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People and Nature

RESEARCH ARTICLE

Interdisciplinary and Transdisciplinary Research to Improve Treescapes for the Benefit of People and Nature

Identifying knowledge barriers to agroforestry adoption and co-designing solutions to them

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Abstract

1. Compared to monocultures, agroforestry can promote biodiversity, ecosystem functioning and climate resilience, whilst maintaining or enhancing production and profits. Despite this, uptake in temperate regions remains low. Knowledge gaps amongst land managers are a primary barrier to uptake, but little is known about which aspects of agroforestry management are hindering uptake specifically, or how to address them.
2. We use a mixed-method approach to identify knowledge barriers to agroforestry adoption in the UK and co-design solutions to them. To identify barriers, we interviewed 27 farmers in 2023–2024. We used a perception matrix to quantitatively assess their perceptions of 12 agroforestry knowledge elements (e.g. tree species, inputs, markets) against eight perceptions (e.g. information is important, available or trustworthy). To identify solutions, we used the interview results to direct focus group discussions at a multi-actor workshop with 48 participants, including farmers, policymakers, NGOs and other stakeholders. We then conducted a framework analysis to identify shared solutions and create an evidence-based educational agenda.
3. We found that the perceived knowledge gaps were greater for the business elements (e.g. financial or legal impacts) than the ecological elements (e.g. understory management) and that the relative importance of the learning barriers differed between elements. Averaging across elements, the largest barriers were time constraints and a shortage of trusted information. The proposed solutions to the knowledge gaps included (for example) designs for open-access online tools for independent learning, innovative mechanisms to fund farmer-to-farmer mentoring, agroforestry accreditation to enhance trust in advice and policy reforms to education. Creating living labs or demonstration farms could provide multiple benefits in parallel. We consolidated the solutions into a 10-step educational agenda.

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4. This evidence-based agenda for agroforestry education reflects the views of UK stakeholders across the agricultural supply chain. It is directly relevant to policymakers, agricultural advisors and educators, and researchers and their funders. Many of the solutions are straightforward to implement and could promote agroforestry uptake quickly, whereas others are systemic and require multi-organisational collaboration. Equipping farmers with the knowledge needed to adopt agroforestry and manage it effectively will help us to build a more climate-resilient and sustainable future.

KEYWORDS
agrisilviculture, agroforestry knowledge gaps, alley cropping, educational agenda, multi-stakeholder co-production, regenerative agriculture, silvoarable, silvopasture

1 | INTRODUCTION

Agroforestry is the integration of woody vegetation (trees or shrubs) with crops and/or livestock, including productive (e.g. timber or fruit) and non-productive trees (Table 1). Comparative syntheses have shown that temperate agroforestry can enhance biodiversity, ecosystem functioning, production, profits and human well-being compared to its monoculture counterparts (Table 1) (Amorim et al., 2023; García de León et al., 2021; Jordon et al., 2020; Kletty et al., 2023; Pent, 2020; Torralba et al., 2016). As half the world's habitable land

TABLE 1 A summary of three forms of temperate agroforestry and their impacts compared to their non-agroforestry counterparts.

Silvopasture	Silvoarable alley cropping	Silvopoultry
Silvopasture is the most ancient and common form of agroforestry (Castle et al., 2022; den Herder et al., 2017). Compared to pasture, it can promote biodiversity, soil health, forage production and livestock performance (Amorim et al., 2023; Bobryk et al., 2016; Jose & Dollinger, 2019). It can contribute to climate change mitigation through carbon sequestration and reducing cows' enteric methane emissions (e.g. grazing on willow can lower methane production by 22%) (Thompson et al., 2023). It can also provide climate resilience through microclimatic buffering and by diversifying livestock food sources (Jose & Dollinger, 2019). These benefits can increase profits, with recorded gains of 17% (Dávila-Solarte et al., 2019). However, high establishment costs (e.g. tree guards to prevent overgrazing) can prohibit adoption (Tranchina et al., 2024)	Silvoarable alley cropping involves the integration of rows of trees or shrubs through arable fields. Compared to arable farming, silvoarable farming has greater structural complexity and plant biodiversity, which can promote invertebrates, carbon sequestration, soil health, food production and profits (Kletty et al., 2023; Staton et al., 2022). For example, there are 24% more natural enemies and 25% fewer insect pests in silvoarable systems compared to arable ones (Staton et al., 2019). Silvoarable farming can also promote resilience to climate change via microclimatic buffering, improved soil health and the ecological redundancy provided by increased biodiversity (Blanchet et al., 2021). However, it also increases mental load as farmers must plan over longer timescales, and it constrains management by fixing alley widths that may not be compatible with future machinery	Silvopoultry is the production of eggs or chicken meat with trees or shrubs. This can promote biodiversity, carbon sequestration, soil and water quality and animal welfare (Castle et al., 2022). These welfare benefits stem from direct benefits from the trees (e.g. shade) and indirect benefits (e.g. aerial predator deterrence) (Bright & Joret, 2012; Jones et al., 2007). This translates to a decrease in chicken mortality and increase in egg quality, which can promote profits. For example, a study of 66 flocks found 20% fewer egg seconds (lower quality eggs) and 22% lower mortality rates in silvopoultry (Bright & Joret, 2012). However, with a high percentage (46%) of EU farmland tenanted, adoption can be hindered when profitability takes longer than typical tenancy durations (Eurostat, 2024; Tranchina et al., 2024)

Note: In silvoarable alley cropping, trees are planted in rows, whereas in the other systems, they can be planted in regular or irregular arrangements. Other forms of agroforestry include silvohorticulture (trees and horticulture), forest farming (cultivation of plants under existing forest cover) and linear features, such as hedgerows, shelterbelts, windbreaks and riparian buffers (Castle et al., 2022; García de León et al., 2021). Photo credits: silvopasture (Anne Boisinard), silvoarable (Amelia Hood), silvopoultry (Agforward, flickr, licenced under CC BY-NC-SA 2.0).

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is used for agriculture (Ritchie & Roser, 2024), sustainable intensification—where environmental and production benefits are provided in tandem—is needed to help us meet our growing food needs without further expansion into natural or semi-natural habitats (Godfray & Garnett, 2014; Pretty & Bharucha, 2014). Agroforestry is particularly promising in this regard. It can also enhance resilience to ecological and political shocks to the food system by diversifying food and income sources (Quandt et al., 2023). In the longer term, agroforestry can promote resilience to climate change—including increased droughts and extreme weather events—via microclimatic buffering, improved soil health and greater ecological redundancy via increased biodiversity (Amorim et al., 2023; Blanchet et al., 2021; Lawson et al., 2018; Quandt et al., 2023).

Despite these benefits, agroforestry adoption remains low in temperate regions, with 7.5% and 3.3% of agricultural land area in the EU and UK under common agroforestry systems, respectively (den Herder et al., 2017; Rubio-Delgado et al., 2024). However, as governments increasingly recognise (a) the potential benefits of agroforestry and (b) that insufficient financial incentives are a primary barrier to adoption, policy changes are beginning to redress this via increased financial support (Tranchina et al., 2024; Venn & Burbi, 2023). For example, the Canadian government made agroforestry one of four priority areas in the 2016 Agricultural Greenhouse Gases Programme, worth $27 M CAD (Government of Canada, 2014). In the EU, agroforestry was included as a 'Key Ecoscheme' in the 2023 Common Agricultural Policy (CAP) reform along with new financial incentives (Dauby et al., 2024). In the UK—where this study was conducted—recent post-Brexit government schemes have significantly increased funding for agroforestry, partly driven by the government's need to meet their 2050 net-zero targets (Venn & Burbi, 2023; Westaway et al., 2023). However, better financial support only addresses one of the two major barriers to agroforestry adoption; a perceived lack of knowledge about agroforestry amongst land managers acts as the other major barrier and one which remains unaddressed (Tosh & Westaway, 2021; Tranchina et al., 2024).

