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Scoping Study - Agri-Tech West




Final Report

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EXECUTIVE SUMMARY

ES.1 This Agri-Tech West Scoping Study has been prepared on behalf of four Local Enterprise Partnerships (LEPs) – Stoke and Staffordshire, The Marches, Cheshire and Warrington and Worcestershire – to examine the support for and outline of a united identity for the agri-tech sector across the four LEP areas, to be known as Agri-Tech West.

ES.2 Agri-tech is a broad sector, encompassing significantly more than on-farm activities. This report does not set out an industry SIC Code based definition or an exhaustive list of technologies – but uses an umbrella definition of the '**use of technology to achieve sustainable productivity growth in agriculture and processing**.' All four LEPs have Strategic Economic Plans that include agri-tech to some degree – some with strong emphasis on food and drink and some concentrating on advanced engineering and its links with the rural sector.

ES.3 The agriculture, food and drink processing and related technologies sectors were reviewed to provide an understanding of the Agri-Tech West area's asset base, including subarea strengths and comparative advantages. This asset base review determined that the Agri-Tech West area has a solid and diverse agri-tech sector, with a **broad-based agricultural industry, a variety of small and large food processors, an established engineering sector and a network of land-based and/or engineering education institutions.** There are subarea differences and niches throughout the Agri-Tech West area, as well as several commonalities.

ES.4 The Agri-Tech West area's broad agriculture base is complemented by the breadth of the support or downstream industries, including:

Food Processing	Beverage Processing	Agricultural Supplies	Services
• Meat processing • Prepared meals • Salad and fresh products • Dairy products • Desserts and confectionery • Gourmet products	• Cider • Milk • Ale	• Machinery and componentry • Fertiliser production • Animal feed	• Land-based education • Livestock breeding • Engineering and maintenance

ES.5 The West Midlands is an important **engineering** centre with a broad base. There are established businesses serving the technical needs of the rural sector. However, the engineering base in the region is far broader than just that applied to agricultural machinery. There are opportunities for engineering firms in the region to apply their skills to the agri-tech sector. A higher profile of the technical needs and applications for agriculture and processing through an Agri-Tech West structure will help to take advantage of this engineering base.

ES.6 The **education** sector is a key strength of the Agri-Tech West area, with a network of FE and HE institutions with specialisms in the land based economy and/or engineering. This network of education sites across the area is undertaking research and trials into a wide range of innovative technologies and practices (e.g. advanced engineering, machinery, sensors, genetics, data and weather forecasting) that can be applied to agriculture. These facilities will be a key on-going resource for further integration of the agri-tech sector.

ES.7 The agri-tech sector in Cheshire and the West Midlands is mostly characterised by the application of technology by end users, rather than the production of new technologies by large research firms. That is not to say that there were no new technologies being developed in the area, but that the largest component of the agri-tech sector is the end user – the large and broad agricultural and food and beverage sectors. This suggests that supporting the access to appropriate technology that improves productivity in the sector should be a key focus of any support programme.

ES.8 Take-up of technology is dependent on the size of the firm, with smaller firms less able to increase productivity through technology than larger firms, due to capital costs and opportunities for research and development. However, a coordinated, supply chain approach towards improving productivity has more capacity to access new technologies.

ES.9 Representatives of the agri-tech sector, including businesses, industry organisations, public sector and education, were consulted to gauge the local appetite for an Agri-Tech West identity and to gain further insights into the mix of sectors. It was firmly established that there was **broad support for Agri-Tech West** to represent the West Midlands and Cheshire area and to provide an agri-tech information portal.

ES.10 It is recommended that the four LEPs form Agri-Tech West as a **flexible alliance**, joining resources on particular projects as appropriate to promote agri-tech in the area,

but retaining independence and control of strategic planning at the LEP level. The table below outlines the priority projects and key actions recommended to establish and roll-out an Agri-Tech West programme.

Table E1 – Priority Projects

Project	Actions
Initiating Agri-Tech West	
Establish the Agri-Tech West entity	• Agree on a structure for Agri-Tech West. • Confirm areas within Agri-Tech West area, including a commitment of the 4 LEPs and enquiries to neighbouring areas. • Assemble a board/steering group for Agri-Tech West and a reporting structure • Commit LEP funding • Develop a Business Plan for Agri-Tech West
Financing	• Development of a list of key funders willing to operate in this sector and the likely terms of support. • Examine the possibility of a soft loan fund to assist in the take-up of the technology. • Through the LEPs, lobby government agencies for funding, including devolution of central funding • Through the LEPs investigate options and apply for EU funding. • Investigate other funding sources, such as paid services or membership fees
Skills and Education	
Promote further collaboration between educators/researchers	• Identify areas of duplication and overlap in training provision. • Prepare a agri-tech skills audit for the Agri-Tech West region to identify gaps in knowledge and training. • Identify areas of apprenticeship need and prioritise these areas in further support of the education sector. • Support and encourage cross collaboration of FE/HE courses spanning different institutions.
Promote agri-tech as a career in the region.	• Prepare an agri-tech promotional programme to be disseminated to schools and colleges. • Prepare a programme of jobs fairs for agri-tech, to be held throughout the Agri-Tech West area and in conjunction with and support from FE/HE and industry bodies. • Investigate options of incentivising agri-tech apprenticeship take-up, including encouraging public sector apprenticeship programmes, targeted support for agri-tech SMEs to take apprenticeships and scholarships or similar for students.
Application of Innovation – LEPs and Networks	
Promotion of Agri-Tech West as an information/signposting portal for the sector	• Establish and maintain an Agri-Tech West website and social media presence • Use LEP resources to establish a physical presence/desk within each LEP area. • Launch event for Agri-Tech West • Prepare a detailed compilation of information on programmes, resources, funding, support, networking, etc., at the Agri-Tech West area and UK levels.

Project	Actions
	• Establish working links with existing programmes of business support (e.g. Growth Hubs, Catalysts, local authorities, etc.)
Applying technology to agriculture	• Prepare a programme of regular information events (both physical and web-based) that have the objective of exposing participants to emerging technologies and technology providers. • In concert with other industry organisations (e.g. AHDB, NFU) develop a common platform for dissemination of information and research into emerging agri-tech technology and practices
Strengthening supply chain links	• Provide a go-between for small primary producers to develop supply relationships with processors, cooperatives and markets. • Investigate software/website options for primary producers to promote their products as they are ready to harvest.
Brexit position – strategy, lobbying and guidance	• Prepare a positioning paper for the UK Government that outlines key items that need to be addressed and clarified for the agri-tech sector and Agri-Tech West's position on behalf of the industry. • Liaise with other industry organisations, particularly agricultural and manufacturing bodies to explore opportunities to present a united position for lobbying.
Opportunity for New Products and Innovations	
Network of best practice operations	• Compile a network of leading businesses and operators in the region that would be willing to showcase their operations • Encourage industry operators to visit the network of best practice operations through Agri-Tech West promotional material and events. • Encourage visitations to the research centres and trial farms within the network of FE and HE institutions.
Evaluation of technologies	• Development of fact sheets setting out the relevance of technological improvements to different sectors, the likely costs and the benefits achieved by adopters.
Sectoral support – dairy, horticulture, food and drink production, advanced manufacturing, genetics, etc.	• Establish sectoral committees as appropriate. • Sectoral committees to prepare and present a plan for the support and growth of each sector. • Investigate options for a 'business mentoring' programme where start-up/SMEs are paired with established firms/business leaders in the area for support and
Long Term Options	
Long term option – centres of excellence, pilot plants, model farms, etc.	• Review the asset base within education facilities and the established network of best practice options to identify gaps. • Consult with the agri-tech sector to identify areas of need in terms of demonstration facilities. • Identify a site(s) for such facilities, with it being recommended that any facilities collocate with existing assets (e.g. FE/HE) to minimise costs. • Undertake a feasibility analysis on such facilities, which will examine capital costs, land acquisition, on-going costs, revenue streams and benefits to the industry.

Source: BE Group and Mickledore

1.0 INTRODUCTION

1.1 BE Group and Mickledore have been commissioned to undertake this Agri-Tech West Scoping Study. The study has been commissioned by four Local Enterprise Partnerships (LEPs) – Stoke and Staffordshire, The Marches, Cheshire and Warrington and Worcestershire. The Agri-Tech West study area encompasses the four LEP areas.

1.2 The four LEPs came together to jointly commission this study, recognising that the rural economy and its relationships further along the processing chain do not neatly sit within a LEP or county boundary. A more coordinated, inter-LEP area approach was seen as providing a more appropriate means of assessing and developing the industry. Furthermore, there is policy impetus identifying agri-tech, agriculture or advanced manufacturing in the LEP Strategic Economic Plans.

1.3 The project objectives of the study, as identified in the Invitation to Tender, are listed below (paraphrased), with details of the chapters of this report in which they are addressed:

- Engagement with a range of businesses operating in the agri-tech sector and the supply chains within the Agri-Tech West area (Chapter 6.0).
- Provision of analysis and understanding of the scope of the agri-tech sector in the four LEP areas and the Agri-Tech West area as a whole. This is anticipated to include consultations with industry organisations, research institutions and higher and further education institutions (Chapters 4.0, 5.0, 6.0 and 7.0).
- Identification of commonalities, synergies, differences and unique selling points in the Agri-Tech West area, inferring opportunities or barriers to economic growth (Chapters 4.0, 5.0, 6.0 and 7.0).
- Identification of potential options and next steps to encourage value-added growth and increased productivity in the sector across the Agri-Tech West area (Chapter 8.0).
- Proposals for governance and models of operation to put potential operations into practice (Chapter 8.0).
- Proposals of what “asks” might be made of Central Government in order to realise these growth ambitions (Chapter 8.0).

1.4 The term “agri-tech” is increasing in usage, although there remain variations in its understanding and scope. Terms such as agri-food, agri-science and agri-business

are also in use, with overlapping meanings. As such this study outlines a definition of agri-tech for this study and for an on-going Agri-Tech West programme.

1.5 The UK Government released *A UK Strategy for Agricultural Technologies* in 2013 with the objective of better integrating the UK's strengths in science and farming with trade, investment and international development. It was promoted at the time as the first time the Government looked at the opportunities of the agricultural technologies sector as a whole, bringing together science, food production and farming. The strategy included funding for the establishment of centres for agricultural innovation and an Agri-Tech Catalyst. With the change in Prime Minister and Government ministries in July 2016, elements of agri-tech will come under the Department for Business, Energy and Industrial Strategy (BEIS) and the Department for Environment, Food and Rural Affairs (DEFRA).

1.6 Broadly, agri-tech is a linking of two traditional sectoral strengths of Cheshire and West Midlands – agriculture and manufacturing. A unified, integrated strategy for agri-tech development across Cheshire and West Midlands would benefit both these traditional strengths and improve economic links within the region. Furthermore, an integrated agri-tech approach would encourage research, innovation and investment in the sector.

1.7 Improvements in productivity through innovation in agriculture and food and beverage processing would have long term benefits for the Cheshire and West Midlands area and the UK as a whole. It is increasingly important that the agricultural sector produce more from less as populations grow and land resources become more scarce. Productivity increases would improve resilience in the sector, helping to ensure that it can remain sustainable and profitable over the long term. This would improve the UK's food security and reduce the reliance on importing raw and processed food and beverage products.

Methodology

1.8 This Agri-Tech West Scoping Study has been consultation-focussed, corroborated by a review of published data on the industry. The study has established a clear definition of agri-tech to take forward in the Agri-Tech West programme. The study assessed the sector strengths in each of the four LEP areas and the Agri-Tech West area as a whole through an analysis of economic and employment data. A series of location quotients were calculated, which highlight the specific niche strengths within the LEP areas, relative to the national averages.

1.9 The consultation targeted industry organisations, public bodies, further and higher education and key businesses to gather a broad range of opinions and viewpoints of the industry and a potential Agri-Tech West programme. The consultations were undertaken using face-to-face and telephone interviews with one or two representatives of each organisation. The consultations enabled a more in-depth understanding of different components and dynamics of the agri-tech industry. The consultations also highlighted the interrelated nature of the industry in the region through discussions of the supply and business links within the industry.

1.10 The study used the data gathered to compile an asset base for the Agri-Tech West region, including its component LEPs. Differences and similarities between the sub-regions are highlighted to demonstrate existing and potential areas of commonalities and linkages.

1.11 The study has prepared a series of recommendations for the on-going growth and development of the agri-tech industry in the region. The study provides options for Agri-Tech West, including governance, priorities and key actions. A series of key strategies has been developed to guide the establishment of an Agri-Tech West identity and its key programmes.

Agri-Tech West Area

1.12 The Agri-Tech West area stretches from Warrington in the north to the northern half of the Wye Valley in the south and from the Welsh border in the west to the edge of the Peak District in the east. It encompasses a wide range of rural landscapes, which encourages a substantial breadth of agricultural production. The area also includes significant areas of industrial production, particularly around Telford and in Staffordshire, as well as being on the edge of the Greater Birmingham conurbation, thus providing substantial opportunities for manufacturing to support the rural economy.

1.13 The table below lists the local authority areas incorporated within the Agri-Tech West area.

Table 1 – Local Authority Areas within Agri-Tech West Area

LEP	Local Authorities
Cheshire and Warrington	Cheshire East Cheshire West and Chester Warrington
Stoke and Staffordshire	Cannock Chase East Staffordshire Lichfield Newcastle-under-Lyme South Staffordshire Stafford Staffordshire Moorlands Stoke-on-Trent Tamworth
The Marches	Herefordshire Shropshire Telford and Wrekin
Worcestershire	Bromsgrove Malvern Hills Redditch Worcester Wychavon Wyre Forest

Source: BE Group, 2016

1.14 The Agri-Tech West area comprises a population of approximately 3,280,000 (mid 2015), representing some 6 percent of England's population. It sits on the edge of the substantial urban areas of Greater Birmingham, Greater Manchester and City of Liverpool Region, meaning that there is considerable potential for linkages within the Agri-Tech Region and to neighbouring areas for labour, skills and training, suppliers and downstream processing.

2.0 AGRI-TECH DEFINITION

Introduction

2.1 Agricultural Technology, or agri-tech as it has become known, has become a recognised 'sector' in the UK economic development landscape. Agri-tech has been the subject of significant investment and agri-science became recognised as one of the 'eight great technologies' of the UK economy. Finding a definition of what actually constitutes agri-tech is rather more difficult to achieve.

2.2 In fact, agri-tech as a sector appears to have no agreed formal definition with different organisations coining the phrase to suit their own particular approach. In fact, the main UK Government Report which established the areas as a priority – 'UK Strategy for Agricultural Technologies' (2013) offered no particular definition.

2.3 This report does not seek to set out a detailed definition using industry SIC Codes or an exhaustive list of technologies – but uses an umbrella definition of the '**use of technology to achieve sustainable productivity growth in agriculture and processing**.'

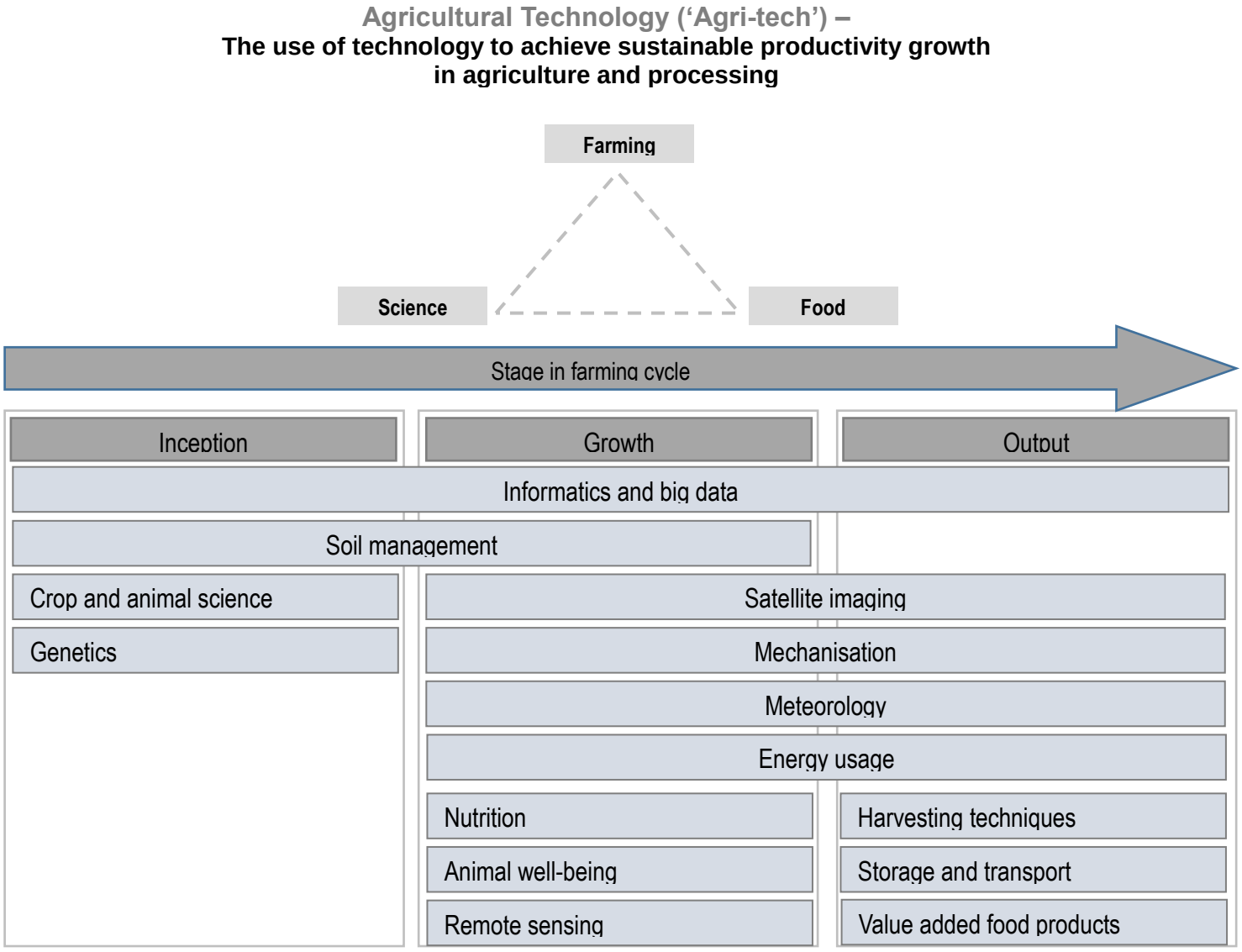
2.4 This definition encompasses work which would be carried out in the scientific community, in the farming sector and in the food processing industry. The definition and the involvement of different parts of the sector is set out in the diagram overleaf complete with some suggestions of the relevant areas of technology at different stages of the farming process. This is intended as an illustration of some of the key areas rather than a comprehensive definition.

2.5 The key aspects of the definition are that the work is principally about technologies and their implementation. That the technology needs to improve productivity in the agricultural supply chain and that any changes in technique need to be sustainable in terms of the impact on the environment.

2.6 **What is immediately clear from using this definition is that 'agri-tech' is not really a sector at all. It is actually the application of several different areas of science, processes and equipment to an agricultural use**. Some of these technologies may have originally been developed or applied to non-agricultural uses (e.g. GPS tracking, machinery/componentry, software) but agri-tech is the application of diverse areas to agriculture or downstream processes.

2.7 Even this key finding of the definition points to one of the key conclusions of this study – and that is a successful agri-tech strategy must be at least partly focused on the dissemination of products and processes across as many operators in the sector as possible.

Figure 1: Definition and some areas of technology by stage



Source: Mickledore

2.8 Explanations of the following terms are provided in the context of the above diagram:

- **Inception** – the beginning of the production process whether seed manufacture and sowing or animal breeding and birth
- **Growth** – the nurturing of plant or livestock
- **Output** – the harvesting / slaughter activity, processing of the product and

downstream activities.

2.9 Whilst the definition of agri-tech and a schematic breaking down the different areas of work has been presented, it is useful to consider some of the ways in which agri-tech is changing the manner in which farming and production is being carried out.

2.10 In the absence of a formal definition of agri-tech we do not claim to have produced the comprehensive list of exact areas where the application of technology is able to make a difference – but rather provided some of the most commonly heralded areas of recent advance.

Informatics and Big Data

2.11 The first of the innovation centres to be developed as a result of the agri-tech strategy was the Centre for Agricultural Informatics and Metrics and Success and this will focus on the application of informatics and big data in agriculture.

2.12 The UK agri-tech strategy stated that there is a huge amount of data generated from the laboratory to the farm to the retailer and that this has the potential to drive innovation throughout the agri-tech sector.

2.13 At the individual farm level, more precise data can increasingly be used to provide evidence of compliance with regulatory and quality assurance and traceability requirements whilst at an aggregated level, benchmarking information allows farmers to compare their own performance with local, regional and national averages.

2.14 The UK strategy asserts that bringing farming data together with related information on areas including consumer preferences and trends and climate change data has the potential to generate even greater business benefit. The collection and analysis of data can provide the evidence to define, understand better and help deliver sustainable productivity and yield gain.

2.15 Examples of information-related innovation in the farming sector include a crop management tool developed by drinks giant PepsiCo in collaboration with Cambridge University. Rolled out to farmers in 2011, the tool provides precision information about crops, helping farmers reduce their water use and carbon emissions, boost harvests and increase efficiency.

2.16 Another example is a data sharing scheme between supermarket Sainsbury's and its dairy suppliers. Farmers share data including electricity usage, manure storage and fuel usage, and in return can benchmark their performance against others. The data showed, for example, that the best 10 percent of producers are delivering 47 percent more yield than the worst 10 percent of producers using 11 percent less feed, the strategy document says. This difference alone is worth £4.5 million a year.

2.17 It seems that big data, collaboration and understanding has so far been driven most effectively at a supply chain level and the creation of cooperative or contractual supply chains between farms and the primary processor is a recurring theme of this study.

2.18 The ability to use data is becoming more accessible at a local level however. Companies such as Vital Fields offer software to control fields. Systems monitor weather forecasts, track crop phases, estimate the threat of plant diseases, analyse data from the farmer's electronic "field book" and thus helps to make prognoses about fields, helping users keep track of costs and finally grow crops more efficiently.

Soil management

2.19 In the UK, the Government seeks to control soil management standards and the Department for the Environment publishes 'Soil management standards for farmers'. The work starts from the premise that farmers need to protect the soil from a number of possible threats such as erosion, organic matter decline, compaction and contamination. As a result, the guide explains the cross-compliance soil management standards that must be adhered to in order to protect the soil, and gives guidance on how this can be achieved.

2.20 The guide also outlines good soil management practices for various farming activities and how to meet cross compliance requirements. These include arable farming, fruit and flower growing, restoring and recreating habitats for biodiversity, maintaining landscape features, and grazing and keeping outdoor pigs.

2.21 As a result, the UK has the structure in place to implement new soil management techniques through compliance processes linked to subsidy payments.

2.22 This is another area of agri-tech which is being partly influenced by the key actors in the supply chain. Unilever, for example, have set out their requirements of the soil management techniques applied to become a supplier.

2.23 In the UK specifically the Agriculture and Horticulture Development Board (AHDB) (cereals and oilseeds) has undertaken / gathered together a large amount of research on soil management which is all published on their website – with 14 articles published since 2012. The organisation is now finalising their This four-year (2012-2016) programme of activity which had three projects investigating a range of practical and sustainable soil management practices. The work includes managing on-farm soil variability by using data from yield maps. Other parts of the programme are looking at how different types and quantities of organic matter influence soil structure and the effect of different cultivation techniques on the soil.

2.24 Soil management is therefore an area where advances are being made but in many cases the issue is the wide scale implementation of the current knowledge and best practice.

Animal and Crop Science

2.25 Animal and crop science could be viewed as an umbrella term for strands which are considered separately such as genetics, nutrition and animal well-being.

2.26 Much of the work in disease management, pest control, seeds and fertilizer has been carried out by the agri-chemical / life science sectors. The largest players in this sector are Monsanto, Bayer (currently the subject of an acquisition bid by Monsanto), and Syngenta (currently the subject of an acquisition by Chem China), DuPont (under the Pioneer division) and Dow. The acquisitive nature of the sector perhaps demonstrates the attractiveness of some of these technology businesses and the role they are playing in agriculture.

2.27 In terms of UK understanding and implementation the AHDB provides a substantial body of information and guides for UK farmers:

a. The AHDB Beef & Lamb Better Returns Programme (BRP) encourages English beef and sheep producers to evaluate their businesses to identify where improvements can be made in terms of cost reduction, environmental impact and animal performance. It focusses on breeding, selection for slaughter, health and fertility, nutrition and forage, and systems and costings.

b. The AHDB cereals and oilseeds publishes a substantial amount of research information and best practice findings on disease, weeds, pests, grain quality, environmental research and industrial uses research.

c. AHDB Dairy publishes substantial information on animal health (mastitis, healthy Feet, bull proofs, herd genetic reports and inbreeding checker); technical information (on health and welfare, breeding, grassland management); and R&D (breeding, environment, health and welfare, nutrition, production systems and soils).

d. There are similar research projects published on the horticulture, pork and potatoes websites.

Genetics

2.28 Much of the content regarding genetics, breeding and seeds is within the heading of Animal and Crop Science and AHDB publish work on genetics and breeding within their general research sections.

2.29 The UK's largest bull stud is based in Chester and claims to have the most successful and robust sexed semen available anywhere in the world. The company, Cogent International, was the first to offer sexed bull semen. Further genetics and breeding firms are located in the Agri-Tech West area, predominantly in Chester, particularly for cattle, but also for horses and other livestock. The Cheshire region has a broader science cluster in life sciences, including pharmaceutical and biomedical research, which while not directly influencing animal breeding and genetics programmes, would add to the pool of researchers and demand for specialist equipment in the area.

2.30 The UK has a number of companies involved in leading activities in genetics, breeding and artificial insemination not only in cattle but also for sheep and pigs.

2.31 Genetics is also key to creating disease resistance and significant work is carried out in the UK. One recent example is the creation of a new method to determine if a bread wheat variant is resistant to wheat yellow rust. This work was carried out following the identification of new genetic markers by researchers at The Earlham Institute and John Innes Centre (JIC) both in Norwich.

2.32 The Earlham Institute carries out wide-ranging research into animal, plant and microbial genomics to help to improve crop breeding, withstand disease and enhance yields.

Satellite technology

2.33 Satellite technology is recognised as making a significant contribution to agri-tech.

2.34 Some commentators have cited satellite imagery as one of the additional technology benefits with the ability to see areas of disease or poor growth in crops although the resolution provided by satellite imagery is now being surpassed by the ability to use drones for exactly the same purpose but with better resolution and the immediacy of the results. Drone technology linked to targeted intervention of disease, pests or poor growth reduces costs / environmental impact of indiscriminate spraying and can increase yields.

2.35 GPS tracking has made a significant impact on farming as tractors can follow exactly the same tracks (within 2cms) helping cultivate the land, plant seeds and apply fertilizer in the right location minimizing waste. The tracking also ensures that work in fields is precise – avoiding going over the same ground twice or missing areas.

Mechanisation

2.36 Improvements in the effectiveness, reliability and cost of farm equipment is continuous. Linked to the GPS and imaging points above, drones are becoming more commonplace in agriculture.

2.37 Increasingly tractors are now fitted with telemetry systems – essentially various sensors which send back remote data to a central point. JCB are one of the tractor manufacturers working in this area.

2.38 Some systems are now in place to automate many activities – automatic feeding systems for animals and automatic milking systems for dairy herds.

2.39 Japan is already running trials of fleets of robotic tractors including harvesters, sprayers and rice planters to create multiple autonomous systems in farming.

2.40 Mechanisation is set to grow further with the work on unmanned vehicles to have the potential to change farming long before there is widespread acceptance of automated passenger cars.

