including AgriFood Tech, with a strong focus on science, technical and project management skills;
- Support technical HE (including Higher Apprenticeships) linked to and supported by industry to meet the need for engineers, technicians, skilled operatives and managers;
- Offer Higher Apprenticeships, HNCs/HNDs and undergraduate degrees;
- Link to local research and technical centres serving AgriFood Tech including UEA's science and engineering schools, NRP, Hethel, National Centre for Food Manufacturing (NCFM) in Holbeach and Poultec at Mattishall.

The aim would be to significantly increase the supply of technical HE skills to the industry within 5 years.

Leadership: The proposed New Anglia AgriFood Tech Skills Group will advise on this development, providing the essential sector and industry voice.

When: developing a new HE centre of the type proposed will require considerable time and it is suggested that the aim should be to develop an initial proposal and business plan by December 2017, with the aim to have the centre fully planned and funded by December 2018 to open in 2019/20.

Resources and support: this proposal will require substantial investment in the tens of millions to bring to fruition and will therefore require strategic intervention from the government (HEFCE), supported by the industry and New Anglia LEP. To develop the business plan and market assessment the delivery partners should consider an application to the New Anglia LEP Skills Deal.

Intervention 5 – Develop the Supply of Trainers to Meet the Needs of the AgriFood Tech Sector Skills Providers

Rationale: the development of the skills system in New Anglia's AgriFood Tech sector is constrained by an ageing tutor group and challenges in recruiting new trainers at every level, with particular issues in growing skills-areas such as engineering, where industry is also short of staff and thus paying higher salaries. Addressing gaps in more traditional topics such as soils and water management where the tutor pool is now ageing rapidly is also critical. Without an adequate supply of tutors and lecturers it will be impossible to deliver the ambitions to increase the supply of local talent to the industry.

Action to be Taken: there is a need to address the shortfall in trainers and lecturers available to the AgriFood Tech sector by recruiting and training additional staff. One area which should be explored and which some other technology sectors have already used, is to retrain older experienced staff as trainers as they seek to reduce their working hours when approaching retirement.

The proposed programme would be structured to:

- Recognise industry experience as valuable and important to students, alongside or as an alternative to formal qualifications, to help broaden the pool of potential tutors available to the sector;
- Recruit, train and accredit additional staff to act as trainers on a full and part time basis to meet the evolving skills needs of the AgriFood Tech sector;
- Promote a training role as a viable, straightforward and attractive career change option for staff in the AgriFood Tech sector, with clear and cost effective routes to accreditation, employment and career progression

The potential to develop CSR programmes which link larger employers with training providers to support provision with experienced and skilled staff input should also be explored.

Particular attention needs to be paid to easing the transition into a training role for new tutors through careful structuring of the time commitment and costs involved which can make the transition period daunting and off-putting.

Leadership: providers including UKRS, Poultec and Easton and Otley are struggling to secure the trainers and lecturing staff needed for a wide range of disciplines. Working together to develop the supply of qualified staff could help to address this challenge.

When: a programme to develop an increased supply of new trainers and lecturers should be developed by March 2018.

Resources and support: a programme to develop new staff to act as trainers would help to ensure older workers and those at risk of redundancy could retrain into new roles as tutors. The potential for ESF and similar funding should be explored to support this need, possibly building on the *Industry Educator* Model developed by Bishop Grosseteste University in Lincolnshire using ESF funding.

Intervention 6 – Develop a Workforce Development Programme to Equip the Sector with the Skills Needed for Growth

Rationale: the existing AgriFood Tech workforce faces unprecedented challenges through the adoption of new technology, pressures to raise labour productivity and to fill gaps in the workforce left by a fall in migration. Former programmes to support the sector's workforce development (e.g. EAFRD skills) have been suspended and other programmes specifically exclude the agricultural industry. Industry growth needs a focus on skills for the existing workforce as well as attracting new entrants, as most of the post 2020 workforce are already in work.

Action to be Taken: there is a need to address the workforce development needs of the existing AgriFood Tech workforce by offering a programme of Training Needs Analyses (TNA) to assess business development needs, linked to a programme of short courses tailored to fit around existing work commitments and focused on new technology, management and industry growth.

