

Scottish farms, internet access and social media

Farmer intentions survey briefing note, March 2021

Carla Barlagne¹, Jonathan Hopkins¹, Lee-Ann Sutherland¹, Douglas Wardell Johnson²,
Andrew Barnes³, Jenny McMillan³, Steven Thompson³

¹ Social, Economic and Geographical Sciences Group, James Hutton Institute, Aberdeen, UK

² Information and Computational Sciences Group, James Hutton Institute, Aberdeen, UK

³ Department of Rural Economy, Environment and Society, Scotland's Rural College, Edinburgh, UK

Summary:

This research note presents analyses of the role of social media and internet access in Scottish farming. It focuses particularly on differences between diversified and non-diversified farmers, as well as amongst established and new entrant farmers. Findings are based on the Scottish Government Farmer Intentions Survey (2018), which gathered 2 483 answers.

Internet speed and access are particularly important for **diversified farms**, and for **new entrants** to the sector. Other key findings include that:

- **Social media and the internet** were found to be of little help as sources of information for developing the business holding by established farmers (m = 3.67 on a scale from 0 to 10).
- **Social media and the internet** have been found to be of some help by new entrants (m = 4.97 on a scale from 0 to 10).
- 43% of the diversified and 34% of non-diversified farmers estimated that changes in internet access over the last 5 years had 'slightly' or 'significantly' changed the way they manage their business holding.
- **Internet speed** was found to be a **hindering** factor in the development of **diversification activities** by 58% of the diversified farmers.
- **Internet speed** was found to **hinder** the **management** of the **farm** by 47% of the **new entrant** farmers.

There was no link between farmers' perceptions of the usefulness of social media and the internet and their geographical location, the current and future economic prospects of the farming household, or their future plans for the business.

1.0 Introduction

The internet and social media are increasingly important for contemporary farming businesses, enabling farmers' access to information that is crucial to informing their farming activities. Potential applications and opportunities offered by high-speed broadband and social media include:

- i) access to decision support through real time data analysis (e.g. smart farming);
- ii) access to market information;
- iii) identification and access to business opportunities;
- iv) connecting to potential customers;
- v) improved well-being through reduced (feeling of) isolation

(Mishra and Park 2005, Citoni, Fioranelli et al. 2019, Boursianis, Papadopoulou et al. 2020, Henaughen 2020).

Low connectivity within rural areas has been identified as a major hindering factor for the farming sector (NFUS 2021). Current efforts to increase the connectivity of (remote) rural areas in Scotland (The Scottish Government 2017, Feeley 2020) within the wider context of digital transformation could open a range of opportunities for the farming sector and lead to an increase in farms' business value (Balachandar and Chinnaiyan 2020).

This research note aims to examine the links between use of the internet and social media and the farming sector in Scotland, with a particular focus on off-farm diversification and new entrants into farming.

This briefing note aims to answer the following research questions:

- 1) How do farmers perceive the contribution of internet and social media to the development of off-farm diversification activities?
- 2) How does engagement with the internet affect the farming household's current and future prospects?
- 3) Does experience in farming affect use of internet and social media?

2.0 Methods

The Farmer Intentions Survey (FIS) 2018, designed by researchers at The James Hutton Institute and Scotland's Rural College (SRUC), used a geographically representative sample of 10,000 businesses, chosen on region, size, and farming enterprise information, and used farm stratification from the June Agricultural Census (JAC). For a large-scale survey such as this, the JAC sampling framework is the most appropriate as it gives national level coverage and detailed information on agricultural activity, and it means that background information requirements are minimised. The survey collected data from farmers who identified themselves as the main decision maker on their business or holding and explored themes such as past and intended changes in farm activities, perceived enablers and barriers to farming, Brexit, and new entrants into farming (Barnes, Thompson et al. 2019, Barlagne, Hopkins

et al. 2020, Hopkins, Sutherland et al. 2020). The survey also included a number of questions related to the use of internet and social media and their contribution to identifying and developing business opportunities.