To address this perceived lack of knowledge about agroforestry and therefore support its uptake, the relevant information needs to be available to farmers first and foremost. Besides the availability of information, there are many further barriers to learning about new farming practices that need to be addressed (David et al., 2022). Trust in the information is important; for example, a lack of trust in automated systems compared to in-person advice has hindered the uptake of precision agriculture (Brugler et al., 2024). The desire for professional advice can also create a financial barrier to accessing information, particularly if the cost of advice is high (e.g. legal advice into how tree planting might impact land value) (David et al., 2022; Low et al., 2024). An additional barrier to learning is time, as farmers have high workloads that are often over 48 h a week in Europe (Donohoe et al., 2024). For example, a perceived lack of time was a major barrier to farmers adopting GHG mitigation practices in the Netherlands (Gomes & Reidsma, 2021). High workloads also limit farmers' capacity to learn, especially for agroforestry where new skills, new markets and long timescales (e.g. 20–60 years to harvest timber) need to be considered (Staton et al., 2024). In addition, personal mindset and farmers' perceptions about whether they would be able to understand and practically implement the information are important (David et al., 2022; Gomes & Reidsma, 2021). The relative importance of these barriers can also vary depending on the specific knowledge aspect that the farmers are learning about; for example, learning how to fertilise trees may be less daunting than evaluating the impacts of tree planting on land value (David et al., 2022).

Once specific knowledge barriers to adopting a new practice have been identified, this information can be used to create targeted solutions to address each barrier. Co-design and related participatory approaches—including co-production, social-ecology and translational ecology—are gaining traction due to strong evidence of their ability to create innovative, practical, implementable and scalable solutions to complex problems (Busse et al., 2023; Enquist et al., 2017; Gaba & Bretagnolle, 2020; Kurle et al., 2022). These mission-oriented approaches include stakeholders in their ethos, recognising that co-designing solutions or other outputs can be more effective at creating implementable solutions and changing behaviour than researcher-led approaches (Asah & Blahna, 2020; Fujitani et al., 2017).

Our study has two aims. First, we aim to identify the specific barriers that farmers perceive as hindering them from learning about different aspects of agroforestry knowledge. To do this, we conducted mixed-methods interviews that included the use of a perception matrix (Moon et al., 2017). This is an innovative method that can quantify perceptions to make intra- and inter-individual comparisons, and it has only recently been applied to agri-environmental research (Moon et al., 2017). Our second aim is to co-design an educational agenda for UK agroforestry to create specific and actionable solutions to address the perceived knowledge barriers we identify here. To do this, we used the results from the perception matrix to inform discussions with a multi-actor group. This multi-step process results in an agenda that is evidence-based and reflects the views of stakeholders across the agricultural supply chain in the UK.

2 | MATERIALS AND METHODS

This research was conducted in Southern England, UK, from October 2023 to February 2024. We used a mixed-method approach consisting of two stages: (1) identifying perceived knowledge barriers with in-person interviews and (2) co-designing solutions to these barriers at a workshop and creating an educational agenda based on these solutions (Figure 1). This approach is situated within a post-positivist epistemology, acknowledging that the resulting agenda is shaped by our chosen methods, the researchers' positionalities and the participants' contexts (Braun & Clarke, 2024). This research was approved by the University of Reading's ethics committee [reference numbers: 2259C and 2261D] and participants provided written informed consent.

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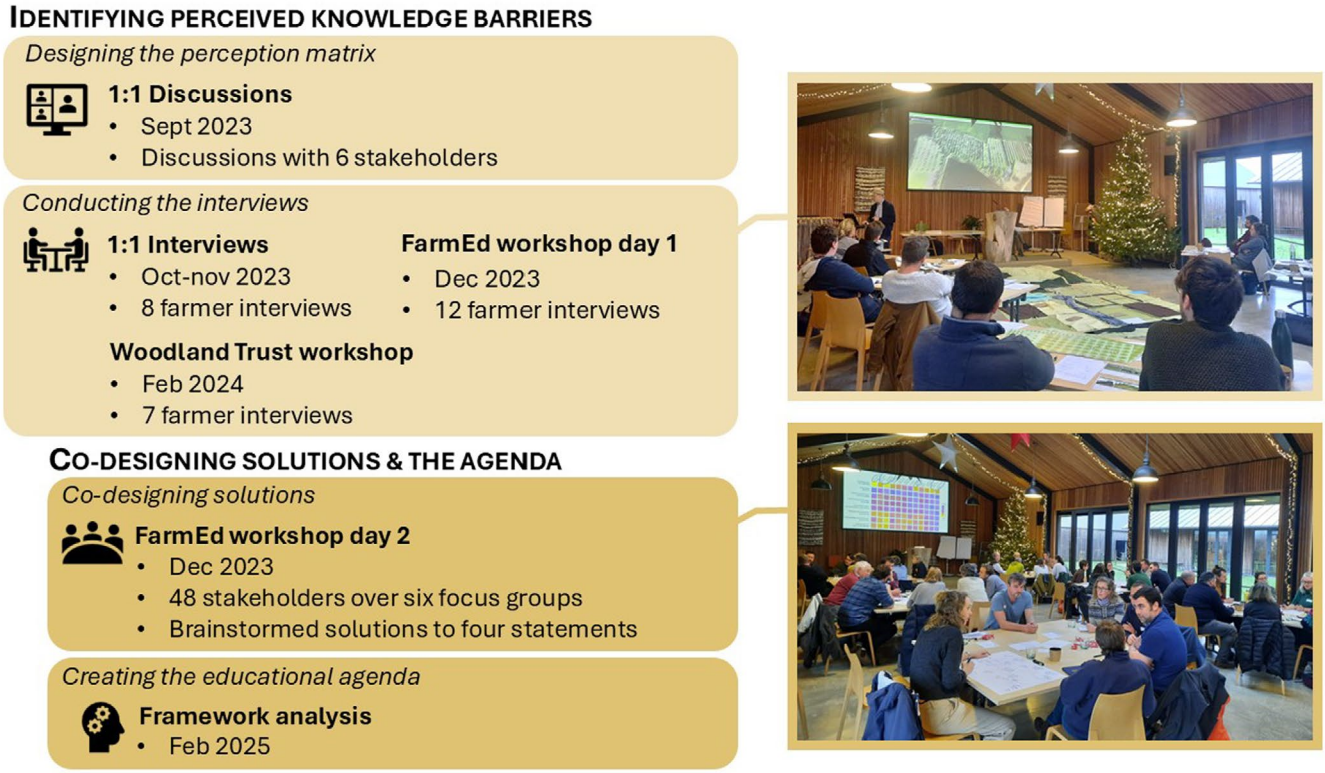

FIGURE 1 A scheme showing the research process with dates. The top photo shows an agroforestry training exercise for farmers during the first day of the FarmEd workshop. The lower photo shows a wider group of stakeholders working in a focus group on the second day.

We limited the scope of this research to in-field agroforestry, which we defined as having single or multiple trees, shrubs or woody perennials within arable, pastoral, poultry or mixed farming systems. We clarified that this includes productive (e.g. timber or food) and non-productive trees in regular (e.g. alley cropping) or irregular (e.g. parkland) planting arrangements. We excluded linear boundary features, like hedgerows, because they are the most common form of agroforestry in the UK and Europe; agroforestry accounts for 7.5% of utilised agricultural area in Europe without linear boundary features, but with them, this increases to 25% (den Herder et al., 2017; Rubio-Delgado et al., 2024). Given their prevalence, many farmers know how to manage them already, and there are knowledge hubs already available: e.g. Hedgelink (2025). Henceforth, we use 'agroforestry' to refer to this definition of in-field agroforestry.

