# UK Agri-Tech Centres

**Briefing for UK Parliament Scottish Affairs Committee**  
12 April 2019

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UK Agri-Tech Centres: Briefing for UK Parliament Scottish Affairs Committee

1. Background to UK Agri-Tech Centres

The four UK Agri-Tech Centres of Agricultural Innovation were established through a unique collaboration between UK Government, academia and industry to drive greater efficiency, resilience and wealth across the agri-food sector. A £90 million investment from the UK’s strategic innovation agency, Innovate UK, is enabling the four Centres to harness leading UK research and expertise, build new infrastructure and drive forward innovation.

Together, the four Centres aim to:

- Join-up existing excellence and invest in new innovative resources and research that don’t exist elsewhere
- Address challenges that no one part of the sector can address alone
- Open up opportunities for transformational change
- Position the UK as a global leader in sustainable food production

1.1 Agri-EPI Centre is accelerating the adoption of precision agriculture and engineering technologies to boost productivity across the whole agri-food chain. It does this by exploring how to optimise performance of the highly complex agricultural production and processing systems. The Centre provides world-class R&D facilities, connects academia and industry and progresses next generation technologies such as sensing, imaging and robotics to create a new understanding of production efficiency. www.agri-epicentre.com

1.2 Agrimetrics’s mission is to catalyse the whole agri-food sector through the power of big data and advanced analytics. It has created the world’s first big data platform dedicated to the agri-food sector and has pioneered the use of new web technologies in this sector so its data platform can connect disparate data and convert them into valuable insights. Data that would otherwise have been impossible or prohibitively expensive to access can now be integrated with a researcher’s or company’s own data for analytical purposes. This includes earth observation imagery and data which Agrimetrics delivers to the market for uses such as crop growth modelling. www.agrimetrics.co.uk

1.3 CIEL (Centre for Innovation Excellence in Livestock) works with 12 of the UK’s leading livestock research institutions and an active network of industry members spanning the entire food supply chain, from farmers to processors and retailers. CIEL aims to use these collaborative partnerships to enhance and accelerate business-led innovation, as well as inspire and identify opportunities that could lead to the development of new products, services and techniques that can benefit the entire agri-food chain. www.CIELivestock.co.uk
1.4 **Crop Health and Protection (CHAP)** works to help ensure our sector can feed a growing global population, nutritiously, sustainably and securely. CHAP acts as a nexus between government, researchers and industry and builds innovation networks to identify and accelerate transformational solutions to drive step changes in sustainable crop productivity. It provides open access, state-of-the-art facilities run by world class experts that provide contract research capabilities and technology demonstrators dedicated to transforming crop productivity focused in the following key areas: Integrated Pest Management, Crop Protection (biopesticide development), Soil Health, Digital Farming Systems, Vertical Farming systems, Greenhouse Technology, Genetic & Breeding Technology. CHAP aims to unlock the potential of farming by improving productivity by tackling such issues as, soil erosion, adapting to climate change, managing the impact of pests and disease, depleting natural resources and providing environmentally friendly solutions. [www.chap-solutions.co.uk](http://www.chap-solutions.co.uk)

2. **Agri-Tech Centre facilities in Scotland**

2.1 **Agri-EPI Centre**

Agri-EPI’s Northern Hub (one of four UK hubs), based on the outskirts of Edinburgh, is home to operations staff and the Scottish based technical and projects teams. In late 2019 the Hub will relocate to a new building near The Roslin Institute, shared with CIEL and the University of Edinburgh, providing R&D facilities, business incubation units and meeting space for members and partners.

In partnership with Scotland’s Rural College (SRUC), Agri-EPI has opened a state-of-the art calf-rearing facility at the Crichton Royal Dairy Farm in Dumfries.

At the University of Edinburgh, Agri-EPI has established a unique early growth aquaculture facility which will host research into disease challenges, genomic improvements and the use of precision technology.

In addition, 10 of Agri-EPI’s 28 ‘satellite farms’ are based in Scotland, covering dairy, beef, sheep, arable, pigs and poultry. The purpose of the satellite farm network is to allow new precision farming technologies and techniques to be developed, trialled and shared in real-life, commercial farming settings.

2.2. **Agrimetrics**

Agrimetrics, being a technology business, is “in the cloud” and does not invest in large capital facilities. There were some smaller scale initial investments, including at SRUC, which is one of Agrimetrics’s founding partners, where Agrimetrics has installed computer servers for use on joint data-projects and refurbished and equipped a room as a state-of-the-art video broadcast and recording studio.