2.41 A further area in which initiatives are underway is in creating smart buildings which allow indoor and in some cases multi-storey agriculture. A Company called Plant Lab

was established in 2010 and offers what it calls "radical new plant logic". It designs high-tech laboratories where plants can be grown with less use of resources and space. Inside these environments plants are organized in layers, instead of sunshine they have far-red LED lamps. PlantLab has created an ID for each type of plant to provide necessary conditions and found the best growing recipe. At the end such labs could be part of city construction.

Meteorology

2.42 Agriculture is inextricably linked to climate and weather. There are at least two areas where research in meteorology can make a difference to farming.

2.43 The first is in accurate forecasting. Very predictable longer range forecasting can allow better scheduling of farming activities.

2.44 A study of meteorology and farming outcomes may allow a better understanding of the impact of small changes in climate and the effect on yields and the inputs / crop varieties that may be more resilient to such changes.

2.45 The UK Met Office is a significant contributor to this area of discussion and the new Met Office super computer in Exeter will provide added data analysis to assist in further development.

2.46 There is the opportunity for UK businesses to work in this area in economies where meteorological services are currently under-developed.

Energy Usage

2.47 Energy use and farming is an important area for farm cost saving and the ability to reduce the environmental footprint of the industry.

2.48 Mechanisation, animal husbandry, crop drying, de-humidifying etc. all increase the amount of energy used in farming and the environmental impact of farming is becoming an area of increased attention.

2.49 Farming and land use were together responsible for emissions of 48.4 million tonnes carbon dioxide equivalent (CO2e)1 in 2008, or about 7.7 percent of total UK greenhouse gas emissions (in the form of nitrous oxide, methane and carbon dioxide). Livestock, fertilisers, and fuel use in farming cause most of these emissions. The remainder are from changes in natural carbon balances caused by the way land is

used and managed. Given these emissions, the agricultural sector in England had its first GHG reduction target from Government – a cut of 11 percent by 2020.

2.50 Energy efficiency projects are widely promoted and the use of renewable energy on farms is increasing – initially through wind and solar but increasingly through anaerobic digestion, ground and air source heat pumps, biomass and in some cases, micro-hydro. In some cases, biomass and bio-fuels and solar are competing for land use.

2.51 The reuse of resources on a farm is well-practiced and understood by those working the land. Increasingly, it is understood the energy/heat resource is also able to be reused within the farm operations or on-sold as an additional income stream. Applications include the production of energy from waste materials, use of heat exchangers to transfer heat from one element to another (e.g. to cool livestock sheds, heat horticulture buildings) or the use of surplus land for energy production.

Nutrition and animal well-being

2.52 Mineral additives to common feeds are increasingly commonplace in farming and there are a large number of animal feed companies based in the study area.

2.53 Feed systems are also used to ensure that each animal is gaining the correct level of feed to optimise its health and growth.

2.54 A company called Farmeron is one example of individual nutrition management for cattle. Farmeron has developed a cloud computer service for cattle farmers. Farmers can use it to store all information about their animals, control feeding, observe productivity of each and track their health.

2.55 Different approaches are being developed to feed livestock sustainably – one company Ynsect (French) launched in 2011 and focuses on insect bio-refinery products for agro-industries. It extracts proteins out of beetles and flies which can then be used either for animal nutrition production or even for human usage. In the end of last year.

Remote sensing

2.56 Remote sensing and telemetry is linked to big data and automation projects and there are a huge number of potential applications.

2.57 Companies such as Gamaya founded in 2014, provides a crop monitoring system that uses ultra-compact optical sensors. Its technology is based on hyper-spectral imaging

(HSI) which enables its customers to diagnose crop diseases and determine the required amount of protection chemicals for crops

2.58 Another example of the use of sensors and the application to farming is provided by CropX. Founded in 2013, this company developed an automatic irrigation system which optimises water usage. It includes wireless sensors and a mobile app to determine necessary amount of water.

Packaging

2.59 Innovation in packaging techniques and products has improved quality control and extended shelf-life of food products. Innovation in the packaging sector is driven by cost, weight, shelf-life, aesthetics/design, sustainability, quality control and availability of raw materials.

2.60 The use of polymers continues to expand, driven by its durability and lightweight properties. Polymers are pushing into packaging areas traditionally used by other materials – e.g. beer and wine bottles. Innovations in plastic bottle production (increasing rigidity around the bottle cap, reducing gas permeability) means that plastic bottles can be designed to support and store alcoholic products without spoilage. Innovations in plastic packaging have also included cook-in-the-bag products, allowing food manufacturers to develop ready-meal products offering high levels of convenience and limited cleaning up.

2.61 Innovations in food treatments also impact on packaging. Novel food treatment processes such as irradiation, UV treatments, high pressure processing, pulsed electric fields, etc. mean that the packaging must be designed to withstand such treatments (e.g. polymer degradation, pressure changes).

Conclusion

2.62 There is not really a selection of technologies which are unique to agriculture but rather a seemingly endless variety of applications of technologies which are also used elsewhere.

2.63 The challenge in an extremely fragmented industry such as farming is to gain widespread use of the most effective technologies in order to sustain the innovators and improve productivity in farming.

2.64 This is the area in which Agri-Tech West can play a role in terms of matching the needs of both the innovators and the end users.

2.65 One interesting aspect is the role of supply chains in these processes. Whilst some large farms may be able to devote time and funding into implementing new ideas (with an uncertain payback) many cannot. The opportunity for an entire supply chain to champion and work on innovation is surely one answer to this issue and is returned to later in the report.

3.0 UK POLICY CONTEXT

Introduction

3.1 This chapter reviews the relevant national, LEP, local and sectoral policies within which the Agri-Tech West proposal would operate. It is recognised that with the change of government, including departmental changes, and with the on-going impacts of transitioning out of the European Union, the overarching policy context is subject to change. As a consequence, it is important that the Agri-Tech West entity is developed with significant flexibility to adapt to policy shifts in agriculture, agri-tech, industry or trade.

UK

A UK Strategy for Agricultural Technologies

3.2 In 2013 the UK Coalition Government published a strategy on Agricultural technologies. This strategy was called 'A UK Strategy for Agricultural Technologies' and was heralded as the first time that the UK Government, science base, food and farming industry had worked together to identify and develop the opportunities and strengths of the UK agricultural technologies sector as a whole.

3.3 The vision set out by the work was 'that the UK becomes a world leader in agricultural technology, innovation and sustainability; exploits opportunities to develop and adopt new and existing technologies, products and services to increase productivity; and thereby contributes to global food security.'

3.4 The strategy sets out the key global drivers behind the interest and growth in the sector – a rising population, rapid development of emerging economies with western lifestyle aspirations and growing geopolitical instability around shortages of land, water and energy.

3.5 The report highlights the technological revolutions which are heralded as the breakthroughs in agricultural technology. These are cited as nutrition, genetics, informatics, satellite imaging, remote sensing, meteorology, precision farming and low impact agriculture.

3.6 The report highlights the fact that the UK infrastructure to support industry in applying science and technology to help modern farming and food production had declined over the past 30 years. This resulted in the report setting out how that would be addressed.

3.7 The actions that were developed were as follows:

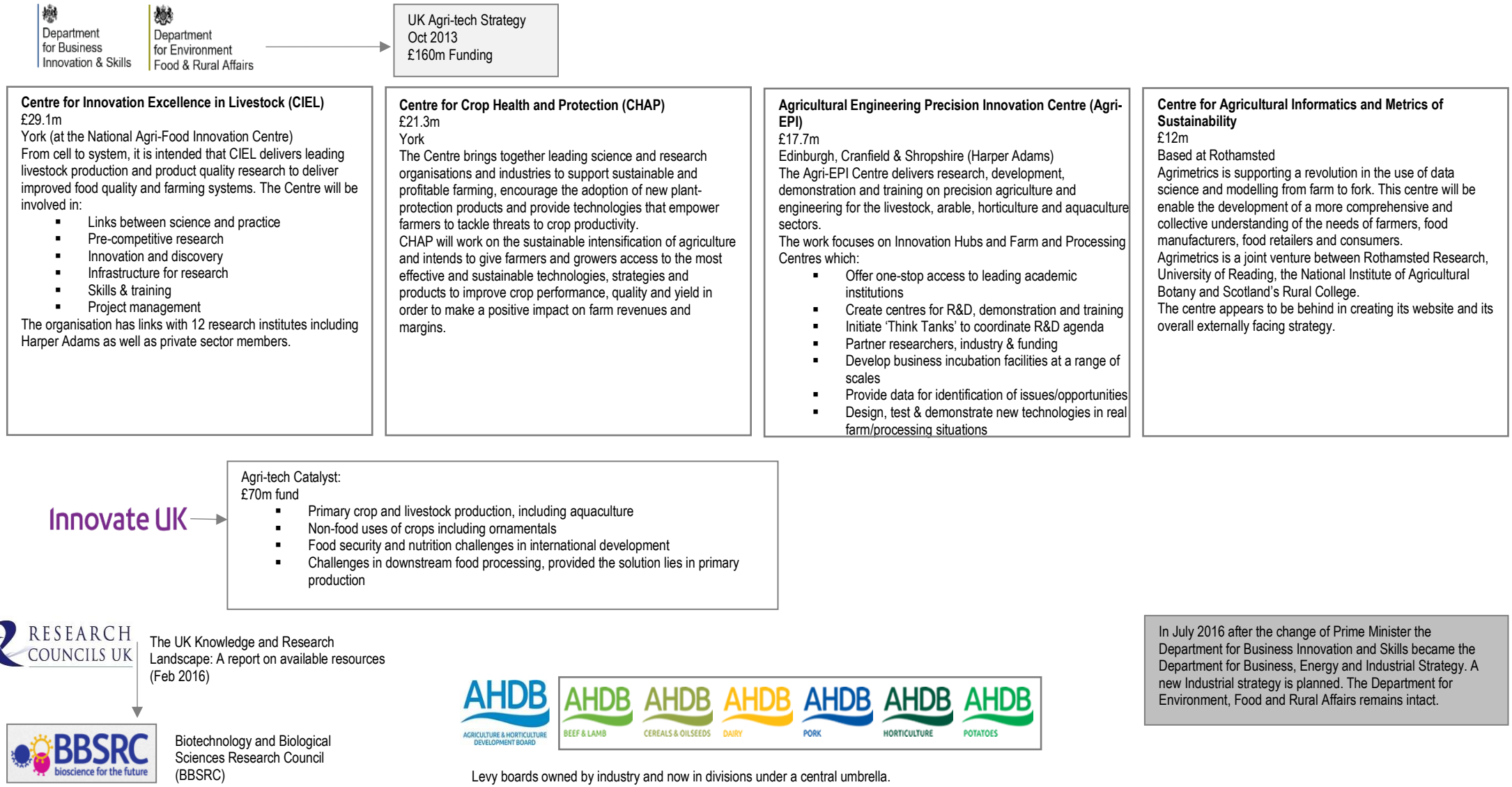
- Improve the translation of research into practice through a £70 million Government investment in an Agri-Tech Catalyst which will provide a single fund for projects, all the way from the laboratory to market. This will include £10 million to deliver international development objectives.
- Increase support to develop, adopt and exploit new technologies and processes through £90 million of Government funding for Centres for Agricultural Innovation.
- Help the UK exploit the potential of big data and informatics and become a global centre of excellence by establishing a Centre for Agricultural Informatics and Metrics of Sustainability.
- Provide stronger leadership for the sector. The Leadership Council gives industry a stronger and more cohesive voice with Government and the science base.
- Build a stronger skills base through industry-led actions to attract and retain a workforce who are expert in developing and applying technologies from the laboratory to the farm.
- Increase alignment of industry research funding with public sector spend by increasing understanding of what is being spent and where.
- Increase UK export and inward investment performance through targeted sector support.

3.8 It was established that a Leadership Council would oversee the delivery of the actions set out above and that it would also help facilitate the integration of the Technology Strategy Board.

Our Interpretation of the UK Position

3.9 The following diagram sets out the broad position of the national initiatives in the Agri-tech sector:

Figure 2: UK Agri-Tech – National Initiatives



3.10 The structure in the diagram shows the funding, institutes and initiatives which were established after the National Strategy was created but in addition it highlights the important role that the AHDB has held in the sector and summarises the departmental changes impacting on agri-tech.

3.11 Agri-Tech West would need to establish its role within this network of initiatives and entities. Agri-Tech West should not merely be a duplication of roles already undertaken. Its niche can be that it provides a Cheshire and West Midlands level representative identity that can link with the national initiatives and programmes emerging from central government. It can inform operators within its area of opportunities and information sources available to the sector.

Midlands

The Midlands Engine for Growth – Prospectus

3.12 The Midlands Engine for Growth is a partnership of 11 LEPs across the Midlands, including three of the four LEPs involved in the Agri-Tech West partnership, although not involving Cheshire and Warrington LEP.

3.13 The Prospectus outlines the vision for the Midlands and opportunities for growth. It responds to the Government ambition to grow the Midlands economy by £34 billion by 2030 and create 300,000 jobs by 2020. The prospectus outlines how the region will "*improve productivity, drive economic growth, create jobs and improve quality of life across the region*."

3.14 The Prospectus describes the Midlands economy thus:

> "*The Midlands has a strong advanced manufacturing and engineering base which employs 637,400 people and accounts for 19.7% of the UK's manufacturing output. This is allied to key high-value wealth creating sectors such as: transport technologies; agri-food and drink production; healthcare, life sciences and translational medicine; and energy and low carbon technology. Underpinning much of our wider sectoral excellence is our creative, digital and design sector and strengths in business and professional services.*"

3.15 The Prospectus outlines a vision to improve productivity of its existing key sectors "*through business investment, research and development, innovation, skills and*

connectivity improvements." Furthermore, the intent is to nurture high growth potential sectors in partnership with the region's further and higher education institutions.

3.16 The Prospectus states ambitions for the region's key sectors, including the food and drink sector. "*The Midlands Engine's food and drink sector will evolve as the UK's larder. We are home to global brands and the sector is based on a thriving and complementary agricultural and agri-technology sector, contributing greatly to the nation's food security*." Business/university consortia will be encouraged to exploit opportunities in advanced food manufacturing and farming. "*The agri-food sector and its production chains integrate strengths in food production technologies, agricultural engineering, nutrition and health outcomes, product development, design and marketing.*" It is noted that the Prospectus specifically mentions several large agri-food producers and research firms in the Midlands region, none of which are in the Agri-Tech West area, although some are nearby in the Birmingham region.

3.17 A series of next steps is outlined in the Prospectus, including an agri-food sector accelerator led by Midlands Innovation, similar to their existing Energy Research Accelerator. Midlands Innovation is a research and innovation partnership of six universities in the region, although none within the Agri-Tech West region. Therefore, active lobbying may be required to expand the focus of this proposed agri-food sector accelerator to include the Agri-Tech West region.

Local Enterprise Partnerships

Cheshire and Warrington Matters – A Strategic and Economic Plan for Cheshire and Warrington (2014)

3.18 The Strategic and Economic Plan for Cheshire and Warrington outlines the LEPs vision for the economy in 2021 and 2030. The Plan also details a series of strategic imperatives, intervention priorities, enabling programmes and investment programmes to realise the stated vision.

3.19 The Plan describes the region's economy as having "*distinctive sectoral specialisms in advanced, high-value engineering, energy, and professional and business services as well as growth potential in food, agri-tech and biological engineering*." In supporting the growth of sectors in Cheshire and Warrington, the Plan includes five objectives under its Business Support Enabling Programmes, including:

> "*Increase the contribution to the economy of industries, supply chains, and technologies with high growth potential and where we have embedded existing strengths and capacity; this includes R&D in natural sciences, engineering and technical consultancy, energy, automotive, chemicals and agri-tech*"

3.20 The Plan also includes a commitment to invest in national centres of excellence, with agri-tech provides as an example, within its Skills Enabling Programmes. Specifically, funding is committed in the plan for an agri-tech innovation centre at Reaseheath (which Reaseheath now expects to open in 2017).

Stoke-on-Trent and Staffordshire Enterprise Partnership Strategic Economic Plan (2014)

3.21 Stoke-on-Trent and Staffordshire's Strategic Economic Plan presents the vision for the region to 2030 and objectives and commitments to achieve the vision.

3.22 Agri-tech is identified as one of five recognised local strengths in advanced manufacturing, described as "*drawing on our agricultural back-drop and Harper Adams University on our border to capitalise on an increased global focus on food security and the agri-plant capacity at JCB*."

3.23 The Plan recognises Stoke-on-Trent and Staffordshire's position within the wider regional agri-tech sector, identifying livestock farming in Shropshire as an opportunity for agri-tech research and development and seeing Harper Adams as a key regional asset.

3.24 The Plan details a number of priorities and actions for each stated objective. While not specifically detailing priorities and actions for the agri-tech sector, agri-tech businesses in the region would benefit from stated priorities including business support, encouraging innovation, promoting enterprise and encouraging inward investment.

The Marches – Strategic Economic Plan – Accelerating Growth through Opportunity (2014)

3.25 The Marches' Strategic Economic Plan identifies the following sectoral strengths in its region: "*food and drink; agri-technology, advanced and automotive manufacturing; defence & securities; tourism & leisure; environmental technologies & services and social enterprise.*"

3.26 This Strategic Economic Plan separates food and drink and agri-technology as distinct sectors, although the discussions on each sector show an overlap. The food and drink sector is described as "*food and drink manufacture, processing, food services and auxiliary services such as packaging*". Agri-technology was not specifically defined, although appeared to relate more to the engineering sector related to agricultural equipment and technology, including research and development of new technology.

3.27 The Plan includes details of its funding bid, including a Priority Year One for funding capital investment in further education to support its priority sectors, three of which have relevance to agri-tech – food and drink, agri-technology and advanced manufacturing.

Worcestershire – World Class Worcestershire – Our Strategic Economic Plan (2014)

3.28 Worcestershire's Strategic Economic Plan identifies agri-tech as one of its three growth sectors, alongside advanced manufacturing and cyber security/defence/IT. The Plan defines agri-tech as "*the supply chain spanning seeds, agro-chemicals, machinery, engineering, skills and other inputs including green energy, across arable and livestock agriculture, forestry horticulture, food processing, packaging and retailing*."

3.29 Supporting agri-tech is a constant and strong theme throughout Worcestershire's Plan, including investments plans, areas of business support, development of centres of excellence (including one now built at Pershore College), innovation and skills improvement.

3.30 The Worcestershire LEP generally label the sector as agri-food/agri-tech, emphasising both the food production and the equipment/technology sides of the sector. As discussed in Chapter 2.0, this Scoping Study has adopted an umbrella definition of agri-tech as the application of technology to agriculture and food production.

Summary

3.31 While the term agri-tech is still emerging in its usage and there remains some variations in its meaning, agri-tech is increasingly supported in the national and LEP strategic planning. The guidance provided by the UK Government's A UK Strategy for Agricultural Technologies has led to further strategic planning for the sector at the LEP level. All four LEPs have Strategic Economic Plans that include agri-tech to some degree – some with strong emphasis on food and drink and some concentrating on advanced engineering and its links with the rural sector.

3.32 The changing political landscape in the UK, with departmental revisions following the change in Prime Minister and the overarching influence of the transition out of the European Union, will mean that Agri-Tech West will be established in a dynamic and uncertain policy environment. This will be felt at the national and local level. As such, Agri-Tech West would need to be established as a flexible, adaptable entity, able to respond to policy changes and remain relevant and informative for those that it represents.

3.33 This suggests that a more rigid and formal Agri-Tech West entity arching across the four LEP areas may not be appropriate in the short term while the policy environment is changing. A smaller, incremental and less formal alliance between the LEPs in regards to Agri-Tech West would represent less of a commitment of resources in an uncertain environment, where planning is difficult. As a new policy regime emerges, such an alliance may be strengthened over time as appropriate.

4.0 ECONOMIC PROFILE OF THE AGRICULTURE SECTOR

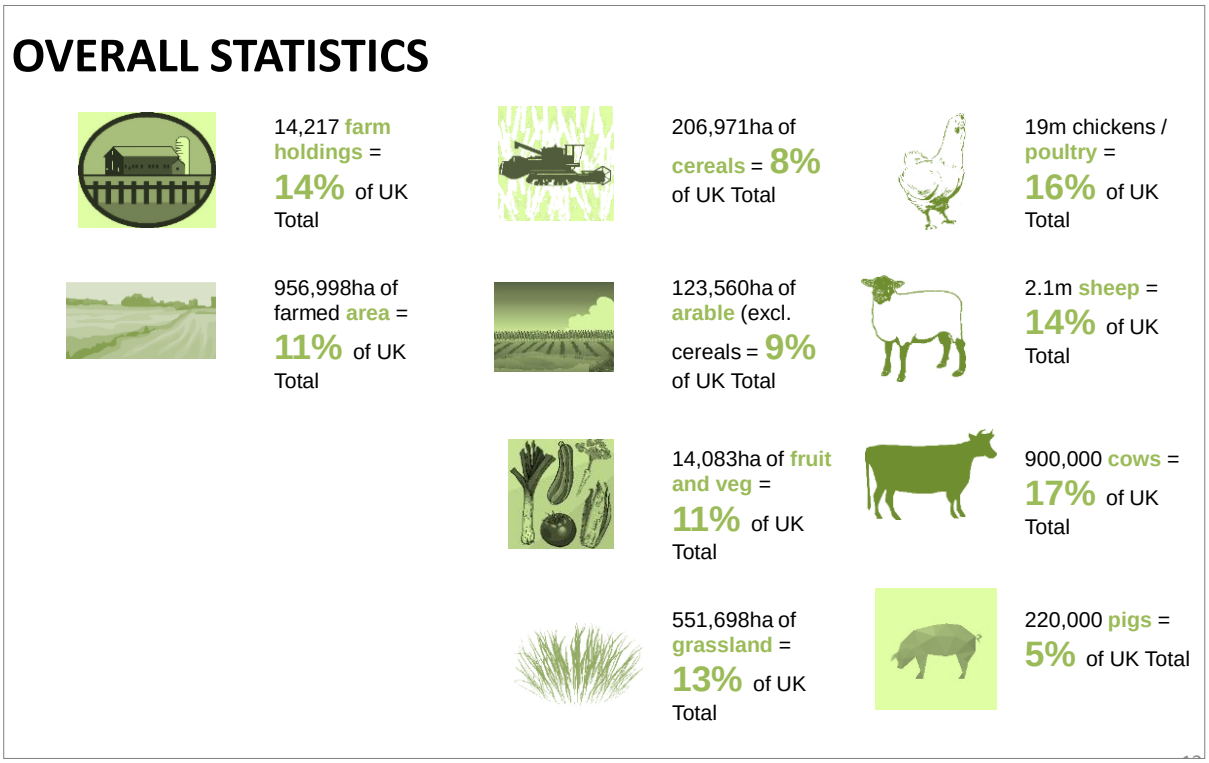
4.1 The main economic data for the agricultural sector is collected by DEFRA who collate a comprehensive Local Authority breakdown for key crops areas and livestock numbers on agricultural holdings as well as employment data for the sector. All data in this chapter is from this source unless stated.

4.2 This data is compiled every 3 years with the last available data having been created for 2013. The 2016 data is expected to be published in 2017. The data in this chapter is presented for the following five areas:

- Cheshire and Warrington
- Staffordshire, including Stoke
- Worcestershire
- Shropshire, including Telford
- Herefordshire

4.3 The following overall diagram sets out the scale of activity in the entire 'Agri-Tech West' area:

Figure 3: Summary Agricultural Statistics for Agri-Tech West Area



Source: DEFRA

4.4 The farmed area in the Agri-Tech West area is almost one million ha, representing a substantial 74 percent of the total land area across the Agri-Tech West area (approximately 1.29 million ha).

4.5 With 14 percent of the UK's farms but only 11 percent of the farmed area, it can be seen that farms in the area are smaller than the national average and this reflects the smaller proportion of cereal and arable production in the west which typically involve larger land holdings and a greater concentration of dairy, cattle and poultry production which involve more intensive requirements for land.

4.6 Overall, agriculture provides employment for 42,000 people and this represents just 8.8 percent of the UK farming workforce demonstrating a lower labour intensity in the type of farming undertaken in the area. The following table summarises the number of workers in the agriculture sector by English region for comparison and demonstrates that the relative importance of agriculture employment in the Agri-Tech West area in England.

Table 3 – Comparison of Agriculture Employment by English Region

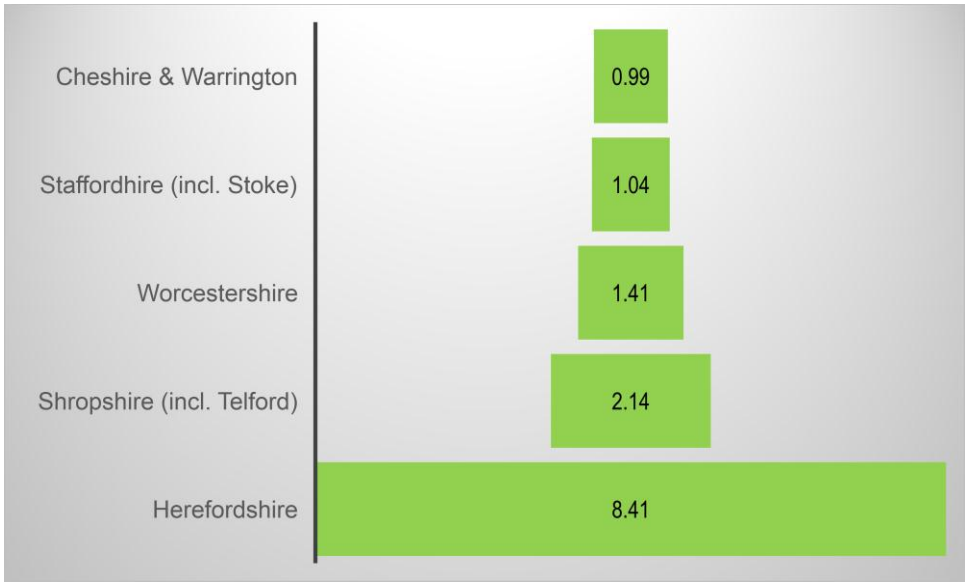
	Employment numbers
North East	10,313
North West and Merseyside	31,939
Yorkshire and The Humber	31,711
East Midlands	33,378
West Midlands	41,095
Eastern	39,536
South East (incl. London)	45,825
South West	61,765
Total for England	**295,563**

Source: DEFRA

Agricultural Output

4.7 Whilst there is significant agricultural activity taking place across the area, its overall contribution to the economy should be seen in context.

Figure 4: Contribution of Agriculture to Gross Value Added (2012)

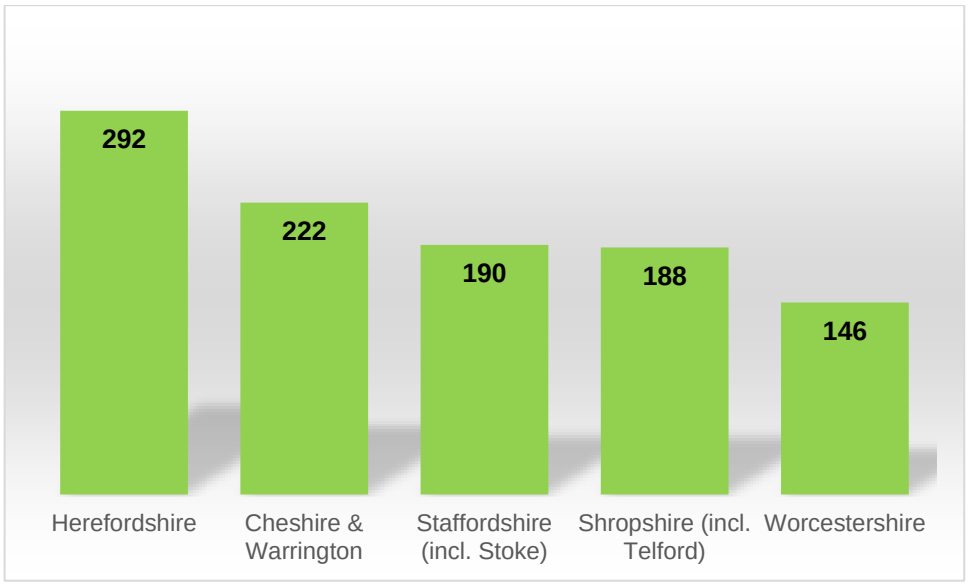


Source: ONS Regional GVA Data

4.8 The chart above demonstrates that agriculture contributes just 1 percent to the economy of Cheshire but represents 8.4 percent of the Herefordshire economy.