The proposed programme would be structured to train existing sector staff to:

- Adopt new technology which can improve labour efficiency, develop new enhanced products and services and exploit the data now available to manage production;
- Develop enhanced management and supervisory skills to develop the leadership and project management skills needed by the industry, including transferring management techniques used in other industries, e.g. Lean Manufacturing, 6 Sigma, into the AgriFood Tech sector. Where possible linking this provision with courses offered across sectors to facilitate knowledge exchange should be explored;
- Respond to the opportunities and challenges which are flowing from major strategic changes such as Brexit and the adoption of new technology.

The provision should be designed in active collaboration with industry and be challenge-led i.e. which skills need to be developed, with providers then invited to tender to deliver packages of workforce development with and co-funded by the AgriFood Tech industry.

Working with supply chain partners e.g. major food processors, supermarkets, Co-ops, who can both support and promote the courses would increase effectiveness.

Leadership: the programme should be developed by the LEP in conjunction with the AgriFood Tech Skills Group and seek tenders from training delivery bodies to deliver specific packages of support. The LEP should ensure that whether delivered at local level, or nationally by DEFRA and/or ESFA, that the needs of the New Anglia AgriFood Tech sector are reflected in workforce development programmes.

When: a programme to deliver an AgriFood Tech workforce development programme should be developed by November 2017 and implemented from January 2018.

Resources and support: the programme should be supported with EU funding (ESF, EAFRD and ERDF) and future UK structural funds. A minimum budget of £1m per annum should be sought, with an initial 3-5 year programme agreed.

Appendix 1 - AgriFood Tech definition

Agri Food Tech Sector – agreed sector definition (December 2016)

Purpose - the purpose of the sector definition is to agree which types of employment are in scope for the sector skills plan.

AgriFood

In scope:

- Agricultural, horticultural and forestry production (crops, livestock, ornamental crops, biomass and biofuels, renewable materials)
- Food and drink processing (including artisan foods)
- Input supplies (e.g. machinery, fertilisers, seeds, packaging etc.)
- Food wholesaling and marketing
- Food logistics

AgriTech (see full national definition in annex)

In scope:

- Plant genetic improvement; plant health; crop storage and silage
- Animal genetic improvement; animal nutrition; animal health and welfare
- ICT systems
- Soil and substrate management; environmental interactions; harvest and early stage processing
- Engineering and precision farming
- Infrastructure
- Advisory services

Food Tech:

- Food production technology
- Dietary health and consumer food technology

The sector skills plans will not include the skills needs of the food retail and catering industries, but will, where relevant identify how changes in these sectors will affect the demand for skills in the rest of the food chain and the technology employers which support it

Links to other New Anglia LEP Priority Sectors - in developing the Agri Food Tech Sector Skills Plan the SkillsReach New Anglia LEP Skills Team will also explore the potential to link to the skills requirements in other sectors for which sector skills plans are being developed by New Anglia LEP, including:

- ICT and Digital – due to the rapid growth in the use of big data and sensor technologies in agri-food
- Energy – due to the agri-food sector potential for biomass and biofuel production
- Life Sciences – due to the underpinning science and innovation from life sciences which supports both agricultural and food production
- Ports and Logistics – given that 28% of road freight in the UK relates to the food chain and that Lowestoft is the largest food port in the UK
- Advanced Manufacturing – given the increased use of robotics and autonomous systems in the food chain
- Tourism and culture – given that over 30% of tourism expenditure is on food and drink

AgriFood Technology Leadership Council Definition of AgriTech⁷

The farming industry, including diversified activities such as on-farm waste and biomass (grass, energy crops, specialist crops) for non-food uses.