Three categories of interest were identified from the dataset, specifically, new entrants to farming, diversified, and non-diversified farmers.' New entrants to farming were identified by their response to the question: "Approximately, how many years have you been involved in the management of the business holding?". Based on their answers (more than 5 years/less than 5 years), respondents were categorized as New Entrants (N = 200) or Established Farmers (N = 2 294). The undertaking of diversification activities was identified by responses to the question "Are there diversification enterprises operated on the farm?" Based on their answers (yes or no), respondents were categorized as diversified (N = 729) or non-diversified farmers (N = 1754). The final questionnaire dataset contained 2,483 responses. Most of the questions were common to both cohorts but specific questions were tailored to the new entrants' cohort. Due to variation in response rates between questions, comparisons may not be based on the full totals noted above. The exact wording of the questions that were asked to the respondents appears either in the legend of the figures or in the footnotes.

3.0 Results

3.1. Internet, social media and diversification activities and geographical location

Results show that internet speed and access are particularly important for diversified farms. Answers to the different questions are presented below.

- **Please indicate your level of agreement with the following statement: "Low internet speed has been a problem for diversifying"**

58% of the diversified cohort agreed that low internet speed has been a problem for diversification.

- **In the last 5 years have changes in internet access changed the way you manage your business holding?**

In total, 43% of the diversified and 34% of the non-diversified farmers estimated that changes in internet access over the last 5 years had 'slightly' or 'significantly' changed the way they manage their business holding. Differences between the two cohorts were significant at the 5% level of significance (Chi-Square test, $p = 0.00$, $\alpha = 0.05$).

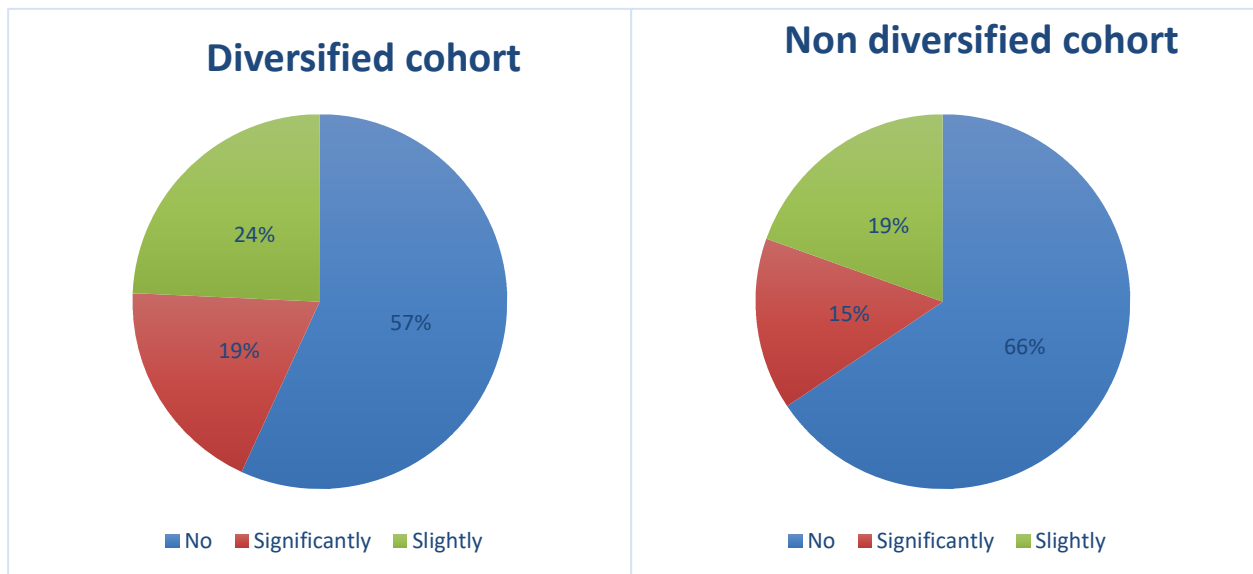


Figure 1. In the last five years, have changes in internet access changed the way you manage your business holding? (N = 382 diversified and 1047 non-diversified farmers)

The data collected does not allow us to estimate the nature of this change, or the nature and quality of internet access (*i.e.* broadband, mobile network, speed of the broadband, etc.).