2.1 | Identifying perceived knowledge barriers

Our target group for identifying perceived knowledge barriers included farmers in England and/or Wales who were interested in adopting agroforestry, either for the first time or by expanding their current practices. We justify this target group by simplifying agroforestry adoption into a two-step process, where the first step is mobilising farmers who are uninterested in agroforestry (this targets farmers who do not want to adopt agroforestry) and the second step is supporting farmers who are interested in implementing it (this targets farmers who want to adopt agroforestry). We focussed on the latter group because our aim was to develop practical, implementable tools and guidance to help interested farmers adopt agroforestry. The perceived knowledge barriers amongst uninterested farmers may be different from the ones we identified, and in this case, farmer identity and social influences would also play a role (Urquhart et al., 2025). These barriers were not the focus of our study, which investigated knowledge barriers amongst interested farmers.

We recruited farmers through personal networks and mailing lists managed by two UK charities: Linking Environment and Farming (LEAF) and the Woodland Trust. We conducted in-person interviews at 1:1 meetings and two workshops (Figure 1). One workshop was led by these authors (see Section 2.2) and the other by the Woodland Trust in Suffolk, England, in February 2024. The workshops provided training on agroforestry, which enabled us to focus on our target group. Interviews were conducted independently *before* the workshops started. This mixed approach enabled us to access farmers conveniently and cost-effectively.

We used a perception matrix in the interviews, which is an adaptation of the Repertory Grid Technique (Moon et al., 2017). In a perception matrix, respondents are given a standardised grid with columns that contain individual *elements* (e.g. people, objects) against rows that contain *constructs* (perception statements). Each cell in a single row is rated according to two opposing perception statements (constructs) that represent opposite ends of a

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quantitative rating scale (e.g. 'this person is trustworthy' with a score of one and 'this person is not trustworthy' with a score of five). The respondent assigns a value for each cell in the grid, providing one value per element (e.g. family, friends) across each construct (e.g. trustworthiness, kindness). By intuitively valuing elements against each other, participants create directly comparable data within and between respondents (Moon et al., 2017). Here, we use aspects of agroforestry knowledge as elements, rather than people or objects which have been used previously (Moon et al., 2017; Scherfranz et al., 2024). Adapting perception matrices to assess knowledge is a new application of this method, and we propose this as a way to create more targeted solutions to address knowledge barriers and promote behaviour change effectively.

Our perception matrix contained 12 elements and eight constructs to identify perceived knowledge barriers to agroforestry adoption. We drew up an initial list of elements that was revised through 1:1 discussions with three agroforestry farmers, two agroforestry advisors and one agroforestry policymaker in the UK (Figure 1). The final three conversations led to no further revisions, and we considered consensus to have been reached about which elements to include. We grouped the elements (SI1) into three categories with:

a. *Four business elements*: agroforestry funding; markets for agroforestry products; the long-term financial impact of adopting in-field agroforestry; and the legal and regulatory impact of adopting in-field agroforestry (e.g. tax implications).
b. *Six ecological elements*: tree species and variety selection; tree planting arrangement (density, orientation); tree pest and disease control; tree pruning and harvesting; tree understory management; agroforestry inputs (e.g. irrigation, fertiliser).
c. *Two wider-impact elements*: the impact to adjacent crops or livestock of adopting in-field agroforestry; the wider environmental and ecological impacts of adopting in-field agroforestry.

The first two constructs start with statements about whether the interviewee thinks (1) knowledge about the element is important and (2) they already know about it (SI1). Through this process, we can identify whether there is a perceived knowledge barrier or not, with elements that are ranked as important but that interviewees have little knowledge about acting as the largest barriers to agroforestry adoption. The remaining six constructs related to the barriers for gaining knowledge about the elements. They included statements on the perceived availability of advice/information, trustworthiness of advice/information, availability of time to access advice/information, affordability of advice/information, ease with which advice/information could be understood and extent to which learning about this topic feels daunting (SI1). These constructs were initially chosen based on existing evidence that one or more of them have acted as barriers to changing farmer practices in Europe (see Section 1) (Antier & Baret, 2025; Brugler et al., 2024; David et al., 2022; Gomes & Reidsma, 2021). Then, during the pre-interview discussions (Figure 1), we asked the stakeholders whether any additional constructs were needed, and none were proposed. These constructs measured *perceived* knowledge, not actual knowledge, about the elements. For example, a farmer in a drought-prone area may perceive that they know about agroforestry inputs, but they may not have considered the need to irrigate their saplings, and in reality, their agroforestry trees may not establish well without this knowledge. Actual knowledge can be used to predict whether farmers would manage agroforestry effectively, whereas perceived knowledge can be used to understand why agroforestry uptake is low and how to address this (Rubio-Delgado et al., 2024).

This perception matrix was situated within a three-part interview that included farm characteristics, the perception matrix and socio-economic demographic questions (SI1). Data analysis was conducted visually and by calculating means and standard errors. We did not conduct a statistical analysis as the educational agenda—our final output—was created without one; workshop participants received a visual summary of the perception matrix with means and standard errors (see Section 2.2). We used R version 4.3.3 (R Core Team, 2024) with packages *tidyverse* and *viridis* for data wrangling and plotting (Garnier et al., 2024; Wickham et al., 2019).

2.2 | Co-designing solutions and creating the educational agenda

Our target participants to co-design solutions to these perceived knowledge barriers were agroforestry stakeholders in the UK, including (but not limited to) farmers, environmental organisations, agri-businesses, researchers and policymakers. We aimed to include stakeholders that were currently working in agroforestry and related areas who could offer fresh perspectives. We recruited semi-purposively to achieve a group with a broad range of stakeholders, with a deliberate bias towards land managers who could implement agroforestry as they are the primary audience for educational interventions.

We recruited stakeholders to a two-day workshop at FarmEd, an agroforestry demonstration farm in Oxfordshire, UK. The first day (04/12/23) was an agroforestry training day where we openly (not purposively) recruited four farm advisors and 16 farmers via social media and existing networks. This research grant (see 'Funding Information') subsidised the training day from £175 to £30 per person. This acted as an incentive for the farmers, with the aim of attracting 'harder-to-reach' farmers who may not have otherwise been interested in engaging in research or policy events, as including their voices is important to avoid biasing agricultural consultations (Hurley et al., 2020). For the second day, we purposively recruited 28 additional agroforestry stakeholders to include a balance of roles, experience and expertise. We prioritised farmers, who are the target audience for educational interventions. The resultant group of 48 stakeholders included 20 farmers, 4 farm advisors, 12 agroforestry researchers from six organisations, three policymakers, two representatives from government advisory bodies, two agroforestry consultants, two representatives from environmental NGOs, one

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farmer-education centre employee, one representative from a farmers' association and one local council member.

We assigned these 48 participants to one of six focus groups (tables) based on their roles to create a balance of expertise. Each table had 3–4 farmers, two researchers, one policymaker or policy advisor and 1–2 other stakeholders. We presented the results of the perception matrix visually (SI2) and summarised them into four key statements (see Table 2). One statement was created from each element category (business, ecological or wider impact), and an additional statement was included from the business elements as these barriers were particularly high (see Section 3). The perception matrix we presented differs from the results below as seven interviews were conducted after the workshop to increase the sample size of respondents (Figure 1). However, the workshop statements still reflect the final results accurately after these additional interviews (see SI2 and Figure 2).

We gave participants 40 min to brainstorm solutions to these statements. Each focus group was assigned a facilitator (an agroforestry researcher) who made a mind map of solutions per statement. After 40 min, the facilitator summarised their discussion verbally to the room, and these summaries were transcribed.

We created an educational agenda from the solutions proposed in the co-design workshop. We used the Framework Method with an inductive (data-driven) approach to group the

TABLE 2 The four statements taken to the workshop and a summary of the discussion points and proposed solutions.