Plant subsectors (crops including cereals, oilseeds, pulses, forage, potato, sugar beet, vegetables, salads, mushrooms and fruit) including:

- Plant genetic improvement: genetics, genomics, biotechnology, breeding/ propagation, genetic conservation
- Plant health: plant production (physiology, agronomy, crop management and nutrition such as fertilizer/ agri-chemicals) and plant protection (identification, diagnostics, epidemiology, management / control including biological controls / vaccines / therapeutics of pest disease and weeds)
- Crop storage and silage (including post-harvest storage and on-farm waste and biomass for non-food uses)

Animal subsectors (livestock: dairy, beef, sheep, pigs, poultry (egg and meat) and aquaculture for fish: salmon, trout, shellfish) including:

- Animal genetic improvement: genetics/ genomics; breeding/reproductive technologies; genetic conservation
- Animal nutrition, including ingredients for animal feed; grazing systems and pasture diversity
- Animal health and welfare (endemic diseases, exotic diseases, behaviour): identification, diagnostics, epidemiology, management / control, vaccines, therapeutics, surveillance; building and environmental design to reduce stress and promote welfare

ICT systems and decision support: to support production planning, scheduling; input use efficiency (e.g. irrigation scheduling)

Environmental and physical subsectors including:

- Soil/ substrate management: soil physics, biology and chemistry, soil amendments (e. g. biosolids, AD digestates, water retention gels etc.); controlled traffic farming; reduced ground pressure; soil sampling; soilless growing media (glasshouse crops)
- Environmental interactions (air, water, biodiversity – plant and animal; ie. technology / decision support tools to improve animal welfare & environmental outcomes including reducing air and water pollution, greenhouse gas emissions including quantity and quality of air and water)
- Harvest and early-stage processing including harvest technologies, post-harvest cleaning, postharvest storage (chemicals and storage conditions), on-farm waste (AD and other waste treatment plants) and biomass for non-food uses

Engineering and precision farming, including machinery (cultivation, crop and grass health (drilling, spraying, fertiliser application), tractors, harvesters, pickers, post-harvest transport and cleaning), robotics including GPS applications and autonomous devices, sensor technology (hand held, fixed and remote including animal welfare and monitoring)

Infrastructure: buildings (including glasshouses, livestock production buildings), heating and cooling systems, storage of crop and animal products in ambient, controlled atmosphere, cold stores and freezing plants, irrigation/ water management storage and distribution systems, dirty water systems, lighting (intensive livestock and glasshouse crops); 'vertical' and enclosed farming systems

Advisory services

⁷ BIS RESEARCH PAPER NUMBER 284 (July 2016), Agri-Tech Industrial Strategy: Evaluation Scoping Study and Baseline

Appendix 2 - Consultees

Sector Skills Plan Development Process

The development process for the AgriFood Tech Sector Skills Plan was overseen by the New Anglia Food, Drink and Agriculture (FDA) Board, which met in March 2017.

In addition a Task and Finish group established by the FDA Board met to: agree the scope of the plan (December 2016); develop initial thoughts and agree the engagement strategy (January 2017); to receive and comment on the draft plan (April 2017).

The development of the plan was also informed by a meeting of the Norfolk Rural Development Strategy Delivery Group which met in March 2017 on the theme of rural skills.

A series of key informant interviews were conducted with a mix of employers, sector skills providers and representative bodies.

An employer questionnaire was also circulated widely by industry groups to seek the views of employers on key gaps in current skills provision, how they thought skills needs may evolve in the future and the areas in which further investment in skills is needed.

In total 30 consultees were interviewed and/or attended the meetings held (several of whom attended more than one meeting) and 36 employers completed the online questionnaire. More details of those consulted is set out in appendix 2.

In addition to this sector skills plan, a supporting datapack has been developed which outlines the current workforce in the sector, trends in its skills levels and how the local AgriFood Tech sector in New Anglia compares with other areas. This datapack also reports on the underlying socio-economic context for the industry locally and reports on projected changes in future skills needs and current student numbers.

In developing the plan the following consultees were interviewed or attended consultation events:

- Alastair Rhind, New Anglia LEP
- Andrew Alston, Farmer
- Ben Turner, Ben Burgess Ltd
- Clarke Willis, Anglia Farmers
- David Henley, Easton and Otley College
- Doug Field, East of England CoOp, New Anglia Board Member and FDA Board Chairman (from March 2017)
- Dr Belinda Clark, AgriTech East
- Dr Jonathan Clarke, John Innes Centre
- Dr Nigel Davies, Muntons
- Edward Bales, Poultec
- Eliska Cheeseman, Norfolk County Council
- Emma Taylor, Norfolk County Council
- Eve Cronin, Norfolk County Council
- Greg Smith, Royal Norfolk Agricultural Association
- Jasmine Joolia, Suffolk County Council
- Jo Bruce, UK Rural Skills

