

# Agroforestry and Orchards Pilot

---

SUMMARY REPORT - AUGUST 2023

Christian Gossel

ORGANIC RESEARCH CENTRE | TRENT LODGE, STROUD ROAD, CIRENCESTER,  
GLOUCESTERSHIRE, GL7 6JN

## Abstract

The Agroforestry and Orchards Pilot is a unique program offering funding and support for participants in four counties to establish agroforestry and orchard projects on their land. This study explored three aspects of the pilot: response to funding levels, existing barriers, and opportunities for blended funding. These topics were investigated through analysis of applicant data, an applicant survey, semi-structured interviews, and review of literature and other sources.

The pilot provided sufficient funding for most participants to implement their agroforestry designs, although this varies on a case-by-case basis. A lack of long-term funding may have limited design choices to ensure a rapid return on investment, however the short-term payments were also a catalyst for many individuals to explore alternative longer term funding sources. Lack of knowledge was proven to be a consistent barrier to agroforestry adoption and, while partially addressed through learning vouchers, this is an area that should be explored further. Influence from the wider community and general public was less impactful but the results still suggest that opportunities exist for promoting tree planting to a larger audience. Finally, the opportunity for blended funding, such as through a carbon credits scheme, was met with mixed reviews. Providing support for those who are interested in gaining additional income from such sources is recommended but implementing a requirement to use these schemes should be avoided as it could reduce the attractiveness of the overall funding opportunity, particularly given the strong opinions individuals may hold about such schemes.

Other key positives of the pilot include flexibility in design and long-term commitments, and the opportunity to use the pilot as a small-scale trial before expanding at a later date.

## Table of Contents

Abstract.....	1
Table of Contents.....	2
Table of Figures.....	3
Agroforestry and Orchards Pilot.....	5
Introduction .....	5
Methods.....	6
1.1 Applicant Data .....	6
1.2 Applicant Survey .....	6
1.3 Applicant Interviews .....	6
1.4 Literature Review .....	7
Results and Discussions .....	7
2.1 Application Data .....	7
2.1.1 Farm type.....	7
2.1.2 Land tenure .....	11
2.1.3 Agroforestry type.....	11
2.1.4 Tree density .....	12
2.1.5 Tree species and products .....	13
2.2 Applicant Survey.....	17
2.2.1 Importance of Different Aspects of the Pilot.....	17
2.2.2 Funding from the Pilot .....	18
2.2.3 Knowledge and Learning.....	21
2.2.4 Social Influence .....	24
2.2.4 Flexibility and Ambition .....	26
2.2.6 External Funding and Markets .....	30
Conclusion .....	35
References.....	37
Appendix.....	40
Comparison of agroforestry and orchard project responses on the importance of various aspects of the pilot project. ....	40

Comparison in usefulness of knowledge sources between individuals who received 50% funding and 100% funding .....	41
Survey Questions .....	42

## Table of Figures

Figure 1. Pie chart breakdown of the different land-use types from applicants in the Agroforestry and Orchards Pilot. ....	8
Figure 2. Percentages of land types from 21 agroforestry sites across the UK (The Agroforestry Hub, 2023). ....	9
Figure 3. Percentage of different land types in the Agroforestry and Orchards Pilot with non-farms excluded. ....	9
Figure 4. Classifications of the different types of agroforestry and orchard planting across the applications.....	12
Figure 5. Counts of the different tree species identified in 45 applications for the Agroforestry and Orchard Pilot. ....	15
Figure 6. List of the species used in agroforestry projects across the UK (The Agroforestry Hub, 2023). ....	16
Figure 7. Respondents' responses when asked about the importance of various factors when deciding to apply for the Agroforestry and Orchards Pilot. A breakdown of this figure comparing agroforestry projects and orchard projects can be found in the appendix. ....	18
Figure 8. Respondent's opinion on if funding was sufficient by the two groups who received 100% and 50% funding respectively. ....	19
Figure 9. Respondents' rating of different sources of knowledge on agroforestry. ....	23
Figure 10. Respondents' level of knowledge on various aspects which are relevant to agroforestry. .	23
Figure 11. Frequency of positive and negative comments heard by respondents in relation to their agroforestry projects.....	25
Figure 12. Comparison of respondent's willingness to adapt when offered 100% funding and 50% funding respectively.....	27
Figure 13. The importance when applying for the Agroforestry and Orchard Pilot of a market for the products generated from a respondent's project.....	30
Figure 14. Respondent's level of importance given to markets when grouped by level of funding coverage.....	31

Figure 15. The positive and negative aspects of carbon credit schemes selected by respondents. ...	32
Figure 16. The importance of various aspects of the pilot project to respondents who implemented agroforestry projects.....	40
Figure 17. The importance of various aspects of the pilot project to respondents who implemented orchard projects.....	40
Figure 18. Comparison of respondent's reported level of usefulness around various knowledge sources when grouped by funding coverage.....	41

# Agroforestry and Orchards Pilot

## Introduction

The Agroforestry and Orchards (A&O) Pilot is a component of the wider Shared Outcomes Fund Trees Outside of Woodlands (SOF TOW) project, which is developing innovative and sustainable new ways to increase tree cover to address both climate and ecological emergencies. The £2.5M, three-year programme is funded by HM Government and delivered in partnership by The Tree Council, Natural England, the Department for Environment, Food & Rural Affairs with five local councils: Shropshire Council (who led the A&O pilot), Chichester District Council, Cornwall Council, Norfolk County Council and Kent County Council (who did not take part in the A&O pilot). The pilot focuses on funding for trees in agroforestry systems, defined as being the “practice of deliberately integrating woody vegetation (trees or shrubs) with crop and/or animal systems to benefit from the resulting ecological and economic interactions”, as well as more traditional orchard systems (European Union, 2023). Specifically, the purpose of the pilot was to establish the rate of uptake of agroforestry and traditional orchard establishment in each pilot area and to investigate whether incentives such as government loans/contributions to the initial capital cost of establishment could encourage greater uptake by farmers, smallholders and communities.

