

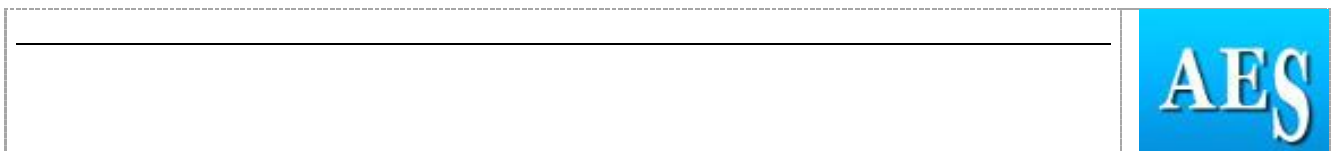
Extended Abstract

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Paper/Poster Title	Evaluation of psychological factors influencing farmers' intention to implement sheep scab control measures in Northern Ireland
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Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	200 words max
<p>Sheep scab, caused by the ectoparasitic mite, <i>Psoroptes ovis</i>, is an endemic disease in Northern Ireland (NI) sheep flock and constitutes significant economic and welfare costs for the NI farming industry. In spite of its endemic nature, historically, very little research has been undertaken to support the control of the disease in NI. This study offers the first attempt to analyse the psychological and behavioural factors influencing farmers' intention to implement sheep scab control measures in NI. To achieve our objective, we employed a mixed-methods approach. Quantitative data from a sample of 126 sheep farmers was statistically analysed using an extended theory of planned behaviour (eTPB) approach in an ordered logistic regression modelling framework. The results of our analyses showed that attitude, perceived behavioural control, emotional effect, membership of Business Development Groups (BDG) and the attainment of a higher education qualification are statistically significant factors influencing farmers' intention to adopt sheep scab control measures. The study provides a solid foundation on how to effect behavioural changes among sheep farmers to improve their ability to implement effective disease control measures.</p>	
Keywords	Sheep; Sheep scab; Animal welfare; Endemic disease; Mixed methods
JEL Code	Animal Welfare Policy Q180 see: www.aeaweb.org/jel/guide/jel.php?class=Q)
Introduction	100 – 250 words
<p>Sheep scab, caused by infestation with ectoparasitic mite, <i>Psoroptes ovis</i>, is an endemic disease in Northern Ireland (NI) and constitutes significant economic and welfare costs for the NI farming industry (Crawford et al., 2022). Recent estimates of the annual cost of sheep scab to the GB farming industry range from £78-202 million and it is expected that with similar levels of prevalence that the costs to NI would be similar on a pro rata scale (£4.5-£12 million) annually (Nixon et. Al., 2020). Historically, very little research into sheep scab control measures have been carried out in NI (Crawford et al., 2022). Given the unique nature</p>	



of farming in the region, especially in relation to land rental systems (based on the traditional “conacre” system, a short-term land rental system unique to Ireland) a study of sheep scab control measures will provide important information for the design of policies to control the spread of the disease. This is supported by epidemiological investigations of transmission of cattle diseases in NI, which identified a highly fragmented but interconnected farm system with ample opportunities for contact between animals on contiguous land parcels (Milne et.al., 2022).

The objective of this study is to analyse the psychological and behavioural factors influencing farmers' intentions to adopt sheep scab control measures in NI. The sheep scab control measures are defined in terms of willingness to undertake enzyme-linked immunosorbent assays (ELISAs), otherwise referred to as blood tests. Studies have shown that sheep scab can be present in a flock without any clinical signs. Therefore, relying on the presence of clinical signs or the identification of active skin lesions constitutes a potential hindrance to the effective control of sheep scab (Smith, Ruston, Doidge, Lovatt, & Kaler, 2022). This is because early (sub-clinical) cases of disease will be missed. The ELISA test is effective at detecting sub-clinical infestations (Nunn et al., 2011), and more widespread use of the test allows the early identification of these cases and reduces further transmission of the disease. This study contributes to the extant literature by providing the requisite evidence base for the design of more efficient and sustainable policies to control sheep scab.

