UNIVERSITY CENTRE SPARSHOLT

An Investigation into Agricultural Technology Skills needs in Sustainable Land Management

A piece of action research to help inform and refresh the Solent LSIP 2026 report.

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Executive Summary

Purpose of study

Through engagement with land managers, agri-tech providers and academics this project provides feedback to Hampshire Chamber as Hampshire and Solent LSIP ERB on training and skills needs in agri-technology in sustainable land management. These findings aim to inform and refresh the LSIP 2026 report.

Methods

A systematic rapid evidence review of the literature was conducted, incorporating published and grey literature. Two separate focus groups were held engaging over 30 individuals from a wide range of businesses in the sector across small farms/estates, agri-tech developers, to academics and advisers. In addition, a questionnaire was distributed to gather quantitative data on specific skills needs.

Key findings

The workforce within this sector is wide-ranging and so too are the skills required. The key skills needs found across all data gathered by this study are:

1. Awareness of available technologies
2. Knowledge of funding sources
3. Ability to select most suitable training/technology
4. Data management

Recommendations

Five key recommendations for support are proposed below.

1. Training on decision making process for which agri-tech to use
2. Training on using agri-tech in conjunction with more traditional practices

3. A continuous review of agri-tech – what is available, what is best for each given scenario, cost benefit analysis
4. Provision of a manual/list of agri-tech for sustainable land management, providers and linked funding options. Ideally with some indication of which is the best choice given the land use/sector of the industry.
5. Provision of an objective agri-tech advisor to support decision making

Methodology

This project was time constrained at seven weeks from 12th January to 6th March. Therefore, there are some adaptations made within the methods to allow for reliable sample of the literature and views from the industry within a short time period.

Desk research approach

A systematic rapid evidence review of published and grey literature, was undertaken using the following key terms and Boolean search operators:

> (agri* OR agricultur* OR "land management") AND (tech* OR technolog*) And (skill* OR training) AND (sustainable).

Any other relevant literature already known to the author was also reviewed alongside known governmental legislation and funding linked to the topic area.

Survey design and response rate

A short questionnaire survey was implemented which included both multiple choice and free-text answers. This enabled both quantitative and qualitative data to be gathered. The design was purposefully accessible to all active members of the industry (Beatty et al., 2019). See Appendix A for a link to the questionnaire and a list of questions.

Response rate was 26% with 11 out of 42 individuals successfully completing the questionnaire. This was limited due to time available for the project.

Focus group details

Two focus groups were held incorporating a wide range of representatives from the industry. Focus group A included a range of 21 land managers and industry representatives from Winchester to River Test Farm Cluster Farm group meeting on 26th February 2026. A total of 42 individuals were invited to Focus group B, with the final group composed of seven including a range of academics, land managers and organisations spread across the wider Hampshire area on 27th February 2026. See appendix B for the list of attendees to each focus group.

The questionnaire was utilised to form the structure of the sessions and ensure that both the survey and focus group results could be analysed alongside each other. Those that could not attend the focus groups were invited to complete the questionnaire.

Note on triangulation of evidence

Qualitative and quantitative evidence was acquired from a wide variety of sources three types of evidence triangulation were performed including investigator, theory and data source triangulation (Carter et al., 2014). Commonalities and differences were highlighted and assessed. Any bias from sources was tested and addressed.

Sector Overview

Current state of the sector

There is an influx of agri-tech options from a wide variety of suppliers used within sustainable land management. These options are also rapidly evolving in a competitive market with a increasing pressure on land managers to make the correct investment into the most financially and practically viable technology.

Trends, drivers of change (technology, regulation, demographics)

There is a clear trend in this sector towards diversification with numerous areas of the industry utilising agri-tech for sustainable land management. The main areas include:

- Precision drilling
- Precision harvesting
- Variable rate technology (VRT) for fertiliser and pesticides
- Yield mapping
- Wildlife monitoring
- In-field soil sensors (moisture, nutrients, carbon)
- Environmental monitoring
- Farm carbon calculators
- Greenhouse gas monitoring systems
- On-farm renewable energy (solar, anaerobic digestion)
- Wearable livestock sensors (activity, rumination, health)
- Automated milking systems
- Robotic weeders (laser or mechanical)
- Hydroponics and aquaponics
- Smart irrigation systems
- Vertical farming systems
- Rainwater harvesting tech
- Farm management software platforms

The over-arching driver of change in this sector is governmental funding, with grants available to support sustainability, specific technologies or innovation. The primary source of funding for sustainable land management is provided by Defra (2026a). There are numerous options, with four sitting under the Environmental Land Management Schemes. These include the 'Sustainable Farming Incentive' (reopening for two application windows in June and September 2026), 'Countryside Stewardship Higher Tier', 'Landscape recovery' and 'Capital items' (reopening in July 2026). There is also the 'Farming in Protected Landscapes' programme.

Defra also provide the 'Farming Equipment and Technology Fund' with a new round opening imminently on 17th March 2026 (Defra, 2026a). Though this grant could tangentially support sustainable land management, it's key focus is to help fund items that would improve productivity, manage slurry and improve animal health and welfare.

The UK Research and Innovation 'ADOPT' funding, first launched in April 2025. This aims to support farmer-led, collaborative trials on-farm to test and investigate innovative solutions to challenges within this sector (Defra, 2026b). It supports development of agri-tech but minimal support is targeted towards skills training.