Applicants were able to apply to their local authority for funding and support in implementing their plans for the following year, beginning in 2020 and continuing through to 2022-23. Each application was reviewed and discussed by the respective local TOW officers. The program offered funding for trees, tree protection, and fencing material alongside design support and guidance.

This report has been produced by the Organic Research Centre at the request of the Shropshire Council and other stakeholders to review the implementation of the pilot project in relation to three specific objectives:

- Investigate how different levels of subsidy and support impact on the uptake of agroforestry and orchards with landowners in the four Trees Outside Woods pilot areas.
- Understand what barriers to uptake still exist for landowners who have expressed an interest in planting agroforestry and orchard systems and what gaps in funding there may be.
- Explore different sources of ‘blended’ funding such as loans and carbon credits and how these may fill any gaps in funding that exist.

This study draws upon all of the application rounds to date, covering projects from a few months to 2 years of age.

The following report begins with a detailed description of the methods used for the study: applicant data, applicant survey, applicant interviews, and a literature review. The first of these reviews the

existing information from applications to the pilot. This includes the sub-topics of farm type, land tenure, agroforestry type, tree density, and tree species and products. The second method presents the results from a survey of applicants in the pilot, covering the overall importance of the pilot, funding, knowledge and learning, social influence, flexibility and ambition, and external funding and markets. The results and discussions of each aforementioned topic are supported by insights from a series of case studies based on semi-structured interviews with applicants, investigating in further detail the answers and topics raised in the survey. Finally, the literature review feeds into the discussions to compare the findings of this report to similar work in the literature to identify where this pilot has succeeded and where further work is required.

## Methods

### 1.1 Applicant Data

The details of applicants to the Agroforestry and Orchards Pilot were requested from the individual local authorities. A total of 55 applications were returned, 23 from Shropshire, 11 from Chichester, 15 from Cornwall, and 6 from Norfolk. Varying levels of detail were provided and where possible information on farm and land type, land ownership, type of agroforestry, tree density, tree species, species diversity, and identified products were extracted for analysis. Basic analysis was carried out in excel.

### 1.2 Applicant Survey

The applicant survey took the form of an online survey delivered to all applicants of the Agroforestry and Orchard Pilot. The survey was created in collaboration with project stakeholders to ensure that questions asked and data collected were relevant and of interest. The survey was created in Google Forms and distributed via email to the local authority TOW project officers who then passed it on to their respective applicants. The survey was grouped into seven sections; General data collection (i.e. farm name, overall thoughts on the pilot), funding, knowledge and learning, social influence, flexibility and ambition, external funding and markets, and additional comments. A range of question types were used including multiple choice, open text, and scale selection. The full list of questions and answers included in the survey can be found in the appendix. The survey was open 8<sup>th</sup>-31<sup>st</sup> March 2023. A second survey was also created for individuals who had initially applied or shown interest in the Agroforestry and Orchards Pilot but subsequently didn't continue with the program. Only two of these individuals could be identified and neither of them responded to the survey.

### 1.3 Applicant Interviews

Four respondents to the applicant survey were selected for further semi-structured interviews. These consisted of visits to the project site and a two hour discussion about their particular

responses to the survey and thoughts on the Agroforestry and Orchards Pilot. The aim of these interviews was to provide a more detailed discussion of points identified in the survey and to cover topics which were not identified in the survey, such as tenancy. Three of the interviewees were situated in Shropshire and the fourth in Norfolk. They were selected based on standout responses to the survey and ability to provide a range of project sizes. A summary of each interview is represented via a case-study box throughout the rest of this report.

## 1.4 Literature Review

The literature review brings together the results from this study through the applicant analysis and survey, with existing data from the literature. A range of sources have been utilised for the discussion, from past projects similar to the Agroforestry and Orchards Pilot, existing national funding schemes for agroforestry, and a mix of grey literature and scientific papers. A full list of information sources can be found in the references section.