4.9 Not only does agriculture make the largest contribution to the Herefordshire economy but in absolute terms Herefordshire represents the most important County of the area in agricultural output. Despite the low proportion of agricultural GVA to the Cheshire economy, in terms of the overall absolute impact of the sector to the area, Cheshire is the second largest contributor.

Figure 5: Absolute Gross Value Added by area (£m)

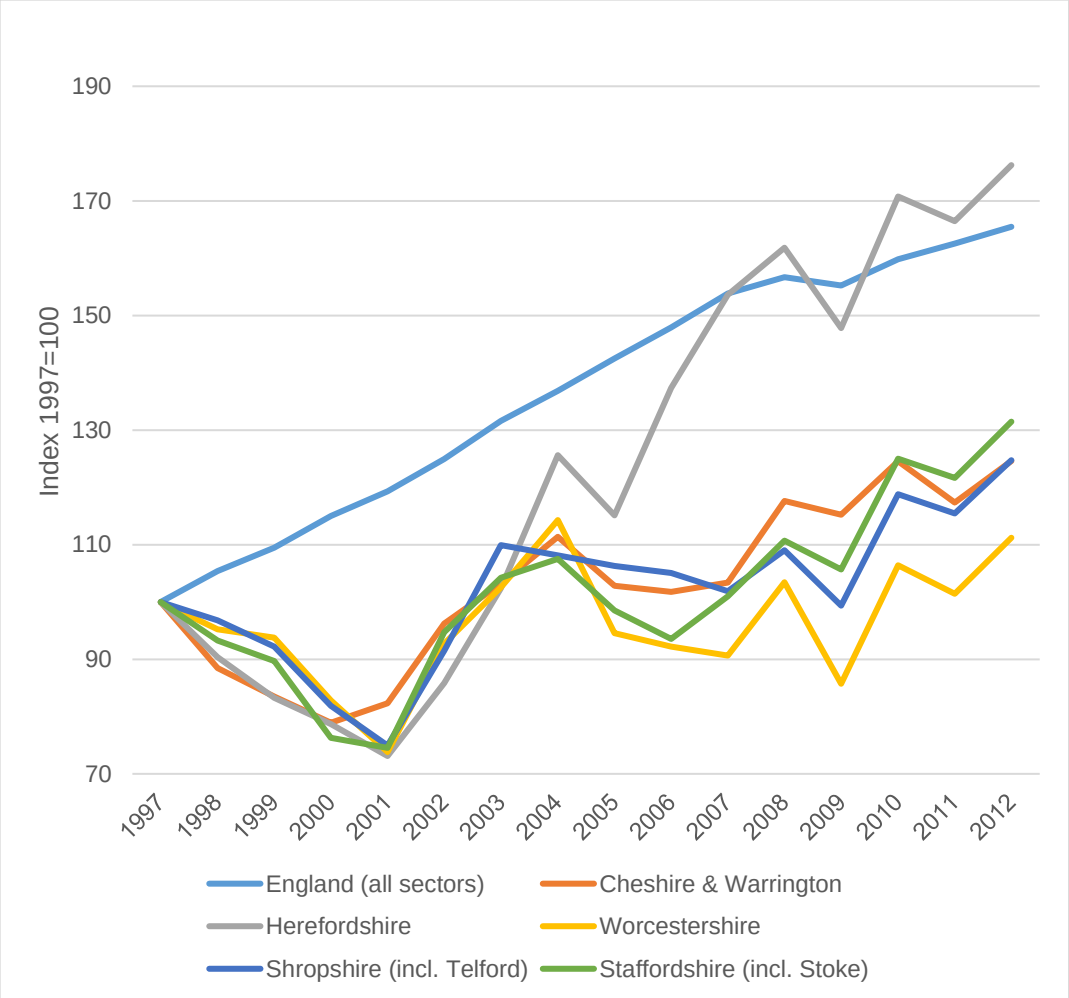


Source: ONS Regional GVA Data

4.10 Agriculture may make a relatively small contribution to the GVA of each of the Counties of the study area but the GVA generated has grown since 1997 in each of the Counties. The graph below shows the index of GVA 1997-2012 for the agricultural sector and this is also compared to the overall growth in output for England as a whole in all sectors.

4.11 The graph shows that agriculture declined in economic output in each location 1997-2001 and then rebounded. Only in Herefordshire, however, did the output then outstrip the overall national growth in GVA.

Figure 6: Indices of Agricultural Gross Value Added over time by area



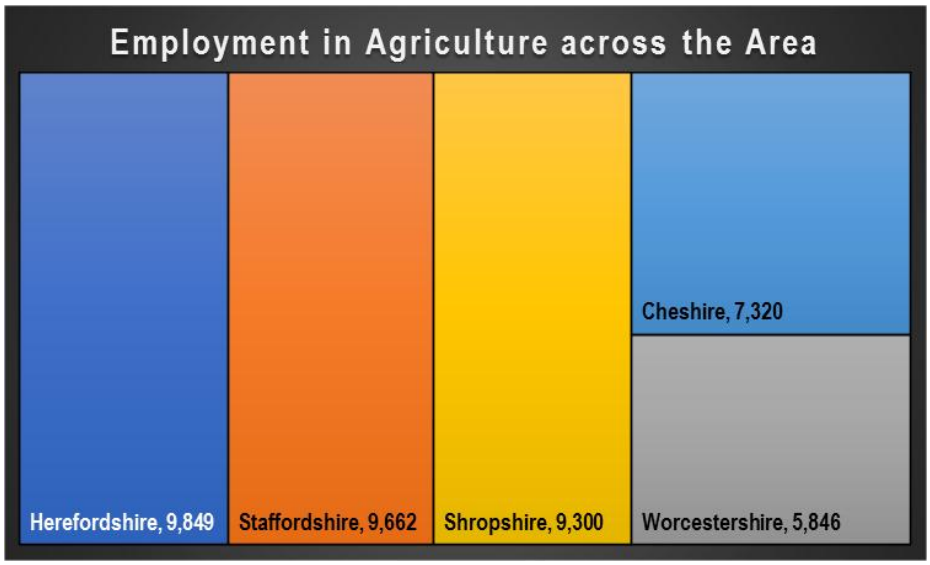
Source: ONS Regional GVA Data

Employment

4.12 With 42,000 people employed by agriculture, the Agri-Tech West area employs 8.8 percent of the UK workforce in the sector. The workforce is split as follows with

Herefordshire employing the largest number of people but only fractionally behind Staffordshire and Shropshire. Clearly in terms of output per employee Herefordshire (£29,647) outstrips Staffordshire (£19,664). The highest GVA per head is recorded in Cheshire (£30,327).

Figure 7: Agricultural Labour force by area



Source: ONS

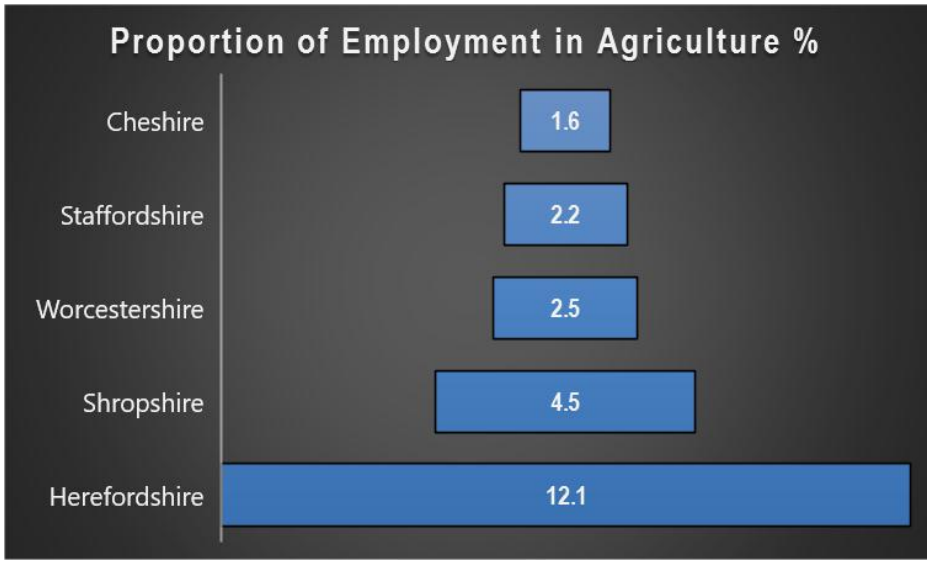
Table 4 – GVA per head employed for agricultural

	£ GVA / head
Cheshire	30,327
Herefordshire	29,647
Worcestershire	24,974
Shropshire	20,215
Staffordshire	19,667

Source: Mickledore derived from data in this report

4.13 The proportion of employment employed in each area is then set out in the graph below. The graph shows that in Herefordshire almost 1 in 8 people are employed in the agricultural sector (with a likelihood that many more besides will be employed in ancillary activities). The area with the lowest proportion of employees in the sector is Cheshire.

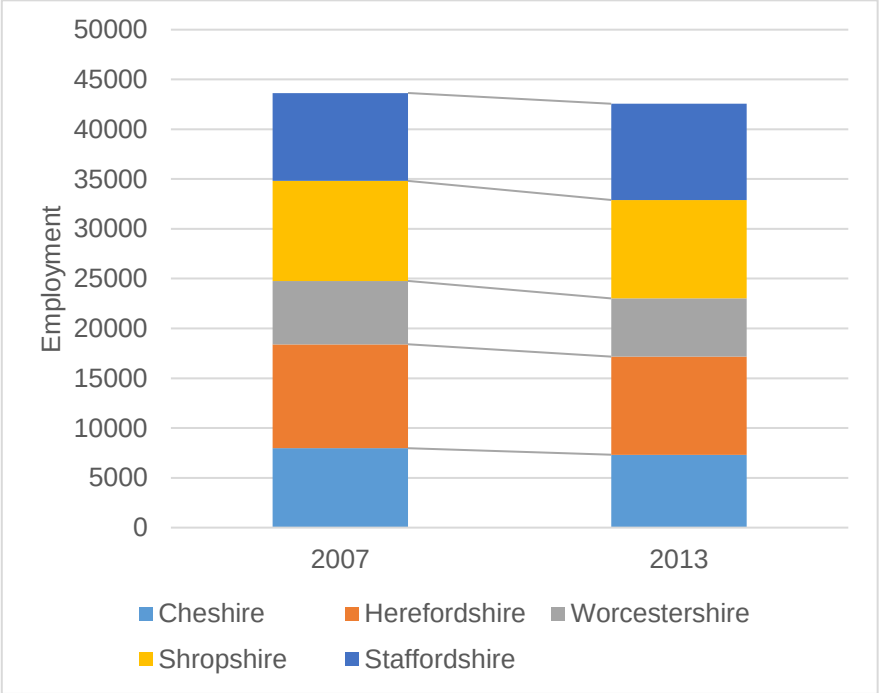
Figure 8: Agricultural Labour force proportions by area



Source: ONS

4.14 Since 2007 agricultural employment in each County area has declined. Overall the 'agri-tech west' area suffered a reduction in employment of 2 percent. This is considered to represent a reasonably robust performance given that the employment in the sector across the UK as a whole fell by 4 percent in the same period. The Agri-Tech West area performance is shown in the graph below by each county.

Figure 9: Changes in agricultural employment by area



Source: ONS

Farms and Farmed Area

4.15 Across the whole 'agri-tech west' area there are almost 1m Ha of farmed land split between 14,200 farms. The result is that the average unit size is 67 acres – but the unit size is largest in Shropshire and smallest in Staffordshire and Worcestershire. Overall Shropshire has the largest number of farms and the largest area of farmed land.

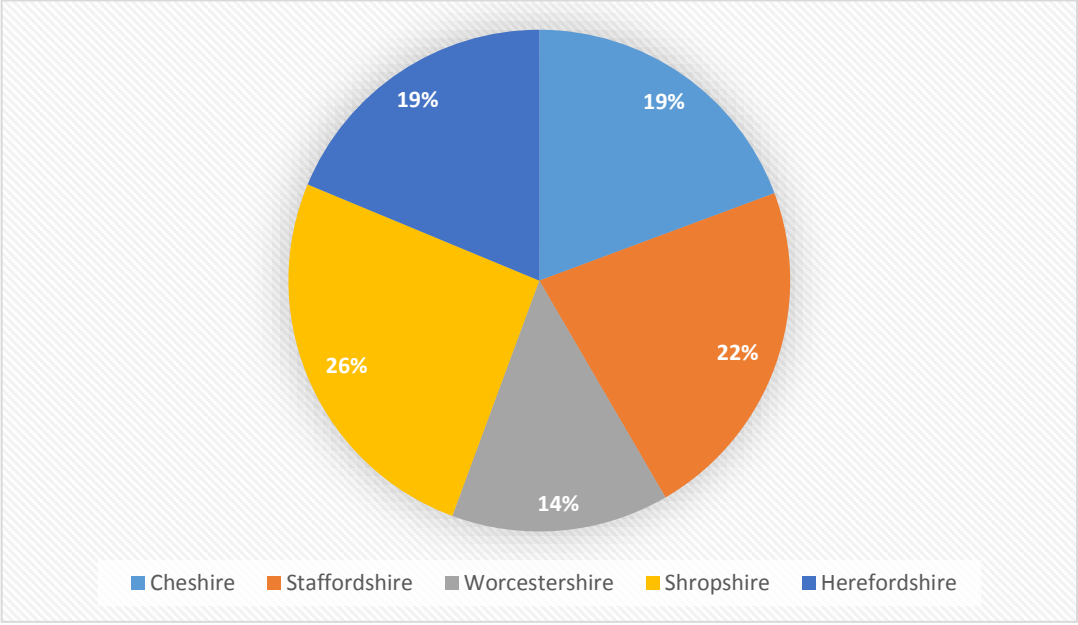
4.16 Worcestershire has the smallest number of farm units, the smallest farmed area and the smallest farms.

Table 5 – Farms and farm sizes by area

	Farms Units	Farmed area, Ha	Average size, Ha
Shropshire	3,643	289,422	79
Staffordshire	3,167	192,044	61
Cheshire	2,749	171,293	62
Herefordshire	2,664	182,470	68
Worcestershire	1,994	121,768	61
Total	14,217	956,997	67

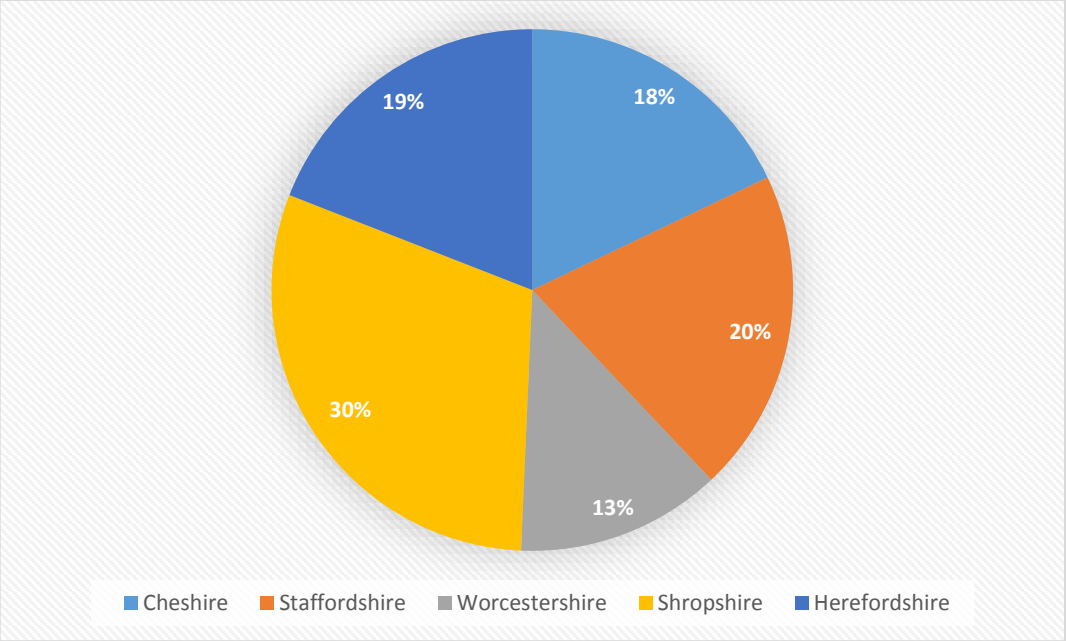
Source: DEFRA

Figure 10: Split of farm holdings (14% of UK total)



Source: DEFRA

Figure 11: Split of farming area (11% of UK total)



Source: DEFRA

4.17 The characteristics of the farming areas and unit sizes is to a large extent a function of the type of agriculture which is prevalent in each of the County areas. The different types of farming activity are set out in the sections which follow.

Cereal Production

4.18 Within the area 21 percent of farmed land is used for cereal production. Nevertheless, the total amount of cereal farming land in the area only represents 8 percent of the UK total land allocated for cereal production.

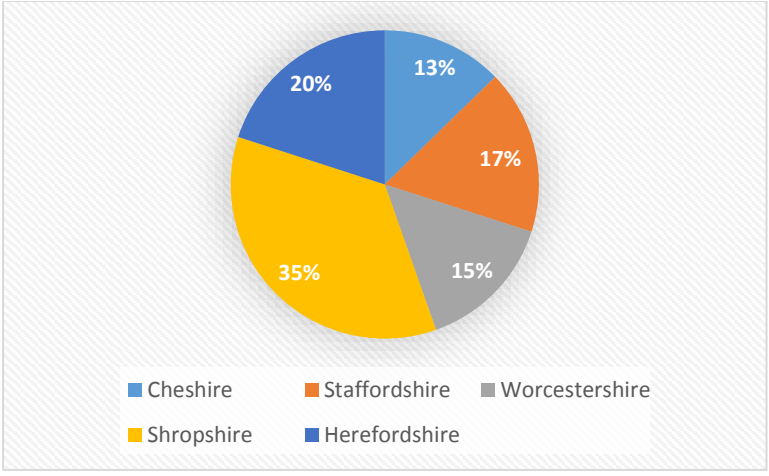
4.19 The largest cereal growing area is Shropshire. With 73,000 hectares of land dedicated to cereal production, Shropshire contributes 35 percent of all cereal land across the area and 25 percent of its farming area is focused on cereal production. Worcestershire allocated a similar proportion of its farmed land to cereal production. Cheshire dedicates the lowest proportion of its farmed land to cereal production at 15 percent of all farmed land.

Table 6 – Cereal production by area

	Farmed Area, Ha	Percentage of Farmed Area
Shropshire	73,227	25
Herefordshire	41,426	23
Staffordshire	35,727	19
Worcestershire	30,295	25
Cheshire	26,296	15
Total	**206,971**	

Source: DEFRA

Figure 12: Split of cereal production (8% of UK total)



Source: DEFRA

Arable Production

4.20 Within the area 13 percent of farmed land is used for arable production. The total amount of arable farming land in the area only represents 9 percent of the UK total land allocated for arable production.

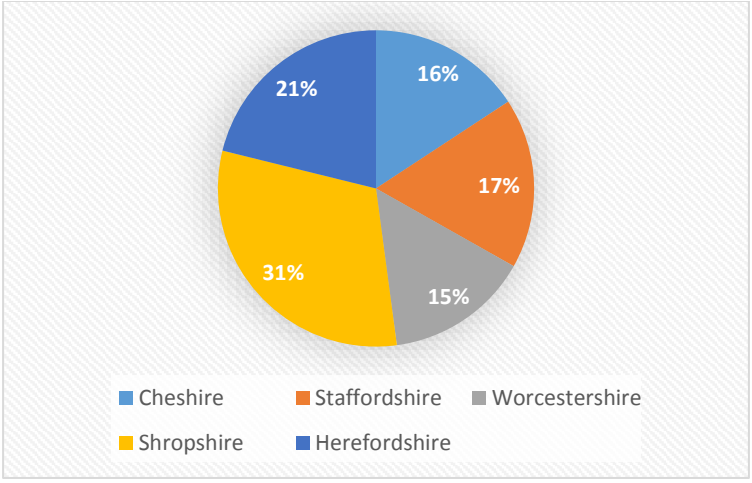
4.21 The largest arable growing County within the area is Shropshire with 28,255 ha in arable production. This total represents 13 percent of the growing area of Shropshire. In the case of arable production, however, a larger proportion of land in the area is allocated to arable production in Herefordshire (14 percent) and Worcestershire (15 percent). Cheshire and Staffordshire both have just 11 percent of farming land dedicated to arable production.

Table 7 – Arable (excluding cereals) production by area

	Farmed Area, Ha	Percentage of Farmed area
Shropshire	38,255	13
Herefordshire	26,135	14
Staffordshire	21,530	11
Cheshire	19,467	11
Worcestershire	18,174	15
Total	**123,560**	

Source: DEFRA

Figure 13: Split of arable (excluding cereals) production (9 percent of UK total)



Source: DEFRA

Fruit and Vegetable Production

4.22 Within the area 1.5 percent of farmed land is used for fruit and vegetable production illustrating the intensive farming methods used in this sub-sector. The total amount of fruit and vegetable farming land in the area represents 11 percent of the UK total land allocated for fruit and vegetable production.

4.23 It should be noted that fruit and vegetable production forms part of the broader term 'horticulture' which also includes flowers, ornamentals, seeds and nuts. The data below is for fruit and vegetable production only, as compiled by DEFRA, but for the Agri-Tech West area this is the key component of horticultural production.

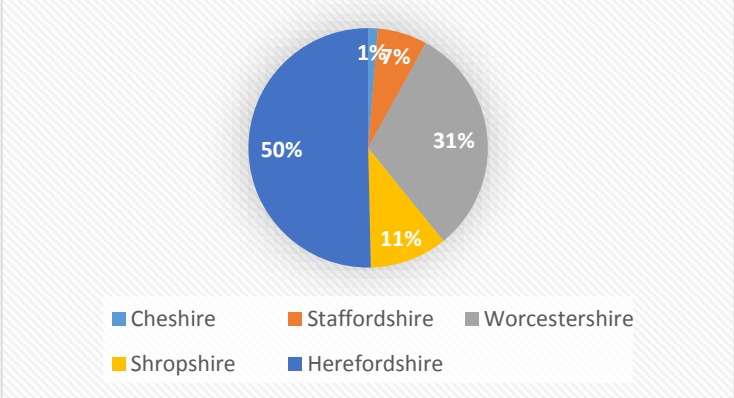
4.24 The variation in fruit and vegetable production across the area is very large with Herefordshire and Worcestershire allocating 4 percent of agricultural land to the product and Cheshire allocating 0.1 percent.

Table 8 – Fruit & Vegetable production by area

	Farmed Area Ha	Percentage of Farmed Area
Herefordshire	7,092	4
Worcestershire	4,386	4
Shropshire	1,477	0.5
Staffordshire	945	0.5
Cheshire	184	0.1

Source: DEFRA

Figure 14: Split of fruit and vegetable production (11 percent of UK total)



Source: DEFRA

Grassland

4.25 Within the area 57 percent of farmed land is agricultural grassland illustrating the importance of livestock and dairy in some of the areas. The total amount of grassland farming in the area represents 13 percent of the UK total land allocated as grassland.

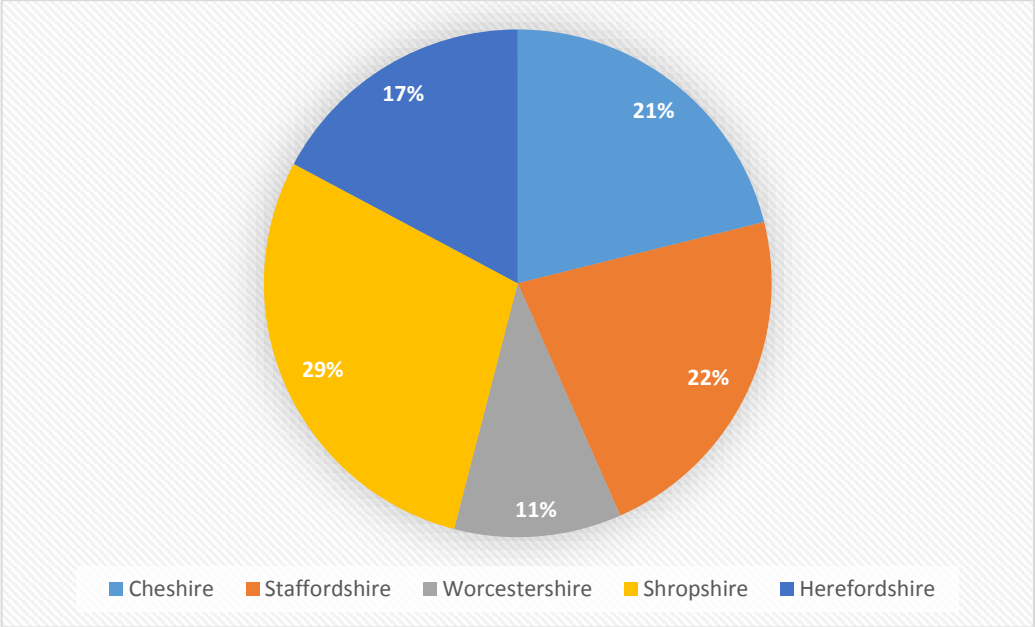
4.26 The largest total number of hectares of grassland can be found in Shropshire but the highest proportion of grassland compared to total farmed area is found in Cheshire where 68 percent of the farmed land is allocated as grassland.

Table 9 – Grassland by area

	Farmed Area, Ha	Percentage of Farmed Area
Shropshire	158,621	55
Staffordshire	122,845	64
Cheshire	116,525	68
Herefordshire	94,949	52
Worcestershire	58,757	48

Source: DEFRA

Figure 15: Split of grassland (13% of UK total)



Source: DEFRA

Poultry

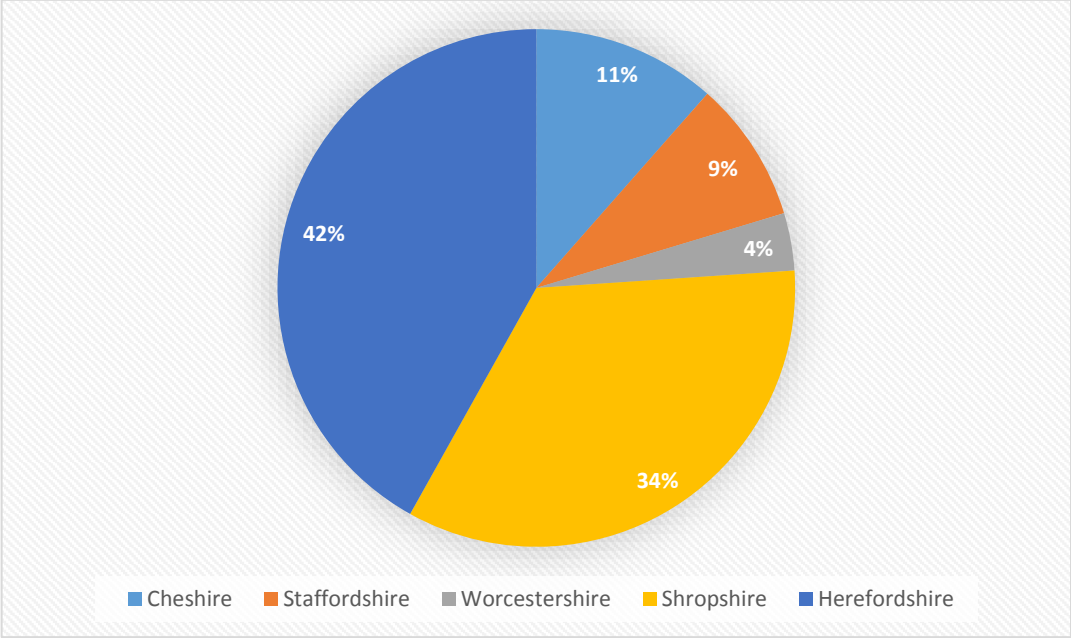
4.27 The largest concentration of poultry is found in Herefordshire. In fact, with a headcount of almost 8m birds the County has 42 percent of the total poultry production in the area. Given that Shropshire also typically has 6.4m farmed birds the two areas together account for 76 percent of poultry production in the Agri-tech west area. Worcestershire has the lowest concentration of poultry farming activity and represents only 4 percent of production.