Market competition between large providers (such as John Deere, CLAAS, Omnia etc) also drive the decisions made by land managers on which agri-tech will be obtained. Currently decisions made by land managers are mostly driven by sales representatives from these providers visiting the site and providing a potential biased view of which technology would be most advantageous for sustainable land management.

Workforce profile

The last assessment by Defra (2025) of the overall agricultural workforce in England has shown decrease in number of farm workers over the past three years, see Figure 1. In addition, they recorded that the ratio of male to female principle farmers and farm holders remained unchanged, but the proportion of females under 35 years was slightly higher at 19%.

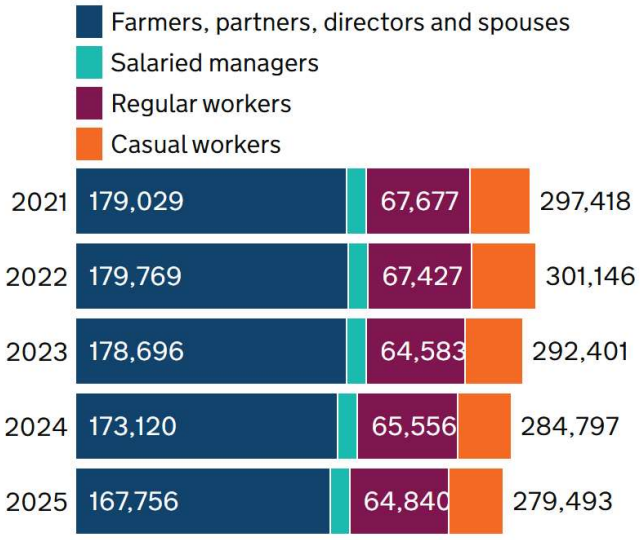


Figure 1. Taken from Defra (2025) - "Total agricultural workforce in England at 1 June".

Within this workforce, the individuals using agri-tech in sustainable land management is wide ranging. Team sizes depend on the area of land being managed. The individuals that use the technology have a range of backgrounds with increasingly more 'new generation' farmers entering the industry. Job roles within this sector span hands-on field work to strategic policy and business innovation.

Overall, the skills of the workforce are varied across multiple disciplines, utilising agri-tech within food production and ecological enhancements. Skills in sustainability are increasingly vital as funding and legislation drives sustainable land management. Skills in agri-tech and interpreting data are becoming more essential for those entering the industry or progressing within it.

Findings: Skills Needs Analysis

Evidence from desk research

Overview

There have been multiple attempts to assess the progression of skills needs of the sector related to agri-tech and sustainable land management (e.g. Winter, 1997; Ritz et al., 2019; Sørensen et al., 2021; Mayor et al., 2022; Dickinson et al., 2025; Fry, 2025). Findings from these assessments are wide ranging, depending on the needs of the sector at that point in time. Winter (1997) outlines the 'emergence of environmentally sustainable agriculture' and the need for farmers' knowledge to evolve. This same theme is apparent in most articles published since and discovered in this systematic rapid evidence review.

Skills needs identified by existing reviews

Sørensen et al. (2021) has identified five key categories of skills required to transition towards sustainable agriculture including 'Systems perspective', 'Lifelong learning', 'Knowledge integration', 'Building and maintaining networks and learning communities' and 'Technical and subject-specific knowledge and technology'. They identify that knowledge and skills in agricultural technology is evolving and developing based on the needs for more sustainable agricultural practices.

Mayor et al. (2022) undertook a study across nine European countries engaging with a range of roles within the sector. Whilst only one or two farmers were engaged from each country within this study, their findings are useful. Figure 2 below shows the most selected skills in a ranking exercise they conducted to assess the overall skills needs for sustainable agri-food and forestry sectors.