# Results and Discussions

## 2.1 Application Data

### 2.1.1 Farm type

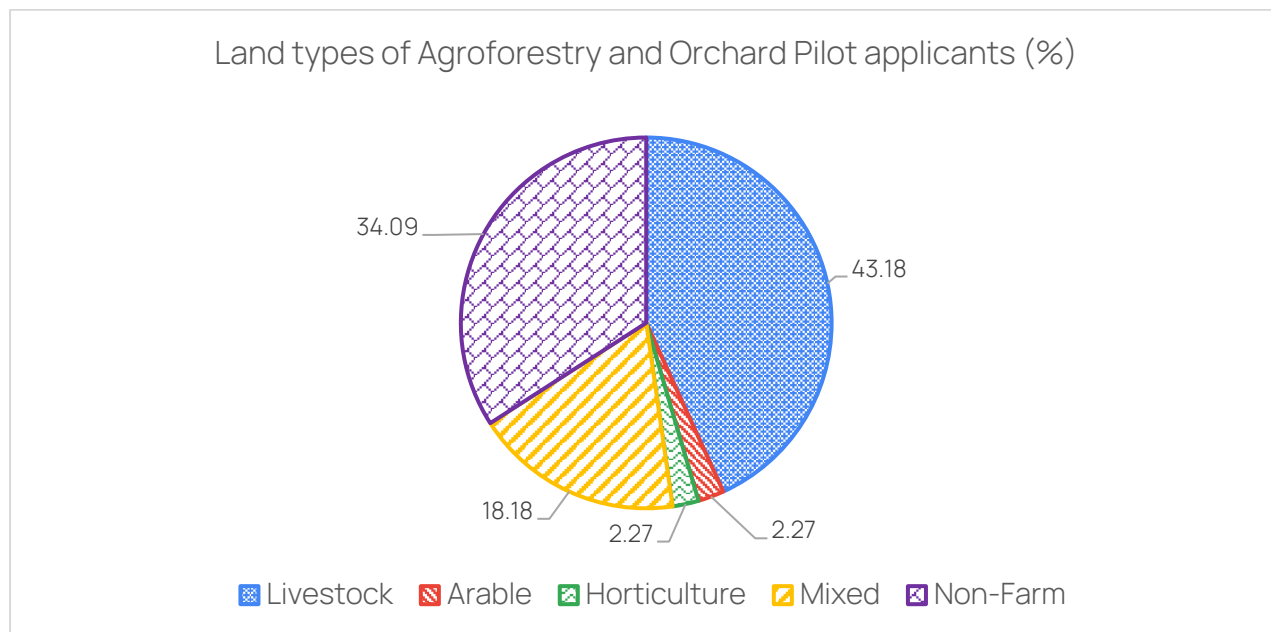
Livestock was well represented in the received applications, making up just under 43.2% of all projects (Figure 1). Only a single arable farm submitted a project application, although 8 mixed farms (arable and livestock) also submitted applications. Within the mixed farms the tree planting was primarily linked to livestock benefits despite there also being benefits for arable aspects. Only one farm was described as horticultural. The remaining 34.1% of applicants were not farms and typically comprised community owned land, i.e. community orchards.

These data are difficult to compare with existing literature as there is a lack of centralised databases for agroforestry in the UK. The closest publicly available database is hosted by the Agroforestry Hub (2023) and contains 21 agroforestry sites in the UK. From this database details on farm type have been extracted to provide a comparison between the current study and wider UK context.

In agreement with the pilot findings, livestock farming dominates the current make-up of agroforestry sites across the UK (Figure 2). Arable and horticulture represents a small proportion in both the pilot and wider sample. There appears to be some disparity between sources in the proportion of mixed farms (arable and livestock) integrating agroforestry. However, the UK-wide database doesn't include non-farm examples such as community orchards which are included in the pilot and so the results aren't directly comparable. If we also remove non-farm examples of



agroforestry from the pilot project data, then the ratios of land types are similar for all types (Figure 3).



**Figure 1. Pie chart breakdown of the different land-use types from applicants in the Agroforestry and Orchards Pilot.**

These results suggest that the uptake of agroforestry on different land types within the Agroforestry and Orchards Pilot is representative of wider UK agroforestry practice and may also be representative of adoption in the future.

Literature sources further re-enforce the pattern of livestock (silvopasture) being the dominant type of agroforestry with values as high as 99.6% (Defra, 2017; Soil Association, 2020). The minimal levels of agroforestry on arable and horticultural land is in contrast to findings from research into these specific systems. The theoretical benefits of agroforestry to horticultural systems have been well documented but empirical data gives a less clear picture (Green, 2019). This may be due to difficulty with measuring the benefits or a lack of mature examples of silvohorticultural systems from which data can be captured. This creates a chicken and egg problem where practical examples are needed to validate assumed benefits but will be less forthcoming without that evidence base.

Silvoarable systems are also well recorded in the scientific literature and existing mature systems give rise to empirical evidence of the benefits of this practice (Staton, et al., 2022). The relatively low uptake of silvoarable may instead be due to the complexities – perceived or otherwise – of designing and fitting trees into an arable system (see Albanwise Case Study).