Table 10 – Poultry by area

	Headcount
Herefordshire	7,877,637
Shropshire	6,427,486
Cheshire	2,161,101
Staffordshire	1,622,612
Worcestershire	675,161

Source: DEFRA

Figure 16: Split of poultry (16 percent of UK total)



Source: DEFRA

Sheep

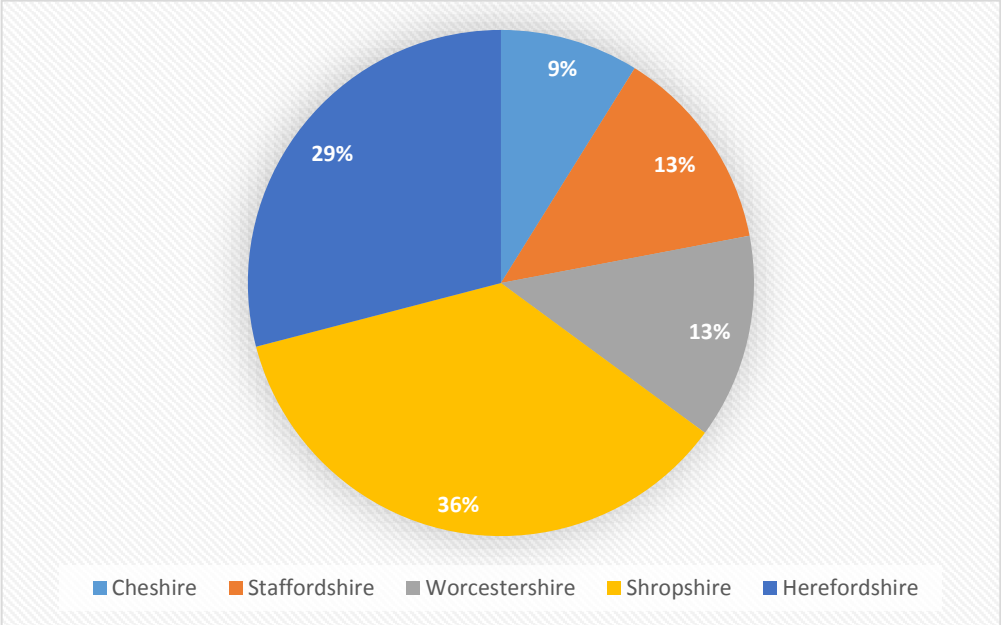
4.28 The largest concentration of sheep is found in Shropshire followed by Herefordshire – with the two areas combined accounting for 65 percent of the total number of animals across the area. Cheshire has the lowest number of sheep of any of the counties within the area.

Table 11 – Sheep by area

	Headcount
Shropshire	748,697
Herefordshire	606,315
Staffordshire	274,380
Worcestershire	272,842
Cheshire	184,693

Source: DEFRA

Figure 17: Split of sheep (14 percent of UK total)



Source: DEFRA

Cattle

4.29 The largest concentration of cattle is also found in Shropshire followed by Cheshire and Staffordshire – with the three areas combined accounting for 79 percent of the total number of animals across the area. Worcestershire has the lowest number of cows of any of the counties within the area.

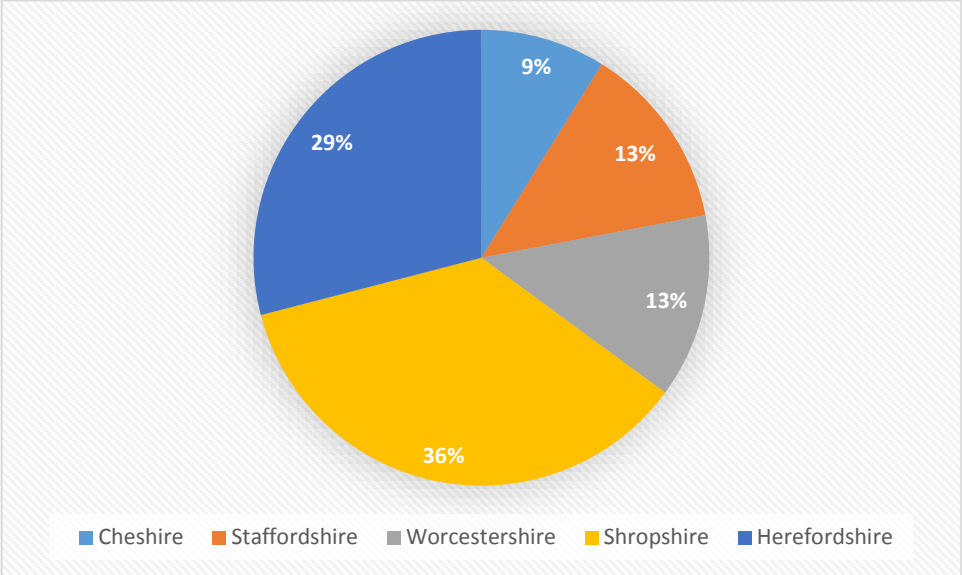
4.30 The data does not provide a split between dairy and beef herds.

Table 12 – Cattle by area

	Headcount
Shropshire	250,550
Cheshire	235,802
Staffordshire	226,470
Herefordshire	122,623
Worcestershire	62,313

Source: DEFRA

Figure 18: Split of cattle (17% of UK total)



Source: DEFRA

Pigs

4.31 The largest concentration of pigs is also found in Shropshire followed by Staffordshire – with the two areas combined accounting for 65 percent of the total number of animals across the area. Worcestershire has the lowest number of pigs of any of the counties within the area.

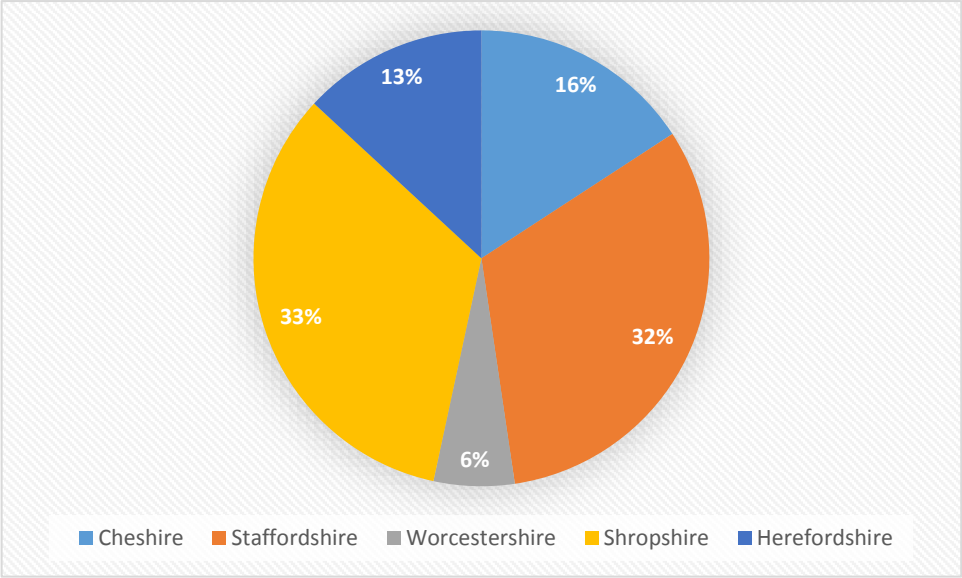
4.32 Whilst Shropshire and Staffordshire have a high proportion of the pigs across the area, the 'agri-tech west' area is not a strong pig farming area.

Table 13 – Pigs by area

	Headcount
Shropshire	73,078
Staffordshire	69,460
Cheshire	34,495
Herefordshire	28,620
Worcestershire	12,486

Source: DEFRA

Figure 19: Split of pigs (5% of UK total)



Source: DEFRA

Farming Data Conclusions

4.33 Whilst conclusions are useful to draw from the data, it is important to note that every part of the area has at least some activity in every sub-sector examined and as a result the conclusions will always be generalisations to some point.

4.34 The area provides a larger contribution to UK livestock farming than arable farming with the exception of pig farming. Perhaps reflecting this the area has smaller farm sizes than the UK as a whole.

4.35 Agriculture represents a relatively small proportion of economic output and employment across the area apart from in Herefordshire. The sector has also represented a relatively low contribution to GVA per worker employed – but the situation appears to be far stronger in Cheshire and Herefordshire than Staffordshire.

4.36 Herefordshire is the largest agricultural economy in the area (by GVA) and is the area where the highest number of people are employed in agriculture. The growth in GVA from agriculture 1997-2012 in Herefordshire outstripped the total rise (all sectors) in GVA for England over the same period. The sector employs almost 1 in 8 people in the area. The area allocates a relatively large farmed area to those activities not involving grassland (cereal, arable & fruit & vegetables). Reflected by this, whilst the area has a strong livestock sector, its strengths relative to the remainder of the area are in poultry and sheep farming.

4.37 Cheshire outstrips Herefordshire in terms of GVA per head generated but agriculture is a small proportion of the economic output or employment for the economy of the area. The Cheshire agricultural economy has a large proportion of activity dedicated to grassland and cows – but is not exclusively focused on this area. The GVA growth from agriculture in Cheshire has been out-performed by Staffordshire and Herefordshire – but is in line with Shropshire.

4.38 Shropshire has the largest farming land allocation of any of the areas and for that reason, in absolute terms is strong across most of the sub-sectors apart from fruit and vegetables where a very low proportion of land is allocated for production. Shropshire also has the highest number of sheep, cows and pigs and is only narrowly in second place in terms of poultry numbers.

4.39 Staffordshire has some similarities to Cheshire with, to a certain extent, a focus on grassland and cattle and very little activity in the fruit and vegetable sector. Staffordshire does however outstrip Cheshire in the rearing of sheep and pigs. Staffordshire does however appear to have a low GVA per head earned from agriculture compared to all the comparator areas.

4.40 Worcestershire has the smallest amount of land allocated to agriculture and the poorest growth recorded in GVA from the sector. Of all of the areas, livestock agriculture is the least important to Worcestershire – the area has a relatively high proportion (compared to the study area) of land in use for fruit & vegetables, arable use and cereal production. Clearly the area has some livestock production but is placed last of all the counties for headcount in poultry, cattle and pigs across the area (and has the second fewest sheep).

4.41 The variation in growth of GVA per employee in agriculture between the counties is a measure of the relative improvements to agricultural productivity from each area. A more coordinated approach to the sector, including information sharing collaboration and support, would help spread the benefits of improvements in productivity in agriculture.

5.0 FOOD AND DRINK PROCESSING AND TECHNOLOGY

Introduction

5.1 The section above profiles the activities of the agricultural sector. This is the key market for agricultural technologies but the analysis does not provide any information on the companies in the sector, downstream businesses, the support for the sector or agricultural technologies.

5.2 To address this, the following analysis sets out Office of National Statistics (ONS) data on the companies and employment in the area by Standard Industrial Classification (SIC Code).

5.3 The information is supplemented by Companies House data on those companies registered in the area. The work has assembled the data for every registered company within the area for the relevant SIC Codes but a note of caution is required that not every company completes its SIC code correctly and a large number of companies operate within an area but have their registered office elsewhere. For these companies there is no available data and so any company analysis in the UK does not deal with a full dataset.

5.4 However, the data does represent a reasonable sample of the significant business types in each area. The important outputs from the data for the Agri-Tech West Scoping Study are the *relative* strengths of each area and the niche employment types. That is, the outputs of this analysis are those sectors that are significantly more important to the local economy than the same sectors are to the national economy.

General Findings

5.5 The work has highlighted that in general agricultural technology businesses are not always easy to identify. Many of the technologies which are applied to the sector are not always provided by firms that exclusively supply the agriculture or food technology sector and as a result the companies are within the more general categories of engineering or software. In the future, if a wider selection of businesses is sought to participate in the sector support activity undertaken across the area it would be useful for the end users of technology to invite relevant suppliers to participate in sector activities.

5.6 The work on agriculture and food and drink processing highlights that across the whole

area there are very many potential users of technology and relatively few players in the area with a business focused purely on agricultural technology – although there are exceptions. In Shropshire for example there is a milking technology business and in Cheshire a cattle breeding genetics company both related to the strengths of the area in dairy.

5.7 There are some synergies across sectors. The strengths of Staffordshire and Worcestershire in machinery production, Cheshire's strength in chemicals, and the strengths of Worcestershire in software (cyber-security) are all examples of areas where some opportunities exist in the agriculture and food processing sectors and there appear to be some skills and / or businesses which could be applied to agricultural technology issues.

5.8 The detail of the strengths of the sectors and then some of the larger businesses registered in the area are set out below.

Location Quotients

5.9 ONS produce data on an annual basis which estimates the number of employees in a sector as a result of a survey. This is the Business Register and Employment Survey (BRES).

5.10 Set out below are the numbers of employees and location quotients (LQ) for the sub sectors within the broad agri-business sector. Location quotients measure the proportion of employees for each sector in an area and compare it to the proportion of employees for that sector across the country as a whole. A LQ of 1 suggests the same proportion of employees as the national average, a LQ of 2 suggests double the proportion of employees.

Cheshire

5.11 Despite the relatively low proportion of GVA and employment associated with agricultural activity in Cheshire, the area does record relatively high proportions of employment in supporting industries.

5.12 As might be expected from the concentration on dairy farming, both Cheshire East and Cheshire West & Chester employ a relatively large proportion of people in the manufacture of dairy products (compared to the national average) and the chemical heritage of the area also results in relatively high concentrations of employment in

fertilizers and pesticides and other agrochemical products.

5.13 In absolute terms support services to agriculture and post-harvest crop activities employ 700 people in Cheshire East and this is also the sub-sector with the highest LQ. The fertilizer activity in Cheshire West employs c1,200 people. Otherwise the absolute numbers of people employed in the sub-sectors are not particularly high.

Table 14 – Cheshire and Warrington Sectoral Location Quotients

Cheshire East	Employees	LQ
016 : Support activities to agriculture and post-harvest crop activities	700	6.70
105 : Manufacture of dairy products	300	2.60
106 : Manufacture of grain mill products, starches and starch products	200	3.60
109 : Manufacture of prepared animal feeds	400	4.46

Cheshire West & Chester	Employees	LQ
105 : Manufacture of dairy products	300	3.15
201 : Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	1,200	6.65
202 : Manufacture of pesticides and other agrochemical products	100	5.27

Warrington	Employees	LQ
201 : Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	500	3.59

Source: Mickledore's analysis of BRES data

Herefordshire

5.14 The analysis has already demonstrated that almost 1 in 8 people in Herefordshire work in agriculture, and perhaps unsurprisingly there are a large number of people employed in sectors linked to agriculture.

5.15 The highest absolute number of people work in the processing and preserving of meat products, but in relative terms the most notable sector is the manufacture of beverages where the proportion of people employed is 17x the national average. The County has

also strengths in other processing activities, manufacture of machinery and wholesale activities although these sub-sectors employ smaller numbers in absolute terms.

Table 15 – Herefordshire Sectoral Location Quotients

Herefordshire	Employees	LQ
101 : Processing and preserving of meat and production of meat products	1,700	8.84
103 : Processing and preserving of fruit and vegetables	300	3.35
105 : Manufacture of dairy products	100	2.48
106 : Manufacture of grain mill products, starches and starch products	200	6.02
110 : Manufacture of beverages	1,200	17.19
282 : Manufacture of other general-purpose machinery	400	2.15
283 : Manufacture of agricultural and forestry machinery	100	4.75
462 : Wholesale of agricultural raw materials and live animals	200	3.18

Source: Mickledore's analysis of BRES data

Shropshire

5.16 The industrial classification data for Shropshire is somewhat similar to Herefordshire with all the same sectors showing a high relative proportion of employment – with the exceptions that Shropshire does not have the same concentration of activity in grain or general purpose machinery and Herefordshire does not have a high proportion of activity in animal feeds.

5.17 In absolute terms the processing and preserving of meat products is the sub-sector employing the highest number of people (2,100) as indeed it was in Herefordshire.

5.18 Telford and Wrekin, as with most of the area, have some strengths in dairy – but also in wider food manufacture. The manufacture of general purpose machinery in Telford and Wrekin is important, employing 2,100 people but may not be agriculture related.

Table 16 – Shropshire and Telford and Wrekin Sectoral Location Quotients

Shropshire	Employees	LQ
101 : Processing and preserving of meat and production of meat products	2,100	7.09
103 : Processing and preserving of fruit and vegetables	300	2.47
105 : Manufacture of dairy products	600	7.20
109 : Manufacture of prepared animal feeds	400	7.69
110 : Manufacture of beverages	400	3.16
283 : Manufacture of agricultural and forestry machinery	400	13.72
462 : Wholesale of agricultural raw materials and live animals	600	7.47

Telford & Wrekin	Employees	LQ
105 : Manufacture of dairy products	200	3.46
108 : Manufacture of other food products	600	2.43
282 : Manufacture of other general-purpose machinery	1,700	9.04

Source: Mickledore's analysis of BRES data

Staffordshire

5.19 In absolute terms in Staffordshire (including Stoke) the processing and food manufacturing sector is a big employer. Processing fruit and vegetables, the manufacture or other foods, bakery and beverages are all strong sectors – as is the manufacture of general purpose machinery. This influence of JCB in this area, including support businesses, would partially explain the high LQ for general-purpose machinery manufacturing in Staffordshire.

5.20 The LQs for Staffordshire, despite the large levels of absolute employment, are more limited – but this is a function of the large levels of employment in Staffordshire more generally depressing the proportion of employment in the sectors being examined.

5.21 Staffordshire is the only county in the study area where the manufacture of dairy products does not exceed 2x the proportion of employees recorded in England and Wales as a whole.

Table 17 – Staffordshire and Stoke-on-Trent Sectoral Location Quotients

Staffordshire	Employees	LQ
103 : Processing and preserving of fruit and vegetables	900	2.39
104 : Manufacture of vegetable and animal oils and fats	100	2.54
108 : Manufacture of other food products	2,200	2.00
109 : Manufacture of prepared animal feeds	400	2.31
110 : Manufacture of beverages	1,700	5.09
282 : Manufacture of other general-purpose machinery	1,700	2.15

Stoke-on-Trent	Employees	LQ
107 : Manufacture of bakery and farinaceous products	900	2.59

Source: Mickledore's analysis of BRES data

Worcestershire

5.22 Worcestershire has high levels of absolute employment in processing and preserving fruit and vegetables reflecting the concentration of fruit and vegetable farming in the area. The area also has a concentration in the manufacture of general purpose machinery but it is likely that this is not agriculturally related given the more general engineering strengths of the area. Dairy product manufacture is also a strong employer.

5.23 Worcestershire is the only location in the area with a high LQ in fish processing.

Table 18 – Worcestershire Sectoral Location Quotients

Worcestershire	Employees	LQ
102 : Processing and preserving of fish, crustaceans and molluscs	314	5.20
103 : Processing and preserving of fruit and vegetables	1,732	7.02
105 : Manufacture of dairy products	771	4.84
106 : Manufacture of grain mill products, starches and starch products	232	2.76
282 : Manufacture of other general-purpose machinery	1,445	2.69
462 : Wholesale of agricultural raw materials and live animals	301	2.01

Source: Mickledore's analysis of BRES data

Company Analysis

5.24 As part of the work completed we have gathered all the companies registered within the study area. This data is provided under Appendix 1. The data is a complete list of all those companies within the area with a relevant Standard Industrial Classification (SIC) code. We have limited this list to those companies who disclose their turnover and employees (under UK Company law only medium sized companies and above have an obligation to file full accounts).

5.25 Within this section we have listed those companies registered in each area which state an employment total of >100.

5.26 There are a number of important limitations which should be noted with data of this sort. The companies shown have their registered address in the area concerned – but many companies may have a head office elsewhere and the local site is not registered as a separate registered address. Companies of this type will not be found by this analysis (nor through any other list).

5.27 A further limitation of data of this sort is that the employee total shown is the employment by that registered entity and shown in the last produced accounts. The result is that the employment shown may not be the total at the location in the study area – but this is the only available data.

5.28 As a result, the company information provides some information about the larger businesses working in the sector in each location but does have limitations. The data is useful to give some insight into the types of companies operating in the area, their business model and the types of companies who may be interested in an agri-tech initiative.

Table 19 – Companies Registered in Herefordshire with over 100 Employees

Company	Location	County Area	UHC	Country	Employees
Sun Valley Foods Limited	Hereford	Herefordshire	CARGILL INC	US	2,177
S & A Group Holdings Limited	Hereford	Herefordshire	S & A GROUP HOLDINGS LIMITED	GB	715
H. Weston & Sons Limited	Ledbury	Herefordshire	H. WESTON & SONS LIMITED	GB	219
Chase Products Limited	Hereford	Herefordshire	CHASE PRODUCTS LIMITED	GB	175

Company	Location	County Area	UHC	Country	Employees
Tyrrells Potato Crisps Limited	Leominster	Herefordshire	CRISPS HOLDINGS LTD	n.a.	174
Wyevale Holdings Limited	Hereford	Herefordshire	WYEVALE HOLDINGS LIMITED	GB	156
Universal Beverages Limited	Ledbury	Herefordshire	HEINEKEN NV	NL	111

Source: Companies House

5.29 Cargill is one of the largest farming and food production companies in the world. In the case of its chicken business (Sun Valley Foods) in Hereford, the Company deals with a number of independent chicken farmers rather than having complete control over the supply chain.

5.30 Cargill operates two processing facilities in Hereford, one dedicated to primary processing (Grandstand Road) and the other to further processed chicken products (Yazor Road).

5.31 Established over 50 years ago, Cargill's combined Hereford sites employ around 2,000 people across production and office based functions. Cargill currently processes 1.6 million chickens per week at the Grandstand Road plant. These chickens are received from Cargill's network of 100 + independently owned farms, slaughtered (using a state of the art controlled atmosphere stunning process), cleaned, chilled and prepared either for further processing or packaged as fresh chicken products (whole chickens and jointed chicken pieces for the food service, retail and restaurant businesses).

5.32 Chicken and chicken portions are further processed at Yazor Road – Cargill's largest secondary processing plant – into fresh chicken treated with sauce and dressings, rotisserie chicken and breaded and battered chicken for retail and restaurants.

5.33 S&A is a leading UK based grower, packer, importer and exporter of soft fruit and asparagus. A family owned business with over 40 years' fresh produce experience, S&A is the largest independent specialist strawberry grower in the UK. S&A supply multiple retail customers across the UK and Mainland Europe.

5.34 S&A provides fresh strawberries, blueberries, raspberries and blackberries, which are available all year. Berries are grown on the company's own farms and sourced globally from partner growers.

5.35 H. Weston & Sons is a large cider and perry production company founded in 1878 offering brands such as Stowford Press. The business also undertakes considerable export activity.

5.36 It is not entirely clear what work is undertaken by Chase Products although it may be related to the William Chase enterprises formed after the sale of Tyrells (see below).

5.37 Tyrrells was founded in Leominster, Herefordshire, in 2002 by farmer and entrepreneur William Chase. In April 2008, Chase sold a majority stake for £30M to Langholm Capital. Chase used the money from the sale of his stake in Tyrrells to start production of Chase potato vodka, again using his own farmed potatoes. Tyrells was subsequently bought by Investec and the company is still registered in Hereford.

5.38 Wyevale Holdings owns Wyevale nurseries which supplies nursery stock of trees and shrubs for wholesale into the Amenity, Landscape and Retail markets.

5.39 Universal Beverages is a contract drinks manufacturer and undertakes juice production, fermentation, storage, bottling, product formulation and other product development services. The business has recently expanded its productive capacity.

Table 20 – Companies Registered in Worcestershire with over 100 Employees

Company	Location	County Area	UHC	Country	Employees
K.F. Investments Limited	Evesham	Worcestershire	K.F. INVESTMENTS LIMITED	GB	1,813
Seafresh Group (Holdings) Limited	Redditch	Worcestershire	SEAFRESH INDUSTRY PCL	TH	323
CP Foods (UK) Limited	Kidderminster	Worcestershire	CHAROEN POKPHAND FOODS PCL	TH	242
Springhill Farms (Pershore) Limited	Evesham	Worcestershire	MAPP HOLDINGS LIMITED	GB	204
Dawn Foods Limited	Evesham	Worcestershire	DAWN FOODS COÖPERATIEF U.A.	NL	190
Ferryfast Produce Limited	Pershore	Worcestershire	HOB FARMS LIMITED	GB	126

Company	Location	County Area	UHC	Country	Employees
Huegli UK Ltd.	Redditch	Worcestershire	DR. A. STOFFEL HOLDING AG	CH	111
Red Star Growers Limited	Pershore	Worcestershire	RED STAR GROWERS LIMITED	GB	110

Source: Companies House

5.40 KF Investments is the Holding Company for Kanes Foods – a large food business operating 4 production facilities within a 28-acre site in the Vale of Evesham. The company works with local growers and produces salads, dressed salads, beansprouts, egg noodles, dressings and cooking sauces as well as prepared vegetables.

5.41 Seafresh is the Holding Group company which owns Blue Earth Foods Ltd. Blue Earth Foods in Redditch is a major supplier of chilled seafood products to leading retailers throughout the United Kingdom and Europe. The company predominantly sells own label prawn and shell fish products.

5.42 CP Foods based in Kidderminster is a supplier of chicken, duck, prawns, fish, rice and snacks from Thailand for ingredients for the UK food manufacturers. The business also undertakes chilled packing and gas flushing, bagging, multi component packing and assembly, sleeving, cartoning, casing, and chilled meat slicing, dicing and shredding. This work, however, is undertaken from a factory in Newmarket rather than from the registered business address.

5.43 Springhill Farms is a fruit and vegetable wholesaler specialising in strawberries, raspberries, mushrooms, apples, salads and some vegetables.

5.44 Dawn Foods is a subsidiary of a large US bakery business manufacturing sweet bakery products such as muffins, cakes and other sweet pastry products both for the retail and food service sector. Generally, in the UK, these are for own brands or the unbranded sector.

5.45 Ferryfast Produce Limited is a supplier of perishable food products both grown from the business' own farm and from suppliers across the world. The farm activities involve nurseries which have expanded over the years from just 2 glasshouse sites to over 400 acres of land and 9 acres of glasshouses across several locations. The business

provides supplies to retailers and also offers third party logistics support.

5.46 Hügli has had an operation in Redditch for 30 years. The business manufactures savoury and nutrition products. The facility has extensive capabilities in the blending and packing of dry powder foods as well as full technical support and a new product development suite. The customers served include major European food brands, wholesale food service suppliers, multiple retailers as well as pharmaceutical and specialist nutrition companies. The range manufactured includes dietary supplements and specialist nutrition products as well as soups, sauces, seasonings, gravies and beverages.