- John Fuller, New Anglia Board Member and FDA Board Chairman (until February 2017)
- John Newton, Norfolk NFU
- Katy Anderson, East Region CLA
- Kerry Dunham, Norfolk County Council
- Madeleine Coupe, New Anglia LEP
- Michael Gray, Suffolk County Council
- Nicola Currie, Easton and Otley College
- Phil Clark, Konings
- Philip Richardson, farmer (retired) and Morley Trust
- Richard Self, Edge Careers and Anglia Farmers
- Robert Rous, Suffolk Agricultural Association
- Robert Sheasby, East of England NFU
- Sam Fairs, Hill Farm Oils
- Toni Wynn, Norfolk County Council

In addition 36 people, whose profile is detailed in the datapack, filled in an online questionnaire and provided comments on the priorities for skills in the agrifood sector. These consultees represented employers with the following key characteristics:

- 86% had been established for over 20 years;
- 63% employed 1-9 employees, 11% 10-49, 14% 50-249 and 11% over 250 staff

Appendix 3 - The AgriFood Tech Sector in the New Anglia LEP area

The food chain is the largest manufacturing sector in the world, UK and New Anglia region. Global food retail is estimated to be worth between \$4.3trillion⁸ & \$5.6trillion⁹, with both reports saying consumer expenditure is growing at 6% per annum and projected to reach \$8.5trillion by 2020 (USDA 2013).

Adding the value of food service gives a total Global food market worth \$7-8trillion, five times the size of the global automotive market (estimated at \$1.5trillion in 2015¹⁰).

In the UK the food chain generates sales of over £200billion, has a GVA of £108billion and employs just over 3.9million people¹¹. The last decade from 2006-'15 has seen a period of strong growth in the UK AgriFood sector:

	2006		2015		Trend 2006-'15	
	Sales	GVA	Sales	GVA	Sales	GVA
Agriculture	£14.5bn	£4.9bn	£23.8bn	£8.5bn	+64%	+73%
Retail & catering	£155bn	£72.7bn	£202bn	£98.1bn	+30%	+35%
Employment	3,662,000		3,851,000		+5%	

The food chain is worth over 6 times as much as farmgate value and the UK has one of the most sophisticated food sectors in the world, with consumer spending on convenience, provenance, health, eating out of the home and innovation all growing.

Expenditure on AgriFood Technology and farm inputs has been growing rapidly with total purchases by farmers up by +73% over the period 2006-'15 (DEFRA 2016).

The Global Agritech Market was estimated at £142billion by UKTI in 2012¹². The Technology & Innovation Futures Report¹³ (2017) noted that: *'Imports make up about 40% of domestic food consumption – a figure forecast to reach 50% within a generation. Convergent technologies have clear potential to improve productivity of UK farming and its contribution to the economy'*

In 2011 USDA (2011)¹⁴ looked at global R&D expenditures on agriculture and food and found that in 2010, global private sector investment in agricultural input R&D reached \$11.03bn, having doubled since 1994.

⁸ US Department of Agriculture (USDA) Economic Research Service (2013), Global Food Industry

⁹ Industrytoday.co.uk (2015), citing research by Persistence Market Research

¹⁰ Statista (2015), Revenue of the leading automotive manufacturers worldwide in 2014

¹¹ DEFRA (2016), Agriculture in the UK 2015

¹² UKTI (2013), AgriTechnology Sector: Market Trends and Opportunities Report

¹³ Government Office for Science (2017), Technology and Innovation Futures Report

¹⁴ USDA (2011), Research Investments and Market Structure in the Food Processing, Agricultural Input and Biofuel Industries Worldwide

Scale of the New Anglia AgriFood Tech Sector

Within this rapidly growing Global and UK sector, New Anglia is arguably the most productive farming region in the UK, with the most profitable farms, a dynamic food chain and the largest concentration of agri-food research in Europe. New Anglia's agriculture has a turnover of £1.65billion, including 52% of the UK sugar beet production, 20% of its cereals, 21% of the pig herd and 21% of the duck, geese and turkey flocks. In 2013, 91,891 out of 653,489 employees (14% of all employees) in the LEP area worked in the food and drink supply chain, up from 89,129 in 2009¹⁵.

