FARM TECH CIRCLE

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Cutting edge facilities supporting sustainable milk production

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Dairy production innovators have a novel, state-of-the-art facility in which to test technology following the relaunch of Agri-EPI Centre's South West Dairy Development Centre (SWDDC).

Already established as a high-performing dairy innovation unit, the SWDDC has reopened following an extensive upgrade to install the latest robotic and sensor technology. Additions include a high-welfare, free access system for cows, integrating Lely A5 robotic milking systems with precision-grazing, while incorporating the existing GEA robotic feeding system. Galebreaker side curtains ensure the climate within the building is continually optimised.

The resource offers a truly innovative environment for developing, testing and demonstrating new technologies and techniques to support sustainable, efficient, high health and welfare, cost-efficient milk production. Located close to Shepton Mallet in the heart of the region's milk field, the unit features a typically sized 180-cow herd run on a commercial basis and provides a platform for higher technology readiness level developers.

The building and facilities are run by precision engineering specialists, Agri-EPI Centre, while the herd is owned and managed by the Christensen family, trading as Steanbow Farms. and noted throughout the farming community for their efficient dairy and poultry enterprises. The project is supported by Innovate UK. All milk goes to local processors, Barber's cheese.

"We are thrilled to reopen the Centre for business following the installation of an R&D platform focussing on integrating free grazing and automation ready for innovation," explains Agri-EPI Centre Head of Agri-Tech (Dairy), Robert Morrison.

The Centre key areas of focus are to

> Provide state-of-the art facilities for research, development and demonstration with an emphasis on optimising productivity

> Integrate robotic milking wth precision grazing

> Demonstrate profitable and resource efficient milk production techniques

> Demonstrate the highest standards of animal health and welfare and how technology can be used to optimise this

> Demonstrate routes to sustainable milk production by adopting circular dairy principles in all aspects of the production process

Steanbow Farms' Neil Christensen comments:

"We're keen to work with Agri-EPI as service providers on our farm. We want the Centre to do well which is why we created that relationship in the first place – for the future of the industry. A robotic demonstration farm is becoming more and more relevant as the industry tackles ever increasing labour challenges. This Centre is demonstrating systems and an approach; it's a place for technology testing but also knowledge exchange and industry engagement."

Robert Morrison adds:

"We look forward to developing new partnerships and projects – both funded and private research, which will continue our current themes featuring animal health and welfare, environmental sustainability, farm business sustainability, and feed and productivity."

Watch the video

Funding opportunities

Farming Equipment and Technology Fund Grants

The Farming Equipment and Technology Fund is part of the Farming Investment Fund.

It offers grants for specific items of equipment to increase productivity, boost environmental sustainability and improve animal health and welfare.

Farmers, foresters and growers in England, including contractors to these sectors, can apply for a grant between £1,000 and £25,000. Grants go towards the cost of specific items from a prescribed list.

Grants guidance

The Farming Equipment and Technology Fund 2023 is split into 2 themes:

Productivity and Slurry grant

> The items in this list improve agricultural sustainability and horticultural and forestry productivity, helping farmers use less inputs, reduce emissions and cut waste.

Find out more about this grant

Animal Health and Welfare grant

> The items in this list offer improvements in the health and welfare of livestock, potentially helping farmers improve biosecurity or decrease environmental stress.

Find out more about this grant

On-Farm Impact:
JoJo's Vineyard

Ian Beecher-Jones
Precision Farming Adviser

> Aiming to improve the efficiency of farmers through the use of technology

> Showing first-hand that precision viticulture is the future for wine growers

> Agri-EPI tapping into viticulture to discover future needs and concerns of growers

JOJO'S

Background

Ian Beecher-Jones, co-owner of JoJo's Vineyard in Oxfordshire, has been a precision farming adviser for several years and is part of Agri-EPI Centre's innovation farm network. At JoJo's Vineyard, he is growing 6 different varieties of grapes to make still and sparkling wine and incorporates agri-tech at every level possible to enhance efficiency, sustainability and productivity.

JoJo's vineyard is situated in the Chiltern Hills, near Henley on Thames, Oxfordshire. At the vineyard, Ian utilises the latest technology from drones, robots, satellites and data, which helps the team at JoJo's make the best grapes possible.

There are many great traditions in vine growing that shouldn't be lost. Ian explains that blending in new technology alongside the traditions will create an opportunity for vineyards in the UK to produce a product suited for the next new world in a sustainable way.

Ian said:

"We're excited to be working with Agri- EPI to explore the opportunities for JoJo's and the rest of the UK vineyards.