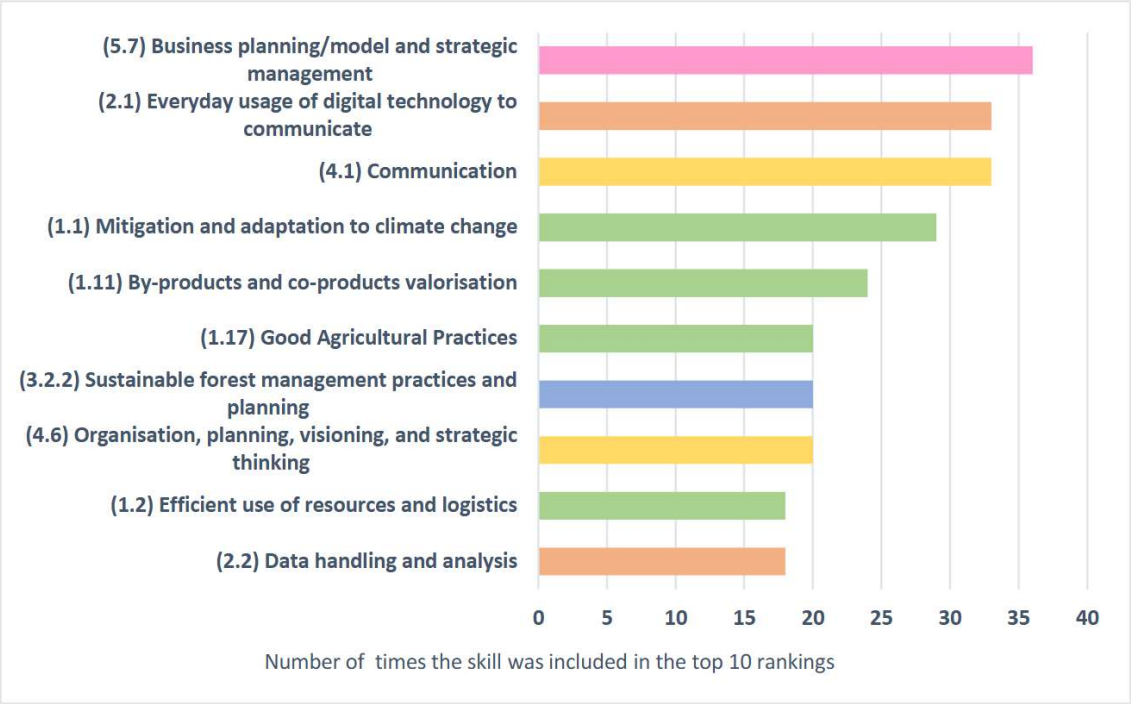


Figure 2. Taken from Mayor et al. (2022) – "Most selected skills from the skills lists, 10-ranking exercise. In brackets skill numbers from Appendix A tables."

Within this 'digital technology', is ranked as highly important and 'data handling and analysis' ranked lower. However, agri-tech in general can enable and support the majority of skills highlighted here.

Dickinson et al. (2025) have recently assessed what new technologies are currently being developed/implemented shown below in Figure 3. With the emphasis made that training in the use of these technologies should match the rate of change/innovation in agri-tech. In contrast to Mayor et al. (2022), Dickenson et al. (2025) highlights the need for data handling skills as a high priority within training ecosystems.

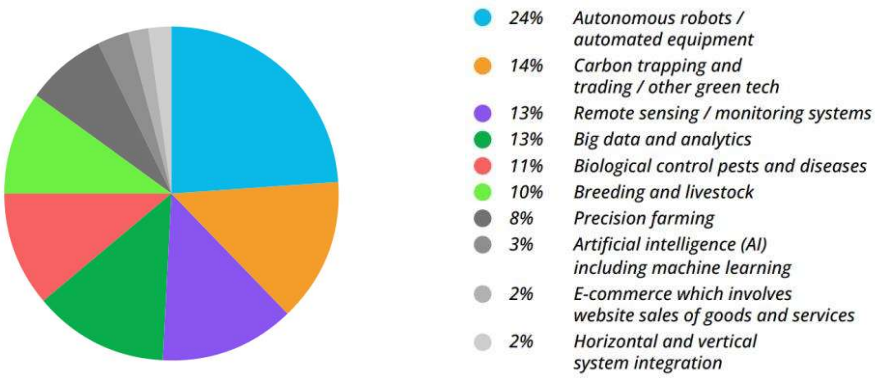


Figure 3. Taken from Dickinson et al. (2025) "New technologies currently being developed/recently implemented".

Across the sector, agri-tech is used widely for sustainable land management, but the implementation of each type/group of technology varies. This can be seen in Figure 4 below taken from Fry (2025).

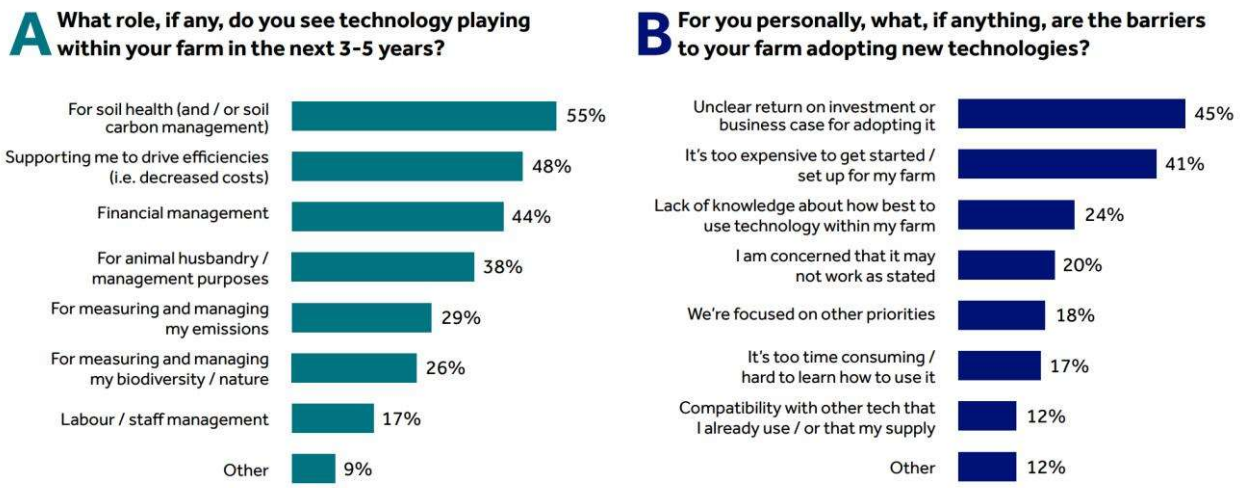


Figure 4. Taken from Fry (2025) "Role of Agri-tech and barriers to adoption".