Statements discussed	Summary of discussion points and proposed solutions
Lack of knowledge about agroforestry funding is a *major barrier* to agroforestry adoption. Farmers do not think advice/information on this is available and (less important) that finding trusted advice and time to access it is a challenge	There are many existing private and public funding schemes, but awareness is low A searchable, online, updateable list of funding schemes with a paper version and an interactive decision-support system would be useful There needs to be better clarity, coordination and stability in public funding with better (legal) advice to improve agroforestry uptake Improved opportunities for cooperation and collaboration between businesses and private funders are needed, e.g. to help identify joint ventures and mitigate risks Knowledge exchange activities on funding applications could support farmers to find and complete them, especially if government funded Agroforestry schemes in the UK are yet to be announced, but clarification is needed on what could be funded and which options (public and private) could be stacked Specialised agroforestry advisors are needed Improving teaching for future land managers could help
Knowledge about the legal/regulatory and long-term financial impacts are also *major knowledge barriers*. Farmers have many issues with accessing this advice/information: availability, trust, time and cost. Importantly, they think they *may not be able to understand advice/information on this and find the prospect of learning about it daunting*	Funded demonstration sites with long-term agroforestry examples, baseline data and ongoing monitoring of finance and other impacts would build trust in the evidence on agroforestry adoption A network of independent advisors (with possible accreditation) is needed that can offer tailored advice for individual farmers (e.g. land-owner vs. tenant) Funding or subsidising advice would improve access Better integration of forestry and farming disciplines/training would improve advice Regulatory bodies should provide clear advice and FAQ pages with responses to key questions Peer-to-peer farmer knowledge exchange is important, and funding is needed to support this as it is often based on good will A better understanding of long-term markets for agroforestry products is required
Knowledge about tree variety/species selection and planting arrangement are also barriers, but farmers think that they *would be able to understand this easily* and do not feel daunted about the prospect of learning about it	A range of educational outputs (e.g. videos) and tools (e.g. interactive decision-support tools and paper summaries) and formal education/teaching would be useful for learning about tree species, varieties and planting arrangement Access to knowledge needs to be free and hosted by trusted and independent organisations (SI6) Funded real-farm examples are needed, e.g. from demonstration farms, on-farm workshops, roadshows with experts or living labs Better networking and (funded) peer-to-peer learning opportunities would help knowledge exchange Need to improve integration of forestry and farming for advice Better knowledge of markets would inform species choice Tree nurseries could provide specialist knowledge of tree species to help agroforestry tree selection Training future land managers in agroforestry would help
Knowledge about spillover effects (the effects of agroforestry on adjacent crops/livestock) is also a barrier, particularly *finding available advice that can be trusted*	There is a need for primary research into spillover effects and demonstration farms with baseline data (could look back on sites with exiting agroforestry schemes) Funding for external advice would help Peer-to-peer farming learning would be particularly effective for knowledge exchange

Note: See SI4 for a more detailed summary.

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proposed solutions into steps in an agenda (Gale et al., 2013). The Framework Method is a structured form of thematic analysis that uses a systematic approach to code qualitative data into a matrix (Gale et al., 2013). We treated focus group discussions as meaningful reflections of participants' experiences and views, recognising that our interpretation was shaped by the workshop context and experiences as researchers (Braun & Clarke, 2024). We identified the steps qualitatively through analysing the workshop notes to find recurring or overlapping suggestions across statements. We then manually applied inductive descriptive codes to group similar suggestions.

3 | RESULTS

3.1 | Identifying perceived knowledge barriers

Of the 27 farmers we interviewed, 22% were women and 78% were men. This is representative of the proportion of women farmers in the UK (16%) (gov.uk, 2024). In terms of age, one interviewee was 20–29 years old, eight were 30–39, seven were 40–49, eight were 50–59, and three were 60–69. This is a bias towards younger farmers (38% of farmers in the UK are 65+ (gov.uk, 2024)), but this may reflect the finding that younger farmers are more likely to implement agroforestry in Europe (Rois-Díaz et al., 2018). Our interviewees spanned a range of farm types, with 15 mixed farms, eight arable, three pastoral and one horticultural. See SI3 for further interviewee demographics and farm types and Data Sources for the corresponding references.

The perception matrix elicited responses along the full range of potential ratings, with averages across participants ranging from 1.59 to 4.26 (Figure 2). When we asked participants if any elements or constructs were missing from the matrix, all responded 'no', indicating that the elements and constructs included were comprehensive. Constructs one (C1) and two (C2) relate to knowledge about the different elements, while C3–C8 relate to barriers to attaining knowledge about these elements (Figure 2). Farmers considered knowledge of all of the elements important for agroforestry adoption and management (C1), but perceived their knowledge as limited (C2) (Figure 3). This supports previous findings that knowledge is a barrier to agroforestry uptake (Tosh & Westaway, 2021; Tranchina et al., 2024). There was variation in the perceived importance and level of existing knowledge of different elements, indicating that some elements may act as a greater

Knowledge about these topics may influence your likelihood to adopt in-field agroforestry. How do you perceive these topics in relation to each other?

Constructs	Elements →	E1 (Bus)	E2 (Eco)	E3 (Eco)	E4 (Eco)	E5 (Eco)	E6 (Eco)	E7 (Eco)	E8 (Im)	E9 (Im)	E10 (Bus)	E11 (Bus)	E12 (Bus)	
	1 -point end	Agroforestry funding	Tree species and variety selection	Tree planting arragement (density, orientation)	Tree pest and disease control	Tree pruning and harvesting	Tree understory management	Agroforestry inputs (e.g. irrigation, fertiliser)	The impact to adjacent crops or livestock of adopting in-field agroforestry	The wider environmental & ecological impacts of adopting in-field agroforestry	Markets for agroforestry products	The long-term financial impact of adopting in-field agroforestry	The legal & regulatory impact of adopting in-field agroforestry (e.g. tax, Env. impact ass., permanency)	**5** -point end
C1	Knowledge about this is **important** for successfully adopting/managing in-field agroforestry on my farm.	1.78 ± 0.19	1.78 ± 0.18	1.59 ± 0.17	2.04 ± 0.16	2.26 ± 0.17	2.52 ± 0.18	2.93 ± 0.23	1.85 ± 0.18	2.33 ± 0.21	2.19 ± 0.21	1.81 ± 0.25	2.00 ± 0.26	Knowledge about this is <u>not</u> **important** for successfully adopting/managing in-field agroforestry on my farm.
C2	I already **know** about this in the context of adopting/managing in-field agroforestry on my farm.	3.81 ± 0.26	3.19 ± 0.23	3.59 ± 0.24	4.00 ± 0.20	3.74 ± 0.25	3.41 ± 0.22	3.74 ± 0.24	3.59 ± 0.23	3.22 ± 0.23	3.37 ± 0.23	3.74 ± 0.20	4.26 ± 0.18	I <u>do not</u> **know** about this in the context of adopting/managing in-field agroforestry on my farm.
C3	I think advice/information on this would be readily **available** to me.	3.07 ± 0.29	2.37 ± 0.25	2.41 ± 0.25	2.48 ± 0.22	2.37 ± 0.20	2.48 ± 0.21	3.04 ± 0.21	3.07 ± 0.21	2.59 ± 0.19	2.70 ± 0.23	3.22 ± 0.23	3.26 ± 0.22	I think advice/information on this would <u>not</u> be readily **available** to me.
C4	I think finding reliable advice/information on this I can **trust** would be easy.	2.85 ± 0.24	2.59 ± 0.22	2.74 ± 0.18	2.70 ± 0.23	2.52 ± 0.19	2.63 ± 0.18	3.41 ± 0.17	3.44 ± 0.19	3.19 ± 0.18	3.15 ± 0.24	3.89 ± 0.18	3.67 ± 0.21	I think finding reliable advice/information on this I can **trust** would be <u>difficult</u>.
C5	Finding **time** to access advice/information on this would be easy.	3.00 ± 0.28	2.81 ± 0.23	3.04 ± 0.27	3.15 ± 0.23	2.85 ± 0.24	2.89 ± 0.19	3.11 ± 0.20	3.19 ± 0.22	3.07 ± 0.21	3.41 ± 0.21	3.63 ± 0.21	3.89 ± 0.19	Finding **time** to access advice/information on this would be <u>difficult</u>.
C6	I think **affording** advice/information on this would be easy (includes free information).	2.41 ± 0.24	2.44 ± 0.22	2.44 ± 0.22	2.78 ± 0.20	2.63 ± 0.21	2.41 ± 0.17	2.74 ± 0.21	2.63 ± 0.18	2.56 ± 0.17	3.00 ± 0.21	3.30 ± 0.19	3.63 ± 0.22	I think **affording** advice/information on this would be <u>difficult</u> (includes free information).
C7	I think **understanding** advice/information on this would be easy.	2.52 ± 0.23	2.22 ± 0.19	1.96 ± 0.17	2.74 ± 0.17	2.41 ± 0.18	2.26 ± 0.17	2.30 ± 0.18	2.44 ± 0.22	2.44 ± 0.23	2.52 ± 0.22	3.07 ± 0.18	3.33 ± 0.23	I think **understanding** advice/information on this would be <u>difficult</u>.
C8	The thought of learning about does <u>not</u> feel **daunting**.	2.19 ± 0.24	2.00 ± 0.21	1.96 ± 0.22	2.52 ± 0.23	2.37 ± 0.20	2.33 ± 0.19	2.59 ± 0.24	2.44 ± 0.20	2.19 ± 0.22	2.67 ± 0.23	2.93 ± 0.21	3.44 ± 0.22	The thought of learning about this feels **daunting**.
	Average across knowledge-barrier constructs (C3 - 8)	2.67 ± 0.26	2.41 ± 0.22	2.43 ± 0.23	2.73 ± 0.22	2.52 ± 0.20	2.50 ± 0.19	2.86 ± 0.21	2.87 ± 0.21	2.67 ± 0.21	2.91 ± 0.23	3.34 ± 0.21	3.54 ± 0.22	