5.47 Red Star Growers is a grower partnership formed in 1997. The partnership involves a number of large farmer producers and operates a 900 square metre fully accredited packhouse and refrigerated distribution area, the company offers washing, packing and labelling to any specification. Much of the produce is sent out iced-packed to maintain freshness. The Company also offers contract packing, labelling and despatch. The business provides a variety of vegetables including leeks, carrots, beetroot, asparagus, cabbage, sprouts, broccoli, courgettes and various beans.

Table 21 – Companies Registered in Shropshire with over 100 Employees

Company	Location	County Area	UHC	Country	Employees
Anglo Beef Processors UK	Shrewsbury	Shropshire	ABP FOOD GROUP UNLIMITED	GB	1,994
LAF Holdings Limited	Oswestry	Shropshire	LAF HOLDINGS LIMITED	GB	681
R J Fullwood And Bland Limited	Ellesmere	Shropshire	STICHTING ADMINISTRATIEKANTOOR VERDER INTERNATIONAL	NL	594
Zwanenberg Food UK Limited	Shrewsbury	Shropshire	ADANS HOLDING N.V.	NL	524
Magna Specialist Confectioners Limited	Telford	Shropshire			375
P D M Produce (U.K.) Limited	Newport	Shropshire	P D M PRODUCE (U.K.) LIMITED	GB	236
TM Telford Dairy Limited	Market Drayton	Shropshire	T.M. DAIRY (UK HOLDING) SARL	GB	187

Company	Location	County Area	UHC	Country	Employees
Oaklands Farm Eggs Limited	Telford	Shropshire	OAKLANDS FARM EGGS LIMITED	GB	183
C J Wildbird Foods Limited	Shrewsbury	Shropshire	C J WILDBIRD FOODS LIMITED	GB	163
Pickstock Telford Limited	Oswestry	Shropshire			139
Single Source Limited	Telford	Shropshire	SÜDDEUTSCHE ZUCKERRÜBENVERWERTUNGS-GENOSSENSCHAFT EG	DE	136
Fabdec Holdings Limited	Ellesmere	Shropshire	FABDEC HOLDINGS LIMITED	GB	115
Evolution Foods Ltd	Telford	Shropshire	EVOLUTION FOODS LTD	GB	105

Source: Companies House

5.48 Anglo Beef Processors in Shrewsbury is one of ABP's UK plants. They are one of the largest beef processing companies in the UK and have 27 UK operations as well as several European sites. They offer their farming suppliers (they work with 35,000 farmers) access to information on the latest techniques in managing livestock and also run a 'future farm' competition annually.

5.49 LAF Holding, based in Oswestry own Lloyds Animal Feeds from which its name is derived and they also own other companies including Country Fresh Pullets, Country Fresh Broilers, Alan's Skip Hire, Feedco, GLM Trading, Highbury Poultry Farm Produce, Hyton Poultry, Llynclys Farm, Posterflair, Smartstage, Tanat Valley Foods and Vic Thorman (Pullets). The business provides data on various aspects of feeding and maintaining livestock.

5.50 Fullwood is a leading designer and manufacturer of milking systems and has been supplying the dairy industry with all types of solutions from conventional herringbone, parallel and rotary parlours to the very latest automated milking robots for over 70 years. The business has helped farmers in more than 80 countries to maximise the productivity and profitability of their dairy businesses. The business is now owned by the Verder Group.

5.51 Rea Valley Speciality Foods is a trading division of Zwanenburg Food UK Ltd., presenting the Group's range of speciality cooked meats. British Corned Beef, First-

Grade Ox Tongue and Pork Lunch Tongue for loose counter and prepack sale within supermarket, independent high-class delicatessen and farm shop sectors.

5.52 Magna specialist confectioners develops chocolate products for use by other food manufacturing businesses. The business includes a development activity which works alongside customers.

5.53 PDM is a specialist lettuce and baby leaf grower supplying salads to UK retail and food service businesses from a 2,500-acre farm and with partners in Spain, Italy and Portugal in order to extend the growing season. The business employs a technical team to work closely with seed breeders worldwide to constantly trial new ideas to deliver improvements in yields, quality, taste, flavours, bite and crunch.

5.54 TM Telford dairy is a dairy operation which has recently been acquired by the Muller Group. It is one of a number of dairy operations operated by Muller within Shropshire which are filed under a wholesale SIC code and have not therefore been automatically picked up as part of the data capture.

5.55 Oaklands Farm Eggs Ltd are a well-established family business based in Shropshire and owned by J A & O Griffiths and Sons. The business was established in 1967 and produces eggs from chickens which it rears from day old birds. It produces nearly 500 million eggs a year. Full records are kept on all aspects of bird welfare and husbandry.

5.56 CJ Wildlife is the brand name for CJ WildBird Foods Ltd which was set up in 1987 on a farm in Shropshire by Chris Whittles, initially researching and providing just a small range of seeds for wild birds, the business is now a leader in the research, design, development and supply of wild bird and wildlife food and feeding products.

5.57 Pickstock Telford is a family run supplier of assured British beef products to retailers, butchers and food service professionals across Europe. The business has been operating for 40 years and runs a facility that is dedicated to a single strain of beef herd. The business works with local farmers.

5.58 Single Source is a specialist packaging company to the food industry offering a range of different packaging for sweeteners, beverages and ancillary products for beverages, soft drinks, sauces and spices.

5.59 Fabdec is a producer of machinery, equipment and consumables primarily for the dairy industry but has also some activities in the brewing industry.

5.60 Natural Selection Foods is the flagship brand of Evolution Foods Ltd. Evolution Foods has grown and evolved into the UK's premier independent supplier of retail packed dried fruit, nuts and snacking products; providing over 60 million packs in 2015 from its own purpose built facility.

Table 22 – Companies Registered in Staffordshire with over 100 Employees

Company	Location	County Area	UHC	Country	Employees
Molson Coors Brewing Company (UK) Limited	Burton-On-Trent	Staffordshire	MOLSON COORS BREWING COMPANY	US	1,997
Ornua Foods UK Limited	Leek	Staffordshire	IRISH DAIRY BOARD CO-OPERATIVE LTD	IE	675
National Veterinary Services Limited	Stoke-On-Trent	Staffordshire	PATTERSON COMPANIES, INC.	US	511
Florette UK + Ireland Limited	Lichfield	Staffordshire	SOCIETE COOPERATIVE AGRICOLE ET AGRO-ALIMENTAIRE AGRIAL	FR	403
JCB Transmissions	Uttoxeter	Staffordshire	GLOBAL ENGINEERING SERVICES NV	NL	392
Knighton Foods Limited	Stafford	Staffordshire	PREMIER FOODS PLC	GB	350
Salads To Go Limited	Lichfield	Staffordshire	FLORETTE UK & IRELAND LTD	n.a.	255
JCB Power Systems Limited	Uttoxeter	Staffordshire	GLOBAL ENGINEERING SERVICES NV	NL	233
John Pointon & Sons Limited	Leek	Staffordshire	JCM GROUP HOLDINGS (UK) LIMITED	GB	224
James T Blakeman & CO (Holdings) Limited	Newcastle	Staffordshire	JAMES T BLAKEMAN & CO (HOLDINGS) LIMITED	GB	192
Rumenco Limited	Burton-On-Trent	Staffordshire	RUMENCO HOLDINGS LIMITED	GB	159

Source: Companies House

** Florette UK & Ireland and JCB are listed twice each in this list as they have two separately listed companies registered with Companies House. The available employment data includes*

differing jobs numbers; however it is unclear from the information available whether there is any overlap in these employment numbers.

5.61 Molson Coors is an international brewing business and in the UK is responsible for the Carling, Coors, Cobra and Staropraman brands. The Company operates a large brewing operation in Burton-on-Trent.

5.62 Ornua was formerly the Irish Dairy Board and is responsible for dairy products such as the production of Pilgrims Choice cheese and Kerrygold butter. The business also manufactures some powdered milk products as ingredients. Ornua purchased North Downs Dairy and the business produces 50 percent of the UK's private label hard cheese as well as Pilgrims choice which is the 2nd largest UK brand.

5.63 National Veterinary Services is a large veterinary product wholesaler.

5.64 Florette produces pre-packaged salads for the UK retail market. The business is French owned but established its UK presence in 1999. The business takes produce from across Northern Europe (including the UK) in the summer and sources from Southern Europe in the winter months.

5.65 JCB Transmissions is an international business producing construction, military, agricultural and specialist vehicles. The business has introduced a number of features relating to agri-tech into its agricultural products including LiveLink, a telematics system.

5.66 Knighton Foods is a joint venture between Premier Foods and Speciality Powders and is a powder manufacturing and packing facility involved in the production of powdered beverages and desserts.

5.67 Salads to go Ltd is a transport business linked to Florette above.

5.68 John Pointon and Sons provides waste disposal, recycling and environmental solutions for animal by-products and food waste. Every year, the business collects more than a half a million tonnes of animal by-products and food waste. Waste is then rendered and supplied to the oleochemical pet food industries.

5.69 James Blakeman is a manufacturer and supplier of chilled, cooked & frozen sausage

meat based products to the wholesale, catering and food services sector.

5.70 Rumenco is an independent company which manufactures farm animal feeds. The business has worked in animal nutrition standards and requirements and was a pioneer in the production of feed blocks. The business also now supplies ruminant supplements and animal licks.

Table 23 – Companies Registered in Cheshire with over 100 Employees

Company	Location	County Area	UHC	Country	Employees
Frank Roberts & Sons Limited	Northwich	Cheshire	FRANK ROBERTS & SONS LIMITED	GB	856
NWF Group PLC	Nantwich	Cheshire	NWF GROUP PLC	GB	840
CF Fertilisers UK Group Limited	Chester	Cheshire	CF INDUSTRIES HOLDINGS, INC.	US	546
Wright's Pies (Shelton) Limited	Crewe	Cheshire	WRIGHT'S PIES (SHELTON) LIMITED	GB	489
Morning Foods,Limited	Crewe	Cheshire	MORNING FOODS LIMITED	GB	360
Glanbia Cheese Limited	Northwich	Cheshire	GLANBIA PUBLIC LIMITED COMPANY	IE	359
Arthur Chatwin Limited	Nantwich	Cheshire	ARTHUR CHATWIN LIMITED	GB	278
Meadow Foods (Holdings) Limited	Chester	Cheshire	MEADOW FOODS (HOLDINGS) LIMITED	GB	275
Bibendum PLB Group Limited	Crewe	Cheshire	BIBENDUM PLB GROUP LIMITED	GB	240
Tithebarn Limited	Winsford	Cheshire	EQUIOM (JERSEY) LTD	n.a.	190
E.Park & Sons Limited	Macclesfield	Cheshire	E.PARK & SONS LIMITED	GB	184
Cogent Breeding Limited	Chester	Cheshire	WHEATSHEAF INVESTMENTS LIMITED	GB	165
Oakes Millers Limited	Nantwich	Cheshire	OAKES MILLERS LIMITED	GB	157
Massey Bros (Feeds) Ltd.	Crewe	Cheshire	MASSEY BROS (FEEDS) LTD.	GB	151
Quintessential Brands UK Holdings Limited	Warrington	Cheshire	QUINTESSENTIAL BRANDS UK HOLDINGS LIMITED	GB	150

Company	Location	County Area	UHC	Country	Employees
Dairygold Food Ingredients (UK) Limited	Crewe	Cheshire	DAIRYGOLD CO-OP SOCIETY LIMITED	IE	149
Joseph Heler Limited	Nantwich	Cheshire			143
Trouw (UK) Limited	Northwich	Cheshire	SHV HOLDINGS NV	CW	137
The Fayrefield Group Limited	Crewe	Cheshire	THE FAYREFIELD GROUP LIMITED	GB	133
Forresters of Cheshire Limited	Frodsham	Cheshire	FORRESTERS OF CHESHIRE LIMITED	GB	132
John Morley (Importers) Limited	Congleton	Cheshire	J M HOLDINGS LIMITED	GB	114
Ungerer Limited	Chester	Cheshire	UNGERER INDUSTRIES INC	US	105
Thomas Hardy Holdings Limited	Warrington	Cheshire	THOMAS HARDY HOLDINGS LIMITED	GB	103

Source: Companies House

5.71 Frank Roberts & Sons is a bakery business called 'Roberts'. The company has been in operation since 1887 and delivers freshly baked goods to customers right across the North of England, North Wales and the Midlands. Over 3.5 million loaves / rolls are made each week. The business also manufactures biscuits and supplies catering sandwich manufacturers.

5.72 NWF Agriculture has grown to be a leading national supplier of ruminant animal feed, feeding one in six dairy cows in Britain. The business supplies over 4,300 farmers. The business remains acquisitive in this sector. The organisation also runs a distribution business and a fuel supply operation.

5.73 CF Fertilisers owns a significant fertiliser chemical facility in Ince (Cheshire) and an additional factory in Teesside. The business makes in excess of 1.5 million tonnes per year which equates to 40 percent of the UK fertiliser needs.

5.74 Wrights is predominantly a bakery manufacturing sweet and savoury pastries but the business operates several high-street stores in Staffordshire and also manufactures ready meals. The business has an initiative to procure its vegetables fresh from farms

within 25 miles of the facility.

5.75 Morning Foods is seeking to establish a position as Europe's best oat miller. The company has a long tradition of providing healthy and nutritious wholegrain oats to the food ingredient and manufacturing sectors in a wide variety of finished product and packaging formats. The business uses locally sourced products where possible.

5.76 Glanbia Cheese claims to be the leading mozzarella manufacturer in Europe. They provide custom cheese making solutions to companies in over 20 countries around the world and are a joint venture between Glanbia plc and Leprino Foods Company. Glanbia plc is an international nutritional solutions and cheese group, headquartered in Ireland with over €2 billion in annual sales. It is also a world leader in value-added dairy ingredients.

5.77 Chatwins is a retail bakery business with more than 20 shops and 300 employees. Chatwins is one of the region's largest bakery businesses with outlets in Cheshire, Staffordshire and North Wales.

5.78 Meadow Foods is the UK's largest independent dairy and a leading supplier of milk and dairy ingredients to the food industry. For more than 20 years the business has built relationships with both farmers and customers. Meadow Foods has a dedicated and secure supply of more than 600 million litres of milk per year and maintains strong relationships with its network of 600 producers. All milk procured is Farm Assured and in 2015 Meadow Foods supplied over 100,000 tonnes of dairy ingredients to manufacturers operating in sectors such as prepared foods, bakery, confectionary and ice cream.

5.79 The Bibendum PLB Group consists of five trading companies selling wine, spirits and beers to the UK trade and consumer.

5.80 Tithebarn is a specialist producer of livestock feed supplements. Founded in 1935, the business now has customers in over 50 countries. The business is best known for mineral and protein supplements, but also supplies a wide range of animal health products and forage enhancers. Tithebarn invests in product research and farm-testing.

5.81 E Park and Sons is a potato business established in 1924. They represent one of the

UK's few remaining family owned and run potato businesses in existence and are involved in growing, wholesaling, supplying retail, potato seed and processing.

5.82 Cogent operates the UK's largest bull stud. Based on the commercial requirements of today's dairy farmer, the business has successfully developed a breeding programme founded on production, type and reliability. Cogent was the pioneer of sexed semen technology and continues its work today to improve the process and research and develop new technologies.

5.83 H J Lea Oakes is owned by Oakes Millers Ltd and is one of the longest established independent animal feed manufacturers in Britain with a history dating back to 1675 when the Lea family began milling feeds to supply the Cheshire farming community. The business is still independent and family run and has become one of the largest feed manufacturers in the region.

5.84 Massey Bros is another animal feed business with 125 years of experience working on nutrition for each variety of livestock. The business has 3 operating locations in the UK and is committed to nutrition R&D.

5.85 Quintessential Brands is a business specialising in the distilling of gin and vodka as well as providing other contract distilling, bottling and packaging facilities.

5.86 Dairygold Food Ingredients is a producer of cheese and operates in fast-moving consumer goods (FMCG) and Foodservice channels providing cheese products to meet their requirements.

5.87 Joseph Heler produces traditional cheeses and sources its milk from over a hundred specially selected local farms, located within a 45-mile radius of the dairy.

5.88 Part of the Nutreco Group, Trouw Nutrition GB is a leading authority in the field of animal nutrition and the Company seeks to provide innovative nutritional products and technically advanced solutions to the increasing demands of the modern agricultural and companion animal nutrition markets. The company supplies nutritional products and services to the animal feed industry.

5.89 Fayrefield Foods is an independent sales and marketing company specialising in the supply of commodity dairy products, premium added value ranges and healthy eating

products for third parties. The business will work with suppliers to create and package the product and operates an outsourced facility to provide this support.

5.90 Forresters is one of the largest suppliers of cooked, raw and coated poultry in the United Kingdom, supplying both the retail and food service sectors with a variety of frozen and chilled products. The company was established in 1972 and still remains independently family owned.

5.91 Morley's (John Morley Importers Ltd) are a leading supplier to bakers, breakfast cereal and food manufacturers, providing a wide range of ingredients selected from over 20 countries around the world. Products include sultanas, raisins, currants, apricots, figs, dates, almonds, hazelnuts, coconut, bananas, apples, cranberries, orange and lemon peel, glacé cherries and many other ingredients, including mincemeats and fruit fillings.

5.92 Ungerer Ltd specialises in the development, manufacture and supply of quality fragrances, flavours, essential oils & aroma chemicals.

5.93 Thomas Hardy is a unique, private, service company dedicated to brewing and packaging customers' premium brands under confidential contracts.

Conclusion

5.94 For the reasons explained any analysis of businesses in an area based on those companies registered at Companies House against specific SIC codes will not provide a comprehensive sample nor an accurate representation of employment in the area. The analysis does, nevertheless, provide some insight into the types of business in the area.

5.95 It is striking that in the supply chain the larger employers remain the producers and whilst some producers entirely control the supply chain, to the most part the producers are creating an informal or contractual relationship with independent small farmers.

5.96 If a generalisation can be made, the dairy and livestock sectors (with the exception of poultry) appear to rely to a greater extent on smaller farmers with a processor at the top of the supply chain.

5.97 Growers and suppliers of salads and vegetables appear, to a certain extent, to have grown through acquisition of land / through cooperation and have created their own

direct supply relationships. They have also created supply relationships overseas to ensure that they can guarantee their retail customers year-round supply.

5.98 Unsurprisingly the area has a number of dairy businesses and dairy equipment manufacturers and suppliers. This is a known core strength of the area – but the number of significant companies when considered together may be a new finding.

5.99 The fact that the area has a preponderance towards livestock farming also means that the area has a number of animal feed businesses and animal nutrition would appear to be an important theme for the area.

5.100 It is also clear that there are a number of companies who have adopted at least some agri-tech practices and techniques across the area and would appear to be leading candidates for a role in any subsequent initiative.

5.101 The analysis above has already highlighted the employment and location quotient detail for each county area and from the tables shown the strengths of the area can be derived. Any further summary inevitably misses some important sector detail but the table below defines those sectors which are perhaps the most prevalent and well represented in each area. They should not be read as the only areas of specialisation for each area. These areas of specialisation do not include each area's agricultural niches, which were discussed in the previous chapter, rather it is the downstream strengths that are highlighted.

Cheshire	Chemicals (fertiliser)
Herefordshire	Meat processing, manufacture of beverages
Shropshire	Meat Processing
Staffordshire	Food production, beverages and machinery
Worcestershire	Fruit and vegetable processing

5.102 It is clear from the analysis of this chapter that there is a broad breadth of processing and technology specialisms across the Agri-Tech West area, including agricultural inputs (chemicals, machinery, feed, breeding) and a wide variety of food and beverage processing. This, combined with the broadness of the agriculture sector analysed in the previous chapter, demonstrates the extensive agri-tech sector base that is currently in the Agri-Tech West area. This

provides a strong foundation upon which to develop a more integrated and productive agri-tech sector.

6.0 STAKEHOLDER CONSULTATION

6.1 This chapter provides a summary of the consultations undertaken for the study. The consultations undertaken were a cross-section of businesses, education institutions, industry organisations and public agencies. While the four LEPs are the clients and key audience for this study, they were also consulted as a resource for local information of the economy and key businesses. The objectives of the consultations were to:

- Understand the current dynamics in the agri-tech industry in the region, including subarea differences;
- Understand the market specialisms within each LEP area and the Agri-Tech West area as a whole to corroborate the economic data;
- Discuss existing linkages within the industry;
- Understand the access to, use and take-up of technology in the sector.
- Discuss various models of the Agri-Tech West concept and means of supporting the industry;

6.2 The consultations were undertaken in one-on-one meetings, being a mixture of face-to-face and telephone meetings. The full list of consulted businesses and organisations is attached in Appendix 2 and the list of discussion topics is provided in Appendix 3. Below is a summary of the key responses of the consultations undertaken. The summary has been grouped by broad organisation – education, industry bodies (e.g. National Farmers Union, Tenant Farmers Association, Country Land and Business Association), LEPs and businesses.

6.3 The tables below are summaries of the responses provided by those consulted. They have not been attributed to a specific respondent for anonymity reasons, rather the type of respondent. The responses are the comments of the representatives of the organisations consulted and do not represent a position of this Scoping Study.

Table 24 – Consultation Responses – Current Asset Base

Group	Responses
Industry representatives	*Major themes* • Very good asset base in and around the region, including universities and colleges that are rural based. • There are considerable resources to draw upon in the region, including a diverse agricultural industry. *Other themes* • The education sector in the region is a good resource to learn new skills related to changing technology.

Group	Responses
Education	*Major themes* • The education facilities in the region are a strong asset for the sector, providing important skills and linking students to industry. • There are several innovation and research centres within the FE/HE institutions, providing a strong array of such assets in the region.
Local Enterprise Partnerships	*Major themes* • There is strength in the agriculture and manufacturing sectors in the Agri-Tech West region. • Food and drink production is an important component of the manufacturing base in the region, with several high profile brands and many SMEs. • Advanced engineering is another key manufacturing sector in the region, with links to the rural sector and potential for considerable growth. • The land based colleges and universities are a key asset of the region – with strengths in agriculture and engineering and important links to businesses. *Other themes* • Many food and drink SME's in the region producing niche products (e.g. cheese, chocolate, biscuits, ciders, ales, gourmet, halal, etc) • There is a solid breeding and genetics sector in Cheshire, primarily around dairy cattle but also other livestock.
Key Businesses	*Major themes* • Broad sector, including growers and processors. • FE/HE network is a key asset. • Arable, horticulture and livestock businesses are prevalent in the area, which should be promoted as a key asset. *Other themes* • The processing chains from grower to processor to market is not limited to the Agri-Tech West market. • The animal breeding/genetics sector is a key sector in Cheshire, with an internationally leading reputation.

Source: BE Group and Mickledore

Table 25 – Consultation Responses – Agriculture Sector in the Region

Group	Responses
Industry representatives	*Major themes* • The farming uses in the region are very broad, including arable, livestock, horticulture, with some subarea differences. • The agricultural sector in the Agri-Tech West region in nationally important. • Sector will need to reduce impacts on the environment. • Increasing productivity in the sector is the overriding challenge across the UK. Productivity has not increased as much as European competitors. Sector will need to increase productivity and production to provide food security. • The labour market is ageing in the rural sector. *Other themes*

Group	Responses
	• The region has a wide range of rural landscapes, which mean opportunities for a wide array of rural uses. • The region has a large population within it and in neighbouring areas. This puts pressure on land and resources (e.g. water use, catchment pressures). • Connectivity (mobile and broadband coverage) remains a major issue in rural communities. • The sector is seeing fewer farm businesses getting larger and producing more, especially evident in the dairy sector. • It is important that the planning framework allows for business expansions on rural sites – e.g. farms extending buildings, processing on site, etc. • Rural energy production (wind, solar, anaerobic digester) can have a role in agri-tech sector, including providing an income stream to fund other areas of development. • Phosphates are an issue in this region. • Land tenure remains an important rural issue. Coupled with the price of land it means that it is difficult to get into the rural sector.
Education	*Major themes* • Agriculture in the region is broad and an important part of the economy. • Education has a critical role in improving the productivity of the agriculture sector in the region. *Other themes* • Cheshire has a solid equine industry – racehorse breeding, equine hospital, equine science. • Cheshire has a strong breeding industry – cattle, horses, rare species. There are some important genetics firms in the County supporting the dairy industry.
Local Enterprise Partnerships	*Major themes* • There is a significant breadth to the agriculture industry in the Agri-Tech West area. • Dairies and dairy products is a major component of agriculture in the region, particularly in the northern half. • Horticulture and orchards is a major agricultural component in the southern half of the area.
Key Businesses	*Major themes* • There is considerable breadth in the agriculture sector in the region, including livestock, horticulture and arable. • The quality arable, horticultural and pastoral land in the region means there is a long history of quality agriculture in Cheshire and West Midlands. • Networks from grower to processor are established and sophisticated. • Agricultural and food processing sector is a low margin and often labour intensive business. Price pressures from supermarkets/end users are substantial and keep margins tight. *Other themes* • Key issues in livestock farming at the moment are animal welfare and the farming impact on the environment. Reduced use of antibiotics is emerging as a further key issue for livestock farming.

Group	Responses
	• Farming businesses that are diverse are more resilient to changes in the marketplace. Farming businesses that grow their own feed for livestock are at an advantage due to reduced costs. • Reuse of waste products for energy production (e.g. anaerobic digestion) is emerging on farms as a means of disposing waste and reducing energy costs. • Larger farms benefit from efficiencies due to economies of scale and being able to produce a range of products. • There is innovation in the agriculture sector. However, some farmers are resistant to change and retain traditional practices. • Farms produce a commodity product. Therefore there are 3 opportunities for improving profitability – reduction of costs/economies of scale, increasing yield through technology or creating added value. • Long-term contractual positions with processors are desirable to provide certainty and greater sustainability of the business. • Cooperative supply chains have emerged in the region (e.g. salad items, potatoes). • Packaging innovation that extends shelf-life has altered the supply chain dynamics from farm to retailer, allowing retailers to source from a wider area.