The UK viticulture sector is on an incredibly upward journey, but we have to be aware of producing wine in the most efficient and sustainable way."

Farmer-led research and development

Ian, in collaboration with Agri-EPI and robotics technology company, Antobot, has recently embarked on two projects at JoJo's vineyard, one to create a vineyard digital infrastructure map, and the other for on-the-ground monitoring using the Antobot robot.

The mapping tool, developed with the Collabriculture project in South Australia, aims to create a shareable, digital infrastructure map of the vineyard's rows and boundaries. The map can then be shared with any ag tech companies wishing to work with vineyards around the world. The model is the foundation on which drones, robots and vehicles can plan navigation paths before arriving on site, avoiding time wastage from surveying. This will improve the efficiency of data gathering services on farm.

Ian has described it as a contextualisation map as it gives context to all the other digital data maps that are generated on the vineyard. "If I can't overlay my rows and blocks on the satellite, drone or robot generated maps I get back, I can't identify exactly where the variation is."

"It is the shareability of the digital infrastructure that is key to establishing a reliable and trustworthy data platform we can all work from."

"Once established we can share it with a range of ag-tech companies who see the benefits and opportunities of working with one of the fastest growing crops sectors in the country."

"The exciting aspect about this project is the global potential to remove cost for growers and speed up the time it takes to engage with ag-technology companies whether they are providing drone, robot, satellite or software services. We are all working from the same infrastructure data."

Vineyards are an ideal environment to work in since the pathways between the rows create a roadway for robots to travel. The robots are fitted with high level GPS and LIDAR systems to help them navigate around the vineyard. The robots at JoJo's will carry cameras and sensing equipment to monitor and analyse the vines and grapes as they grow during the year. Gathering data is a time consuming task. Robots and drones will speed that up.

Agri-EPI making an impact

Agri-EPI aims to improve the efficiency of farms through the use of technology, and they have worked with Ian and JoJo's Vineyard to learn and understand where technology can help growers and improve performance in the vineyard.

In addition to the current grant funded projects at the vineyard, Agri-EPI has deployed technology to provide data and insights that will help validate future R&D projects examining sustainable production. They have installed a TerraPrima Ladybird weather monitoring system that allows farmers to predict crop disease and improve yields, and invested in GPS monitoring equipment and meeting room facilities used to disseminate and host knowledge exchange events about agritech solutions at JoJo's.

Ian said:

"A benefit of working with Agri-EPI is the broad range of tech companies we have access to and the experts who can help us turn data in to decision tools. Not all technologies are going to be appropriate for vineyards, but if we don't try them we will never know. Working alongside technology experts is very exciting, as is getting to know the innovative people who are now working in the agriculture sector. Ag tech is bringing new energy into the agricultural and horticultural sectors which is a benefit to the whole industry, not just viticulture."

Contact us: 0131 239 7100
Agri-EPI Centre, Easter Bush, Roslin EH25 9RG

"From my own 20 years of working in agri-tech, I know that there are growing pains for agritech companies. By working together, JoJo's and Agri-EPI Centre can give a platform to companies to test their technologies and roll them out not only to the wider viticulture sector, but potentially other food growers."
Ian Beecher-Jones, Farmer, JoJo's Vineyard

Ground-breaking technology to monitor biodiversity on-farm 24/7

40% of insect species risk extinction, and a further 30% are endangered (New Scientist 2019), yet few farmers have the tools to actively monitor or quantify on-farm biodiversity, despite it being an important measure of ecosystem, landscape, overall biological health of the farm and key public good. A joint collaborative project funded through Innovate UK and Defra's Farming Innovation Programme, with organic farmer Sophie Alexander, Agri-EPI Centre, AgriSound, Dorset Wildlife Trust, Pollenize CIC and Chirrup AI will use technology to monitor biodiversity 24/7 on a dairy and arable farm in Dorset.

The project aims to test and demonstrate the effectiveness of digital technology as a means of remotely monitoring wildlife diversity in a farming context and address escalating ecological challenges through accurate quantification of nature in any one location. With biodiversity monitoring set to increase through the introduction of policies and schemes, it's vital to assist ecologists with access to scalable remote technologies.

Three separate remote sensing digital technologies will detect, identify, and quantify varieties of invertebrates and birds in correlation to flowering plants that they rely on. Insect conservation and pollination innovator AgriSound, who specialise in remote insect technology and environmental sensors to monitor pollinator populations have installed three unique in-field sensor devices for automated insect monitoring as part of the project. The technology, Polly™ is optimised for attracting pollinators from a broad spectrum of local insects and detects 24/7 through the use of a specialised bioacoustics technology with data transmitted and stored securely, providing a comprehensive understanding of the pollinators on the farm.