- **Usefulness of social media and the internet as sources of advice for developing the business holding**

On a scale from 0 to 10 (0 being of no help), the established farmers' cohort (N = 2494) indicated that social media and the internet were of little help as sources of information for developing their business holding (mean = 3.67, Sd = 2.81). The diversified cohort had a higher mean value than the non-diversified cohort (m = 3.97, Sd = 2.71 and 3.55, Sd = 2.84 respectively) (cf. Figure 2).

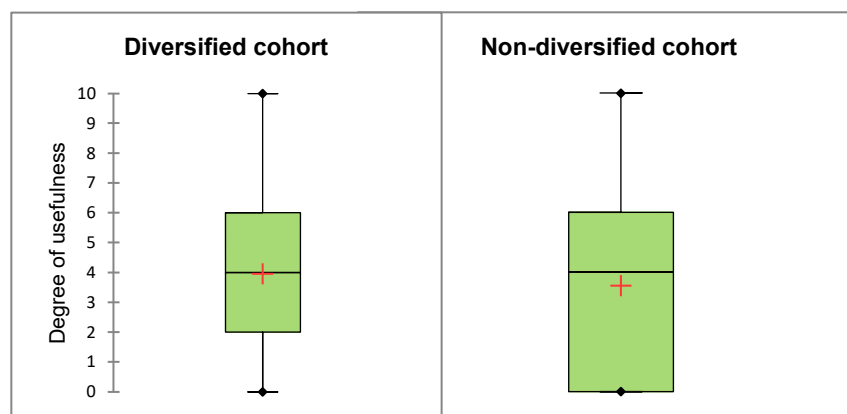


Figure 3. On a scale from 0 to 10 where 0 is no help, how useful were social media and the internet as sources of advice in developing the business holding? Results presented for the diversified (N= 674) and non-diversified cohort (N= 1609).

The distribution of the two cohorts was significantly different suggesting that the diversified cohort benefited more from social media and internet than the non-diversified cohort (Mann-Whitney test, $p = 0.036$, $\alpha = 0.05$). Analysis of the distribution of the two cohorts reveals that a notable proportion of the two cohorts found social media and the internet not useful at all (cf. Figure 4).

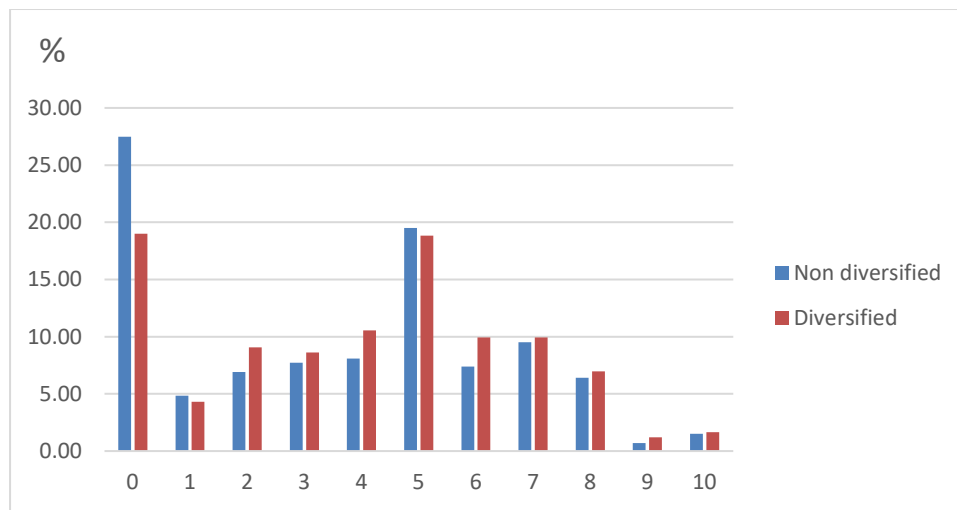


Figure 4. On a scale from 0 to 10 where 0 is no help, how useful were social media and the internet as sources of advice in developing the business holding? Results expressed in % of each cohort

- **Link between the geographical location and perception of the usefulness of internet and social media as sources of advice for developing the business holding¹**

There was no correlation between the perceived usefulness of internet and social media as sources of advice for developing the business holding and the geographical location (defined as follow: Eastern Scotland, North East Scotland, North, Southern, West Scotland) of the business holding as revealed by the Chi-square test performed ($p = 0.108$, $\alpha = 0.05$).