Source: BE Group and Mickledore

Table 26 – Consultation Responses – Education and Skills

Group	Responses
Industry representatives	*Major themes* • The region is lucky in that it has a good base of education institutions servicing the agri-tech sector. These facilities have good links with industry and in-work training programmes. • There is fragmentation in the transfer of knowledge to the sector, which impacts on productivity (UK wide issue). • There is not enough skilled labour in the industry. The agri-tech sector is competing with other sectors for the best labour. • A range of skills are required – technical, processing, engineering, labouring. Changing technology means that the skills set required is also changing. • There is a need for migrant labour in the sector, not just at the low-skill level but higher skills due to labour shortages locally. • The sector has an ageing population and there is lower unemployment in rural areas than urban areas. Therefore, there is a tightening labour market. *Other themes* • Concern that research is “grant led” rather than led by the needs of farmers. • Need to ensure that syllabuses are targeted towards needs of industry and best practice. • Need to ensure that those entering the market have the right technical skills as well as business skills to operate in a modern business.
Education	*Major themes*

Group	Responses
	• The institutions are investing in innovation centres, research centres, centres of excellence, etc to engender stronger relationships with industry. • Education institutions are keen for further engagement with industry – both processing/manufacturing and farming. • Strong emphasis in programmes and courses within FE/HE for placements or internships within businesses. • There is a skills gap in the agri-tech sector, particularly for Level 2-3 skills, applied engineering skills. • Need to understand how to attract teenagers to a career in the industry, especially those with no rural background. Education can have a key role in that. • The ageing rural workforce is a significant issue for the sector. • Research in universities has generally been initiated by academic interest rather than farmers or industry coming to the university with a particular problem. *Other themes* • Harper Adams is 1 of 4 universities in UK involved in Agrifood Advanced Training Partnerships linking businesses with research. • Reaseheath College has an Agriculture Development Academy providing skills support for the agriculture industry. • Reaseheath College and NoWFOOD centre at University of Chester have a close working relationship. • South Staffordshire College – Rodbaston Campus is opening an AgriSTEM Academy. • FE/HE staff require regular reskilling to meet current needs.
Local Enterprise Partnerships	*Major themes* • There is a skills shortage in the region, particularly for skilled trades in manufacturing. • The workforce in manufacturing and agriculture is ageing, with younger age groups not entering these sectors in sufficient numbers to replace workers. • The network of colleges and universities with specialisms in agriculture or engineering is a key strength of the region. These facilities have good links to industry. *Other themes* • Apprenticeships are less attractive to school leavers, with more looking to enter degree courses. • SMEs are not taking on apprenticeships in sufficient numbers. • The northern part of the Agri-Tech West region benefits from the large universities in Manchester and Liverpool, particularly the veterinary school within the University of Liverpool.
Key Businesses	*Major themes* • There are shortages of skilled labour in the agriculture sector. As farms become more mechanised, the skills required are different and higher. • Skilled staff are also difficult to acquire in technology, processing firms. • There is likely to be less employment on farms as operations become more automated. *Other themes*

Group	Responses
	• Businesses have cited their existing links with FE/HE in the area, particularly in regards to internships on projects. • Links with FE/HE also exist throughout the UK. • Some businesses have stated that they would like to improve links with FE/HE colleges for research projects, but it is difficult to dedicate time and resources. • Skilled staff recruitment can be more difficult when the business is located in a rural area. • One firm stated that they use specialist recruitment businesses to find staff, due to their specialist requirements. The business has generally recruited experienced staff but would like to attract graduates, although is not sure of the best way to do this.

Source: BE Group and Mickledore

Table 27 – Consultation Responses – Technology Use and Take-up

Group	Responses
Industry representatives	*Major themes* • Technology is changing rapidly. *Other themes* • There is plenty of research in regards to new technologies/products, driven by the commercial sector. There is limited research into new techniques/practices that improve farming or reduce environmental impacts (i.e. where there is no commercial product at the end to sell, there is less incentive for private sector research). • Farmers are early adopters of new technology and techniques. However new technologies are led by commercial interest and may not be in best interest of farming in this region. • Typically, farmers find new technologies to service a need or issue on the farm. Farmers use on-line forums, networks, YouTube, etc to find out about new trends. Trade expos/events have an important role in displaying and demonstrating new technology options for farmers.
Education	*Major themes* • Agri-tech is moving very rapidly in terms of technology. Therefore, it is very important that practitioners are aware of changes. • Precision farming is the key growth area in arable farming. *Other themes* • Advanced engineering trends in agri-tech sector is moving from large mechanical equipment to applied mechatronics (precision farming, drones, specialised equipment)
Local Enterprise Partnerships	*Major themes* • There is considerable expertise and commercial enterprises in advanced engineering in the region, including several major firms with links to the rural economy. • There are strong links between education institutions and advanced engineering firms. *Other themes* • The livestock breeding sector is highly scientific, with use of genetics as a basis for breed selection.

Group	Responses
Key Businesses	*Major themes* • Technology uses in agriculture are rapidly changing, although the take-up of technology varies greatly within the industry. • Cost of technology is barrier to take-up for SMEs, although it is understood that technology can improve productivity and competitiveness. *Other themes* • Technology uses around livestock farming are towards automation of processes (e.g. automated milking). Technology change can be used to improve animal welfare through temperature controlled environments, waste product removal, recording of animal data, etc. • Machinery sharing is one route around high capital cost of equipment, although this is not applicable for all agricultural technology or sectors. • The cost/benefit model for new technology is not always apparent and in a sector with tight margins this impacts willingness to adopt new technology. • Technology take-up in a given subsector appears piecemeal, with no consistency as to approach or level of take-up. • Packaging innovation is a key change in the food sector, influencing the supply chain from farm to retailer. Packaging with sealed gas filling has extended the shelf life of fresh products, allowing larger businesses to supply a consistent product over larger distances, rather than relying on local and inconsistent supply. • New packaging products includes standardised, rigid polymer packaging for meat and cook in the bag products, which allow for innovative food products to be developed. • One business (breeding) cited that changes in their technology use involve retrofitting existing technologies to their needs (i.e. applying technology already available in other sectors to their business). It is important for their business interests that such practices are kept in-house.

Source: BE Group and Mickledore

Table 28 – Consultation Responses – Innovation and Research Centres

Group	Responses
Industry representatives	*Major themes* • There has been underinvestment in the agri-tech sector over the last decade, however the UK Government's strategy for sector has renewed focus on the sector, including committing funding for innovation centres. *Other themes* • Investment at the LEP or institution level is useful for the industry, but there is a risk of too much fragmentation.
Education	*Major themes* • There is strong investment in innovation centres in FE/HE at the moment in the region, particularly in engineering applied to the rural sector. Facilities include: *Harper Adams* ○ Dairy Crest Food Innovation Centre (opened 2015) ○ Agricultural Engineering Innovation Centre, including the National Centre for Precision Farming

Group	Responses
	○ Agri EPI (Engineering Precision Innovation) Centre (under construction) *Reaseheath* ○ Food Innovation Centre (originally dairy now broader food and drink) ○ Agri-Tech Centre (to open Sept 2017) ○ National Centre for Horticulture, the Environment and Sustainable Technology *South Staffordshire College – Rodbaston* ○ AgriSTEM Academy (to open autumn 2016) *University of Keele* ○ Innovation Hub ○ Innovation Centres (4 existing, 1 under construction) *University of Chester* ○ North West Food Research Development Centre (NoWFOOD) *Pershore College* ○ STEM (science, technology, engineering and maths) centre and agri-tech laboratory *University of Worcester* ○ National Pollen and Aerobiology Research Unit • There is a need for further start up and grow on space (especially the latter) for advanced engineering firms in the region. • There have generally been high levels of occupancy in the innovation centres.
Key Businesses	*Other Themes* • Some businesses would like to use research centres within universities for collaborative projects more than they currently do, although ability to commit resources is a barrier. • One business cited collaboration with research centres at universities outside of the Agri-Tech West area, such as Newcastle and Scotland.

Source: BE Group and Mickledore

Table 29 – Consultation Responses – Brexit

Group	Responses
Industry representatives	*Major themes* • Key issue for the sector, with the implications yet to be sorted out. Brexit could be devastating to agricultural industry if access to the European market is not free. • Migrant labour is important in this sector and there would be an on-going need for migrant labour in coming years. • The Common Agriculture Policy funding is EU based and is would need to be established what funding would be provided post-Brexit. • Industry representatives are providing information to member following the Brexit vote to outline implications and are lobbying to the UK Government to support and protect members' interests.
Local Enterprise Partnerships	*Other themes* • Funding sources for Agri-Tech West would be dependent on Brexit timeframe.

Group	Responses
Key Businesses	*Major themes* • EU labour is a key component of agri-tech sector, particularly agriculture. • Exporting implications of Brexit remain unclear and businesses would like further information as soon as possible. Export oriented firms were the most concerned about the implications of Brexit *Other themes* • There is the potential that exports may be harder. Therefore, should promote buying British produce more. • Livestock and food products have strict licensing, which may change upon Brexit. Businesses would like to know as soon as possible what such changes would be

Source: BE Group and Mickledore

Note: Some consultations were undertaken before the Brexit referendum and some afterwards. The referendum was not mentioned by all participants, particularly before the day of the referendum. However, it emerged as a common theme of discussion after the result.

Table 30 – Consultation Responses – Agri-Tech West – Objectives and Priorities

Group	Responses
Industry representatives	*Major themes* • Agri-Tech West should be a body to encourage technology and to help farmers' issues through technology use. • Opportunity for Agri-Tech West to help sector link to new markets and funding sources. • Agri-Tech West could have a role in encouraging research into farming practices that improve sustainability or productivity but are not receiving investment from the private sector. • Agri-Tech West could have a role in investing in innovation as a means increasing productivity. • Rather than prioritising a particular sector of the market (e.g. bottom/top quartiles), Agri-Tech West should look at preferred ideas/techniques/issues that it should concentrate on, which will be of benefit to all sectors. *Other themes* • Some disagreement as to lobbying role of Agri-Tech West with some saying its priorities should be elsewhere and others saying a lobbying role would be beneficial. • Agri-Tech West can have a role in opening up new markets for the sector. • A gap analysis should be undertaken to identify areas of need in the sector and thus priorities for Agri-Tech West. • A clear definition of "agri-tech" will be important in establishing Agri-Tech West. • Technology use is always changing and thus any innovation strategy should be flexible enough so as not to limit new growth areas that are unknown at this stage.
Education	*Major themes* • Strong support from this sector for an Agri-Tech West identity. • Agri-Tech West should be the coordinating identity in the sector to identify and exploit opportunities.

Group	Responses
	• Agri-Tech West should be the link between different organisations and areas to try to have the sector participants working in synergy. • Agri-Tech West should be key agency to disseminate message that agriculture is productive and profitable through technology. *Other themes* • Need to provide a clear definition of "agri-tech" • Priorities should be to identify and deliver on a series of "quick wins" for the growth of the sector. • Important to focus on support for agriculture sector.
Local Enterprise Partnerships	*Major themes* • There is policy support in the LEPs strategic economic plans for the agri-tech sector. • This study should identify areas of business support and potential markets that Agri-Tech West could focus on. The study should also clearly outline the current asset base so that Agri-Tech West has a solid understanding of the sector. • Agri-Tech West should help businesses in moving up to the next stage of their development. • A primary objective of Agri-Tech West should be to improve productivity in the sector.
Key Businesses	*Other themes* • Agri-Tech West should have a role in demonstrating to farmers about what is possible in terms of alternative practices and technologies to reduce impacts on the environment and improve productivity. • Agri-Tech West could link with other organisations (e.g. NFU) to better connect with the sector but would not want to be stifled by partner organisations. • Agri-Tech West can have a role in supporting local produce by promoting quality of products. • An information portal role for Agri-Tech West would help businesses find out about grant funding and research options available. • Agri-Tech West could have an export support role, to help open up international markets.

Source: BE Group and Mickledore

Table 31 – Consultation Responses – Agri-Tech West – Models and Approaches

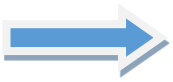
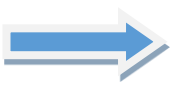
Group	Responses
Industry representatives	*Major themes* • Agri-Tech West should be integrated within existing networks and structures to avoid further fragmentation in the industry. • Agri-Tech West can have a role in coordinating the different parts of the sector, helping to forge a common purpose. • It will be important for FE and HE institutions to have a key role in Agri-Tech West and for Agri-Tech West to complement the work already being undertaken in the institutions. • Agri-Tech West can help in pointing people and businesses to training, resources, advice, etc. *Other themes*

Group	Responses
	• Agri-Tech West should be responsive, flexible and receptive – listen to market to understand priorities and needs. • NFU happy to work with Agri-Tech West and considers that it can provide an interface role with farmers. • AHDB happy to work with Agri-Tech West • Agri-Tech East is very successful because it has excellent key personnel to drive the programme forward, this could be a lesson for Agri-Tech West. Success of Agri-Tech East has been in encouraging small growers to think about new technologies.
Education	*Major themes* • Governance should be as an umbrella organisation to ensure maximised return on investment in the region. • Recommend that there be specialised organisations within Agri-Tech West for different subsectors (e.g. dairy, arable, etc) *Other themes* • Agri-Tech West should consider linking with Agri-Tech East as it is already established and is successful. • Agri-Tech West could be a forum for group purchases of supplies, enabling SMEs to have greater purchasing power. • Agri-Tech West could have a marketing role for local industry.
Local Enterprise Partnerships	*Major themes* • Agri-Tech West would need to outline a programme of funding of projects and businesses. • There are limited networks or forums for the agri-tech sector at present and thus Agri-Tech West could provide that role for the region. *Other themes* • Agri-Tech East is achieving goals in helping businesses grow and should be considered as a potential model for Agri-Tech West. • The LEPs should work together on different projects within the Agri-Tech West programme, depending on opportunities or specialisms within each LEP (e.g. the LEPs for which dairy is a strength should collaborate).
Key Businesses	*Major themes* • An alliance between the LEPs to support agri-tech is broadly supported. *Other themes* • Agri-Tech West could develop a model farm as a “farming centre of excellence” to showcase best practice in the industry and latest technologies. It was suggested that it should not be controlled by one group (a university, college or farming organisation) although could be a collaboration between several parties. Farmers are practical people and would benefit from being able to see and walk around exemplar facilities. • Agri-Tech East is a good networking and information sharing organisation. However, Agri-Tech West could be more of a project-oriented organisation.

Source: BE Group and Mickledore

Summary and Implications for Agri-Tech West

6.4 The consultations within the sector unearthed a significant level of insight and a wide range of opinions. Recurring, key messages emerged as to the current status of the sector are listed below, along with the potential implications for an Agri-Tech West identity.

Theme		Implications for Agri-Tech West
The sector in the Agri-Tech West region has a broad and strong asset base		Good base from which to build a more integrated agri-tech sector.
The network of land-based colleges and universities is a key asset		There are substantial local resources to increase skills in the sector and improve integration in agri-tech.
The food and drink production sector is diverse, produces quality products, has a good reputation and consist of large and SME businesses. This processing sector builds on the diversity and strengths of the primary producers.		There is an established structure of business links through the supply chain. These links will be a solid base for Agri-Tech West.
Advanced engineering is a key strength in the region, with a far broader base than agri-tech. The FE/HE institutions have strong advanced engineering schools.		The engineering technical expertise is strong in the region, with substantial opportunities to increase and broaden the links to the agricultural and processing sectors. Agri-Tech West can have a role in facilitating this.
Agriculture has very tight margins and thus the sector will need to increase productivity in order to remain viable/competitive.		The sector will need to continue to adopt technologies to improve productivity.
The tight margins in agriculture means that many in the sector struggle to update equipment and adopt new technology.		There will need to be a programme of support for businesses to assist in adopting new technologies to improve productivity.
Skills shortages are significant in the agri-tech sector. In particular, as technology changes, new skills are required.		The FE/HE institutions will need to be strongly engaged in the Agri-Tech West programme. Support to improve the accessibility to education and training should be a part of the programme.
The degree of technology take-up varies greatly throughout the sector		Those leading businesses adopting new technology could be used as a showcase for the sector. Those businesses not taking up technology would need a programme of support.

6.5 In addition to the above themes, there were some specific opinions on Agri-Tech West, both in structure and priority areas. While there was diversity in opinions, there were some common messages, including:

- There was broad support for an Agri-Tech West identity to support the sector in this region. This was a key theme that emerged from the consultation, that there was no significant resistance to the concept of Agri-Tech West and that the consultees could see a role and reason for an Agri-Tech West identity to be established.
- Agri-Tech West should have a coordinating and linking role between the different elements of the sector and also providing links to external market and funding sources. There was feedback from the consultees that the disparate elements of agri-tech are not as integrated as they could be (although examples were also provided of good integration), which may result in opportunities not be taken. Agri-Tech West was seen as a potential forum for improved links within the sector, highlighting its different elements and bringing participants together (e.g. through an events programme, signposting to resources, etc.).
- Agri-Tech West should promote means of improving productivity in the sector through innovation and technology use.
- Guidance as to the definition of agri-tech, and therefore the elements coming under the remit of Agri-Tech West, would be of benefit to the industry. Therefore, circulation of the position of this Scoping Study in regards to the definition of agri-tech would be useful to the sector. From an on-going perspective, Agri-Tech West would need to have a promotion role that would have a broad scope, seeking to promote the application of the area's strengths to agriculture and food and drink processing. For example, the engineering, chemicals or IT strengths throughout the area that could be applied to the sector.

7.0 ASSET BASE REVIEW

Introduction

7.1 This chapter brings together the data gathered in the previous sections as a clear and concise statement of the agri-tech asset base within the Agri-Tech West region, including subarea variations. As repeatedly discussed in this study, agri-tech is a broad term encompassing several different sectors including agriculture, manufacturing, education, warehousing and retail. This chapter outlines the key components and features of the agri-tech sector in the Agri-Tech West region.

Businesses

7.2 Chapters 4.0 and 5.0 outline the key employment specialisms throughout the Agri-Tech West region and the key businesses participating in the sector. These chapters highlight the area's diversity and breadth in the agri-tech sector and the mix of business types. Chapter 6.0 summarises the key themes emerging from direct consultations with representatives of the agri-tech sector. From this research, key themes have emerged regarding the commercial asset base in the region's agri-tech sector.

Agriculture

7.3 The agricultural sector in the Agri-Tech West area is representative of the UK's agricultural sector as a whole, with a broad base of commodities production and a range of small to very large agricultural producers. In regards to agriculture's contribution to the economy in gross value added terms, the sector is relatively minor in most counties (contributing about 1-2 percent), although in Herefordshire contributes a more significant 8.4 percent. However, its importance as a supplier of commodities for downstream processors is not accounted for in such statistics. Furthermore, the agricultural sector employs a significant 42,000 people in the region, reinforcing its importance to the economy.

7.4 The region's agricultural sector contributes a higher proportion of the UK's livestock production than arable farming, with the exception of pig farming. Of the livestock sectors, cattle is the highest contributor, with the region having 17 percent of the nation's cattle herd (beef and dairy combined). This affects the mix of downstream processors in the region, with dairy products being an important component of the area's food production.

7.5 Similarly to elsewhere in the UK, livestock farming in the region has seen a smaller number of farming businesses producing a larger output, with respondents to the

consultation phase particularly identifying this trend in the dairy industry. Economies of scale help to make businesses more viable in a sector with extremely tight margins. Larger operations also have more capacity than smaller businesses to upgrade equipment and processes to be more efficient and productive.

7.6 Arable farming in the Agri-Tech West area constitutes a smaller proportion of the nation's output than livestock farming. Shropshire has the largest amount of land dedicated to arable farming and leads the region in land dedicated to cereals, other arable crops and grassland. Herefordshire and Worcestershire have the largest areas dedicated to horticulture (fruit and vegetable growing).

7.7 Horticultural production is a mix of protected growing (glasshouses, poly-tunnels) and orchards. Particular horticultural specialisms include soft fruits, pome fruits (apples, pears, etc) and salad items.

7.8 The agricultural sector's link to the education sector in the region is long-established, with several land-based institutions with good reputations providing skills and training for the rural sector. This relationship is a key asset for the broader agri-tech sector, providing an established basis upon which to develop a more integrated relationship.

7.9 Agriculture's broad base in the Agri-Tech West area can be promoted as a key strength. Other areas in the UK of a similar size may have similar agricultural outputs but through a narrower base (e.g. East of England is predominantly based on cereal and other arable production). Furthermore, the Agri-Tech West area can be seen as representative of the agriculture sector in the UK as a whole, with the potential for it to be used as a test area or pilot scheme for policies or initiatives that could then be rolled out nationwide.

Food and Beverage Production

7.10 The Agri-Tech West area has a broad array of food and beverage producers, using the primary produce of the region but also importing produce from elsewhere in the UK. Conversely, the region's primary produce is not used exclusively within the Agri-Tech West region but is also exported to processors elsewhere in the UK.

7.11 While not exclusively processing the region's produce, the mix of food and beverage production in the Agri-Tech West region is heavily influenced by the region's primary produce. Dairy products, meat products, fruit and vegetable products and beverages are important outputs of the processors in the area. Subarea differences are significant

within the Agri-Tech West area, but overall the area represents a broad and important food and beverage production area for the UK.

7.12 The region houses several large operators and national brands in the food and beverage production sector. Cargill, Muller, Kanes Foods, Anglo Beef Processors, Molson Coors, Ornua Foods and Mornflake are some of the leading operators in the region. Food and beverage production is often a labour intensive sector and thus several of the larger processors are reportedly employing over 1,000 workers, representing a substantial asset in the local employment market. However, there is also a myriad of independent, small businesses producing niche products.

7.13 The producers appear to be generally supplying the UK market, rather than exporting overseas. The larger operators have good market penetration throughout the country, with sophisticated distribution networks and market chains. Unsurprisingly the smaller operators have a more localised market, supplying retailers and end consumers at a more county-sized level.

7.14 While some of the larger producers control the full supply chain, the majority of producers are forming contractual or informal relationships with a network of independent farmers.

7.15 The producers are linking with the education sector through collaborations on product research and development, food and beverage SMEs using incubator and grow-on spaces on campuses, developing specialist research premises on campus and participating in course curricula.

Agriculture Supplies, Equipment and Machinery Production

7.16 A core asset of the agri-tech sector in the region is its current base in the manufacturer of agricultural supplies, equipment and machinery.

7.17 Leading companies in the sector include JCB Transmissions, Fullwood, CF Fertilisers, NWF Agriculture, Tithebarn and Fabdec, producing a range of large farm machinery, specialised equipment (e.g. milking equipment) and farming inputs (e.g. fertiliser and feed). Their markets are not limited to the Agri-Tech West region; rather they have established markets throughout the UK and overseas. Reasons for locating in the region that were identified were the access to labour and markets.

7.18 Importantly for this study, there is a substantially broader manufacturing base in the region and in neighbouring areas that has the potential for further links with the agri-tech sector. Advanced engineering is a strength of the wider area, with a specialty in automotive, machinery and aviation production. This broader manufacturing base can supply parts, servicing and comparable skills to the manufacturing directly linked to the agricultural sector.

7.19 Several large animal feed producers were also identified in the area, positioned in the region to be close to both suppliers (arable farms) and consumers (livestock farms). The broad agricultural base of the region means that it is an attractive location for animal feed operators. Significant fertiliser manufacturers are also present in the region, particularly the northern half.

7.20 A significant genetics and breeding industry serves the livestock (mainly cattle) industry in the region, concentrated in Cheshire. This cluster has a world-leading reputation in animal breeding, sex selection and optimisation of stock. This sector has emerged from the long history of livestock production in the area. The demand for a refined and scientific approach to breeding of livestock has resulted in the specialist breeding and genetics firms. Once again, the location of the sector in this area is to be close to markets, being the dairy farms throughout the northern part of the Agri-Tech West area. There is a broader life sciences cluster in Cheshire, including pharmaceutical and biomedical research firms, which consist of firms that would have similar skill sets to the animal genetics cluster.

7.21 Collaboration with the education sector is strong in the field of advanced manufacturing. Several of the institutions have centres on campus to promote collaboration with industry in regards to advanced engineering, including rural and non-rural applications. This sector has been identified as a key area of growth for the institutions, with considerable investment in increasing workshop, engineering laboratory and innovation centre capacity on campus to support advanced engineering.

Education and Research

7.22 The Agri-Tech West region has a strong array of FE and HE institutions servicing the rural sector and more broadly, agri-tech. These include nationally recognised facilities drawing students from considerably wider than the West Midlands or Cheshire regions. Links to industry are solid and strengthening through the institutions' programmes of

developing innovation centres, research collaboration spaces and centres of excellence on campus.

7.23 Importantly, in regards to planning for Agri-Tech West, it is recognised that there are several initiatives by the education sector in the region to collaborate and engage with the business community, particularly in the area of advanced engineering. There are recent and planned projects to encourage more commercial-led research and innovation on FE and HE campuses. There are also initiatives throughout the network in regards to engineering or IT that are not currently related to the rural sector but the research and skills could be applied to agricultural or processing uses.

7.24 The table below provides a summary of the education facilities within the region that have key agri-tech assets. It is not a complete list of all FE and HE facilities in the region, rather focussing on those with key research and education strengths in agri-tech related areas.

7.25 Collaboration between the institutions has been observed, both within the Agri-Tech West region (e.g. combined courses between University of Chester and Reaseheath College) and outside the region (e.g. Harper Adams University collaborating with Scotland's Rural College and Cranfield University on the Agri EPI Centre project).

Table 32 – Education and Research Key Facilities

Name	Description	Innovation Centres
Higher Education		
Harper Adams, Shropshire	Leading land based university, with a national profile. Courses include agricultural and land based studies, environment management, engineering and agri-food processing. University has about 3,500 students, 19% of which are from West Midlands. Strong links with business community through innovation/research centres and requirement of students to complete internships as part of courses. University states that they have approximately 500 business contacts for internships.	Agricultural Engineering Innovation Centre • Clean engineering labs available for businesses • Research for rural engineering – tractors, machinery, mechatronics, hydraulics, etc. • Units for training, product development and testing • Includes National Centre for Precision Farming • Some permanent business tenancies, some occupying for a specific project (e.g. 2-3 year term) National Centre for Precision Farming • Business led centre to improve farming efficiency and productivity. • 2 stated roles – promote and evaluate technology use in agriculture to improve productivity and provide a node for networking and sourcing information. Dairy Crest Food Innovation Centre • Opened in 2015 for Dairy Crest's product research and development. Includes laboratories, test kitchen and pilot plant for new product development. • University and Dairy Crest combine on projects and Dairy Crest provides guest lecturers, student placements. Agri EPI Centre • EPI – engineering precision innovation • Currently under construction • Emerging from UK Government's investment in innovation in agriculture. • Collaborating with other facilities – Scotland's Rural College, Cranfield University and industry representatives, with several sites proposed. • Will have research farms and processing equipment for applied research, demonstration, training and education.
University of Liverpool	The University's Leahurst campus is home to its School of Veterinary Science. Leahurst includes veterinary hospitals, practices and	Tesco Dairy Centre of Excellence (Woodpark Farm) • Working dairy farm with approximately 200 cows on 200 acres.

Name	Description	Innovation Centres
(Leahurst), Cheshire	working farms. The three practices serve agriculture as well as domestic needs – farm animals, equine and small animals. The two hospitals are an equine hospital and a small animal hospital.	• Demonstration farm for best practice and sustainable farming. • Teaching farm for students. • Tesco's network of dairy farmers can access the farm for education, advice and demonstrations. Ness Heath Farm • Mixed livestock teaching farm • Used for animal husbandry and veterinary teaching. • Livestock supplies local markets and retailers.
University of Chester, Cheshire	University with campuses in Chester (4 campuses), Warrington and Thornton (Ince), with a combined student population of over 12,000. The university has a broad science and engineering faculty based at the Thornton Science Park. This faculty includes food science and innovation, which offers courses in conjunction with Reaseheath College.	Thornton Science Park • University purchased former Shell Technology Centre in Ince in 2013 and it comprises about 100,000 sqm of laboratory, workshop and office space over 48 buildings and 66 acres. The university has undertaken a programme of refurbishing the buildings. • Home of the science and engineering faculty • High Growth Centre is an innovation centre for start-ups and SMEs in engineering, automotive, advanced manufacturing and environment. North West Food Research Development Centre (NoWFOOD) • Incubator units for food product SMEs • Food product testing, including laboratory testing, blind tasting, etc. • Training, especially on food safety and hazards • Bespoke consultancies for laboratory testing. Riverside Innovation Centre • Office based incubator centre in Chester, with conferencing/meeting facilities and business support.
Keele University, Staffordshire	Standard university (i.e. not specifically land based), with 3 faculties – natural sciences, medicine and health sciences and humanities and social sciences. University has approximately 10,000 students. Some research being undertaken in natural sciences that are related to agriculture – pest	Science and Innovation Park • 4 innovation centres operating with a fifth innovation centre to open mid-2016. 2 centres are dedicated for medical businesses, with 2 generic business spaces. • Innovation Centre 5 will provide about 2,800 sqm of office and workshop/lab space. • Described as an R&D and innovation cluster of health/med-tech, advanced materials, energy and environment, ICT and professional business services.