Taking the tighter AgriFood Tech definition, which excludes food retail and catering, the sector generated 7% of the LEP's GVA and employed 50,000 staff or 7.4% of the workforce, double the national average (see datapack). It also accounts for 10.8% of all businesses in the LEP area. Growth in the AgriFood Tech sector since 2010 has been broadly in line with the growth of the LEP economy.

The New Anglia AgriFood Tech sector had exports of £479m in 2015, with £300m going to the EU and £179m elsewhere (see datapack). At 17% of the exports in the LEP area the sector is more important to exports than in any comparator LEP area.

Major AgriFood Tech Sector Employers

The New Anglia AgriFood Tech sector contains 7,875 companies, but these companies are not evenly distributed across the area. Business numbers in the sector are lowest in Norwich (100) and Ipswich (95), and highest in South Norfolk (880), Mid Suffolk (920), Kings Lynn and West Norfolk (930) and Breckland (935).

Over the period 2010-'16, the number of business units in the New Anglia sector has grown by 7.4% (despite a fall in employment – see section 2 below), although this is a slower growth rate in business unit numbers than seen in GCGP (+8.7%), GLLEP (+10.9%), SELEP (+11.6%) or the much larger increase seen nationally (+13.3%).

As well as many SMEs the AgriFood Tech sector in New Anglia contains a concentration of larger companies which are UK market leaders or have a turnover in excess of £50m. There are at least 50 of these companies including:

- Crop products: British Sugar; Colmans; Duffield Mills; Favor Parker; Frontier; Gleadells; Muntons; Produce Investments Limited; Ragleth;
- Meat products: Bernard Matthews; Cranswick; Gressingham Foods; Tulip;
- Drink products: Adnams; Greene King; Konings; Robinsons;
- Other processed foods: 2 Sisters Food Group; Direct Table Foods; Heinz; Kerry Food Group; Kinnerton; Linda McCartney Foods; Mars; Pasta Foods; Penguin Lutosa; Premier Foods; Smithfield Foods;

¹⁵ New Anglia Food, Drink and Agriculture Board Terms of reference

- Logistics and supply chain companies: Agricola Group; Anglia Farmers; Fram Farmers; J&H Bunn; Nidera; Promens Packaging;
- Engineering/technology companies: Briar Chemicals; Claas UK; Dow; Limagrain.

New Anglia AgriFood Tech Research and Innovation

The New Anglia area has an internationally significant concentration of research and development in both agriculture and food. This research base is also a significant provider of post graduate training with a global reputation and creates a significant market for those with higher level skills and qualifications.

The key AgriFood Tech research and development assets are:

Norwich Research Park (NRP) in total employs 12,000 people, including 3,000 scientists and generates over £100m of investment in research, much of which is directed at challenges in the agri-food sector. NRP includes 3 of the national 8 BBSRC strategic institutes (JIC, IFR and Earlham Institute):

- The John Innes Centre (JIC) - is the number 1 ranked plant science centre in the world;
- The Earlham Institute (formerly The Genome Analysis Centre – TGAC) - has in the last decade been established as a leading centre for genomic analysis;
- The Sainsbury Laboratory - is privately funded and linked to JIC working on plant sciences;
- Institute of Food Research (IFR) - is the only nationally funded food research institute in the UK;
- British Beet Research Organisation (BBRO) - is funded by industry and based at NRP;
- NRP also hosts 75 companies, many of which are knowledge led spinouts and start-ups working in the AgriFood Tech sector;
- The UEA and Norfolk & Norwich University Hospital both work on dietary health and will merge their dietary teams with IFR in 2018 to form the new Quadram Institute, a £81m investment to create a national centre for dietary health.

The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) is based in Lowestoft and employs 530 people across its Lowestoft and other UK sites.

A number of experimental farms include Morley run by NIAB TAG, which also operates the STAR project in Suffolk and there are trial sites for many companies including, for example, those run by Europe's largest seed company Limagrain, in Woolpit in Suffolk and Docking in Norfolk. Other companies such as Muntons and British Sugar in the food sector have their own R&D programmes.