2.3 **CIEL**

The total capital investment in Scotland by CIEL, through Innovate UK funding, is £15.6m - spent between 2016 and 2019. Partner Institutions have match funded this, as a minimum, so the total financial investment in Scotland will be well over £30m.
Other benefits to Scotland have been new, specialist roles created using these research facilities and industry investment alongside to benefit from the capability delivered. An example of this is a new poultry partner facility at the Bush Estate near Edinburgh, next to the SRUC Avian Science Research Centre.

2.3.1 CIEL facilities with SRUC:

- **Ruminants**
  - **Mobile Sheep Feed Intake Facility**: Precision assessment of individual sheep intake, to assess variation between sheep and enable selection for feed efficiency, leading to increased efficiency in terms of lamb produced per unit of grass eaten. Capability can be employed in ram breeding flocks around the UK.
  - **Cattle Feed Intake Feeders**: Precision measurement of cattle feed intake, allowing for individual intake measurements to support feed efficiency research.

- **Monogastrics**
  - **Free Farrowing (High Welfare) Sow Unit**: A new facility ideal for studying sow and piglet behaviour and performance. The innovative design delivers improved welfare without compromising productivity, offering significant benefits for sow welfare by allowing performance of natural behaviours that enhance mothering ability and reduce piglet mortality. This provides a more dynamic environment for the piglets, improving early life experiences, which can improve health and growth.
  - **Flexible Flooring Pig Unit**: An upgraded facility providing flexible flooring and penning allowing the user to have different configurations of floor-type and pen size. It is ideal for focused trials tackling both fundamental and industry-relevant research challenges.
  - **Avian Science Research Centre**: Launching June 2019, the ASRC will be the largest capacity research facility of its kind in the UK, enabling research for avian nutrition, behaviour and welfare, product quality and safety & health. It will be the only poultry research facility in the UK that can accommodate scientifically sound replicated trials, from small-scale pilots through to commercially relevant conditions.

- **Multi-sector**
  - **Mobile CT Scanner**: Portable, high-resolution assessment of sheep, pig and calf, carcass or live animal body compositions, used for studies of growth, productivity, genetic improvement or animal health. It can be used for farmers and breeding companies across the UK - helping to improve efficiency of production systems & product quality and providing increased precision of assessment and introduction of novel traits to genetic improvement programmes, leading to faster genetic gain & better breeding objectives.
  - **Mobile Sensory Quality Laboratory**: Thought to be the first mobile unit of its kind, a portable facility offering the latest imaging and product quality testing technologies, supporting research, animal breeding programmes and ensuring consumer preferences are at the heart of the innovation process.
  - **EGENES**: An information platform for routine evaluation of livestock genotypes. The system provides key decision support for breeding programmes and has been adopted by
major genetic suppliers across Europe and North America. The information generated allows selection for end product quality traits and, importantly, disease resistance.

2.3.2 CIEL facilities with The Roslin Institute, University of Edinburgh

Large Animal Research and Imaging Facility (LARIF): World-class infrastructure launching from late 2019 in support of agriculture, veterinary medicine and human health. A unique facility in Europe, bringing together dedicated large animal surgery and holding facilities alongside imaging (MRI, CT, C-ARM) and critical care resources. Research will draw on the renowned expertise of The Roslin Institute in farm animal genetics, genome editing and infectious diseases, working alongside a highly specialised team of large animal technicians and anaesthetists from the Royal (Dick) School of Veterinary Studies, providing large animal studies at the highest standard of animal welfare vital for quality science.

Expertise in imaging and genetic improvement of livestock is further supported by SRUC.

2.4 CHAP

The CHAP Crop Spraying Unit at The James Hutton Institute (JHI) will help develop precision crop spraying protocols to reduce their use and improve crop health.

With Liberty Produce and JHI, the Controlled Environment Farming Commercialisation Centre is dedicated to the development and commercialisation of innovative technologies for use in Vertical Farming.

3. Agri-Tech Centre projects with a Scottish base or reach

3.1 Agri-EPI Centre

With SRUC:
- Two significant projects in the area of productive and sustainable crop and ruminant agricultural systems will commence in May, funded through UK Research and Innovation.
- Tailtech, a high-tech system involving 3D cameras, is being developed to help UK farmers spot the early warning signs of tail biting in pigs. The project involves SRUC, Innovent Technology and several other leading pig supply chain partners.