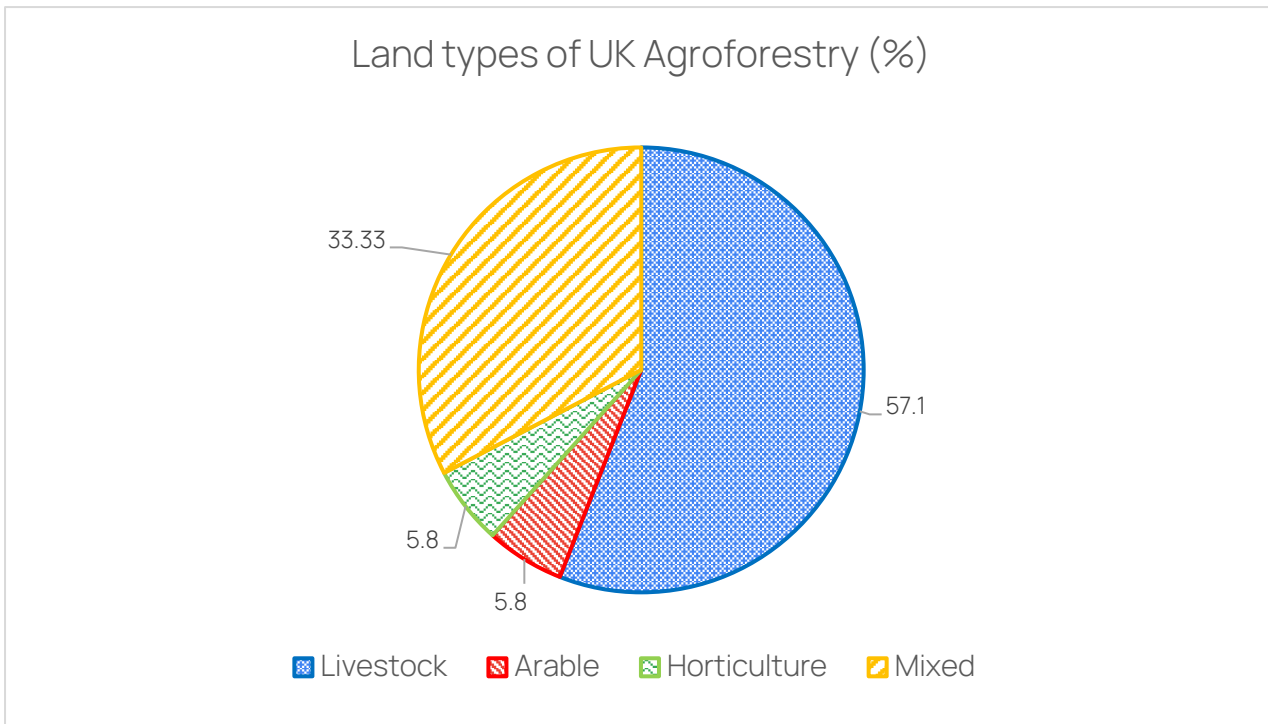


Figure 2. Percentages of land types from 21 agroforestry sites across the UK (The Agroforestry Hub, 2023).

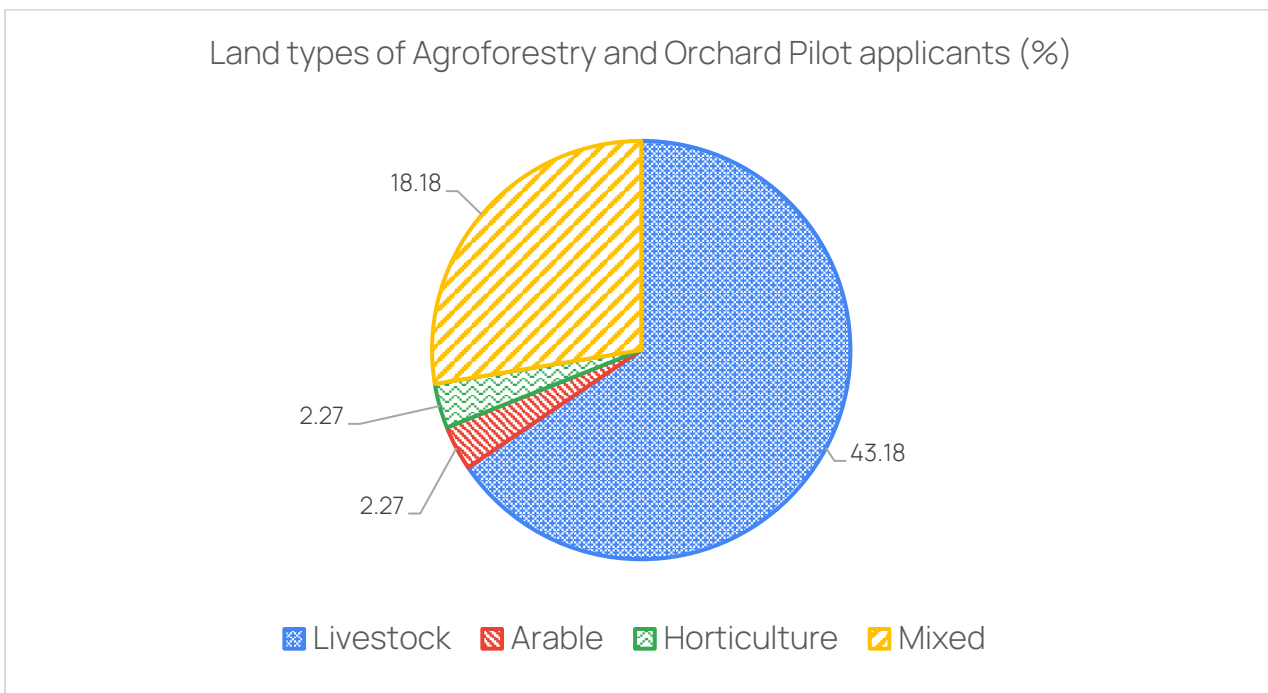


Figure 3. Percentage of different land types in the Agroforestry and Orchards Pilot with non-farms excluded.

## **Albanwise Environment Ltd.**

Albanwise manage a large expanse of agricultural land across Norfolk and Yorkshire. Their Agroforestry and Orchards project is acting as a trial on some of their arable fields in Norfolk.

The design covers two fields, the first of size 8 ha with 4 rows of planting, including Mulberry, Apple, and a mix of native broadleaves planted in East-West orientation. The second field is 14.8 ha and features 17 rows of nut and timber trees, including a row of espaliered almonds running North-South and a block of 12 rows with hornbeam & hazel. The rows have been designed for ease of operation of farm machinery with a spacing of 40 m.

The funding covered planting and fencing costs, except for some additional hare fencing. In the next few years the company foresees additional costs as the bio-degradable mulch mats will need to be replaced. For now they are able to take on the additional management costs, however, this will be a concern if they expand the agroforestry in the future.

This planting is viewed as an initial trial, both to see how the trees cope but also how the wider farming operations are affected. They have already had to adapt their rotations, excluding some specialist crops such as vining peas and sugar beet, and some cereals such as rye and maize. This is due to some contractors not feeling comfortable working in the tree-planted fields and foreseeing the harvesting of these products near impossible, despite their design approach leaving plenty of room for equipment.