As seen above, agri-tech skills needs are wide ranging and there are multiple barriers to adopting those technologies.

To successfully establish long-term sustainable agricultural practices not only do land managers need to be skilled in the use of agri-tech but also in ecology (Carlisle et al., 2019). Agri-tech can enable training and general affinity with ecological practices via apps such as 'The Healthy Hedgerows' app (PTES, 2026) that enables users to assess the health of their hedgerows via measures of structure and biodiversity. Another example is the Merlin ID app (Cornell Lab, 2026) that utilises bioacoustics to monitor and identify bird species by their song.

Survey results

Key quantitative highlights from the survey results are presented below. In particular, the answers to question 5 and 8 provide key insights into the current agri-tech skills and those that need support in the industry.

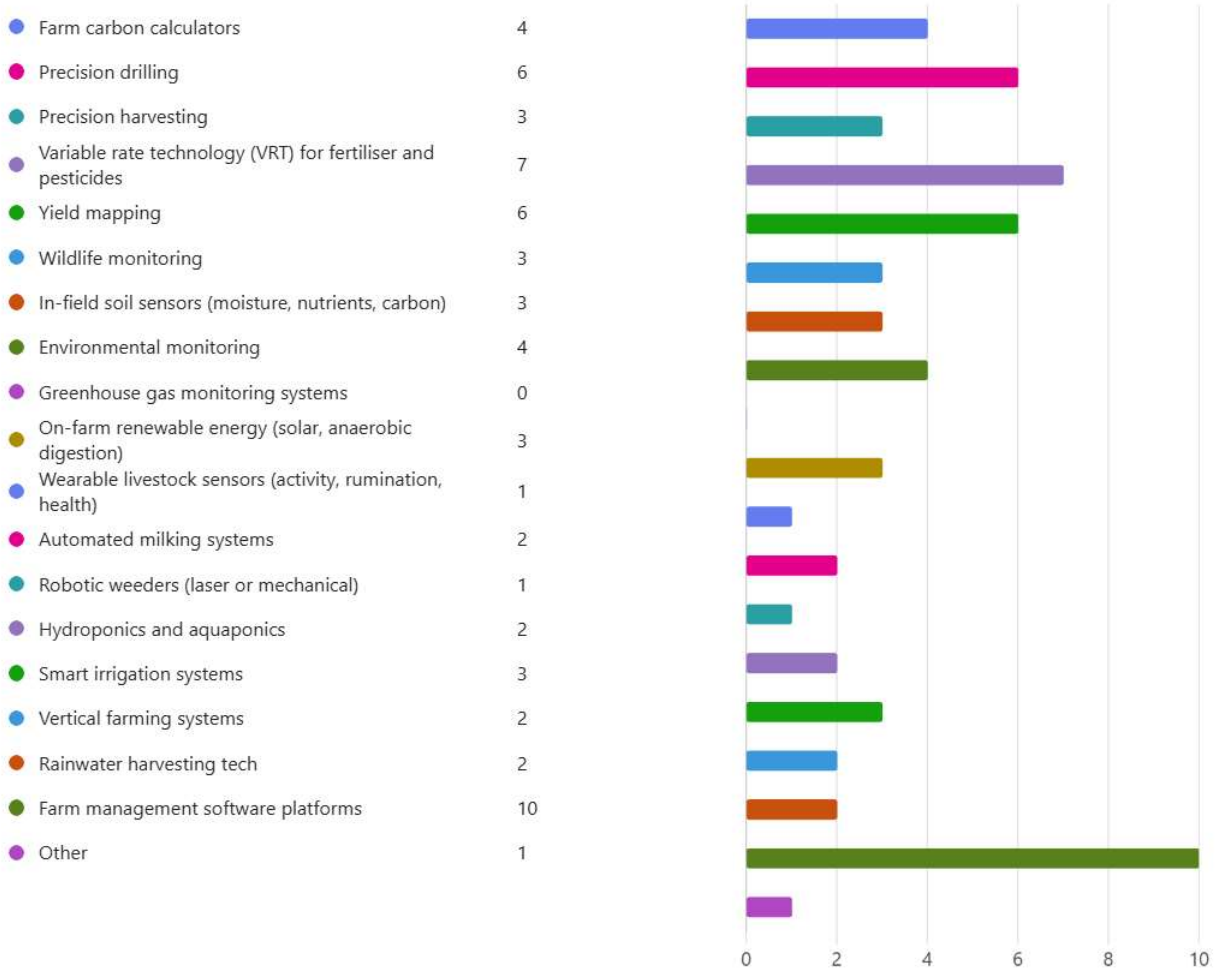


Figure 5. Question 5 – What current area of Agri-tech skills for sustainable land management do you feel confident in?

Figure 6. Question 6 – What specific skills within these areas do you have/provide?

Figure 7. Question 7 – What Agri-tech do you use/provide? (please provide name of each device/software and brand).