FIGURE 2 The perception matrix showing average ± standard error ratings for all respondents. Colours show the average ratings along a continuous scale: Yellow shows ratings with high agreement to statements on the left (1 point end) and purple shows ratings with high agreement to the opposing statements on the right (5 point end). Below the perception matrix is a bar that shows the average ratings across all knowledge-barrier constructs (C3–C8). Constructs above the dashed black line relate to knowledge about the different elements, and constructs below it relate to barriers to attaining knowledge about these elements.

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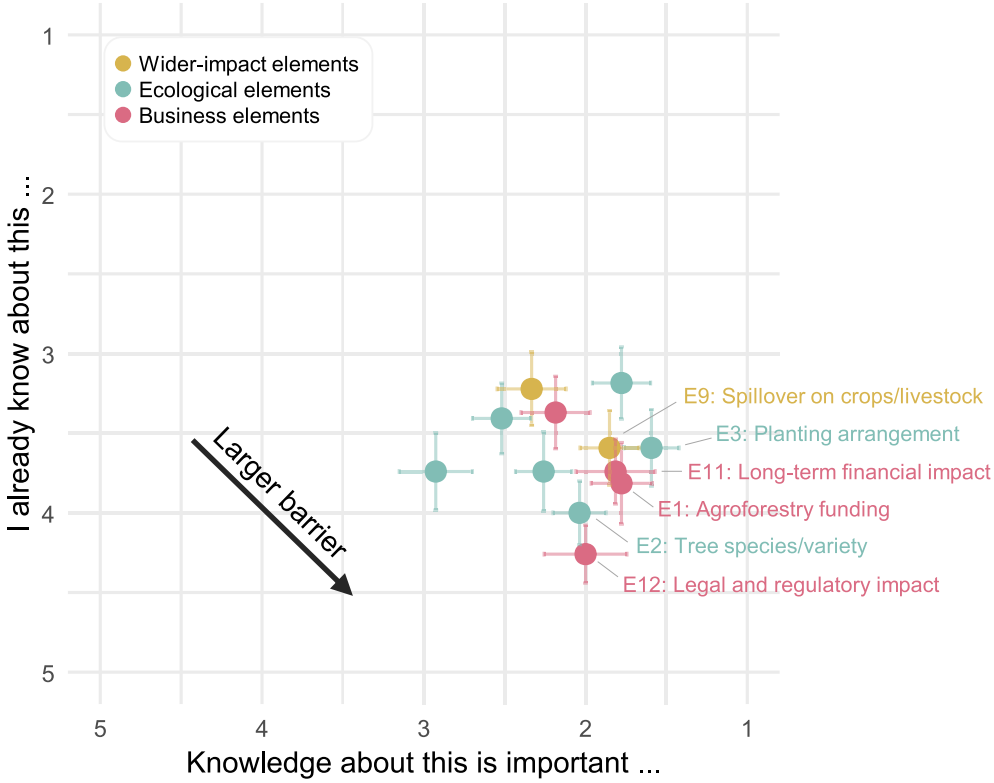

FIGURE 3 A scatterplot showing the mean ratings of each knowledge element against the first (*x*-axis) and second (*y*-axis) constructs. Points are coloured by the element categories, and error bars show the standard error along each axis. The six elements that were taken forward to co-design the educational agenda are named.

barrier than others (Figures 2 and 3). Agroforestry funding, tree pest and disease control, the long-term financial impact of adopting in-field agroforestry, and the legal or regulatory impacts of adopting in-field agroforestry had higher-than-average perceived importance and lower-than-average existing knowledge (Figures 2 and 3). Overall, the perceived knowledge gap was greater for the business elements (average importance rating 1.94 ± 0.23 and average knowledge rating 3.80 ± 0.22) than for the ecological or wider-impact elements (Figure 4).

Looking across constructs 3–8, we found that the perceived barriers to attaining knowledge about the different elements varied; the largest barriers were finding time to access advice/information (average rating 3.17 ± 0.23), finding reliable information that participants could trust (3.06 ± 0.22), finding advice/information readily available (2.76 ± 0.23) and being able to easily afford advice/information (2.75 ± 0.21) (Figure 4). Looking across the elements, we show that the barriers to learning about the business elements were perceived as higher than the ecological or wider-impact elements across all knowledge-barrier constructs (Figure 4). This shows that interventions to address knowledge gaps related to the business elements could be particularly impactful for promoting agroforestry uptake if tailored to effectively address the perceived knowledge barriers. In particular, the legal and regulatory impacts of agroforestry adoption (average rating across C3–C8: 3.54 ± 0.22) and the long-term financial impacts of adopting agroforestry (3.34 ± 0.21) were rated higher than markets for agroforestry products (2.91 ± 0.23) and agroforestry funding (2.67 ± 0.26). Whilst the former two elements reflected the wider pattern of high ratings for barriers related to time and trust, they also rated highly the elements related to farmers' perceived ability to afford or understand information and learn about it without being daunted (Figure 2).