With the James Hutton Institute (JHI):
- Engagement in the China SmartFarm concept to develop a holistic approach to the food supply chain for a more efficient and sustainable approach to farming and food production. SmartFarm is a key component of the Agri-Tech Flagship challenge, one of the major deliverables under the UK-China Science Technology and Innovation Strategy.

With Moredun Research Institute:
- Collaboration on a commercialisation initiative.
With Edinburgh, Heriot Watt and Strathclyde Universities:
- Engagement around the development of technology on the Agri-EPI satellite farms focused on the Internet of Farming Things. This includes, with Strathclyde University and Cisco, the implementation of the 5G RuralFirst project at selected sites and on Orkney.

With Edinburgh University:
- Assisting with engagement of international partners around student recruitment for the University’s Global Academy of Agriculture & Food Security.

With the University of Strathclyde:
- Provision of scientific and technical support in a European project, which, with Holland’s Wageningen University and Serbia’s University of Novi Sad, seeks to increase early career researchers’ knowledge of precision agriculture technologies.

With the University of Stirling:
- A partnership project involving a Scottish Agri-EPI satellite farm on the use of sensors and data to improve livestock productivity.

Additional projects involving Scottish commercial partners:
Agri-EPI is involved in numerous additional projects in partnership with Scottish agri-food and technology companies, aimed at driving the development and adoption of precision agriculture in countries including the UK, New Zealand and Paraguay.

3.2 Agrimetrics

With SRUC:
- With financial support from Agrimetrics, SRUC has developed an in-person and online Continuing Professional Development course, Vetnomics, on the use of genomic data in the livestock sector, aimed at vets and others.
- Agrimetrics is the data integration partner for the SmartCow initiative, integrating key European cattle research infrastructures to promote their co-ordinated use and development by providing the academic and private research community with easy access to high quality data services and resources.

Additional projects involving Scottish commercial partners:
- Agrimetrics has partnered with Innovent Technology, CIEL and Agri-EPI on the Data Integration Project to bring cattle and pig data together with environmental data to analyse meat production and understand impacts on meat quality.
- Agrimetrics leads the discussion on data innovations in the agri-food sector in national initiatives that cover Scottish interests, including the Agricultural Productivity Working Group (co-ordinated by AHDB) and the Food Industry Initiative on Antimicrobials.
3.3 CIEL

- **Sheep Genetic Improvement Scoping Study UK** to drive the future direction of genetic improvement in the British sheep industry and recommend solutions that deliver breeding goals to maximise genetic, economic and environmental gain across the sector. Partners included: Defra, SRUC, AHDB, the National Sheep Association, agribusiness consultant AbacusBio and CIEL.

- **Feed into Beef**, a 5-year collaborative project to produce new feeding standards for modern beef cattle to help drive precision nutrition and increase the efficiency of beef production. Scientific leads are the Agri-Food and Biosciences Institute (AFBI) and SRUC – with CIEL leading multiple industry partners for AHDB.

- **GrassCheckGB - 14 beef, sheep and dairy farms across Scotland** form a key part of a 50-strong GB farm monitoring network participating in GrassCheckGB, a new initiative aiming to help all farmers across Great Britain improve grassland productivity and pasture utilisation. Monitoring equipment installed on-farm is capturing key metrological data such as temperature, rainfall and sunshine hours, and each participant farmer is measuring grass every week through the grazing season.

  GrassCheckGB is a collaboration between CIEL, AFBI, Rothamsted Research, the three GB meat levy bodies – AHDB, Hybu Cig Cymru (HCC) and Quality Meat Scotland (QMS) - with the additional support of several industry sponsors.

- **Nanoparticles** is a CIEL and SRUC project awarded through a UK-China AMR competition to develop a new alternative to antibiotics for use in poultry – these are biocidal compounds encapsulated in biodegradable nanoparticles. The project started in February 2019 and is expected to take 31 months to complete. Partners include SRUC, GAMA Healthcare, Shanghai Veterinary Institute and a major broiler/pig producer within the Shanghai region.

3.4 CHAP

- In addition to the work at JHI, CHAP is progressing new projects with local soft fruitgrowers and pest control companies.

4. Suggest areas of focus for the Committee around innovation in Scottish agriculture

4.1 Adoption of technology
• The slow rate of adoption of new technology across the agri-food sector is a major barrier. Any schemes to facilitate adoption should be investigated.