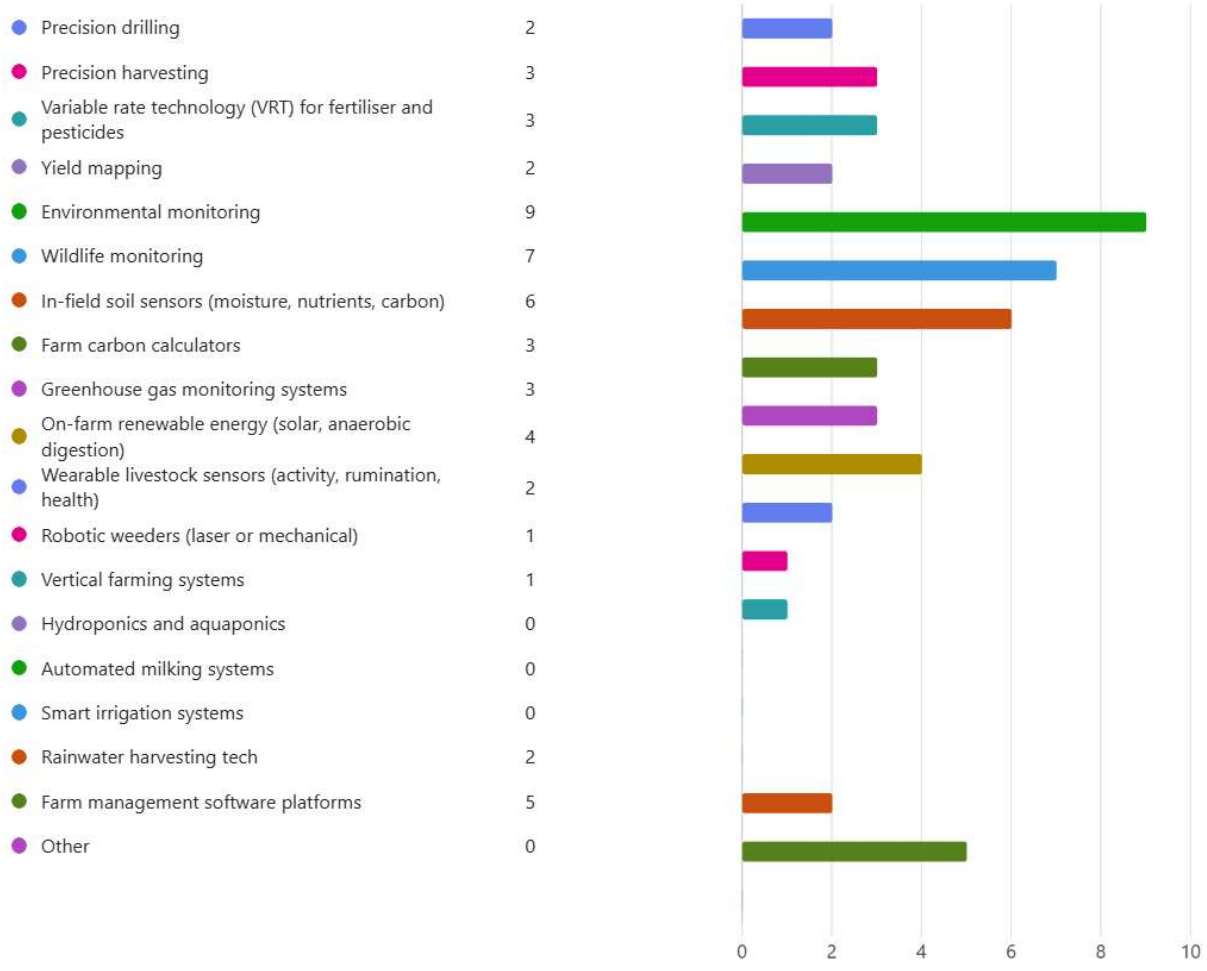


Figure 8. Question 8 - What Agri-tech skills for sustainable land management do you think need support in our industry?

Summary of responses to Question 10 - Suggestions for improvement to provision of training in agri-tech skills for sustainable land management

- Tailor training to small and large farms equally
- Improve provision of training in specific agri-tech on farm by the provider
- Training in applying for grant funding

- How best to record, manage and analyse data as a foundation for being able to learn new agri-tech skills
- A more holistic approach looking at how everything links together
- Investment in recruiting and retaining good calibre lecturing staff in order to be able to deliver a good well-rounded education for students, ahead of looking to invest in capital items or infrastructure.
- Arable sector needs a financially viable and stable trading environment as a foundation prior to agr-tech training provision

Focus group insights (qualitative themes)

A wide range of needs in agri-tech skills for sustainable land management were highlighted across the two focus groups and can be seen in the supplementary files on focus group notes. The main themes across both focus group A and B are outlined below.

Main skills areas in need of support

- Awareness of available agri-tech and its relevance to sustainable land management
- Knowledge of correct trialling/deployment of agri-tech to optimise sustainability
- Ability to use agri-tech in conjunction with on the ground skills
- Efficient capability in the use of agri-tech
- Ecological monitoring with the use of agri-tech
- Interpretation of the data collected

Specific skills highlighted for support

- Data management
- How AI can be used and programmed to analyse data and outputs on farms
- Critical analysis of agri-tech options
- GIS mapping/planning and support in using software e.g. Omnia or a specific person to call to provide support
- Wildlife monitoring using biosensors and bioacoustics
- Understand the use of field sensors e.g. carbon and soil and be kept up to date with developments and new sensors
- Use of drones

Highlighted skills for new entrants to the industry

- Precision farming (drilling), hands on tools and integrated systems in tractors including GPS technology
- Use of drones for surveying and sowing crops
- Cattle collars are effective over a large site and helpful to map grazing behaviours
- Wildlife monitoring – some skills in use of AI technology to map bird song to species, location and density