The barriers to addressing the ecological elements were perceived as lower than the business or wider-impact elements across all knowledge-barrier constructs (Figure 4). Finding time to access advice/information was ranked as the largest barrier for all elements (average rating 2.98 ± 0.23) except for agroforestry inputs, where finding information that could be trusted was ranked higher (3.41 ± 0.17). This may be due to the perception amongst farmers that crop protection companies, who often provide advice on inputs, are less trustworthy than other stakeholders (Scherfranz et al., 2024). Farmers perceived that they would find it easier to understand advice/information on the ecological elements (2.31 ± 0.18) and were less likely to find them daunting (2.30 ± 0.22) than the other elements, with agroforestry inputs, tree pest and disease control, and tree pruning scoring highest in these constructs (2.30–2.74) and tree planting arrangement scoring lowest (1.96) (Figure 4). In terms of the wider-impact elements, the patterns were similar to the ecological elements, but finding information that could be trusted (3.31 ± 0.18) was ranked higher than finding time to access it (3.13 ± 0.21) (Figure 4).

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Constructs ↓	1 -point end	Average across business elements (E1 & E10 – E12)	Average across ecological elements (E2 – E7)	Average across wider impact elements (E8 – E9)	5 -point end	Average across all elements (E1 – E12)
C1	Knowledge about this is **important** for successfully adopting/managing in-field agroforestry on my farm.	1.94 ± 0.23	2.19 ± 0.20	2.09 ± 0.20	Knowledge about this is not **important** for successfully adopting/managing in-field agroforestry on my farm.	2.09 ± 0.21
C2	I already **know** about this in the context of adopting/managing in-field agroforestry on my farm.	3.80 ± 0.22	3.61 ± 0.23	3.41 ± 0.23	I do not **know** about this in the context of adopting/managing in-field agroforestry on my farm.	3.64 ± 0.23
C3	I think advice/information on this would be readily **available** to me.	3.06 ± 0.24	2.52 ± 0.22	2.83 ± 0.21	I think advice/information on this would not be readily **available** to me.	2.76 ± 0.23
C4	I think finding reliable advice/information on this I can **trust** would be easy.	3.39 ± 0.23	2.77 ± 0.20	3.31 ± 0.18	I think finding reliable advice/information on this I can **trust** would be difficult.	3.06 ± 0.22
C5	Finding **time** to access advice/information on this would be easy.	3.48 ± 0.23	2.98 ± 0.23	3.13 ± 0.21	Finding **time** to access advice/information on this would be difficult.	3.17 ± 0.23
C6	I think **affording** advice/information on this would be easy (includes free information).	3.08 ± 0.23	2.57 ± 0.21	2.59 ± 0.17	I think **affording** advice/information on this would be difficult (includes free information).	2.75 ± 0.21
C7	I think **understanding** advice/information on this would be easy.	2.86 ± 0.22	2.31 ± 0.18	2.44 ± 0.22	I think **understanding** advice/information on this would be difficult.	2.52 ± 0.21
C8	The thought of learning about does not feel **daunting**.	2.81 ± 0.24	2.30 ± 0.22	2.31 ± 0.21	The thought of learning about this feels **daunting**.	2.47 ± 0.23

FIGURE 4 Summary of perception matrix results (Figure 2) taking average ratings across constructs ± standard error of the mean for the business elements (elements A and J–L), ecological elements (elements B–G) and wider-impact elements (elements H–I). Colours show the average ratings along a continuous scale: Yellow shows ratings with high agreement to statements on the left (1 point end) and purple shows ratings with high agreement to the opposing statements on the right (5 point end). To the right is a bar that shows the average ratings across all elements (elements A–L).

3.2 | Co-designing solutions and creating the educational agenda

We summarised the results of the perception matrix into four statements (Table 2) that we took to the FarmEd workshop. Our discussion notes and the proposed solutions to each statement are outlined in Table 2 and available in full in SI4. The full statements were coded into a framework analysis (SI5) to produce an agenda for agroforestry education in the UK. We describe specific organisations or initiatives that were mentioned in the discussions in SI6. We contextualise and elaborate on the solutions in the agenda below. Whilst the statements (and therefore the solutions) this agenda is based on only come from six of the 11 elements in the perception matrix (Figure 2), this agenda addresses what we consider to be the highest priority issues as the selected statements reflect the largest educational barriers identified (Figure 3). Furthermore, many solutions recurred across multiple statements (e.g. funding mechanisms for advice on legal impacts [statement 2] and tree species selection [statement 3]), which shows some consensus about which educational interventions would be most effective across topics (SI5).

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3.3 | An agenda for agroforestry education in the UK

Our agenda for agroforestry education in the UK has 10 steps divided into three categories (Figure 5). These steps are not mutually exclusive or chronological, and we recommend implementing multiple steps in parallel to accelerate agroforestry adoption most effectively. Whilst the focus was UK-specific, many suggestions will be relevant to other regions wishing to promote agroforestry.

1. Improve opportunities for land managers to learn

We identified three pathways to learning about agroforestry: self-learning, peer-to-peer learning and non-peer (e.g. independent) advice. We discuss these in 1A–1C below, but first highlight some shared features. Participants stated the need for advice/information with long-term relevance, reflecting the long-term nature of agroforestry [statement 1]. Having a 'neutral', 'non-member' or 'trusted' party provide or host guidance was desirable, and in-person meetings were valued for building this [statements 1–3]. This echoes findings in the wider literature on trust and farmer learning (Brugler et al., 2024; Oreszczyn et al., 2010). SI6 lists trusted organisations or initiatives that were mentioned specifically. Participants also stated the value of information being accessible (free) and findable (e.g. on mainstream sites people access for things other than agroforestry). Better dissemination of existing information was called for [statements 1 and 3], and social media (e.g. Twitter or LinkedIn) and television (e.g. Clarkson's Farm (Burt, 2023)) were suggested as effective tools. Twitter has been shown to be particularly effective for peer-to-peer learning amongst UK farmers, although this may have changed since it came under new ownership and rebranded as X in 2022 (Rust et al., 2022).

1A. Create open-access tools for self-learning

Participants suggested several creative ideas for tools to promote self-learning [statements 1–3: statement numbers refer to statements provided in Table 2]. They highlighted the value of having different information formats to promote accessibility and access, including online and paper options, as some farmers prefer hard-copies and do not have reliable internet access (NFU, 2023). Key features of the online tools were that they would be dynamic (updateable and interactive), housed by trusted organisations (SI6) and navigable by farmers and advisors.

There were several tools suggested to help farmers navigate funding opportunities [statement 1]:

1. An interactive online search tool to consolidate existing schemes from government, businesses and NGOs, which are currently not centralised (gov.uk, 2023, 2025; Sainsbury's, 2024). Participants suggested having search filters, including postcode and management filters to reflect regional or design restrictions (e.g. planting density (gov.uk, 2025)). They also suggested having a function to explore opportunities for stacking offers and having a printable version for people who prefer information offline (NFU, 2023).