• A key area of focus should be on increasing farmer peer-to-peer knowledge exchange to increase the Scottish farming community’s understanding of the latest innovations and their benefits. Agri-EPI’s satellite farms provide a good platform for this knowledge exchange, with a strong link to the science base.

4.2 Breaking down barriers to the sharing and use of data

• With game-changing solutions required, big data and advanced analytics have the capacity to transform the way we produce, distribute and consume food – creating a more sustainable and profitable agri-food sector that benefits all. In addition, these technological approaches and the resultant emerging evidence base can catalyse innovation and development of new disruptive business models that help UK agriculture reach its full productivity potential at the pace and scale of change required.

• Drive a change in culture around how farmers view data sharing: demystify data and analytics and educate the industry in Scotland around the potential from data; demonstrate the benefits in terms of productivity and profitability; re-incentivise farmers to new goals, especially given imminent changes in a post-Brexit world; and build trust by establishing a code of conduct for data sharing.

• Wherever possible, make all new taxpayer-funded data “open data” to reduce barriers to entry and allow many more core data building blocks to be used for actionable insights that the sector urgently needs. Invest time, effort and possibly resource to unlock data that already exists so it can be shared widely, ideally as open data. To help enable this: embed in any publicly funded agri-food research an obligation to make any data readily available in the appropriate format to industry.

• Create an independent, trusted repository for industry data.

4.3 The livestock sector

Focus areas are promote:

• Provenance and heritage for Scottish livestock food systems and supply chains.

• The red meat sector.

• Genetics and breeding capability.

• Full impact analysis of livestock supply chains – social, economic, environmental and nutritional.
4.4 Arable farming

- Supporting economically important crops such as barley, potatoes and soft fruits with productivity enhancing programmes on disease prediction, speed breeding to develop advantageous traits and development of biocontrols to reduce environmental impact of agrochemicals in water systems.

- Soil Health monitoring to maintain the productivity and longevity of arable farming.

- Development of Controlled Environment Agriculture to support local economies e.g. remote community healthy, year-round availability of fresh produce, in tandem with Circular economy principles by using locally available green energy supplies.

- Take the lead in developing natural light polytunnels/greenhouses for soft fruit and high value horticulture that reduce the use of plastics, increase crop production and yield and reduce capital expenditure (removing regular replacement of damaged plastics/glass)

4.5 Post-Brexit opportunities

- Use Brexit as a once-in-a-generation opportunity to create a New Deal with farmers and reset expectations for increased productivity. “Public money for public goods” is often interpreted very narrowly, focusing on access and sustainability. Public money for farmers who demonstrate willingness to embrace wide-ranging change to meet the strategic challenges of the future feels more aligned with what the Scottish population would expect from a post-Brexit government. Criteria for public money should be broadened to include initiatives that will transform agricultural productivity, including training, modernising systems and machinery (E&W Countryside Productivity scheme is a possible model), taking on consultative and agronomic advice, and making farming data available for benchmarking and predictive analytics at a regional and national level. Positive rewards and incentives should be used to encourage voluntary sharing of data.

- A post-Brexit UK should not just match what our European neighbours are doing, or adopt best practice, but should instead take a leadership position based on setting high standards and targeting quality, leading to favourable economic outcomes including premium export markets, better prices, higher quality/volumes (closing the yield gap) and reducing costs to create more profitable farms.

5. Recommendations for Government support of Agri-Tech Centres’ work in Scotland:

5.1 Resources & support
• Resources for demonstration platforms across Scotland, such as exemplar farms, to directly demonstrate the benefits of precision technology, promote adoption and drive economic benefit.
• Assess whether Scotland could benefit from a Countryside Productivity Scheme.
• Re-ignite early conversations about the role Agrimetrics can play in making publicly-funded, government-held, agri-food data available to the whole sector to help knowledge exchange and to drive innovation; facilitation of more data-driven decisions from the farm onwards; and improve productivity, thereby providing returns to the tax-payer.
• Funding of applied science (not Capex) to pump prime research activity using the new Centre assets and capability.
• Incentives for industry to use Scottish Institutions.

5.2 Awareness-raising

• Highlight focus areas for the agri-food sector – both for policy and research funding.
• Promote the Centres’ fantastic new capabilities.
• Embrace updates to and adoption of new technologies – e.g. gene editing.
• Encourage greater focus on the agri-tech and agri-food sectors within education.

6. Contact details:

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For further information: www.agritechcentres.com.

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