- Robotic milking (although dairy production declining in Hampshire)
- Farm management software systems – e.g. gatekeeper knowledge will be important. Integration between different systems also.
- Understanding carbon management metrics, biodiversity net gain etc.
- Skills in adapting to climate change and agri-tech that can support this

Emerging and future skills needs

Across both the questionnaire and focus groups results there was a very clear theme to the emerging and future skills needs. It was highlighted repeatedly that there are too many agri-tech options and so it is almost impossible for those in the industry to be able to choose and utilise the correct agri-tech for their land. The main emerging and future specific skills needs areas are:

1. Environmental monitoring
2. Wildlife monitoring
3. Farm management software platforms
4. In-field soil sensors

Key Skills Gaps & Priorities

Critical shortages & Skills in demand now

The results of the desk research, questionnaire survey and focus group discussions have highlighted the following key skills needs as a priority:

1. Awareness of available technologies
2. Knowledge of funding sources
3. Ability to select most suitable training/technology
4. Data management

Anticipated future needs

Land managers will need to be able to pivot agri-tech and knowledge to what is most suitable to maintain sustainable practices. All sources of evidence demonstrated that regular training and a continuously updated, reliable and objective source of information on agri-tech is needed.

Recommendations

Practical actions for employers, training providers, policymakers & short-term vs long-term priorities

Actions are outlined in Table 1 and the short-term/long-term priorities are indicated.

Table 1. Recommendations for actions split into short-term/long-term priorities.

Action		Short-term	Long-term
1	Training on decision making process for which agri-tech to use	✓	✓
2	Training on using agri-tech in conjunction with more traditional practices		✓
3	A continuous review of agri-tech – what is available, what is best for each given scenario, cost benefit analysis		✓
4	Provision of a manual/list of agri-tech for sustainable land management, providers and linked funding options. Ideally with some indication of which is the best choice given the land use/sector of the industry.	✓	✓
5	Provision of an objective agri-tech advisor to support decision making		✓

Suggestions for monitoring and evaluation

An initial trial of some of the training/resource provision could be undertaken within a farm cluster to test proof of concept. The Winchester to River Test farm cluster involved in focus group A could be a good baseline. Table 2 outlines suggestions for monitoring and evaluation. Ideally initial results from evaluation could inform future frequency of monitoring.

Table 2. Suggestions for monitoring and evaluation of actions.

Action	Suggested monitoring/evaluation of each action	When
1	Focus group to discuss efficacy of training after put into practice	6 months after training delivered
2	Focus group to discuss efficacy of training after put into practice	6 months after training delivered
3	Ideally regular checks to ensure content is up to date	Monthly
4	Ideally regular checks to ensure content is up to date	Monthly
5	Review questionnaire to be made available to land managers	After advice provided

Conclusion

Summary of the most important points

There are a wide range of skills needs, however skills in use of specific agri-tech are generally provided by the manufacturer. Land managers instead require clear, objective information on what agri-tech is best for their sustainable land management practices. They then need to be able to make reliable decisions based on this information, either

through training in this area or the provision of objective advice by an independent provider.