Combining other data sets across the farm include Pollenize app to photograph and geolocate plant species. Chirrup AI will use artificial intelligence to monitor species of birds that are thriving on the farm. This, in turn, will reveal more about the diversity of bugs and seeds above ground, and the richness of life in the soil. The same transects monitored by the digital devices will be surveyed by a professional ecologist from Dorset Wildlife Trust to ground-truth the findings.

Sophie Alexander, farm owner of Hemsworth Farms, said:

"I believe it is important to establish our biodiversity baseline and to continue to monitor progress. There are too few experienced ecologists with sufficient time to manage it all. We are therefore pleased to be involved with testing the data collection capabilities of digital technologies to assist ecologists and in this case, Dorset Wildlife Trust to ground truth the information and demonstrate how an organic farming system can nurture wildlife as well as produce food."

This early-stage feasibility project, bringing together a technology start up with RTO and end user, will explore emerging applications of remote sensing to inform the development of a commercially relevant solution. This will catalyse a pipeline of further R&D across a much wider area, new research collaborations and accelerate research translation and development of new solutions.

Casey Woodward, Founder and CEO of AgriSound, said:

"We are thrilled to be embarking on this exciting new R&D project with Agri-EPI Centre and Hemsworth Farms. It's a tremendous opportunity for all parties involved to put AgriSound's cutting-edge pollinator monitoring technology to the test in a real-world farming context. We truly believe this project has the potential to shed new light on all of the great work happening across British farms to improve local biodiversity.

"This collaboration not only underscores the importance of partnerships in driving forward sustainable agriculture but also showcases the immense value of innovative sensing technologies for biodiversity assessment which are being increasingly required as consumers expect produce sourced from sustainable agricultural practices. We anticipate that the insights gained from this project will not only help Hemsworth Farms to better understand and manage biodiversity on their own sites but also act as an example for the wider industry, demonstrating how technology can be harnessed to promote biodiversity and sustainable farming practices."

Agri-EPI expands farms team

Agri-EPI has developed its farm offering, including the addition of new members to their Farm management team over the last few of months.

"Over the last few months Agri-EPI has been investing heavily in its Mixed Farms Team and network of farms, bringing in an On-Farm Technician, enabling us to implement assets on farm, as well as speeding up the process of collecting data. In doing this, it will allow us to pick out gaps which could benefit from the use of technology to help aid on-farm decisions, as well as help to form project ideas & future collaborations with tech companies."

Ross Robertson, head of mixed farms

1. Agri-EPI's new crop farms technician, Richard Round, studied biology at the University of Bristol and received his Master's in future food sustainability from Cranfield University. These studies equipped him with an understanding of the relationships between agriculture and the environment, and the challenges facing both in the 21st century. As crop farms technician, Richard ensures that all equipment on farm functions optimally, and that a strong line of communication is maintained between Agri-EPI and the crop farmers within the innovation farms network. By working on a variety of projects, Richards hopes to help bring forward innovation within the agricultural sector and promote both efficiency and sustainability within farming.

2. Agri-EPI's new mixed farms technician, Murray Watson, works on the ground with mixed farms in Agri-EPI's innovation farms network as the point of contact for the farmers. Murray comes from a family farm in Scotland, farming beef, sheep, and poultry. He has experience working on large dairy farms specialising mainly in calf rearing and herd management and he studied Agriculture at SRUC. Murray assists with the implementation of new tech and management of assets on Agri-EPI's mixed farms.

3. Chukwudi Okolo has been at Agri-EPI since 2021 as project coordinator but has recently joined the Farms team to assist with the coordination and support of farm network activities. Having studied business management and business psychology, Chukwudi came to Agri-EPI eager to further his knowledge and experience in project management. He is now assisting with asset procurement and deployment for the farms, managing records and documents, and maintaining communication between Agri-EPI and our innovation farmers.

The Heads of the Farms team include Claire Hodge, head of agri-tech (crops), Ross Robertson, head of agri-tech (mixed), Duncan Forbes and Robert Morrison, heads of agri-tech (dairy), and Mike Jones, dairy technical manager.

4. Claire Hodge brings to the role as head of crops her in-depth knowledge and experience of the crop sector, and wide network of connections. Based at Agri-EPI's Northern Hub in Edinburgh, she works both nationally and internationally and plays an especially important role in expanding the activities of Agri-EPI's farm network. After graduating from Newcastle University in 2005 with a degree in agriculture, Claire worked on farms in New Zealand before joining Greenvale AP in 2006. It was here that she was introduced to the opportunities within the potato industry. Taking on various roles in procurement, trading, agronomy and factory production, she learnt about the challenges of the cycles in potato production.