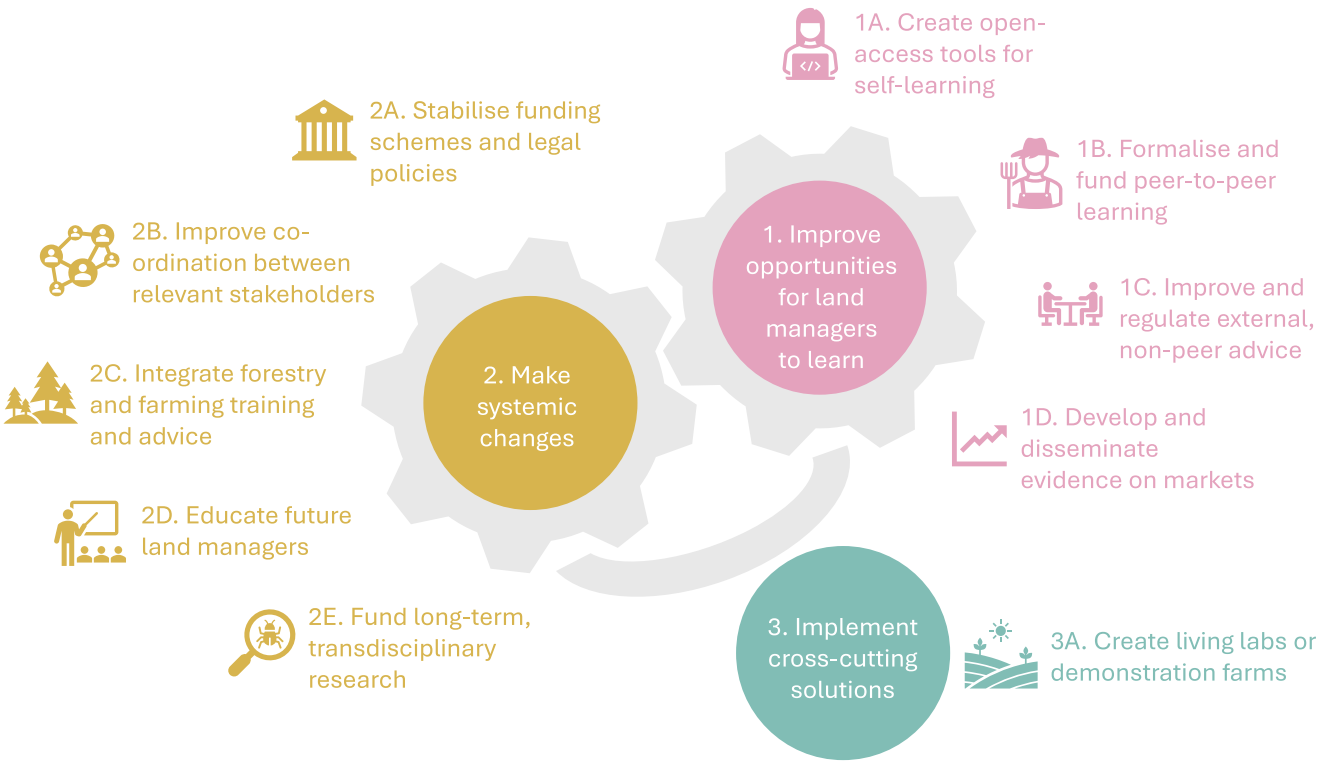

FIGURE 5 A scheme showing the 10 steps in the educational agenda divided into three categories. These steps are not chronological and can be implemented in parallel.

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2. An online agroforestry networking site where farmers could find private investors or businesses to partner with. Kingsclere Estate's Pitch Up Model is an example of one operating on an estate level (Kingsclere, 2025), but an open-access option is needed. This follows growing interest in shared farming or joint ventures in the UK, such as Wakelyn's agroforestry farm that partners with a bakery and craft businesses (willow weaving) to enhance the value of its agroforestry products (Wakelyns, 2025).
3. A farmer-made checklist to guide decisions before joining an agroforestry scheme. Less experienced agroforestry farmers noted that they may lack the knowledge to identify important scheme details, e.g. whether funding covers only initial planting or includes replacement of failed trees.
4. An online Decision Support System to help farmers complete agroforestry funding applications. This could include, for example, an eligibility checker, example answers, advice on common mistakes and how to avoid them, tutorials or videos on how to complete the applications, a cost–benefit calculator comparing stacking options, a pre-submission checklist and accessibility features (e.g. alt text or resizable text).
5. Regular online agroforestry webinars. Webinars can be effective for educating land managers, but agroforestry webinars in the UK are currently dispersed and uncoordinated (SI6) (Xue et al., 2022).

To support farmers with regulatory advice [statement 2], participants recommended clearer webpages from regulatory bodies, including case studies and FAQs. Whilst some resources exist, they could be improved and expanded (e.g. gov.uk, 2025). For selecting tree species/varieties and planting arrangement [statement 3], participants suggested video case studies, a dynamic online species information sheet, and a paper guide with an online decision tree for species selection. Some tools already exist, such as a recent tree species guidebook and the Ecological Site Classification tool (Forest Research, 2025; Staton et al., 2024), but participants called for wider promotion.

While self-learning can promote agroforestry uptake, it is not sufficient on its own to overcome educational barriers and drive behaviour change: a mixed approach combining peer-to-peer learning and external advice is more effective (Rust et al., 2022; Xue et al., 2022).

1B. Formalise and fund peer-to-peer learning

Peer-to-peer learning has consistently been identified as an effective way to promote learning and behaviour change amongst farmers (Oreszczyn et al., 2010; Rust et al., 2022). Participants called for more formalised and funded opportunities [statements 2–4], noting that experienced farmers often provide unpaid mentoring despite high workloads (Donohoe et al., 2024). Group activities, such as training days, social/networking events or visits to practicing farms, were also seen as valuable peer-to-peer learning opportunities [statements 1, 3, 4] (Rust et al., 2022; Xue et al., 2022). Participants suggested that downstream stakeholders (e.g. supermarkets) could fund this as part of their sustainability efforts, with examples like Waitrose's Farming for Nature Programme (Waitrose, 2024). Demonstration farms were proposed [statements 3–4] and are discussed in 4A as a cross-cutting solution.

1C. Improve and regulate external, non-peer advice

The perception matrix results showed a particular need for external advice for the business elements, as farmers feel daunted to learn about them, and self-learning is therefore unlikely to suffice (Rust et al., 2022; Xue et al., 2022). Participants reinforced this in the workshop and requested external advice that was tailored (e.g. specific to tenants or landowners), long-term, independent, funded and included information on stacking offers [statements 1–4]. Funding improves access to advice and de-commercialises it, reducing bias towards profits over environmental outcomes (Sutherland et al., 2013). Participants suggested that governments or downstream stakeholders (e.g. supermarkets) could fund 1:1 advice as part of their sustainability schemes.

Participants suggested that advice would be more accessible if better regulated and coordinated between organisations [statements 1–3], echoing previous calls to streamline the UK's fragmented advisory system (Sutherland et al., 2013). Additionally, participants said more specialist agroforestry advisors are needed, ideally within a trusted national network. Participants proposed common standards or agroforestry qualifications supported by professional accreditations to enhance trust in advice, which is an effective approach (Sutherland & Labarthe, 2022). However, some noted that agroforestry research is rapidly evolving, which may quickly render qualifications outdated (Hastings Silao et al., 2023). Transdisciplinary education for land advisors was also proposed to strengthen advice quality (see 2C).

Whilst 1:1 advice is needed, advice at workshops or training days could help overcome barriers to the ecological elements, which are less daunting for farmers to learn about (Xue et al., 2022). Suggestions included events at demonstration farms or an agroforestry open weekend with experts (see 3C). Formal agricultural training could be better supported in general, as only one-third of farmers have received agricultural training in the UK compared to 80% in the Netherlands (Angioloni et al., 2024; Augère-Granier, 2017).

1D. Develop and disseminate evidence on markets

This study aimed to identify specific pathways to educate land managers and promote agroforestry uptake, but a key knowledge gap emerged in this process with regards to markets for agroforestry products [statements 1–3]. Specifically, the need to identify pre-market processing opportunities/constraints, local markets, internal on-farm markets (e.g. wood for fencing), and long-term markets was raised. As a potential solution, shared farming or joint ventures was suggested (see 1A). A lack of knowledge about or access to agroforestry markets has been identified as a high-priority research gap for UK agroforestry (Hood et al., In Review) and a major barrier to agroforestry uptake globally (Tranchina et al., 2024).

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2. Make systemic changes

There was broad recognition by participants that improving opportunities for land managers to learn needed to be coupled with systemic changes [statements 1–4]. These changes are needed to agroforestry education and research and the wider socio-economic and political landscape.