AgriTech East is a major cluster organisation specifically focused on the industry and the Eastern Agritech Initiative run alongside it provides locally responsive grants for applied research and development.

The strength and breadth of the research base is built on a highly skilled workforce drawn from across the world and attracted to Norfolk and Suffolk by the global reputation of centres such as the John Innes Centre. International recruitment has therefore been a longstanding feature of this sector.



Appendix 4 - Current employment

Employment in the New Anglia AgriFood Tech sector

The sector is not evenly distributed across the New Anglia area with major differences in the percentage and total workforce in the sector at district level, but has a broad geographic spread across the LEP area.

District	Employment	% of workforce
Breckland	6,600	12.8%
Kings Lynn and West Norfolk	6,500	11.3%
Mid Suffolk	5,700	15.3%
St Edmundsbury	4,800	7.5%
North Norfolk	4,500	12.8%
Suffolk Coastal	3,600	6.9%
Waveney	3,600	8.6%
South Norfolk	3,500	6.5%
Broadland	3,100	6.4%
Babergh	2,300	7.0%
Forest Heath	2,200	8.6%
Norwich	1,800	2.0%
Ipswich	1,000	1.5%
Great Yarmouth	900	2.4%

What is noticeable about this data is that the sector is much more important in the rural districts, with over 10% of the workforce in this sector in Mid Suffolk, Breckland, North Norfolk and Kings Lynn and West Norfolk, but less than 2.5% in all three major urban districts of Norwich, Ipswich and Great Yarmouth.

Across the area the percentage of the workforce employed in specifically technology roles (as opposed to production and distribution) as a percentage of the workforce varies from 5% in Mid Suffolk to 21% in Norwich (due to Norwich Research Park).

Across the LEP area the agrifood sector workforce is dominated by employment in agricultural production (46% of the workforce) and food processing (35%), with wholesaling and marketing at 10%, logistics at 5% and input supplies at 5%.

Compared to nationally, this shows a proportionately larger workforce in agricultural production as a percentage of the total (46% as opposed to 35%), but a much lower share of the workforce in food wholesaling and marketing (10% as opposed to 21%).

Given that most GVA in the food chain is post farm gate and that food processing, wholesaling and marketing jobs generate higher per capita GVA¹⁶, this skewing of the sector towards agricultural production adversely affects the sector's contribution to the economy. Recent data does, however, show that the sub-sectors with the fastest growth rates in employment have been in processing and marketing (see datapack).

With a Location Quotient¹⁷ (LQ) of 1.9 for New Anglia and both Norfolk and Suffolk individually, the AgriFood Tech sector has nearly double the importance in the area as it has nationally and is more important than the sector is in either GCGP (LQ of 1.5) or SELEP (LQ of 1.0), but less important than in the GLLEP area (LQ of 3.2). As with the data above for the percentage of the workforce at district level, the LQ varies from 4.0 in Mid Suffolk to 0.5 or less in Norwich and Ipswich.

The sub-sectors in which the LEP area is particularly strong include: manufacture of malt (LQ of 19.1); manufacture of sugar (LQ of 17.0); seed processing (LQ of 14.5); manufacture of agricultural and forestry machinery (LQ of 9.2); manufacture and preserving of poultry meat (LQ of 8.6); manufacture of pesticides (LQ of 6.9).

Compared to the economy as a whole the sector employs more of its workforce on a full time basis (90%) with relatively few part time workers. This is even more pronounced in the areas in which the sector has the highest share of employment.

Salaries

New Anglia has a comparatively low wage economy with average full time gross average wages (2016) of £21,052, compared to a national average of £23,099 and East of England average of £24,233. Workplace wages in New Anglia are 89% of the national average and 91% for New Anglia residents (indicating net out commuting to higher paid jobs in other areas).

Against these averages many jobs in the AgriFood Tech sector compare well with production managers and directors achieving £57,155, scientists £41,127, conservation professionals £34,980, farmers £28,079 and agricultural machinery drivers £25,523. However, food manufacturing operatives at £19,807 and elementary agricultural occupations at £19,776 had wages below the LEP average.