3.2. Internet, social media, and the current and future prospects of the farming household

There was no link between how useful farmers thought the internet and social media were as sources of advice for developing the business holding and:

- their perception of the future economic position of the household² (Chi-square test of association performed on both variable, $p = 0.081$, $\alpha = 0.05$);

¹ "On a scale from 0 to 10 where 0 is no help, how useful were social media and the internet as sources of advice in developing the business holding?"

² "Taking all of your income sources into account, how would you describe the economic prospects of your household over the next five years? "

- ii) the perceived current economic position³ of the household (Chi-square test of association performed on both variable, $p = 0.195$, $\alpha = 0.05$);
- iii) their intention to continue farming in the next 5 years (Chi-square test of association performed on both variable, $p = 0.085$, $\alpha = 0.05$).

3.3. Internet, social media and the new entrants' cohort

- **The usefulness of Social media⁴ and the internet⁵ to entering farming**

Within the new entrant's cohort, social media was found to be of little help for becoming involved in managing of setting up the business holding ($m = 3.04$, $s = 3.03$, $N = 189$) while the internet was found to be of some help ($m = 4.97$, $s = 2.92$, $N = 193$).

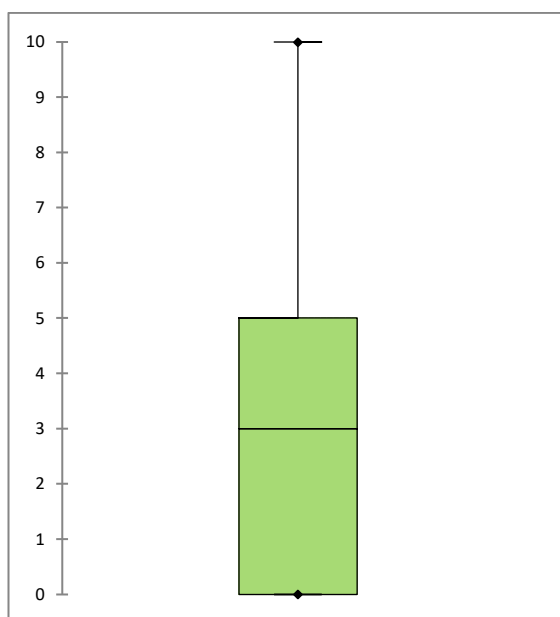


Figure 5. How useful were social media as sources of advice for becoming involved in managing or setting up the business holding (N= 189)?

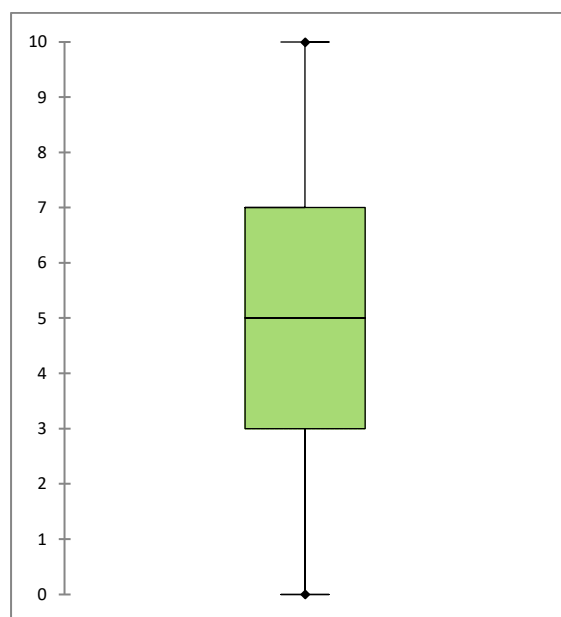


Figure 6. How useful was internet as a source of advice for becoming involved in managing or setting up the business holding (N= 193)

- **Internet speed as an enabling or hindering factor to entering farming**

Some 47% of the new entrants considered a lack of access to high-speed internet⁶ to have been a problem when they became involved in managing the business holding, and 18% considered that

³ "Taking all of your income sources into account, how would you describe the current economic position of your household? "

⁴ "On a scale from 0 to 10, where 0 is no help, how helpful to you were the following sources of advice for becoming involved in managing or setting up the business holding: Social media?"