Despite these difficulties the trees have made a positive impact. While in the fields the farm workers have already noticed a significant increase in biodiversity with Skylarks and Yellowhammers being particularly responsive to the new habitat. The fruit, nuts, and timber will offer further financial benefits in the future, although these are not expected to be significant due to the small scale of the trial. Instead, the espaliered almonds will act as a pleasing photo opportunity for the wedding venue that exists on-site, weaving the tree planting into additional farm diversification projects.

Positive comments about the pilot include the full funding offer, which was useful in convincing other stakeholders to take up the opportunity. Likewise, the flexibility for the variety of planting designs and species selection was a positive factor. Further improvements include the addition of some longer-term funding for management costs, e.g. restocking, new mulch mats and replacement guards. They also believe that the pilot's largest challenge is the initial barrier to tree planting on/in farmland which could be addressed through access to relevant information and farmer-to-farmer interaction, after which the likelihood of individuals coming on-board will be increased.

### 2.1.2 Land tenure

Land ownership and tenancy data was only available for 25 of the received applications. 15 of these were owners of the land on which the tree planting had taken or will take place. Only 2 applicants identified themselves as tenants, while the remaining 8 were community owned.

Previous studies have identified land tenancy as a barrier to agroforestry adoption (Smith, et al., 2013; Soil Association & Woodland Trust, 2018; Howe & Ross, 2019; Defra, 2020). 91.3% of applicants for the pilot were landowners, either as individuals or as part of a community. This value is matched by a similar project run by the Woodland Trust with 87.9% of participants being landowners (Cheshire, 2019). Considering the percentage of tenanted agricultural land in the UK is 45%, there is a clear issue with integrating agroforestry into tenancy situations (Defra & Government Statistical Service, 2022).

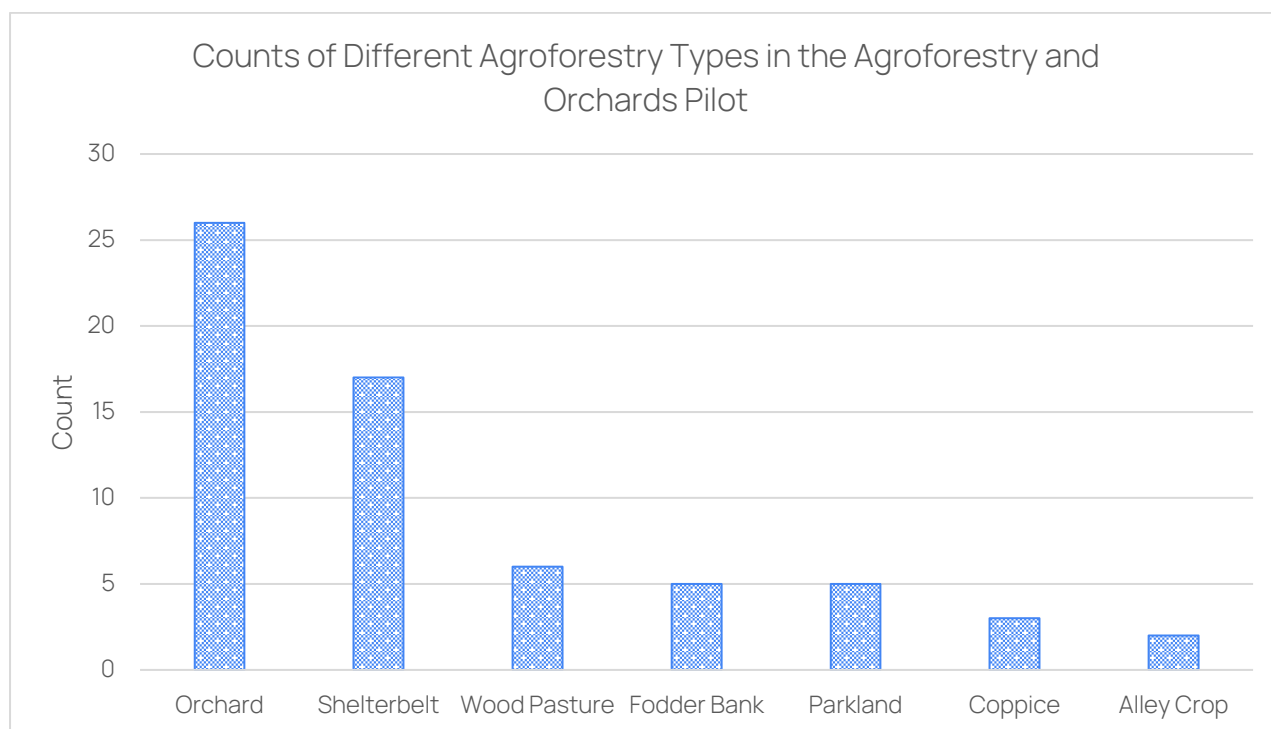
Examples of tenanted agroforestry systems do exist, notably Dartington Estate, Devon which leases its agroforestry tree rows to different producers, treating them as separate units (Dartington Trust, 2023). Alternatively, Stephen Briggs from Whitehall Farm, Peterborough operates a mature agroforestry system on tenanted arable land (Agricology, 2023). Currently the main barrier to agroforestry on tenancy is the opinion of the landowner/landlord. This was represented through points raised in semi-structured interviews with large landowning estates that took part in the pilot. When queried whether they would allow their tenants to partake in an agroforestry program such as the pilot, one respondent would not allow them, while the other would consider it but with heavy involvement from the landowner. Encouraging wider discussions with landowners and tenants, particularly around agroforestry funding and design, is an important factor to advancing past this roadblock to wider agroforestry uptake.