Feedback from the online questionnaire consultees suggest that they expect to see the number of higher skilled, higher wage jobs increase at the expense of a fall in lower skilled production operative jobs.

Trends in employment

The New Anglia AgriFood Tech sector has performed relatively poorly in the last 5 years in employment terms with staff numbers in the sector falling by 3% (2010-'15). The East of England also saw a 1% fall, with the fall being 2% in Greater Cambridgeshire, Greater

¹⁶ DEFRA (2016), Agriculture in the UK (Chapter 14, Food Chain)

¹⁷ Location Quotient compares workforce share in an area to the national average, with values above 1 indicating that git is over-represented and conversely below 1 that it is under-represented in the area

Peterborough (see datapack). This contrasts markedly with a 5% increase in employment in the sector across England and a 5% and 7% increase in the neighbouring LEP areas of Greater Lincolnshire and the South East respectively.

Clearly the national growth in the sector or that seen in neighbouring LEP areas has not translated into growth in 'East Anglia'. Locally the trend was more negative in Suffolk with employment falling by 5% against a 1% fall in Norfolk.

However, there has been an increase in part time roles over the period 2010-'15 in New Anglia, +10%, whilst full time staff numbers fell by 5%.

The datapack also shows that over the period 2010-'15, the growth in the workforce in the sector was also not even across districts, with at the extreme Great Yarmouth reporting a 26% fall in employment, whilst Forest Heath witnessed a 13% rise in employment in the sector. However, this data needs treating with caution as these changes are believed to be influenced by mergers and acquisitions and thus some changes in where employment numbers are recorded at the district level.

Analysis by Burning Glass (see datapack), whilst not believed to be a complete dataset due to reporting issues from smaller employers, shows that the most common vacancies advertised in the sector between 2012-'16 were for production managers and directors or engineers. In terms of job titles the top three titles were all for engineers (maintenance, production and electrical).

Migration

The New Anglia AgriFood Tech sector has been recruiting internationally for many years, whether to attract the best scientists in the world to NRP, or to fill a shortfall in local labour supply for production agriculture and food processing. Hard data on migrants in the sector is difficult to corroborate given that many migrants work via labour providers. However, the Food and Drink sector estimates that nationally over 25% of the workforce, over 100,000 staff are migrants. DEFRA reports that there are over 20,000 migrants working full time in agriculture and the food chain post farmgate is very dependent on migration. Anecdotally most larger food chain employers report that over 35% of their workforce are currently drawn from overseas, with some putting the figure at over 60% (both directly employed and via labour providers).

Local data on National Insurance registrations (NINO data) shows that across all sectors New Anglia has seen migrants entering the workforce stabilise at 10-12,000 every year since 2005, after a big increase over the years immediately before this.

The New Anglia economy suffers a daily net out migration of over 25,000 of its residents to jobs in other areas, with those with L4+ qualifications disproportionately represented in this data at a net loss of over 11,500 people who live in New Anglia but work elsewhere. Most of this daily outmigration is to Cambridge (over 6,000 workers), Colchester (5,000), South Cambridgeshire (5,000) and London (4,000).

Appendix 5 - Links to Other Sector Skills Plans

The rapid development of the agrifood industry and specifically the role of new technology is being fuelled by an increased focus on inter-disciplinary research and innovation which is bringing new technologies into the food chain. In developing the industry and defining its future skills needs, these linkages with other sectors are critical.

a) ICT and Digital

The use of data for decision making and to enable automated systems is increasing rapidly in the food chain. In food processing a 2011 report from the International Federation of Robotics¹⁸ cited by FDF found that Germany had five times as many robot installations in food processing relative to the size of its food industry.

Big data and digital sensors unite in the Internet of Things (IoT), and the adoption of earth observation data (e.g. drones, planes and satellites, ground sensors) is leading to massive new datasets in agriculture. Analysis of this data can be used to guide farm decision making, automated machinery and the delivery of production efficiency.

