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Professor Lisa Collins



Smart agri-systems for the pig industry

Professor Lisa Collins is Head of the School of Biology, Professor of Animal Science, N8 Agrifood Chair in Agricultural Systems, Director of the National Pig Centre and Deputy Director of the Global Food and Environment Institute at the University of Leeds. Her research focuses on the development and application of smarter agricultural systems through multi-disciplinary approaches including technology development, systems modelling and data analytics. Amongst a broad portfolio of active research projects, Professor Collins is PI on PIGSustain, a £2.06M Global Food Security programme grant.

Professor Collins serves on national and international advisory, funding and academic society councils and strategy groups, including BBSRC, the Dog Advisory Council, ASAB council, and European Food Safety Authority groups. She is an experienced public communicator of science, regularly presenting invited public lectures including at the Royal Institution and in national theatres. Her work regularly features in national and international news media in all formats. In 2014, Professor Collins received the British Science Association Charles Darwin Award for excellence in science communication, and in 2010, the UFAW Young Animal Welfare Scientist of the Year award. In 2020, she was elected as a Fellow of the Learned Society of Wales and is the British Science Association Section President for Agriculture and Food for 2021.

The projected rise in the global human population and the anticipated increase in demand for meat and animal products but with a greatly reduced environmental footprint offers a difficult set of challenges to the livestock sector. How to produce more, but in a way that is healthier for the animals, for the public and for the environment? Implementing a smart agri-systems approach, utilising multi-platform precision technologies, internet of things, data analytics, machine learning, digital twinning and other emerging technologies can support a more informed decision-making and forecasting position that will allow us to move towards greater sustainability in future. If we look to precision agriculture, there are a wide range of technologies available and examples of how digitalisation and integration of platform outputs can lead to advances in understanding the agricultural system and forecasting upcoming events and performance that have hitherto been impossible to achieve.

There is much for the livestock sector and animal scientists to learn from the developments of precision technologies and smart agri-system approaches in the arable and horticultural contexts.

However, there are a number of barriers to be overcome: (i) the development and implementation of precision livestock farming technologies that can be easily integrated and analysed without the support of a dedicated data analyst in house; (ii) there is a considerable lack of extensive validation of many developed and available precision livestock farming technologies for different stages of production, systems and environments. This means that reliability and accuracy are likely to be compromised when applied in commercial practice; (iii) the best smart agri-systems approaches are reliant on large quantities of data from across as wide a variety of conditions as possible. Due to complications of data sharing, commercial sensitivities, data ownership and permissions, much of the data that exists within the pig industry is challenging to obtain, or to knit together into a comprehensive picture owing to different ways of collecting the data in different parts of the system; (iv) the high level of investment needed to develop and scale these technologies is substantial and represents significant risk for companies when a technology is emerging.

Using a case study of the National Pig Centre, a flagship pig research facility in the UK, it is considered how a smart agri-systems approach, could be used to consider alternative future systems for production and to monitor these systems in practice as a commercial demonstrator site for future pork production.