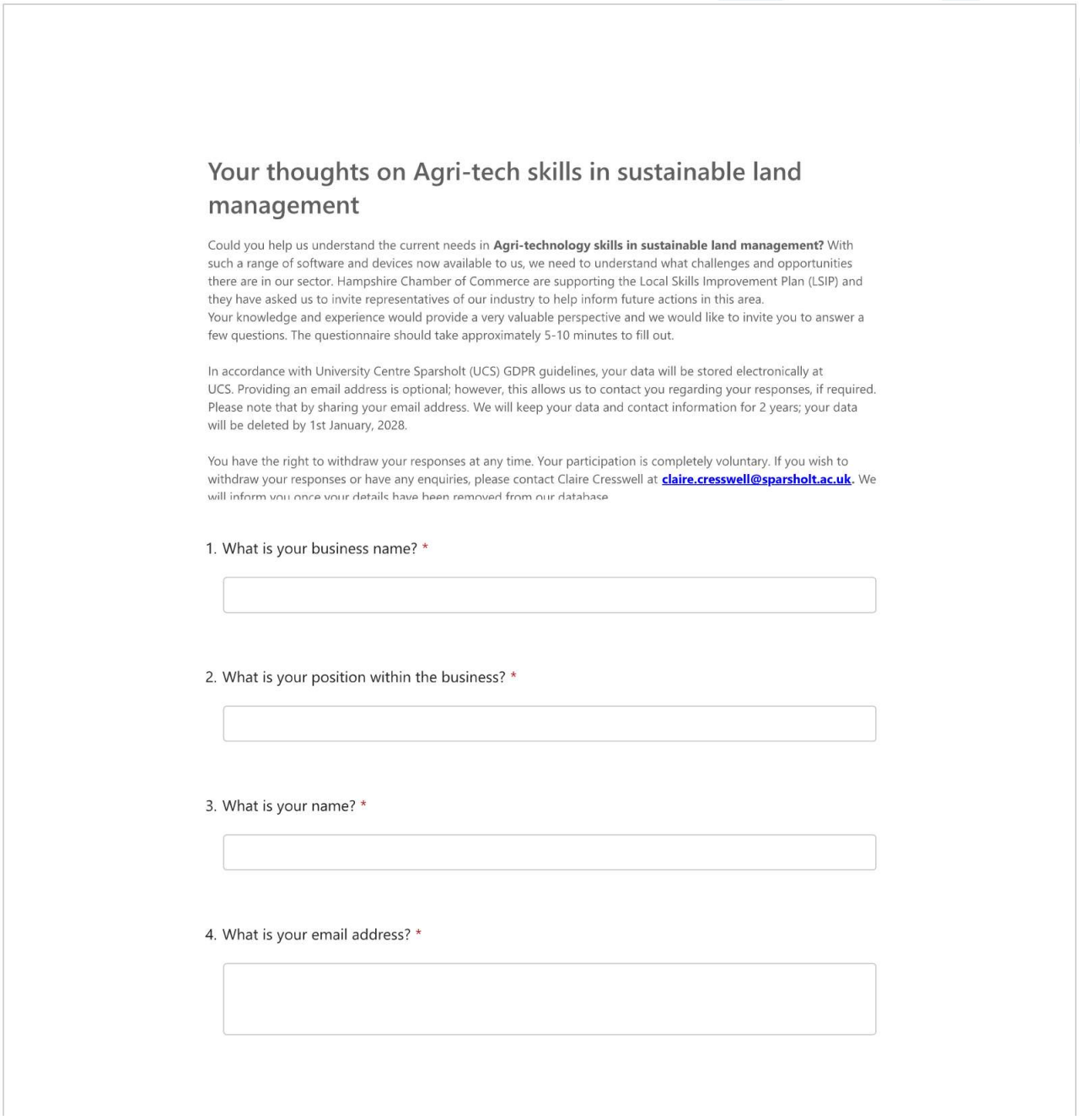
Call to action

Agri-tech skills in land management are continuously evolving, so too must the support for this part of our industry.

Appendices

A - Survey questionnaire

Link to questionnaire and associated data: Your thoughts on Agri-tech skills in sustainable land management – Collaboration



Your thoughts on Agri-tech skills in sustainable land management

Could you help us understand the current needs in **Agri-technology skills in sustainable land management?** With such a range of software and devices now available to us, we need to understand what challenges and opportunities there are in our sector. Hampshire Chamber of Commerce are supporting the Local Skills Improvement Plan (LSIP) and they have asked us to invite representatives of our industry to help inform future actions in this area.
Your knowledge and experience would provide a very valuable perspective and we would like to invite you to answer a few questions. The questionnaire should take approximately 5-10 minutes to fill out.

In accordance with University Centre Sparsholt (UCS) GDPR guidelines, your data will be stored electronically at UCS. Providing an email address is optional; however, this allows us to contact you regarding your responses, if required. Please note that by sharing your email address. We will keep your data and contact information for 2 years; your data will be deleted by 1st January, 2028.

You have the right to withdraw your responses at any time. Your participation is completely voluntary. If you wish to withdraw your responses or have any enquiries, please contact Claire Cresswell at **claire.cresswell@sparsholt.ac.uk**. We will inform you once your details have been removed from our database.

1. What is your business name? *

2. What is your position within the business? *

3. What is your name? *

4. What is your email address? *

5. What current area of Agri-tech skills for sustainable land management do you feel confident in? *

- [ ] Precision drilling
- [ ] Precision harvesting
- [ ] Variable rate technology (VRT) for fertiliser and pesticides
- [ ] Yield mapping
- [ ] Wildlife monitoring
- [ ] In-field soil sensors (moisture, nutrients, carbon)
- [ ] Environmental monitoring
- [ ] Farm carbon calculators
- [ ] Greenhouse gas monitoring systems
- [ ] On-farm renewable energy (solar, anaerobic digestion)
- [ ] Wearable livestock sensors (activity, rumination, health)
- [ ] Automated milking systems
- [ ] Robotic weeders (laser or mechanical)
- [ ] Hydroponics and aquaponics
- [ ] Smart irrigation systems
- [ ] Vertical farming systems
- [ ] Rainwater harvesting tech
- [ ] Farm management software platforms
- [ ] Other

6. What specific skills within these areas do you have/provide? *

7. What Agri-tech do you use/provide? (please provide name of each device/software and brand) *

8. What Agri-tech skills for sustainable land management do you think need support in our industry? *

- [ ] Precision drilling
- [ ] Precision harvesting
- [ ] Variable rate technology (VRT) for fertiliser and pesticides
- [ ] Yield mapping
- [ ] Environmental monitoring
- [ ] Wildlife monitoring
- [ ] In-field soil sensors (moisture, nutrients, carbon)
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- [ ] Robotic weeders (laser or mechanical)
- [ ] Vertical farming systems
- [ ] Hydroponics and aquaponics
- [ ] Automated milking systems
- [ ] Smart irrigation systems
- [ ] Rainwater harvesting tech
- [ ] Farm management software platforms
- [ ] Other

9. If you were to receive training in this area how would you prefer to receive it? *

- ◯ In-person
- ◯ Online
- ◯ Other

10. Please suggest any improvements you would make to the provision of training in agri-tech skills for sustainable land management.

B - Focus group guide & list of attendees

Guide for the focus group was a few slides based on the questionnaire.