### 2.1.3 Agroforestry type

Classification of the agroforestry types was Identified by referring to the descriptions of the projects (Shropshire Council, 2023). Where multiple types of agroforestry exist in one application, more detailed classifications were used to identify individual agroforestry techniques. Orchards were the most popular option with 26 examples, be they traditional planting or in an agroforestry layout i.e. alleys (Figure 4). Shelterbelts were the second most popular option with 17 examples. The remaining classifications of fodder bank, wood pasture, alley crop, coppice, and parkland-style were less popular with a range of 2 to 6 examples of each.

Unlike the pilot, there is a lack of representation from orchards in the wider UK with only a third of listed studies having an orchard component (The Agroforestry Hub, 2023). This may be due to the pilot having a particularly high occurrence of orchards as funding was also available for non-farm orchard systems. Shelterbelts were represented to a similar level in both the pilot and the wider UK database, 39% and 48% respectively. Wood pasture was the most popular type of agroforestry in the UK-wide database, featuring in 81% of examples. Historically agroforestry in the UK was

expressed through multiple systems including pannage, fruit intercropping and wood meadows (Smith, 2010). The high levels of orchards and shelterbelts seen in the pilot or wood pasture seen elsewhere suggest that current schemes may be favourable towards one particular type of system. Ensuring a diversity of agroforestry types are viable will further open up the process of agroforestry to a new audience while also developing a rich mosaic of habitats at the landscape scale.



**Figure 4. Classifications of the different types of agroforestry and orchard planting across the applications.**

#### 2.1.4 Tree density

Determining the density of tree planting was not possible for all applications. Of the 24 applications where density could be determined, there was a range of options depending on the agroforestry type (Table 1). Fodder banks and Shelterbelts were at the higher end with an average density of 1522.33 stems per hectare, although this planting would only take place on a small boundary/hedge. Orchards and parkland-style planting was sparser, with orchards planted at 88 stems per hectare and parkland planting averaging at 19.77 stems per hectare. Within agroforestry types there was also a variety of densities reported, for example alley cropping ranged from 44 up to 208 stems per hectare.

This wide range of results is less prevalent in the literature which identifies agroforestry as falling within a narrower range of between 75 to 200 trees/ha (Soil Association & Woodland Trust, 2018). The existing Agroforestry grant in Ireland stipulates that projects have to be between 100 and 1000 trees/ha, although this has been cited by applicants as a limitation to agroforestry design (DAFM, 2020). Different types of agroforestry require varying levels of tree density. The unusually wide

range of densities seen in the Agroforestry and Orchards Pilot may be an example of the beneficial aspects of flexibility associated with the pilot. The ability to plant very sparse or very dense systems broadens the adaptability of agroforestry to a particular landscape and land system, allowing for complex designs to be implemented and creating an overall more productive and attractive package for landowners.

Type of Agroforestry	Average of Stems per Ha	Range of Stems per Ha	
		Low	High
Alley Cropping	115	44	208
Coppice	179	25	341
Fodder Bank	1522.33	400	2500
Orchard	88	22	222
Parkland	19.77	0.3125	44
Shelterbelt	741.6	44	1975
Wood Pasture	263.33	186	400

**Table 1. Average stems per Ha and range for the different types of agroforestry included in the Agroforestry and Orchard Pilot applications.**

### 2.1.5 Tree species and products

47 tree species were included across the 45 pilot projects where tree species data was available. The three most popular were fruit trees; apple was included in 91.1% of the projects, plum in just over half, and pear in 37.8% (Figure 5). The rest of the trees represented a range of timber, nut, and fruit species with native species being most popular while exotic species such as eucalyptus and almond were only present in a handful of projects. The average level of species diversity in projects was between 6 and 7 tree species, with some projects reaching as many as 19 different species while others, notably orchards, typically only had 1.

When identifying the products and outputs from their pilot projects, fruit was the most common option with 26 projects listing them as specific produce. All other products i.e. nuts, timber, coppice and non-physical i.e. ecosystem services, were rarely identified. Nuts only appeared in 5 applications, while timber, coppice, and non-physical products were identified in 2 projects respectively.

The database of agroforestry projects from across the UK reports 45 different species and similarly the most popular selections are native fruit, timber, and nut species (Figure 6) (The Agroforestry Hub, 2023). Whilst apple was the most common tree in the pilot, it is only featured in 38% of sites in the UK-wide agroforestry database. Instead, the most popular tree species in the latter were Oak

and Alder, which were both present in 57% of projects. The dominance of apple in the pilot could be due to a lack of long-term funding requiring a quick source of income to be generated, a situation which would tend towards apples and other fruit or nut trees while dissuading the planting of trees for timber. Both the pilot and wider UK agroforestry has also shown some forward thinking with planting of species suited to warmer weather, notably nectarines, apricots, and almonds.

Considering the diversity of trees used in any one project, the pilot averaged 6 to 7 species. In comparison, the UK-wide database has an average of 9 species (range 1-28), a difference that is not significant. Other programmes that have attempted to increase species diversity have restricted the number of specific species that can be planted, for example the Irish Agroforestry Grant only allows for 15% of tree species to be fruit and nuts, removing the possibility of a pure orchard system (DAFM, 2020). This has clear negatives in restricting the adaptability of agroforestry designs but does promote a greater diversity of tree species, which in turn has a range of benefits for biodiversity. If a restriction system is implemented then the levels will have to be carefully monitored, with feedback from participants solicited to ensure the program is still an attractive proposition.