Methodology

100 – 250 words

The study employs a mixed-methods approach which combined qualitative and quantitative analytical techniques. The qualitative aspect involved focus group discussions with key stakeholders across the NI sheep farming industry to understand their perspectives on sheep scab. The quantitative aspect involved the use of descriptive statistics and econometric techniques which combined an extended theory of planned behaviour (eTPB) model with principal component analysis (PCA) and ordered logit regression models. This was used to analyse the behavioural drivers of sheep scab control measures using survey data from 126 sheep farmers. The ordered logit regression model in terms of the likelihood of

adopting sheep scab control measures (i.e., willingness to undertake flock-level blood testing for sheep scab), is specified in equation (1).

$$\Pr(Y_i) > j = \frac{\exp(\alpha_j + X_i\beta)}{1 + \{\exp(\alpha_j + X_i\beta)\}}, \quad j = 1, 2, \dots, M - 1 \quad (1)$$

Where j is the response category, X_i is a vector of independent variables, β is a vector of parameters to be estimated and α_j are cut off points for the thresholds of the ordered model, and M is the number of categories of the ordinal dependent variable and is equal to 5 given the five-point Likert scale with which the dependent variable was measured. In total, four models were developed and analysed. The Brant test was conducted to check if any of the variables violate the parallel lines assumption in each of the models to necessitate the use of either the partial proportional odds or the generalised ordered logit model (Adenuga et. Al., 2023). In conducting our analyses, we first considered only behavioural factors (attitude, perceived behavioural control, subjective norm and emotional effect) influencing the decision to undertake blood testing and willingness to pay for the test. We then subsequently undertook the analyses with the inclusion of socioeconomic factors respectively.

Results

100 – 250
words

The results of our analyses show that 32.2% (40/124) of the survey participants had experienced sheep scab on their farm at least once between 2012 and 2022. Only 38% (15/40) of the farmers who had experienced sheep scab on their farms reported that the diagnosis was confirmed by a veterinarian. Among farmers that reported sheep scab on their farms, incidence increased in recent years with the highest incidence occurring in 2022 (46%). The results also show that 59% of the farmers agree or strongly agree to relying only on clinical signs to rule out the possibility sheep scab in their flock. Potential issues around cooperation among farmers to control sheep scab, the conacre land rental system, low levels of awareness regarding the subclinical phase of the disease and a lack of adequate training around sheep scab were noted and could be a hindrance to the effective control of the disease in the region.

The results of the econometric analyses show that attitude, perceived behavioural control, and emotional effect are statistically significant factors influencing the intention to undertake blood test, whereas only attitude and emotional effect were found to be statistically significant factors influencing the willingness to pay for blood test. The attitude of the farmer has the greatest effect on farmers' intention to adopt sheep scab control measures. When the model was adjusted for socio-demographic factors, it was found that membership of a BDG and the attainment of A Level-Higher education or equivalent were statistically significant factors influencing the intention to undertake blood testing.

Discussion and Conclusion

100 – 250 words

To develop policies capable of driving change in relation to the control of scab, it is essential to understand the behavioural factors around farmers' decisions to implement best practice control measures. This study provides insights into the prevalence of sheep scab in Northern Ireland and also analyses the behavioural factors that could influence the intention of farmers to adopt sheep scab control measures. The results of our analyses showed that sheep scab remains an issue of concern in NI with increasing prevalence in recent years. Farmers with positive attitudes towards disease control were more likely to undertake and pay for the blood test as a way of implementing sheep scab control measures. Therefore, any intervention aimed at controlling sheep scab will benefit from promotion of positive attitudes towards sheep scab control measures. For example, through increased awareness of the effect of the disease on animal and farmers' welfare. The sheep farmers attitude towards sheep scab control measures could also be influenced with the incorporation of animal welfare topics in the BDG programme. With emotional effect being a statistically significant factor influencing sheep scab control, there is a need for more awareness and education about the disease to help farmers feel comfortable about reporting the it to allow for a coordinated control of the disease. From the results of our qualitative analysis, markets were identified as high-risk places and occupy a pivotal location for the transmission of sheep scab.



There is a need for stricter measures to ensure that only clean and healthy stock are brought to the market for sale to prevent spread of the disease through markets.