Name	Description	Innovation Centres
	control, soil improvement, sensor development in fish farming.	• Substantial capacity for further growth with 12 sites available for innovation businesses for design and build projects. One site is earmarked for a hotel. • Potentially over 90,000 sqm of additional floorspace (excluding hotel).
University of Worcester, Worcestershire	The University has three campuses in Worcester, with about 10,000 students. The University has a range of institutes (faculties), with the Institute of Science and the Environment faculty being the smallest by enrolments. This institute includes courses in horticulture, animal care and environmental science, although does not offer engineering courses.	National Pollen and Aerobiology Research Unit • Produces regular national pollen forecasts • Research is predominantly regarding pollen levels and implications for allergies.
University of Staffordshire	University's two main campuses are in Stoke-on-Trent and Stafford, with smaller campuses in Shrewsbury and Lichfield. The university has a broad computing, engineering and science, although does not have food or agricultural specialisms.	Business Villages • Small serviced office spaces at Stafford and Lichfield campuses
New Model in Technology and Engineering (NMiTE), Herefordshire	New university intended to open in 2019 focussing on engineering and related skills. Described as a new approach to education, NMiTE will have a strong focus on practical learning. The university will be linked to the University of Warwick. It is understood that funding has yet to be fully committed to NMiTE	
Further Education		
Reaseheath College, Cheshire	Land based college based in Nantwich with almost 3,000 enrolments for apprenticeships, FE and HE courses. HE courses are conducted with the University of Chester. Attracts students from throughout UK. Strong links with rural industry through innovation centres and student internships.	Food Innovation Centre • Originally centre was for dairy processing (which remains a key focus) although now supports broader food and drink sector. • Promoting mechanisation of agriculture and food processing. National Centre for Horticulture, The Environment and Sustainable Technology • Research centre for all aspects of horticulture.

Name	Description	Innovation Centres
	Most part-time students are already in the agriculture or food processing industries and have been sent from to the college from their employer as part of increasing skills. Provides courses to support skills throughout the agri-food process, including farming, environmental management, processing and food product development.	• Plant propagation and growth research • Trials of technology supporting sustainable, intensive production, including hydroponics, LED lighting, micro propagation, etc. Agri-Tech Centre • Funding has been committed, although yet to be built. Target opening is Sept 2017 • Intended to operate as a demonstration centre of technologies for farming and processing. • Strong focus on SME development • Will have facilities for applied research and field trials. Reaseheath Agricultural Development Academy • Academy for skills support for agricultural workers through conferences, events and courses.
Warwickshire College (Pershore), Worcestershire	One of five campuses of Warwickshire College, Pershore is a land-based college near Evesham. Moreton Morrell is another of the College's land based campuses, outside of the Agri-Tech West area in Warwickshire. Pershore has an emphasis on horticultural production, practices and design. Other courses include animal welfare and vet nursing, floristry, landscaping and garden design.	Recent redevelopment of the college included a plant Collections House, STEM centre and agri-tech lab for students to learn about engineering, innovation and sustainable practices in horticulture and aquaponics.
South Staffordshire College (Rodbaston), Staffordshire	Land based college in South Staffordshire District. Specialisms in agriculture, land management and animal care. Strong apprenticeships college for the rural sector. Rodbaston has links with secondary schools, including a significant training programme for 14-16 year olds. Soon to be open AgriSTEM Academy will broaden course base of the college.	AgriSTEM Academy • Currently under construction, due to open in autumn 2016. • The Academy will include engineering workshops for agricultural machinery and automotive/hybrid engineering. • Includes precision farming simulation lab, tractor/vehicle simulator, renewable energy workshops, advanced mechatronics lab. Rural Enterprise Academy • Land-based free school for Year 9 to Sixth Form, linked to Rodbaston • Mix of rural focussed vocational studies and standard high school courses.

Name	Description	Innovation Centres
		• Partnerships with National Farmers Union and Veolia.
Hereford and Ludlow College (Holme Lacy), Herefordshire	Land based college with courses in agriculture, land management, forestry and outdoor education. The College has an equestrian centre and a rural crafts centre for traditional rural skills such as blacksmithing and farriery.	Pound Farm • Working farm for beef and lamb, apple cider orchards and arable cropping.

Source: BE Group and Mickledore

8.0 STRATEGY DEVELOPMENT

8.1 The research presented in the previous chapters has identified a broad and diverse agri-tech economy operating throughout the region, with local niches and strengths and some commonalities across counties. The culmination of this Agri-Tech West Scoping Study outlines opportunities for an Agri-Tech West identity, options for the structure of the identity and recommendations as to the initial priorities for Agri-Tech West.

8.2 There was broad support among the consultees for an Agri-Tech West identity to support the sector. It was recognised that an entity that supports the sector across the four LEPs is logical as there are considerable relationships overlapping the county/LEP boundaries. Furthermore, it was supported that the identity should cover agri-tech as a whole, rather than concentrate on agriculture or manufacturing specifically as this broader approach is not apparent in the region at present.

Opportunities for Agri-Tech West

8.3 The table below is a SWOT analysis of the agri-tech sector in the Agri-Tech West region. The objective of this SWOT analysis is to identify specific opportunities for the direction of the Agri-Tech West identity. The proposed nature of Agri-Tech West as a supporting and facilitating identity for the agri-tech sector means that existing weaknesses and threats identified below may be areas to target for Agri-Tech West in a programme of initiatives.

Table 33 – SWOT Analysis – Agri-Tech West

Sector	Comments
Strengths	• Broad agricultural sector and diverse rural landscapes • Strong history of rural production in the region. • Strong brand association and profile of the region with agricultural products, particularly dairy in Cheshire, cider in Herefordshire and horticulture in Worcestershire. • Strategically located to access main markets in the UK. • Strong and established manufacturing base in the region, particularly in Staffordshire and Telford. • Diverse food and beverage production sector throughout the Agri-Tech West region, including large, prominent brand names and small, niche enterprises. • Solid network of FE and HE institutions that have specialisms in the land based economy, advanced engineering or life sciences. • There are established links between FE/HE and industry, through innovation and research centres, incubator space, student internships, industry participation in curricula, etc

Sector	Comments
	• A broad spectrum of national and international brands has a production presence in the region, including JCB, Walkers, Mullers, Cargill, Mornflake. • There is strategic policy support for the agri-tech sector at the LEP level across the Agri-Tech West region. • The dairy industry is a major and defining part of the northern half of the Agri-Tech West area, including primary producers and processors. • There are a range of animal nutrition businesses in the region, broadening the sector, providing a local supply network for livestock producers and providing another potential market for local arable farmers. • Some established supply chains from primary production to processing, including in poultry, dairy and vegetable sectors.
Weaknesses	• Fragmentation of agricultural sector. • Fragmentation of support, networks and funding sources of the sector. • A large number of smaller operators in the agricultural sector with small landholdings, potentially meaning that they are more vulnerable to market changes. • Heavy reliance (especially in the northern half) on the dairy sector at a time when milk prices are causing unsustainability for many in the sector.
Opportunities	• Agri-tech innovation and precision farming is being supported at national and broad area level. • Large urban centres neighbouring Agri-Tech West region – Greater Birmingham, Greater Manchester and City of Liverpool, which can provide a supply of labour, investment, research, markets, business collaboration. • Opening of further innovation centres at FE/HE institutions provides increasing capacity for research, SME growth and collaboration between education and industry. • Increasing environment and animal husbandry regulations and market expectations provide opportunities for research and innovation. • Supply chain initiatives to drive change through the incentive of contracts and the “stick” of not being part of a preferred supply agreement. • Potential to renegotiate trade and regulation agreements following Brexit. • Uncertainty regarding Brexit provides opportunity for an industry identity to act as lobbyist and information portal • Sector fragmentation provides opportunity for an industry identity to provide a coordination and networking function. • An industry identity has the opportunity to act as a promoter/information portal for new technologies available to the market. • An industry identity has the opportunity to have a marketing function to promote technology developed in the region to potential export markets. • A forum for individual operators to take their technical problems to, in order to be able to liaise with researchers and innovators in order to address the issue through technology.
Threats	• Very tight margins in agricultural sector, particularly in dairy, putting pressure on the smaller operators.

Sector	Comments
	• Tight margins limit the capacity of operators to invest in new technology, thereby potentially falling further behind in the sector. • Unknown outcomes of Brexit, including funding arrangements, access to markets, access to labour and regulatory framework covering agriculture and food production. • The lack of homogeneity in the sector means that a united brand such as Agri-Tech West will have difficulty supporting the whole sector. • Labour shortages in the sector as the sector ages and immigration dynamics change post-Brexit. • UK is opened to cheaper exports following Brexit.

Source: BE Group and Mickledore

8.4 Agri-Tech West has a very good basis upon which to further develop the sector. The entity is not being established to initiate a new sector. Furthermore, there is already significant collaboration and integration between some sector operators, particularly through the education institutions. Therefore, Agri-Tech West will not be attempting to integrate an industry that is reluctant to collaborate. The region has specific sectoral strengths, which can be promoted and enhanced by Agri-Tech West through a programme of support.

8.5 The region's education strength is a key asset and can be leveraged to further integrate the sector and improve its productivity. The network of education institutions has a solid and expanding array of innovation centres, centres of excellence, laboratories and other venues where industry, agriculture and education already intersect. Therefore, the education sector should be fully engaged in the Agri-Tech West programme.

8.6 The supply chain links vary throughout the sector. Some processors also control the primary production aspects, whereas others have contractual or less formal relationships with a range of individual farms. There would be an opportunity for Agri-Tech West to enhance and strengthen the supply chain links, which would benefit both suppliers and processors.

8.7 Agri-Tech West can improve access to technology for operators in the industry. Agri-Tech West should have a key role in the dissemination of information relating to new practices and technology for the sector. Agri-Tech West can be a key, central portal that operators can go to for direction to training, suppliers and research in the industry. Agri-Tech West should also have a facilitation role in driving technology, by providing a forum for individual operators to engage with researchers and innovators to solve business problems.

8.8 The tightness in the dairy industry which is considered unsustainable for many operators is a significant national concern. The importance of the sector to the region is such that Agri-Tech West should have a key role in supporting the dairy industry. The support should be concentrated on identifying practices and means of the industry being viable and sustainable through improvements to productivity.

8.9 Influencing all aspects of strategic planning in the UK's economy over the coming years will be the response to and transition out of the European Union. This will have particular impacts on the agricultural sector, and therefore the downstream businesses, due to the strong agricultural relationships, support programmes and regulations within which the UK sector currently operates.

8.10 At this stage Brexit represents a series of potential risks for the sector, including:

- Loss of European subsidies/grants;
- Potential reduction in the availability of European labour for both primary producers and manufacturers, which may increase labour costs;
- Potential removal of tariffs with low cost non-European countries, which would increase competition in an already tight market;
- Potential introduction of tariffs to European markets, reducing access to key export markets;
- Unknown regulatory framework to replace European regulation.

8.11 The degree to which these risks are realised may not be known for some time. However, one or a combination of these risks eventuating is of a significant likelihood, meaning that there would be further cost pressures on the sector. **Therefore, Brexit occurring increases and accelerates the need for improvements to productivity and sustainable practices. This in turn accentuates the need and opportunity for Agri-Tech West to support the sector at this time**.

8.12 Therefore, from the above discussion on the opportunities for Agri-Tech West, a series of priority projects have been outlined in Table 34 that seek to address the shortcomings in the sector at present and build upon its strengths. The projects have been separated by broad grouping, reflecting the themes emerging from the research for the Scoping Study.

Table 34 – Priority Projects

Project	Reasoning	Actions	Key Stakeholders
Initiating Agri-Tech West			
Establish the Agri-Tech West entity	There is support in the sector for an Agri-Tech West organisation, with potential for benefits over and above that generated through existing support.	• Agree on a structure for Agri-Tech West. • Confirm areas within Agri-Tech West area, including a commitment of the 4 LEPs and enquiries to neighbouring areas. • Assemble a board/steering group for Agri-Tech West and a reporting structure • Commit LEP funding • Develop a Business Plan for Agri-Tech West	• 4 LEPs
Financing	Identifying potential sources of funding is a key component to enable an Agri-Tech West programme to be rolled out.	• Development of a list of key funders willing to operate in this sector and the likely terms of support. • Examine the possibility of a soft loan fund to assist in the take-up of the technology. • Through the LEPs, lobby government agencies for funding, including devolution of central funding • Through the LEPs investigate options and apply for EU funding. • Investigate other funding sources, such as paid services or membership fees	• ATW • 4 LEPs
Skills and Education			
Promote further collaboration between educators/researchers	The network of FE and HE institutions is a key asset of the region and they are undertaking broad research in agri-tech and have strong links to industry. There is some collaboration between	• Identify areas of duplication and overlap in training provision. • Prepare a agri-tech skills audit for the Agri-Tech West region to identify gaps in knowledge and training.	• FE/HE institutions • 4 LEPs • ATW

Project	Reasoning	Actions	Key Stakeholders
	institutions, both within the Agri-Tech West region and elsewhere. However, there are opportunities for improved collaboration to increase access to training across the region.	• Identify areas of apprenticeship need and prioritise these areas in further support of the education sector. • Support and encourage cross collaboration of FE/HE courses spanning different institutions.	
Promote agri-tech as a career in the region.	In order to address skill shortages and the ageing workforce in agri-tech, the sector should be promoted within schools as a career option. Focus should be on the breadth of opportunities in agri-tech – science, business and finance, engineering, trades, environmental management, ICT, agriculture, animal husbandry, etc.	• Prepare an agri-tech promotional programme to be disseminated to schools and colleges. • Prepare a programme of jobs fairs for agri-tech, to be held throughout the Agri-Tech West area and in conjunction with and support from FE/HE and industry bodies. • Investigate options of incentivising agri-tech apprenticeship take-up, including encouraging public sector apprenticeship programmes, targeted support for agri-tech SMEs to take apprenticeships and scholarships or similar for students.	• ATW • FE/HE • LEP school and training representatives • Schools • Industry organisations
Application of Innovation – LEPs and Networks			
Promotion of Agri-Tech West as an information/signposting portal for the sector	An early function that Agri-Tech West can undertake is as an information portal, directing users to training options, industry organisations, researchers, sources of funding, suppliers, similar businesses, events and functions, leaders in the industry, etc. This will improve sharing of information in the industry and encourage closer networks in a relatively inexpensive and quick manner.	• Establish and maintain an Agri-Tech West website and social media presence • Use LEP resources to establish a physical presence/desk within each LEP area. • Launch event for Agri-Tech West • Prepare a detailed compilation of information on programmes, resources,	• 4 LEPs • ATW

Project	Reasoning	Actions	Key Stakeholders
		funding, support, networking, etc., at the Agri-Tech West area and UK levels. • Establish working links with existing programmes of business support (e.g. Growth Hubs, Catalysts, local authorities, etc.)	
Applying technology to agriculture	There is a range of technology options available to agriculture, with take-up of the technology varying throughout the sector. Agri-Tech West can take a leading role in encouraging take-up of technology to improve productivity.	• Prepare a programme of regular information events (both physical and web-based) that have the objective of exposing participants to emerging technologies and technology providers. • In concert with other industry organisations (e.g. AHDB, NFU) develop a common platform for dissemination of information and research into emerging agri-tech technology and practices	• FE/HE • ATW • Industry organisations
Strengthening supply chain links	There is a range of supply chain relationships between primary producers and processors in the region, from full control of the processor to contractual and less formal relationships with a network of suppliers. Facilitating the strengthening of these relationships will benefits processors and farmers in the region.	• Provide a go-between for small primary producers to develop supply relationships with processors, cooperatives and markets. • Investigate software/website options for primary producers to promote their products as they are ready to harvest.	• ATW • Industry representatives
Brexit position – strategy, lobbying and guidance	There is substantial uncertainty in the sector as to the implications of Brexit, with issues including access to markets, availability of labour, funding sources to replace EU funding and regulatory changes being unknown at this stage. Agri-Tech West could take a leading role representing the sector in lobbying to the	• Prepare a positioning paper for the UK Government that outlines key items that need to be addressed and clarified for the agri-tech sector and Agri-Tech West's position on behalf of the industry. • Liaise with other industry organisations, particularly agricultural and manufacturing bodies to explore	• ATW • 4 LEPs

Project	Reasoning	Actions	Key Stakeholders
	UK Government and as a source of information and guidance for industry members.	opportunities to present a united position for lobbying.	
Opportunity for New Products and Innovations			
Network of best practice operations	There is a considerable range of leading businesses and practices throughout the Agri-Tech West region. This asset base can be used to promote best practice agriculture, processing and manufacturing. A network of willing and engaged industry representatives should be compiled to showcase best practices in the region.	• Compile a network of leading businesses and operators in the region that would be willing to showcase their operations • Encourage industry operators to visit the network of best practice operations through Agri-Tech West promotional material and events. • Encourage visitations to the research centres and trial farms within the network of FE and HE institutions.	• ATW • FE/HE • Industry representatives
Evaluation of technologies	Understanding of the on-site benefits of new technologies is important to encourage its take-up. An easy to access and understand platform for information on productivity, profitability, usage and environmental benefits will encourage take-up.	• Development of fact sheets setting out the relevance of technological improvements to different sectors, the likely costs and the benefits achieved by adopters.	• ATW • Industry representatives
Sectoral support – dairy, horticulture, food and drink production, advanced manufacturing, genetics, etc.	Once the foundations and profile of Agri-Tech West are firmly established, through the above priority projects, there would be opportunities for more targeted, sectoral projects and support. These would focus on the specific obstacles to growth within each subsector.	• Establish sectoral committees as appropriate. • Sectoral committees to prepare and present a plan for the support and growth of each sector. • Investigate options for a 'business mentoring' programme where start-up/SMEs are paired with established firms/business leaders in the area for support and	• ATW

Project	Reasoning	Actions	Key Stakeholders
Longer Term Options			
Long term option – centres of excellence, pilot plants, model farms, etc.	In the longer term, there may be an opportunity for a dedicated Agri-Tech West centre of excellence, promoting best practice in the industry. This would need to be established as complementary to such facilities within colleges and universities and the network of best practice operations already established.	• Review the asset base within education facilities and the established network of best practice options to identify gaps. • Consult with the agri-tech sector to identify areas of need in terms of demonstration facilities. • Identify a site(s) for such facilities, with it being recommended that any facilities collocate with existing assets (e.g. FE/HE) to minimise costs. • Undertake a feasibility analysis on such facilities, which will examine capital costs, land acquisition, on-going costs, revenue streams and benefits to the industry.	• ATW • FE/HE • 4 LEPs

Source: BE Group and Mickledore

Agri-Tech West Structure

8.13 The Agri-Tech West entity would require some structure to coordinate its strategic direction, oversee specific projects, coordinate funding and provide oversight. However, it is also recognised that there is significant overlap between the strategic direction of Agri-Tech West and the economic development direction of the four LEPs. Therefore, there would need to be agreement as to the relative roles and responsibilities of Agri-Tech West and the LEPs. More roles and responsibilities transferred to Agri-Tech West from the LEPs would require a more structured Agri-Tech West entity.

8.14 The following Table 35 outlines potential structural options for the Agri-Tech West identity. Considerations of the structure of Agri-Tech West include:

- What structure would be most appropriate to address the priority projects listed above?
- How would a pan-LEP identity be governed/overseen?
- What types of organisations would be represented on the board?
- What structure would be required to cover the full scope of the agri-tech industry?
- What structure would be flexible enough to incorporate differing sectoral and area priorities?
- Is collaboration necessary or are the individual strategic directions within the LEPs sufficient to maximise the opportunities in the agri-tech sector?

8.15 From the structures outlined overleaf, it is recommended that Agri-Tech West be formed as a **flexible alliance**. It is considered that this approach is an appropriate balance between attempting to have a consistent and united direction to developing the sector and enabling individual subareas and niche sectors to flourish without a large overarching body that may have several agendas to address.

8.16 Appendix 4 provides an example of an initiative to promote supply chain integration in the agriculture and food processing sector, the Sustainable Agricultural Initiative.

Table 35 – Agri-Tech West Structure Options

Option	Description	Advantages	Disadvantages
Full integration and collaboration	Agri-Tech West is an independent body funded and overseen by the 4 LEPs. Its board consists of representatives of the LEPs, educators/ researchers, farmers and industry. The body assumes the function of the rural and agri-tech sector voice for each LEP. It undertakes networking, business engagement and economic development roles to promote growth in the sector. Projects and support programmes are undertaken as a single, united entity.	• Can be established as a high profile organisation and brand for the sector. • Maximises collaboration opportunities among individual organisations in the sector, including cross-border collaboration. • Pools resources of the 4 LEPs. • Likely to have higher lobbying influence than individual LEPs.	• Agri-Tech West would be another separate organisation in an already fragmented sector. • Board will need to be large to encompass all areas and key sectors. This is likely to lead to an unwieldy body. • Not all areas of agri-tech sector will need to collaborate with, or oversee all other areas. Therefore the body is likely to be inefficient. • Likely to overlap in support functions with other organisations at the national level (e.g. AHDB).
Federated organisation	Agri-Tech West is an independent body funded and overseen by the 4 LEPs. Its board consists of representatives of the LEPs, educators/ researchers, farmers and industry. The body assumes the function of the rural and agri-tech sector voice for each LEP. Within Agri-Tech West there are subsidiary organisations to promote and develop specific components of agri-tech (e.g. dairy, advanced engineering, genetics/breeding, food processing, etc). These branches have separate committees that plan for the growth of their specific area, including a programme of projects and support. Individual committees report to the overarching Agri-Tech West board. LEP involvement within each committee would be dependent on applicability to each region.	• Can be established as a high profile organisation and brand for the sector. • Maximises collaboration opportunities among individual organisations in the sector. Including cross-border collaboration • Pools resources of the 4 LEPs. • Likely to have higher lobbying influence than individual LEPs. • Enables targeted planning for individual sectors. • All LEPs have involvement in the overall Agri-Tech West body, however can choose which subsidiary bodies to participate in, depending on relevance to their area.	• 2 additional layers of boards/committees, which may be an overreach of bureaucracy. • Agri-Tech West would be another separate organisation in an already fragmented sector. • Some inefficiencies in operation of the Agri-Tech West body (including subsidiaries) are likely due to its large number of stakeholders and wide geographic region. • Likely to overlap in support functions with other organisations at the national level (e.g. AHDB).

Option	Description	Advantages	Disadvantages
Flexible alliance	Agri-Tech West is an alliance between the 4 LEPs to share knowledge and strategic direction for the growth of the sector and to collaborate on specific projects on an individual basis as appropriate. Overarching responsibility for agri-tech remains with the individual LEPs. The rural/agri-tech representatives of the LEPs meet regularly (e.g. quarterly) to improve ties between the LEPs and establish opportunities and conduits for collaboration. However, overall planning and implementation of programme of support for agri-tech remains within each LEP. Some administrative support (e.g. project officer) would be required to coordinate common Agri-Tech West programmes/branding/web presence.	• Allows for individual sectors to be supported at a more localised level. • Relatively inexpensive and straightforward to organise and manage. • Is a flexible, adaptable structure. • Promotes collaboration, but only where relevant, which is likely to be more efficient. • Individual areas are able to plan an agri-tech strategy tailored for their region.	• Without a more formal structure and programme, there is the potential for the alliance to disintegrate over time. • Lower brand profile as a unified agri-tech region. • Some opportunities for collaboration may be missed or not maximised.
No collaboration	The Agri-Tech West concept is not proceeded with. Support of agri-tech remains the full responsibility of the 4 LEPs independently.	• No additional cost • No additional bureaucracy • Individual areas are able to plan an agri-tech strategy tailored for their region.	• Opportunities for cross-border collaboration rely upon existing organisational structures and networking relationships between LEPs. • No improvement over the “baseline” support for the agri-tech sector.

Source: BE Group and Mickledore

8.17 The LEPs and the Agri-Tech West entity will need to determine which of the recommended priority projects should be approved and enacted. Under the flexible alliance approach, Agri-Tech West can be initiated as a programme of support and resourcing with a modest outlay from the LEPs. The flexible alliance approach allows for an incremental increase in the commitment of resources as momentum for Agri-Tech West grows. This, conversely, allows for only a modest level of resources to be lost if policy or other considerations change and Agri-Tech West is not continued.

8.18 The table below summarises the approach to establishing Agri-Tech West under the flexible alliance model.

Table 36 – Flexible Alliance Model

Topic	Approach
Broad Objective	To improve the productivity of the agriculture and food processing industries in the area.
Structure	A small industry focused initiative with a steering group and modest executive function.
Activities	To build a participation base of businesses / organisations across the sector and co-ordinate the completion of actions agreed by the steering group. The initial activities are suggested as those in this report but the steering group will make this finalise this programme.
Governance	Initially the steering group represents the LEPs and industry. The steering group agrees the actions required and meets quarterly. Over time the initiative would ideally become business led.
Resources	A project officer plus a support staff member but with an intention that participating businesses / organisations contribute to the actions identified.
Funding	Initially supported by the LEPs (perhaps through a European Agricultural Fund for Rural Development (EAFRD) bid) the initiative could move towards a membership fee based model with the provision of some chargeable activities (events, training, etc.).
Measurement of success	Number of active and engaged businesses / organisations.

Source: Mickledore

8.19 This model would allow the LEPs to pursue specific projects in the agri-tech sector independently if they so choose.

8.20 There would be opportunities to strengthen the relationship over time between the four LEPs in regards to agri-tech. While it is recommended that the structure for Agri-Tech West is a flexible alliance, such an approach should be monitored and reviewed intermittently, with the potential to increase the integration and formalisation of the

relationship. Furthermore, upon establishment of Agri-Tech West as a brand and programme of support, it may be appropriate to increase the independence of Agri-Tech West from the LEPs, thereby moving towards a more fully integrated or federated organisation, with more control of the agri-tech programme devolved from the LEPs to Agri-Tech West.

Asks of UK Government

8.21 Given the support for Agri-Tech West in the sector in the area, and the commitment to take the Agri-Tech West concept forward, it is appropriate to consider the requests from the UK Government that would be required to enable Agri-Tech West to be established.

8.22 The light touch, flexible alliance model can involve only a relatively modest commitment of resources to fund operations and marketing of the programme. Commitments in the short term may be resourced from current LEP funds. However, it would be necessary to involve and utilise the resources of the UK Government in the continued roll-out of the Agri-Tech West programme.

8.23 Initially it would be appropriate to inform UK Government of the Agri-Tech West proposal itself and the intents of the LEPs to proceed. A clear statement of the Agri-Tech West concept and intended programme should be prepared and provided to central government.

8.24 A proposal for specific requests for funding should be prepared, including:

- Additional capacity funding to create the Agri-Tech West identity required over and above LEP commitments, presumably using EAFRD and Central Government funds to match.
- Sufficient funds to create a lease finance model to allow the mid ranking businesses the ability to fund technology which will save money – but which requires upfront capital which is difficult to fund. This should be a recycling fund virtually in-perpetuity.
- Funding for a centre for the dissemination of technology to users – this appears to be the link missing in the current research and development approach. This could include the devolution of part of the Agri-Tech Catalyst funding to Agri-Tech West to allocate to projects specifically in the area. It is noted that the devolution of funding under the current round is unlikely to occur as applications are now open, although there is a tight window of opportunity as applications do not close until February 2017 (full registration).

8.25 The asks are focussed on raising productivity and growth in the agri-tech sector and reducing on-going requirements for subsidies – that is, an investment to reduce expenditure in the future. This should be the key selling point of the proposal to government.

9.0 CONCLUSION

9.1 It is the recommendation of this scoping study that the four LEPs proceed with Agri-Tech West to support the sector. It is further recommended that the overall structure of Agri-Tech West is as a flexible alliance between the four LEPs. The initial focus of Agri-Tech West should be to establish itself as a facilitator between the differing sectors of agri-tech and to be the "go to" location for information and direction in agri-tech in the region.

