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## **Animal-based indicators to improve the welfare of small ruminants using Precision-Livestock Farming**

**Michelle Reeves, Fiona Kenyon, Emma Baxter, Jessica Martin, Cathy Dwyer**

### **Abstract**

Extensive livestock management systems are perceived by consumers as providing better animal welfare than intensive systems, as animals' behavioural needs are more easily met. In reality, a changing environment and rare opportunities for monitoring, diagnosis and treatment lead to unique welfare risks. UK sheep producers farming extensively face many challenges to the regular assessment of flock welfare, including a dwindling labour supply, thin profit margins and animals spread across vast areas. Despite the availability of technology to monitor the behaviour of other species, such as cattle, the development of technology for use on sheep farms is at an earlier stage. Welfare can be assessed by animal-based measures, such as behaviour, health and physiological traits, which are useful in providing insight into animals' experiences. This PhD project focuses on identifying valid, reliable and feasible sheep welfare indicators that can be measured by PLF technology in extensive systems. This will be achieved by examining three examples of important sheep welfare concerns: lameness, gastrointestinal parasitism and mastitis. Among other animal-based measures, the behaviour of sheep affected by these conditions will be assessed using quantitative and qualitative methods; behaviour sampling and scan sampling will be carried out in person, as well as Qualitative Behaviour Assessments (QBA). Video recordings will be analysed using tracking software to quantify behaviour. Additionally, sensors such as accelerometers and proximity loggers will collect behavioural data. This project will partly consist in continuing the ongoing validation work for these types of wearable technology. However, it also aims to gain understanding on the application of more passive sensor systems, which are less costly and thought to be more acceptable to sheep farmers. Bringing these types of tools to market for sheep producers could contribute to improving the lives of millions of sheep farmed across Europe and answer consumers' calls for high animal welfare production systems.