⁵ "On a scale from 0 to 10, where 0 is no help, how helpful to you were the following sources of advice for becoming involved in managing or setting up the business holding: Internet?"

⁶ "Please indicate whether the following factors helped you, or presented problems to you, or did not affect you when you became involved in managing the business holding: High speed internet access"

access to high-speed internet was helpful. Approximately 25% of the respondents considered that they were not affected by the access or lack of access to high internet speed.

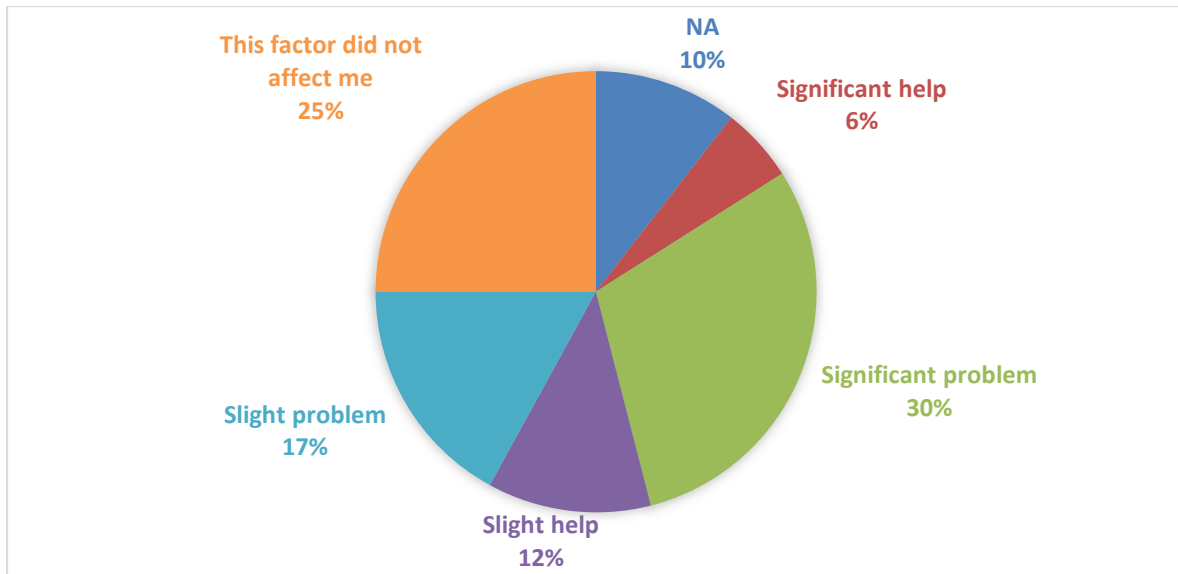


Figure 7. How important a problem or help has high speed internet been when you became involved in managing the business holding? (N = 200)

Finally, new entrants who engaged in diversification activities (27% of the new entrants) tended to agree that low internet speed has been a hindering factor to diversification⁷.

⁷ “How much do you agree with the following statement: low internet speed has been a problem for diversifying”.

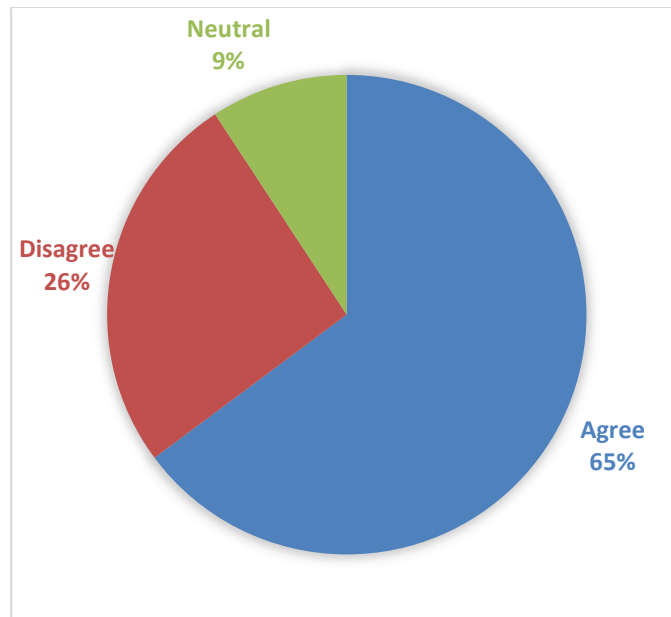


Figure 8. How much do you agree with the following statement: “low internet speed has been a problem for diversifying” (N= 54).