9.2 Agri-tech is its broad form has a solid base in the Agri-Tech West region, with a diverse rural sector, a variety of small and large food processors, an established engineering sector and a network of land-based and/or engineering education institutions. There are subarea differences and niches throughout the Agri-Tech West area, as well as several commonalities.

9.3 The asset base review revealed the sectoral strengths in each county, including the supply chain links. Rural strengths in certain commodities were complemented by similar strengths in the comparable food and beverage processing in the county. For example, Cheshire's strength in dairy farming was complemented by a strength in the manufacture of dairy products. Similarly, Herefordshire's strength in poultry and cattle was reflected in its meat processing strength. Clearly, the interrelationships between farm and processing are established and important for the region's economy.

9.4 The West Midlands is an important engineering centre with a broad base. There are established businesses serving the technical needs of the rural sector. However, the engineering base in the region is far broader than just that applied to agricultural machinery. There are opportunities for engineering firms in the region to apply their skills to the agri-tech sector. A higher profile of the technical needs and applications for agriculture and processing through an Agri-Tech West structure will help to take advantage of this engineering base.

9.5 The education sector is a key strength of the region and provides a network of sites across the region to continue to build the relationships between different parts of the agri-tech industry.

APPENDICES

Appendix 1

Food Processing and Technology Companies

APPENDIX 1 - Food and Beverage Processing and Technology Companies, Agri-Tech West Area

Company name	Town	County	GUO - Name			Number of employees Last avail. yr
CHESHIRE AND WARRINGTON LEP						
Frank Roberts & Sons Limited	Northwich	Cheshire	FRANK ROBERTS & SONS LIMITED		GB	856
NWF Group PLC	Nantwich	Cheshire	NWF GROUP PLC		GB	840
Tata Chemicals Magadi Limited	Northwich	Cheshire	TATA CHEMICALS LIMITED		IN	551
CF Fertilisers UK Group Limited	Chester	Cheshire	CF INDUSTRIES HOLDINGS, INC.		US	546
Wright's Pies (Shelton) Limited	Crewe	Cheshire	WRIGHT'S PIES (SHELTON) LIMITED		GB	489
Nalco Limited	Northwich	Cheshire	ECOLAB INC		US	485
North of England Zoological Society (The)	Chester	Cheshire	NORTH OF ENGLAND ZOOLOGICAL SOCIETY (THE)		GB	428
Morning Foods,Limited	Crewe	Cheshire	MORNING FOODS,LIMITED		GB	360
Glanbia Cheese Limited	Northwich	Cheshire	GLANBIA PUBLIC LIMITED COMPANY		IE	359
Arthur Chatwin Limited	Nantwich	Cheshire	ARTHUR CHATWIN LIMITED		GB	278
Meadow Foods (Holdings) Limited	Chester	Cheshire	MEADOW FOODS (HOLDINGS) LIMITED		GB	275
Bibendum PLB Group Limited	Crewe	Cheshire	BIBENDUM PLB GROUP LIMITED		GB	240
PQ Silicas UK Limited	Warrington	Cheshire	INEOS AG		CH	236
Tithebarn Limited	Winsford	Cheshire	EQUIOM (JERSEY) LTD		n.a.	190
E.Park & Sons Limited	Macclesfield	Cheshire	E.PARK & SONS LIMITED		GB	184
Cogent Breeding Limited	Chester	Cheshire	WHEATSHEAF INVESTMENTS LIMITED		GB	165
Dick White Referrals Limited	Wilmslow	Cheshire	PETS AT HOME GROUP PLC		GB	164
Oakes Millers Limited	Nantwich	Cheshire	OAKES MILLERS LIMITED		GB	157
Oliver Valves Limited	Knutsford	Cheshire				155
Massey Bros (Feeds) Ltd.	Crewe	Cheshire	MASSEY BROS (FEEDS) LTD.		GB	151
Quintessential Brands UK Holdings Limited	Warrington	Cheshire	QUINTESSENTIAL BRANDS UK HOLDINGS LIMITED		GB	150
Dairygold Food Ingredients (UK) Limited	Crewe	Cheshire	DAIRYGOLD CO-OP SOCIETY LIMITED		IE	149
Joseph Heler Limited	Nantwich	Cheshire				143
Terberg Matec UK Limited	Warrington	Cheshire	STICHTING ADMINISTRATIEKANTOOR TERBERG	GROUP B.V.	NL	138
Trouw (UK) Limited	Northwich	Cheshire	SHV HOLDINGS NV		CW	137
The Fayrefield Group Limited	Crewe	Cheshire	THE FAYREFIELD GROUP LIMITED		GB	133
Forresters of Cheshire Limited	Frodsham	Cheshire	FORRESTERS OF CHESHIRE LIMITED		GB	132
MHI Vestas Offshore Wind UK Ltd	Warrington	Cheshire	VESTAS WIND SYSTEMS A/S		DK	124
John Morley (Importers) Limited	Congleton	Cheshire	J M HOLDINGS LIMITED		GB	114
T-T Pumps Limited	Crewe	Cheshire	T-T PUMPS LIMITED		GB	108
Ungerer Limited	Chester	Cheshire	UNGERER INDUSTRIES INC		US	105
Solvay Interox Limited	Warrington	Cheshire	SOLVAY SA		BE	104
Thomas Hardy Holdings Limited	Warrington	Cheshire	THOMAS HARDY HOLDINGS LIMITED		GB	103
Oliver Valvetek Limited	Knutsford	Cheshire	OLIVER VALVETEK LIMITED		GB	95
Stirling Lloyd PLC	Knutsford	Cheshire	STIRLING LLOYD PLC		GB	92
Goodlife Foods Limited	Warrington	Cheshire	W.O.&J.WILSON LIMITED		GB	88
Frostall Limited	Warrington	Cheshire	FROSTALL LIMITED		GB	83
Spanset Limited	Middlewich	Cheshire	SPANSET INTER AG		CH	80
Columbus Mckinnon Corporation Limited	Chester	Cheshire	COLUMBUS MCKINNON CORP		US	73
Northwest Surgeons Limited	Wilmslow	Cheshire	PETS AT HOME GROUP PLC		GB	73
A.P.S. Salads Limited	Wilmslow	Cheshire	A PEARSON & SONS (1949) LLP		GB	60
Werfen Limited	Warrington	Cheshire	WERFENLIFE SA.		ES	60
UPL Europe Ltd	Warrington	Cheshire	UPL LTD		IN	58
J. S. Bailey Limited	Nantwich	Cheshire	J. S. BAILEY LIMITED		GB	58
F.J. Need (Foods) Limited	Nantwich	Cheshire	F.J. NEED (FOODS) LIMITED		GB	56
Brupac Drinks & Machine Company Ltd	Crewe	Cheshire				45
Oliver Twinsafe Valves Limited	Knutsford	Cheshire	TRUSTEES OF MARK RODERICK OLIVER TRUST		n.a.	42
Brevini U.K. Limited	Warrington	Cheshire	BREVINI GROUP S.P.A.		IT	40
Didsbury Ventures Limited	Wilmslow	Cheshire	DIDSBURY VENTURES LIMITED		GB	35

D. Wise Limited	Malpas	Cheshire	D. WISE LIMITED	GB	34
Thomas Hardy Burtonwood Limited	Warrington	Cheshire	BURTONWOOD BREWERY PLC	n.a.	27
Barry Callebaut Beverages UK Ltd	Chester	Cheshire	JACOBS HOLDING AG	CH	25
Delamere Dairy Holdings Limited	Knutsford	Cheshire	DELAMERE DAIRY HOLDINGS LIMITED	GB	23
Hammonds of Knutsford PLC	Knutsford	Cheshire			19
Abbeyvet Export LLP	Northwich	Cheshire	ABBEYVET EXPORT LLP	GB	11
Mercian Limited	Macclesfield	Cheshire			7
Betchton Limited	Sandbach	Cheshire	BETCHTON LIMITED	GB	7
Gelita UK Limited	Crewe	Cheshire	GELITA AG	DE	4
Brevini Fluid Power UK Ltd.	Warrington	Cheshire	BREVINI GROUP S.P.A.	IT	4
Roant Precision Engineering Limited	Warrington	Cheshire			3
Innospec Limited	Ellesmere Port	Merseyside	INNOSPEC INC.	US	442
Uren Food Group Limited	Neston	Merseyside	WOOD PARK FOODS LIMITED	GB	235
Cook Compression Limited	Ellesmere Port	Merseyside	DOVER CORP	US	102
SPL International Limited	Ellesmere Port	Merseyside			72
The MARCHES LEP					
Sun Valley Foods Limited	Hereford	Herefordshire	CARGILL INC	US	2,177
S & A Group Holdings Limited	Hereford	Herefordshire	S & A GROUP HOLDINGS LIMITED	GB	715
H.Weston & Sons Limited	Ledbury	Herefordshire	H.WESTON & SONS LIMITED	GB	219
Chase Products Limited	Hereford	Herefordshire	CHASE PRODUCTS LIMITED	GB	175
Tyrrells Potato Crisps Limited	Leominster	Herefordshire	CRISPS HOLDINGS LTD	n.a.	174
Wyevale Holdings Limited	Hereford	Herefordshire	WYEVALE HOLDINGS LIMITED	GB	156
Universal Beverages Limited	Ledbury	Herefordshire	HEINEKEN NV	NL	111
Glennans Ltd	Leominster	Herefordshire	CRISPS HOLDINGS LTD	n.a.	89
WYE Valley Brewery Limited	Bromyard	Herefordshire	WYE VALLEY BREWERY HOLDINGS LIMITED	GB	59
Quest Vitamins Limited	Hereford	Herefordshire	QUINTA CONCEPTS LTD	GI	56
Micron Sprayers Limited	Bromyard	Herefordshire	MICRON SPRAYERS LIMITED	GB	48
Hereford Contract Canning (HCC) Limited	Hereford	Herefordshire	HEREFORD CONTRACT CANNING (HCC) LIMITED	GB	43
Bevisol Limited	Ledbury	Herefordshire			39
Anglo Beef Processors UK	Shrewsbury	Shropshire	ABP FOOD GROUP UNLIMITED	GB	1,994
LAF Holdings Limited	Oswestry	Shropshire	LAF HOLDINGS LIMITED	GB	681
Ricoh UK Products Limited	Telford	Shropshire	RICOH CO LTD	JP	648
R J Fullwood And Bland Limited	Ellesmere	Shropshire	STICHTING ADMINISTRATIEKANTOOR VERDER INTERNATIONAL	NL	594
Zwanenberg Food UK Limited	Shrewsbury	Shropshire	ADANS HOLDING N.V.	NL	524
Magna Specialist Confectioners Limited	Telford	Shropshire			375
Caterpillar Shrewsbury Limited	Shrewsbury	Shropshire	CATERPILLAR INC	US	264
P D M Produce (U.K.) Limited	Newport	Shropshire	P D M PRODUCE (U.K.) LIMITED	GB	236
TM Telford Dairy Limited	Market Drayton	Shropshire	T.M. DAIRY (UK HOLDING) SARL	GB	187
Oaklands Farm Eggs Limited	Telford	Shropshire	OAKLANDS FARM EGGS LIMITED	GB	183
C J Wildbird Foods Limited	Shrewsbury	Shropshire	C J WILDBIRD FOODS LIMITED	GB	163
Pickstock Telford Limited	Oswestry	Shropshire			139
Single Source Limited	Telford	Shropshire	SÜDDEUTSCHE ZUCKERRÜBENVERWERTUNGS-GENOSSENSCHAFT EG	DE	136
Fabdec Holdings Limited	Ellesmere	Shropshire	FABDEC HOLDINGS LIMITED	GB	115
Evolution Foods Ltd	Telford	Shropshire	EVOLUTION FOODS LTD	GB	105
Tanners (Shrewsbury) Limited	Shrewsbury	Shropshire	TANNERS (SHREWSBURY) LIMITED	GB	103
Busch (UK) Limited	Telford	Shropshire	BUSCH GBR	DE	81
The Cheese Warehouse Limited	Whitchurch	Shropshire	IRISH DAIRY BOARD CO-OPERATIVE LTD	IE	78
Belton Cheese Limited	Whitchurch	Shropshire	BELTON FARM GROUP LIMITED	GB	78
Euro Quality Lambs Limited	Craven Arms	Shropshire	HALAL BRANDS LIMITED	GB	75
Edgmond Foods Limited	Newport	Shropshire	EDGMOND FOODS LIMITED	GB	73
Busch GVT Limited	Telford	Shropshire	BUSCH GBR	DE	67
Jupiter Marketing Limited	Newport	Shropshire			59
Filtermist International Limited	Telford	Shropshire	MELKER SCHÖRLING TJÄNSTE AB	SE	56

Kuhn Farm Machinery(U.K.)Limited	Telford	Shropshire	BUCHER INDUSTRIES AG	CH	29
Fruesh Limited	Shifnal	Shropshire	ALLFRESCH GROUP LTD	GB	20
Haulotte UK Limited	Telford	Shropshire	SOLEM	FR	17
Scan Coin Technology Limited	Telford	Shropshire	SUZO HAPP GROUP	US	14
Adrian Marsh Limited	Market Drayton	Shropshire	ADRIAN MARSH LIMITED	GB	7
Ampacet Distribution UK Limited	Telford	Shropshire			4
Severn Gorge Countryside Trust	Telford	Shropshire			4
Oswestry And District Agricultural Society	Oswestry	Shropshire			4
Shropshire And West Midlands Agricultural Society	Shrewsbury	Shropshire			1
David Austin Roses Limited	Wolverhampton	West Midlands	DAVID AUSTIN ROSES LIMITED	GB	207
Boningale Limited	Wolverhampton	West Midlands	BONINGALE LIMITED	GB	69
STOKE-ON-TRENT AND STAFFORDSHIRE LEP					
Molson Coors Brewing Company (UK) Limited	Burton-On-Trent	Staffordshire	MOLSON COORS BREWING COMPANY	US	1,997
Goodwin PLC	Stoke-On-Trent	Staffordshire	GOODWIN PLC	GB	1,137
Ornua Foods UK Limited	Leek	Staffordshire	IRISH DAIRY BOARD CO-OPERATIVE LTD	IE	675
National Veterinary Services Limited	Stoke-On-Trent	Staffordshire	PATTERSON COMPANIES, INC.	US	511
Norgren Limited	Lichfield	Staffordshire	IMI PLC	GB	408
Florette UK + Ireland Limited	Lichfield	Staffordshire	SOCIETE COOPERATIVE AGRICOLE ET AGRO-ALIMENTAIRE AGRIAL	FR	403
JCB Transmissions	Uttoxeter	Staffordshire	GLOBAL ENGINEERING SERVICES NV	NL	392
Knighton Foods Limited	Stafford	Staffordshire	PREMIER FOODS PLC	GB	350
G.H.B. (Holding) Limited	Burton-On-Trent	Staffordshire	G.H.B. (HOLDING) LIMITED	GB	306
Salads To Go Limited	Lichfield	Staffordshire	FLORETTE UK & IRELAND LTD	n.a.	255
JCB Power Systems Limited	Uttoxeter	Staffordshire	GLOBAL ENGINEERING SERVICES NV	NL	233
John Pointon & Sons Limited	Leek	Staffordshire	JCM GROUP HOLDINGS (UK) LIMITED	GB	224
James T Blakeman & CO (Holdings) Limited	Newcastle	Staffordshire	JAMES T BLAKEMAN & CO (HOLDINGS) LIMITED	GB	192
MCL Group Industries Ltd	Stoke-On-Trent	Staffordshire	MCL GROUP INDUSTRIES LTD	GB	162
Rumenco Limited	Burton-On-Trent	Staffordshire	RUMENCO HOLDINGS LIMITED	GB	159
Freshview Foods Limited	Newcastle	Staffordshire			155
Cottage Delight Limited	Leek	Staffordshire	COTTAGE DELIGHT PROPERTIES LIMITED	GB	149
JCB Landpower Ltd.	Uttoxeter	Staffordshire	GLOBAL ENGINEERING SERVICES NV	NL	131
WJP Holdings Limited	Lichfield	Staffordshire	WJP HOLDINGS LIMITED	GB	109
Staffordshire Meat Packers Limited	Stoke-On-Trent	Staffordshire	STAFFORDSHIRE MEAT PACKERS LIMITED	GB	108
Tennants Fine Chemicals Limited	Leek	Staffordshire	TENNANTS CONSOLIDATED LIMITED	GB	97
Ornua Nutrition Ingredients UK Limited	Leek	Staffordshire	IRISH DAIRY BOARD CO-OPERATIVE LTD	IE	84
Excalibur Trading Company Limited	Stoke-On-Trent	Staffordshire	EXCALIBUR TRADING COMPANY LIMITED	GB	82
Esterchem Limited	Leek	Staffordshire			71
James M.Brown Limited	Stoke-On-Trent	Staffordshire	TENNANTS (IT) INVESTMENTS LTD	n.a.	70
Wells Farm Dairy Limited	Stafford	Staffordshire			59
Ladymoor Foods Limited	Leek	Staffordshire	LADYMOOR FOODS LIMITED	GB	57
First Choice Holdings Limited	Burton-On-Trent	Staffordshire	FIRST CHOICE HOLDINGS LIMITED	GB	54
Celebration Holdings Limited	Burton-On-Trent	Staffordshire	CELEBRATION HOLDINGS LIMITED	GB	49
Polynt UK Limited	Leek	Staffordshire	INVESTINDUSTRIAL III, LP	GB	43
Phytone Limited	Burton-On-Trent	Staffordshire	FMC CORP	US	40
Staffordshire Hydraulic Services Limited	Stoke-On-Trent	Staffordshire	GRACO INC	US	38
Andritz Limited	Newcastle	Staffordshire	ANDRITZ AG	AT	37
Roxane UK Limited	Lichfield	Staffordshire	NEPTUNE SA	FR	35
Ferro (Great Britain) Limited	Stoke-On-Trent	Staffordshire	FHCI LIMITED	IE	32
R & R W Bartlett Limited	Lichfield	Staffordshire	R & R W BARTLETT LIMITED	GB	31
Keeling & Walker,Limited	Stoke-On-Trent	Staffordshire	AMCO INVESTMENTS LIMITED	GB	25
Miller Weblift Limited	Leek	Staffordshire	COMITEX HOLDING N.V.	n.a.	20
Baird Foods Limited	Burton-On-Trent	Staffordshire			10
Border Collie Trust (Great Britain)	Rugeley	Staffordshire			8
Wootton Organic Wholesale Ltd.	Uttoxeter	Staffordshire	GLOBAL ENGINEERING SERVICES NV	NL	6

Cobra Beer Partnership Limited	Burton-On-Trent	Staffordshire			5
Ornua Butter Trading UK Limited	Leek	Staffordshire	IRISH DAIRY BOARD CO-OPERATIVE LTD	IE	3
Soco System (U.K.) Limited	Stoke-On-Trent	Staffordshire	SOCO INVENT A/S	DK	2
Sinclair Collis Limited	Wolverhampton	West Midlands	IMPERIAL BRANDS PLC	GB	88
S I Group - UK, Ltd	Wolverhampton	West Midlands	SI GROUP INC	US	71
Fives North American Combustion UK Ltd	Wolverhampton	West Midlands	NOVAFIVES	FR	40
Fives Solios Limited	Wolverhampton	West Midlands	NOVAFIVES	FR	33
WORCESTERSHIRE LEP					
K.F. Investments Limited	Evesham	Worcestershire	K.F. INVESTMENTS LIMITED	GB	1,813
Inter Rested Limited	Droitwich	Worcestershire	INTER RESTED LIMITED	GB	678
Seafresh Group (Holdings) Limited	Redditch	Worcestershire	SEAFRESH INDUSTRY PCL	TH	323
CP Foods (UK) Limited	Kidderminster	Worcestershire	CHAROEN POKPHAND FOODS PCL	TH	242
Springhill Farms (Pershore) Limited	Evesham	Worcestershire	MAPP HOLDINGS LIMITED	GB	204
Dawn Foods Limited	Evesham	Worcestershire	DAWN FOODS COÖPERATIEF U.A.	NL	190
Allen Gearing Solutions Limited	Pershore	Worcestershire	GENERAL ELECTRIC COMPANY	US	162
Barton Firtop Engineering CO Limited	Bromsgrove	Worcestershire	BARTON FIRTOP ENGINEERING CO LIMITED	GB	155
Ethosenergy Light Turbines Limited	Worcester	Worcestershire	JOHN WOOD GROUP P.L.C.	GB	137
Conveyor Units Limited	Stourport-On-Severn	Worcestershire	NEW CONVEYOR LIMITED	GB	127
Ferryfast Produce Limited	Pershore	Worcestershire	HOB FARMS LIMITED	GB	126
Ferryfast Holdings Limited	Pershore	Worcestershire			126
Articulated Lift Trucks Limited	Redditch	Worcestershire	HC1261	n.a.	115
Huegli UK Ltd.	Redditch	Worcestershire	DR. A. STOFFEL HOLDING AG	CH	111
Red Star Growers Limited	Pershore	Worcestershire	RED STAR GROWERS LIMITED	GB	110
DLF Seeds Ltd.	Worcester	Worcestershire	DANSK LANDBRUGS FRØSELSKAB AMBA	DK	94
Wellpak Group Limited	Evesham	Worcestershire	WELLPAK GROUP LIMITED	GB	62
Frank P. Matthews (Holdings) Limited	Tenbury Wells	Worcestershire	FRANK P. MATTHEWS (HOLDINGS) LIMITED	GB	60
GKN Hybrid Power Limited	Redditch	Worcestershire	GKN PLC	GB	59
Eurofresh Evesham Limited	Evesham	Worcestershire			55
Stirchley Bacon CO. Limited	Redditch	Worcestershire	M & M WALSHE HOLDINGS LIMITED	IE	52
Stirchley Bacon Holdings Limited	Redditch	Worcestershire	STIRCHLEY BACON HOLDINGS LIMITED	GB	52
Lallemand Animal Nutrition UK Limited	Malvern	Worcestershire	PLACEMENTS LALLEMAND INC	CA	52
I.P.T. Technology Limited	Droitwich	Worcestershire	INTEGRATED ECO TECHNOLOGIES LIMITED	GB	47
Tollblend Limited	Worcester	Worcestershire	TOLLBLEND LIMITED	GB	38
Verri Berri Limited	Bromsgrove	Worcestershire	GLOBAL PACIFIC FOOD GROUP LIMITED	BS	29
Global Pacific Processors UK Limited	Bromsgrove	Worcestershire	GLOBAL PACIFIC FOOD GROUP LIMITED	BS	29
MSF Welland Valley Feeds Limited	Evesham	Worcestershire	COUNTRYWIDE FARMERS PLC.	GB	27
Wellhopped Ltd	Malvern	Worcestershire	WELLHOPPED LTD	GB	26
Samsara Limited	Evesham	Worcestershire	SAMSARA LIMITED	GB	23
Fine Agrochemicals Limited	Worcester	Worcestershire	DE SANGOSSE PARTICIPATION II	FR	19
Verseveld PLC	Worcester	Worcestershire	VERSEVELD PLC	GB	5
Food Trac Limited	Malvern	Worcestershire	WESTBRIDGE FOOD GROUP LIMITED	GB	3
Prochaete Innovations Limited	Redditch	Worcestershire	SEAFRESH INDUSTRY PCL	TH	3

SOURCE: Companies House

Appendix 2

List of Consultees

Appendix 2 – Consultees

Industry Representatives
Agriculture and Horticulture Development Board
Country Land and Business Association
Met Office
National Farmers Union – North West
National Farmers Union – West Midlands
Tenant Farmers Association

Education
Harper Adams University
North West Food Research Development Centre – University of Chester
Reaseheath College
South Staffordshire College – Rodbaston
University of Keele
Warwickshire College – Pershore

Local Enterprise Partnerships
Cheshire and Warrington LEP
Stoke-on-Trent and Staffordshire LEP
The Marches LEP
Worcestershire LEP

Key Businesses
Anglo Beef Processors
Aviagen Turkeys
Cargill
Cholmondeley Estate
Dairy Crest
Dawn Meats
Ferryfast
Florette Farm
First Milk
Goodlife
IMT International
KF Investments (Kanes Foods)
Leavesley Group
Mercian Ltd
Muller Foods
Springhill Farm
Tulip Foods
Tyrells Crisps

Appendix 3

Consultation Topics

Appendix 3 – Consultation Topics

Consultations were undertaken through one-on-one conversations, either by telephone or face-to-face meetings. The consultees were provided with a brief introduction into the study at the time of setting up the meeting, including providing details on the clients, the consultants, the objectives of the study, the intended coverage area and the objectives of the consultations.

The consultations were not conducted in a strict question and answer format, rather it was a semi-structured conversation around relevant topics. The points below were used as a loose guide for the consultants, although not all points were relevant to every consultee.

About Business
Prompt for information about business
What type of business?
Number of employees? How has this changed?
Locations?
Why located here?

Suppliers/Markets
Downstream/upstream links
Rural suppliers – who and locations?
Importance of being close to suppliers?
Where sell to?
How have you established new markets in the past – assistance from UKTI, AHDB, others, independently?

Technology
How has technology changed in last 5 years in your sector?
Do you consider your firm as a leader in agri-tech?
How do you find out about changes in technology in your sector? (use of centres of excellence, model farms, etc)
How has changing technology use in your business, changed your operations – efficiency, quality, staff levels, skills levels, premises size?
Does your firm have an R&D department? Do you commission research with universities, colleges, independent research organisations?
Have you used innovation centres or research centres at universities or colleges?
Barriers to new technology

Skills
Where do you send employees that need further training? On site or external?
Apprenticeships
Graduate programmes
Skills gaps – what type of workers are most hard to acquire?
Change in skills needs?

Growth/issues in the sector
What are the key opportunities for growth in the sector?
What are the key obstacles in the sector?
Examples of recent challenges

What level of assistance would your firm require in order to overcome the obstacles and realise the opportunities?

Brexit
Impacts on businesses – positive and negative
What role could an industry body provide in transition?

Agri-Tech West
Need/usefulness of an organisation to represent agri-tech in this region
What sort of priorities should ATW have?

- Lobbying
- Funding
- Assisting with sourcing funding from elsewhere
- Information sharing
- Centre of excellence to showcase technology
- Model farming, incorporating best practice
- Forum for linking research to industry
- Forum for start-ups to access services, assistance
- Business services
- Policy influencing/setting

Appendix 4

Sustainable Agricultural Initiative

Appendix 4 – Sustainable Agricultural Initiative

1. Throughout this report one of the central issues has been how useful technology is recognised and becomes widely established and embedded by a wide variety of users when many farmers are both short of time to come across / implement the technology or short of funding / unclear of the returns available. This is particularly true of the smaller individual farmers.
2. It is also recognised that in some instances farms have worked together effectively and where this is the case there appears to be a greater level of implementation of a common approach. Across the area there are examples of food processor led supply chains, supply chains led by one more dominant supplier, supply chains under a common branding or cooperatives working together.
3. One of the findings of this report is that cost pressures, technology adaption and uncertainty following the EU referendum are all factors which are likely to create further consolidation in farming and a reduction in the number of smaller players.
4. The supply chain / other alliances are initiatives which can slow that consolidation by ensuring that a greater number of the smaller players get an understanding and an incentive to make changes. The supply chain can give contractual certainty to some farmers but at the same time enforce some of the technological changes as a pre-requisite for membership.
5. This is why the primary focus of the study has been on the dissemination of information to both the farmers / producers and also the innovators. If that work can be focused around supply chains it is likely that the outcome will be more effective.
6. One example of a supplier initiative which sets out good practice and in turn means that farmers then have the opportunity to supply some of the global food leaders is the SAI platform. This is a grouping of leading food players who have defined what they expect from suppliers in terms of standards – both environmental, but also in terms of the levels of cost and yield linked to technology. Part of the solution is in sharing the best practice findings of others.
7. Awareness raising of supply chain initiatives such as this one is a core recommendation.