Focus group A list of attendees

Name	Farm
Michael Bond	Bullington Manor Estate
David Burnfied	Hazeldown Farm
Rowena Burnfield	Hazeldown Farm
Giles Burnfield	Hazeldown Farm
Tom Coleman	Lower Norton Farm
Nicholas Craig Harvey	Lainston Dairy
Adrian Dixon	West Stratton Farm
Rob Nicholls	Leckford Estate
Will Liddell	Westover Farm
Matthew Cobb	Sparsholt College Farm
Giles Porter	Testbourne Farm Partnership (Firgo Farms)
Joe Edwards	Middleton Estate
Edward Wills	Middleton Estate
Edward Pettit-Mills	BCM - Agent Bullington Manor Estate
Gary Clarke	Southern Water
Rob Iddeson	Moundsmere Estate Management Ltd
Stephen Woodley	Omacast
Neil Broomfield	Hampshire Ornithological Society
Rosie Pratt	FWAG Southeast
Charlotte Wiffen	FWAG Southeast Placement student & University Centre Sparsholt
Matthew Norris-Hill	FWAG Southeast

Focus group B list of attendees

Name	Organisation	Position
Andrew Ferguson	Waitrose Leckford Estate	Regenerative Farming technical lead
Andy Bason	New House Farm	Farm manager
Irek Wypasek	New Forest Fruit	Managing Director
Matthew Tallis	University Centre Sparsholt	Higher Education lecturer
Ruth Payne	University Centre Sparsholt	Higher Education lecturer
Nick Shorter	Velcourt	Group Chief Executive
Rob Medway	Godshill Orchards	Farm manager
Tom Coleman	Lower Norton Farm	Estate manager

C - Data tables or charts

Included in the main text for clarity.

References

Beatty, P. C., Collins, D., Kaye, L., Padilla, J.-L., Willis, G. B., & Wilmot, A. (2019). *Advances in Questionnaire Design, Development, Evaluation and Testing*. John Wiley & Sons.

Carlisle, L., Montenegro de Wit, M., DeLonge, M. S., Iles, A., Calo, A., Getz, C., Ory, J., Munden-Dixon, K., Galt, R., Melone, B., Knox, R., & Press, D. (2019). Transitioning to Sustainable Agriculture Requires Growing and Sustaining an Ecologically Skilled Workforce. *Frontiers in Sustainable Food Systems*, *3*. https://doi.org/10.3389/fsufs.2019.00096

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, *41*(5), 545–547. https://doi.org/10.1188/14.ONF.545-547

Cornell Lab (2026). Merlin Bird ID - Free, Instant Bird Identification Help and Guide for Thousands of Birds. Retrieved 20 February 2026, from https://merlin.allaboutbirds.org

Department for Environment Food and Rural Affairs (Defra) (2025). *Agricultural workforce in England at 1 June 2025*. Retrieved 20 February 2026, from https://www.gov.uk/government/statistics/agricultural-workforce-in-england-at-1-june/agricultural-workforce-in-england-at-1-june-2025

(Defra) (2026a). *Funding for farmers, growers and land managers*. (2026, February 26). GOV.UK. https://www.gov.uk/guidance/funding-for-farmers

Defra (2026b). *ADOPT – Farming Innovation Programme*. Retrieved 20 February 2026, from https://farminginnovation.ukri.org/adopt/

Dickinson, P., Napier, R., Collier, R., & Erickson, E. (2025). *Review of research and innovation that will impact the English agricultural and horticultural workforce: Executive Summary*. The Institute for Agriculture and Horticulture. https://tiah.org/w/new-skills-set-to-be-the-base-of-future-success-in-farming-and-growing

Fry, S. (2025). Agritech: supporting the future of farming. Barclays. Retrieved 20 February 2026, from https://home.barclays/content/dam/home-barclays/documents/news/Insights/Barclays_Agritech_Report_FINAL.pdf

Mayor, L., Lindner, L. F., Knöbl, C. F., Ramalho, A., Berruto, R., Sanna, F., Rossi, D., Tomao, C., Goodburn, B., Avila, C., Leijdens, M., Stollewerk, K., Bregler, M., Koidis, C., Morin, A., Miličić, V., Fadini, G., Lazaro-Mojica, J., & Busato, P. (2022). Skill Needs for Sustainable Agri-Food and Forestry Sectors (I): Assessment through European and National Focus Groups. *Sustainability*, *14*(15), 9607. https://doi.org/10.3390/su14159607

People's Trust for Endangered Species (PTES), 2026. *Healthy Hedgerows*. Retrieved 20 February 2026, from https://hedgerowsurvey.ptes.org/healthy-hedgerows-survey

Ritz, S., Rizzo, D., Fourati-Jamoussi, F., Dantan, J., Combaud, A., & Dubois, M. J. (2019). Training in agricultural technologies: a new prerequisite for smart farming. In *3rd Rendez-Vous Techniques AXEMA*.

Sørensen, L. B., Germundsson, L. B., Hansen, S. R., Rojas, C., & Kristensen, N. H. (2021). What Skills Do Agricultural Professionals Need in the Transition towards a Sustainable Agriculture? A Qualitative Literature Review. *Sustainability*, *13*(24), 13556. https://doi.org/10.3390/su132413556

Winter, M. (1997). New Policies and New Skills: Agricultural Change and Technology Transfer. *Sociologia Ruralis*, *37*(3), 363–381. https://doi.org/10.1111/j.1467-9523.1997.tb00056.x