4.0 References

- Balachandar, S. and R. Chinnaiyan (2020). Internet of Things Based Reliable Real-Time Disease Monitoring of Poultry Farming Imagery Analytics, Cham, Springer International Publishing.
- Barlagne, C., J. Hopkins, L.-A. Sutherland, D. Wardell-Johnson, A. Barnes, S. Thompson, J. McMillan and M. Spencer (2020). Diversification on Scottish farms: attitudes and future plans. Farmer Intentions Survey briefing note, March 2020. Farmer Intentions survey briefing note, The James Hutton Institute, Scotland's Rural College,: 8.
- Barnes, A., S. Thompson, J. McMillan, M. Spencer, J. Hopkins, L.-A. Sutherland and Keith Mathews (2019). "Farmer Responses to Brexit: Attitudes towards Risk in Scottish Farming - Briefing Note." 6.
- Boursianis, A. D., M. S. Papadopoulou, P. Diamantoulakis, A. Liopa-Tsakalidi, P. Barouchas, G. Salahas, G. Karagiannidis, S. Wan and S. K. Goudos (2020). "Internet of Things (IoT) and Agricultural Unmanned Aerial Vehicles (UAVs) in smart farming: A comprehensive review." Internet of Things: 100187.
- Citoni, B., F. Fioranelli, M. A. Imran and Q. H. Abbasi (2019). "Internet of Things and LoRaWAN-Enabled Future Smart Farming." IEEE Internet of Things Magazine 2(4): 14-19.
- Feeley, M. (2020). How Scotland's farming sector is ploughing ahead with 5G and IoT technology. Special reports. Insider.co.uk.
- Henaughen, Kelly (2020). Broadband project for rural Angus. The Scottish Farmer. Glasgow. **Newsquest (Herald & Times)**.
- Hopkins, J., L.-A. Sutherland, A. Calo, C. Barlagne, D. Wardell-Johnson, A. Barnes, S. Thompson, J. McMillan and M. Spencer (2020). New entrants: their potential contribution to farming in Scotland by 2023. Farmer Intention Survey briefing note, March 2020, The James Hutton Institute, Scotland' Rural College,: 8.
- Mishra, A. K. and T. A. Park (2005). "An empirical analysis of internet use by U.S. farmers." Agricultural and resource economics review 2005 v.34 no.2(no. 2): pp. 253-250.
- NFUS (2021). Union Launches Broadband and Connectivity Survey. Farmers and crofters are being asked how broadband and connectivity has affected them and their businesses. NFU Scotland, NFU Scotland,.
- The Scottish Government (2017). Realising Scotland's full potential in a digital world: 33.

Data analysis:

R Core Team (2018, 2019) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna. <https://www.R-project.org/>

Addinsoft (2021). XLSTAT statistical and data analysis solution. New York, USA. <https://www.xlstat.com>.

Acknowledgements

This work was funded by the Rural & Environment Science & Analytical Services Division of the Scottish Government, as part of the Strategic Research Programme 2016-2021 (RD2.4.2/RD 2.4.1). The interpretations expressed in this report are derived by the authors and do not necessarily reflect those of the Scottish Government or RESAS. We wish to thank participants in the telephone survey and the Agricultural Statistics team for use of the June Agricultural Census data. Thanks to Michael Spencer at SRUC for compiling the dataset. Any errors in analysis or interpretation are those of the authors.

For further information, please contact:

Lee-Ann Sutherland (lee-ann.sutherland@hutton.ac.uk)

Carla Barlagne (carla.barlagne@hutton.ac.uk)

Suggested citation for this brief note: Barlagne, C.; Hopkins, J.; Sutherland, L.A., et al. 2021. Scottish farms, internet access and social media. Farmer intention survey briefing note, March 2021