Developing systems to analyse food chain data helps manage food supply chains. RFID tags are used to track items in the supply chain and IDTechEx reported (2015) that the RFID market, worth \$10.1 billion, will grow to \$13.2 billion by 2020¹⁹.

b) Energy

New Anglia has been progressive in developing both biomass and biofuel production from agricultural, food chain waste and forestry. From straw fired (e.g. at Snetterton) or poultry litter power plants (e.g. at Eye), to on farm anaerobic digestion or biomass heating systems, development of this industry has been rapid. Many farms and food companies have also adopted solar and wind power. The food sector has rapidly developed into a major energy supplier alongside its food production role and needs the skills to install, operate and maintain these energy systems.

c) Life Sciences

The link to life sciences has two main dimensions: the use of life sciences to develop more productive farming and food systems; and, the development of food which has enhanced health benefits to respond to consumer trends and thus open up new markets for the food chain. UK agricultural policy has promoted the need for sustainable intensification with reports including Food 2030 (2010), the Foresight Report (2011)²⁰ and the UK Strategy for Agricultural Technology (2013)²¹ promoting the need to increase production whilst addressing the sector's environmental footprint.

¹⁸ Food and Drink Federation (2014), Key Innovation Challenges for the Food and Drink Industry

¹⁹ IDTechEx (2015), RFID Forecasts, Players and Opportunities 2016-2026

²⁰ Foresight report (2011), Global Food and Farming Futures

²¹ Her Majesty's Government (2013), A UK Strategy for Agricultural Technologies

In the Food 2030²² paper the Government also highlighted that poor diet is estimated to account for a third of all cancer cases, and a further third of cases of cardiovascular disease. Obesity has more than doubled in the last 25 years and increases the risk of developing Type II Diabetes, cardiovascular disease and some cancers²³. Healthy Lives, Healthy People published in 2011²⁴ reported that 23% of adults are obese; 61.3% are either overweight or obese. It estimated that the costs to society and the economy of being overweight or obese were almost £16bn in 2007, with a potential rise to just under £50bn in 2050 if the rise in obesity rates continued.

The relationship between health and food is a major concern to the NHS given the costs of poor dietary choices. It is also leading to new markets, with reports suggesting the global health food market could reach £220billion by 2017²⁵ and the nutraceuticals market will grow at 7% per annum to reach €35billion by 2020²⁶.

d) Ports and Logistics

The food and drink supply chain is a major user of logistics and nationally accounts for 28% of road freight in the UK²⁷. Whilst regional level data is not available, it is thought that this percentage is higher in the New Anglia area given the relative scale of the local agrifood sector. The region also has major food and agricultural product ports at Felixstowe, Great Yarmouth and Kings Lynn.

e) Advanced Manufacturing

The increased use of robotics and autonomous systems in the food chain is drawing on expertise from the advanced manufacturing sector e.g. automotive, which is already using these systems. Continued growth in this demand to meet the challenges of labour productivity and availability will necessitate the agri-food sector learning and taking skills from the advanced manufacturing sector.

f) Tourism and culture

Food is a central part of culture and is increasingly being seen as central to the tourism offer with the percentage of tourism expenditure used on food rising. The COOL Economic Impact Research on Norfolk Tourism²⁸ (2012) reported that tourists to Norfolk spent a total of £1.94bn, which rises to £2.87bn with indirect expenditure impacts in the wider economy. Of direct tourism expenditure 35% is spent on food and drink with sales estimated at £678m. Regionally the tourism sector has shown that it is keen to use local food and drink to differentiate its offer.

²² Her Majesty's Government (2010), Food 2030

²³ Foresight (2007) Tackling Obesities: Future Choices

²⁴ HMG (2011), Healthy Lives, Healthy People: a call to action on obesity in England

²⁵ Metro.co.uk (30th January 2014), Companies grow fat as you slim: the growth of the weight loss market

²⁶ Food & Drink Europe (10th August 2015), In 2020: Global nutraceuticals market to be worth €35billion

²⁷ DFT (2010), Transport Statistics Bulletin: Road Freight Statistics 2009

²⁸ Cool Tourism (2014), COOL Activity 1.2: The Economic Impact of the Norfolk Visitor Economy 2012

Appendix 6 - The Datapack

The Datapack is presented as a separate document which includes a wide range of sectoral and more general socio-economic and skills data for the New Anglia area. It provides the data to underpin many of the comments made in the sector plan and should be used as a reference source which is read in conjunction with the plan.