5. Ross Robertson, head of mixed farms, comes from a farming background and has worked on farms from a young age. Ross graduated from SAC Craibstone with an HND in agriculture and went straight to work on a pedigree Aberdeen Angus farm. He progressed into sales after several years and then into area management and product development with a local manufacturer of quality livestock equipment. Working with technology equipment at development and design stages in an IUK project then led to furthering his career into his role at Agri-EPI Centre.

6. Head of dairy, Duncan Forbes, has great record of experience in the dairy industry. After several years in practical farming, Duncan moved into farm management consultancy and worked over twenty years as managing director at Kingshay. In his role as Head of Dairy for Agri-EPI Centre, based in Somerset, he is focussing on the development of the dairy research and demonstration facility for 180 cows combining robotic milking and feeding in a state-of-the-art building with precision grazing.

7. Agri-EPI's other head of dairy, Robert Morrison, has dedicated himself to the advancement of technology within the agri-tech sector throughout his career, with a particular focus on bringing tech to market. He served as the product manager at Fullwood Ltd, playing a crucial role in a global team responsible for conceptualising, designing, and introducing automated milking products within the Fullwood Packo Group. As head of dairy at Agri-EPI he is able to collaborate with a diverse range of exciting innovators, and work towards developing the next generation of agri-tech products contributing to the global effort of feeding the world, while also striving towards a carbon net zero future. Robert is deeply passionate about leveraging technology to enhance the productivity of farmers and facilitate them to work more sustainably to meet the growing needs of our society.

8. Mike Jones, dairy technical career, has centred his career on sustainable farm management in the dairy sector, including as Farm Manager of Wyndhurst Farm, Langford. Latterly he was precision technical manager at Cogent Breeding, where he was responsible for development and application of precision technology. Mike is based at Agri-EPI's South West Dairy Development Centre but is responsible for dairy assets UK-wide. He plays a key role in steering Agri-EPI's technical strategy in the dairy sector, as well as providing technical expertise and guidance in agri-tech R&D projects. He has a passion for dairy farming and in particular cow health and welfare. He brings experience in cow health monitoring technologies, remote management of dairy herds, cow mobility and fertility management, and in the practical deployment and use of agri-tech on dairy farms.

Tackling Ash Dieback Disease with agri-tech

Ash Dieback Disease (ADD) is a destructive disease of Ash trees, especially England's native Ash species, that threatens forestry productivity and biodiversity in the UK. ADD was first detected in the UK in 2012 and is forecast to eventually kill 80% of UK ash trees, at a predicted cost of £15bn, with £7.6 billion being the estimate for the next 10years (Hill et al., 2019).

As one of England's most useful and versatile native tree species, Ash provides an important commercial revenue stream to Ash growers who produce Ash across the UK. Ash timber is strong, durable, and flexible, with a wide range of practical uses such as tool handles, flooring, furniture, and joinery. Ash provides valuable habitat for a wide range of dependent species. It grows in a variety of soils and climatic conditions. The 'airy' nature of its foliage allows light to penetrate to the woodland floor, encouraging ground plants and fauna. Several insects, other invertebrates, lichens, and mosses depend wholly on Ash for habitat.

A collaborative project between Agri-EPI Centre and Vertinetik will use emerging technology to develop predictive models of ADD and other tree diseases, which can be integrated with decision support systems to inform management of England's Ash trees. The Innovate UK-funded project – a part of Defra's Farming Innovation Programme feasibility round 2 – aims to provide an affordable solution to benefit smaller woodland owners in identifying disease infestations and taking proactive intervention measures to protect the economic and ecological value of Ash trees.

Kalique Dugarte, Co-founder of Vertinetik said:

"We are living through a period of climate crisis. Farmers and woodland owners sit at the front row among those having to experience it first. Changing weather patterns and alien invasive pests and diseases all represent new challenges to the preservation of woodlands. The severity of this challenge can be illustrated by Ash dieback and how an entire native tree species is under threat. So there is a call for action."

"At Vertinetik, we believe in UAVs as a powerful low-cost alternative to the massification of technologies previously available to big budgets. Thanks to our project we will lower frictional costs to facilitate the mapping and monitoring of ash trees, record the state of the trees, and thus help farmers and woodland owners better manage ash dieback and plan routes to recovery and restoration of trees."

AGRIEPICENTRE
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Agri-EPI Centre
Easter Bush
Roslin EH25 9RG

T: 0131 239 7100
E: team@agri-epicentre.com
W: www.agri-epicentre.com