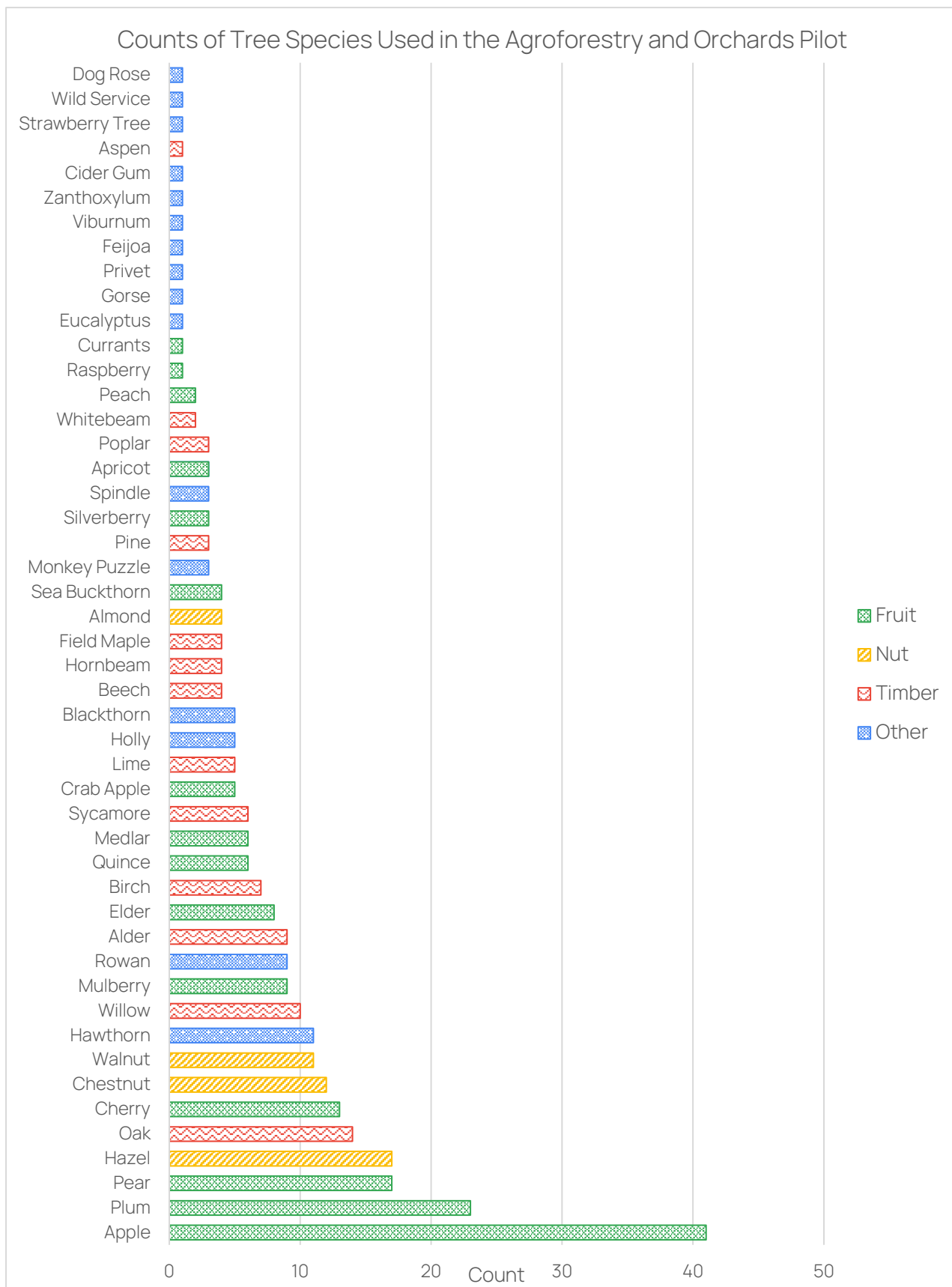


Figure 5. Counts of the different tree species identified in 45 applications for the Agroforestry and Orchard Pilot.