2A. Stabilise funding schemes and legal policies

When we conducted the FarmEd workshop (Dec 2023), post-Brexit agroforestry policies had not yet been finalised across the UK (Venn & Burbi, 2023). Therefore, many land managers did not know what the financial (e.g. eligible designs) and legal (e.g. changes in land designations) implications of adoption were (Venn & Burbi, 2023). Such policies can have a major impact; for example changing the class of land from agriculture to woodland often decreases its value in the UK (Low et al., 2024). It follows then that participants highlighted the need to wait for policy clarity to overcome existing knowledge barriers [statements 1–2]. They also expressed the need for 'better coordination' and 'joined-up thinking' in agroforestry policies, which are devolved in the UK (i.e. set by regional rather than national governments) (Venn & Burbi, 2023). Whilst agroforestry policies have since progressed, many aspects have not been finalised, and differing requirements between nations add complexity (gov.uk, 2025). Furthermore, trust in England's agroforestry policy has been eroded following a sudden pause in the Sustainable Farming Incentive in 2025, less than a year after this scheme had released agroforestry funding (Walker & Horton, 2025). Greater clarity and policy stability are urgently needed.

2B. Improve coordination between relevant stakeholders

The call for better coordination extends beyond governments (2A) to farming and environmental bodies [statement 1]. In the UK, a complex and fragmented advisory system often results in conflicting information that erodes trust in advice and hampers the adoption of agri-environmental options (Sutherland et al., 2013; Sutherland & Labarthe, 2022). Participants suggested that the Central Association of Agricultural Valuers (CAAV), the Country Land and Business Association (CLA), or another trusted organisations could co-ordinate this (SI6).

2C. Integrate forestry and farming training and advice

Participants stated the need to integrate forestry and farming education and advice to address business and ecological knowledge gaps [statements 2–3]. They called for greater collaboration and knowledge-sharing between existing foresters and farmers, who currently inhabit different management and policy contexts (Venn & Burbi, 2023). Participants also suggested revising training to span both disciplines, for advisors, current land managers and future land managers in colleges and universities. Education between these disciplines is not currently integrated and calls for a transdisciplinary approach are growing (Burleigh & Jönsson, 2024). Transdisciplinary agroforestry training for land managers could be a condition for accessing government funding schemes. Similar policies have been implemented previously; for example the UK's Basic Payment Scheme required some training on environmental stewardship for subsidy eligibility.

2D. Educate future land managers

Participants suggested improving land management education [statements 1 and 3], including practical training on sourcing information and completing funding applications. As in 2C, they favoured a transdisciplinary approach spanning forestry and farming and suggested mandating this in policy. This could include, for example, requiring agroforestry training as a condition for completing agricultural educational qualifications. As one-third of land managers in the UK receive formal agricultural training—despite its proven impact on behaviour change—the potential impacts here are considerable (Angioloni et al., 2024; Augère-Granier, 2017).

2E. Fund long-term, transdisciplinary research

This study did not intend to identify research gaps, and a parallel study was conducted with that aim (Hood et al., In Review). However, participants highlighted areas where information was lacking or unreliable [statements 2–4], calling for long-term trials with baseline data. Long-term research contributes disproportionately to developing ecological theory and policy, with long-term studies referenced disproportionately often in policy documents relative to the literature (Hughes et al., 2017). It also fosters collaboration, mutual learning, co-production and the application of research to practice (Busse et al., 2023; Gaba & Bretagnolle, 2020). Despite this, investment in long-term studies is declining, with 64% of agroecological research lasting only 1 year (Hughes et al., 2017; Josefsson et al., 2020). We echo calls for research funders to invest in long-term research (Hughes et al., 2017; Josefsson et al., 2020). Beyond this, participants called for local examples and transdisciplinary research spanning social, political, economic, ecological and agronomic interventions and impacts.

3. Implement cross-cutting solutions

Cross-cutting solutions that address multiple needs identified in this agenda may be particularly effective and cost-efficient. One cross-cutting suggestion was raised repeatedly at the workshop.

3A. Create living labs or demonstration farms

Living labs or demonstration farms were proposed as a way of providing multiple benefits in parallel, including education, research and community building [statements 2–4]. Key features were the need for long-term examples, local examples, baseline data and a transdisciplinary approach (see 2E). Suggested methods included collaborating with early adopters, using financial incentives to pay farmers to participate, and co-designing experiments with policymakers and researchers (Busse et al., 2023). Specific examples included LEAF demonstration farms and AHDB (Agriculture and Horticulture Development Boards) monitor farms (SI6).

Demonstration farms or living labs foster communities of practice where farmers can co-design interventions and test them on working farms (Berberi et al., 2023). Seeing physical examples and being part of a community creates a knowledge-sharing environment that is supportive and effective in promoting behaviour change amongst

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farmers (Berberi et al., 2023; Busse et al., 2023). A long-term network of living labs that co-designs agroforestry experiments—such as the Trees-in-fields Network (Hood, 2025a)—could help to address the steps throughout this agenda (except 2A), making this a potentially cost-effective approach. Living labs work best with long-term funding for research and for a facilitator to co-ordinate the project, but existing funding schemes are often short term (see 2E) (Berberi et al., 2023; Schüler et al., 2025). Systemic changes to research and educational funding that would enhance the availability and quality of funding available for demonstration farms and living labs are urgently needed.

4 | CONCLUSIONS

Our results support previous findings that knowledge gaps are a barrier to agroforestry adoption (Tosh & Westaway, 2021; Tranchina et al., 2024). Here, we go beyond the existing evidence by identifying the specific knowledge gaps and the perceived barriers to attaining this knowledge. Overall, time constraints and difficulty accessing reliable information emerged as the largest learning barriers, issues well documented in the farmer-education literature on other farming interventions (Brugler et al., 2024; David et al., 2022; Gomes & Reidsma, 2021). Addressing high farmer workloads is urgent, not only to support agroecological uptake but also to help ease the worsening mental health crisis in farming (Donohoe et al., 2024). It is imperative that we increase trust in advice, and funding peer-to-peer learning opportunities would likely help with this. We found that the perceived barriers were greater for the business than the ecological elements, with farmers most daunted to learn about the long-term financial, legal and regulatory impacts of adopting agroforestry. This has implications for agroforestry education, as self-learning alone about this topic would likely be insufficient: independent advice from neutral sources is needed (David et al., 2022; Gomes & Reidsma, 2021).

Our 10-step educational agenda to address these learning barriers reflects the views of a large and diverse group of UK stakeholders across the agricultural supply chain. The proposed solutions were specific, practical and varied. They included designs for open-access online tools for independent learning, innovative mechanisms to fund farmer-to-farmer learning schemes, agroforestry accreditation to enhance trust in advice, policy reforms to education and suggested revisions to farming advisory systems. Living labs or demonstration farms were identified as a way of providing multiple benefits in parallel and could therefore be a cost-effective approach (Berberi et al., 2023).

This agenda offers clear and practical actions for policymakers, advisors, educators, researchers and research funders. Many solutions are simple to implement and could accelerate agroforestry adoption quickly, whereas others are systemic and require cross-sector collaboration. Supporting farmers with the knowledge and tools to adopt and manage agroforestry effectively is needed to help us build a more sustainable future that is resilient to climate change and ecological and political instability (Jordon et al., 2020; Kletty et al., 2023; Quandt et al., 2023; Torralba et al., 2016).

AUTHOR CONTRIBUTIONS

Amelia S. C. Hood led conceptualisation, funding acquisition, methodology, visualisation and writing—original draft. Verena Scherfranz and Lena Schaller contributed to methodology. Amelia S. C. Hood, Rosy E. Scholes, Erika Degani, Tom Staton, Alexa Varah and Alice L. Mauchline contributed to data curation. All authors contributed to writing—reviewing and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data are available from the University of Reading Research Data Archive https://doi.org/10.17864/1947.001466 (Hood, 2025b).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Data S1: Supplementary material SI5.

Appendix S1: Supplementary material (SI1–SI4 and SI6).

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