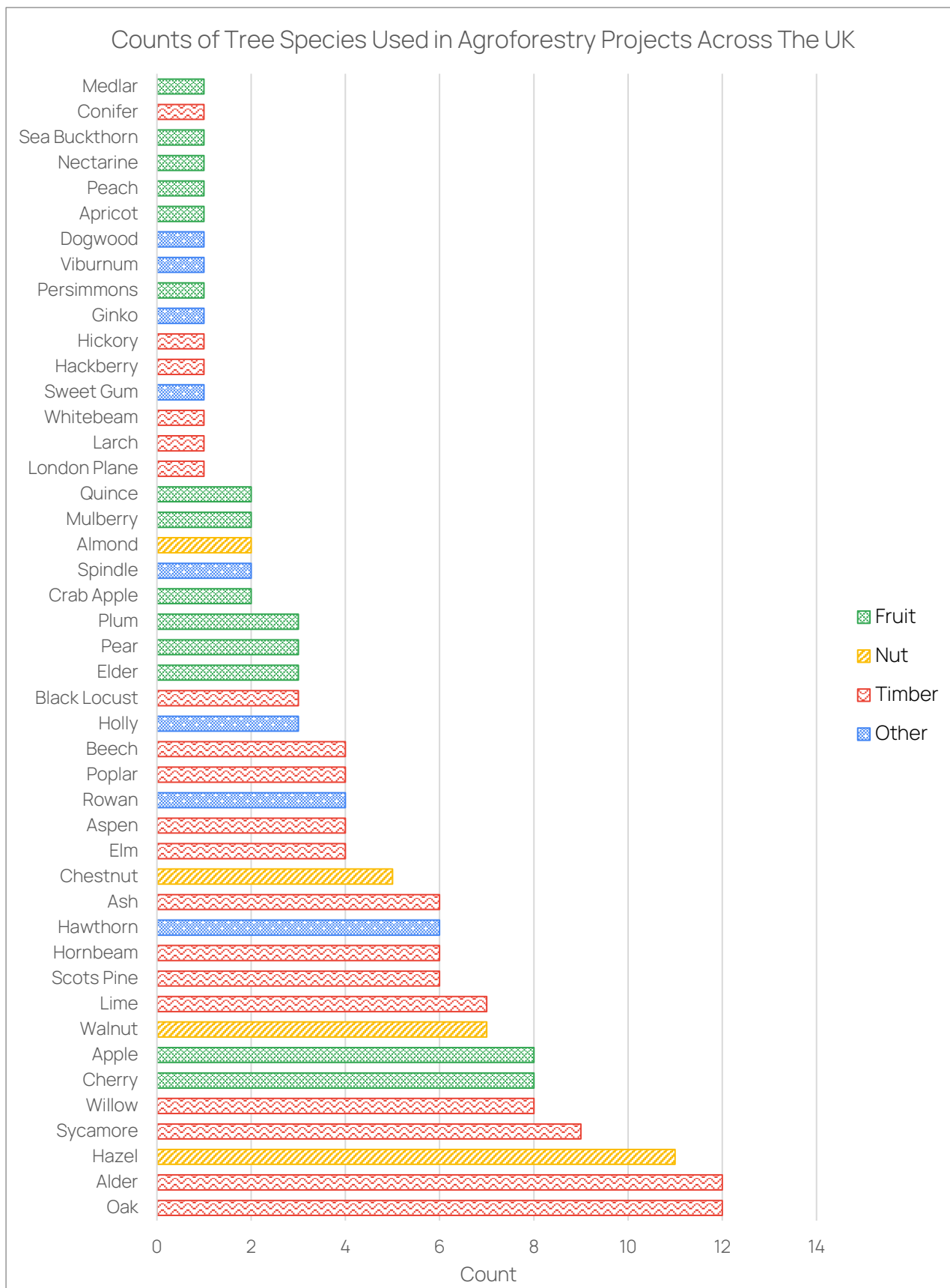


Figure 6. List of the species used in agroforestry projects across the UK (The Agroforestry Hub, 2023).

## 2.2 Applicant Survey

21 responses were received from the survey. Of these, 16 were able to be linked with application data referred to in the above section. 11 of the respondents were from Shropshire, 5 from Cornwall, 3 from Chichester, and 2 from Norfolk.

### 2.2.1 Importance of Different Aspects of the Pilot

The initial questions explored the importance that the respondent attached to different aspects of the Agroforestry and Orchards Pilot when deciding to participate. Funding for trees was noted as being of high importance with 81% of the respondents stating it was either fairly important or very important in their decision to apply (Figure 7). Funding for fencing also followed a similar pattern with 76% finding it fairly or very important.

The funding available for labour costs was of mixed importance to participants with 8 respondents claiming it to be very important, while 4 respondents each marked it as fairly important, a little important and not important. Likewise, the level of advice and support available was also of mixed interest when applying to the pilot with no clear outcome from the responses.

The benefits to the local environment of the project were by far the most popular factor when applying for the pilot with 81% of respondents stating it as very important. Conversely the benefits for income diversification that the pilot offered were of mixed value to applicants: 33% of respondents considered this benefit as not important and 28% considered it very important. Interestingly none of the orchard projects listed income diversification as either fairly or very important, possibly due to their community status. Conversely when just considering agroforestry projects there was a trend towards finding income diversification as important. Finally, an introduction from a project officer to the programme was seen as generally positive with 60% of respondents noting it as being fairly or very important.

Respondents were also able to identify their own factors that played an important role in their decision to apply for the pilot. Comments included community benefits, water and wind regulation, landscape-scale cohesion, and flexibility of requirements.

In their review of UK farmer perceptions of agroforestry, Tosh and Westaway (2021) found that the importance of funding for capital costs (i.e. trees and fencing) was frequently included in surveys and consistently came out as an important factor. Labour costs were less frequently included in surveys, however in those that did include it the results came to a mixed conclusions as to its importance.

Similarly the exploration of farmers opinions on environmental benefits of agroforestry was not a common occurrence in the literature, however when this topic was included the results overwhelmingly conclude that the environmental benefits are important, a result reflected in the pilot responses. Tosh and Westaway reported the same pattern for business diversification, with

many surveys finding it an important aspect. This is not representative of all the pilot respondents who had mixed opinions on the importance of income diversification benefits, although is representative when only agroforestry projects are considered. The importance of economics is a complex area which will be explored further in the later section on external funding and markets.

A similar contrast between the results of this pilot and those in the literature exists for the responses to advice and support given. Within the pilot some individuals found resources available useful, while others preferred to learn themselves or already had sufficient knowledge and so didn't use or value the resources available. Tosh and Westaway instead found that while few studies have explored this topic, those that have report a high level of support and advice as vital to influencing farmer uptake. There are a range of possible reasons for why this difference appears; farmers may have already utilised resources about agroforestry and were simply waiting for a funding program, or they may prefer to learn in their own way by trial and error, rather than through offered resources. This is an area that requires further study.

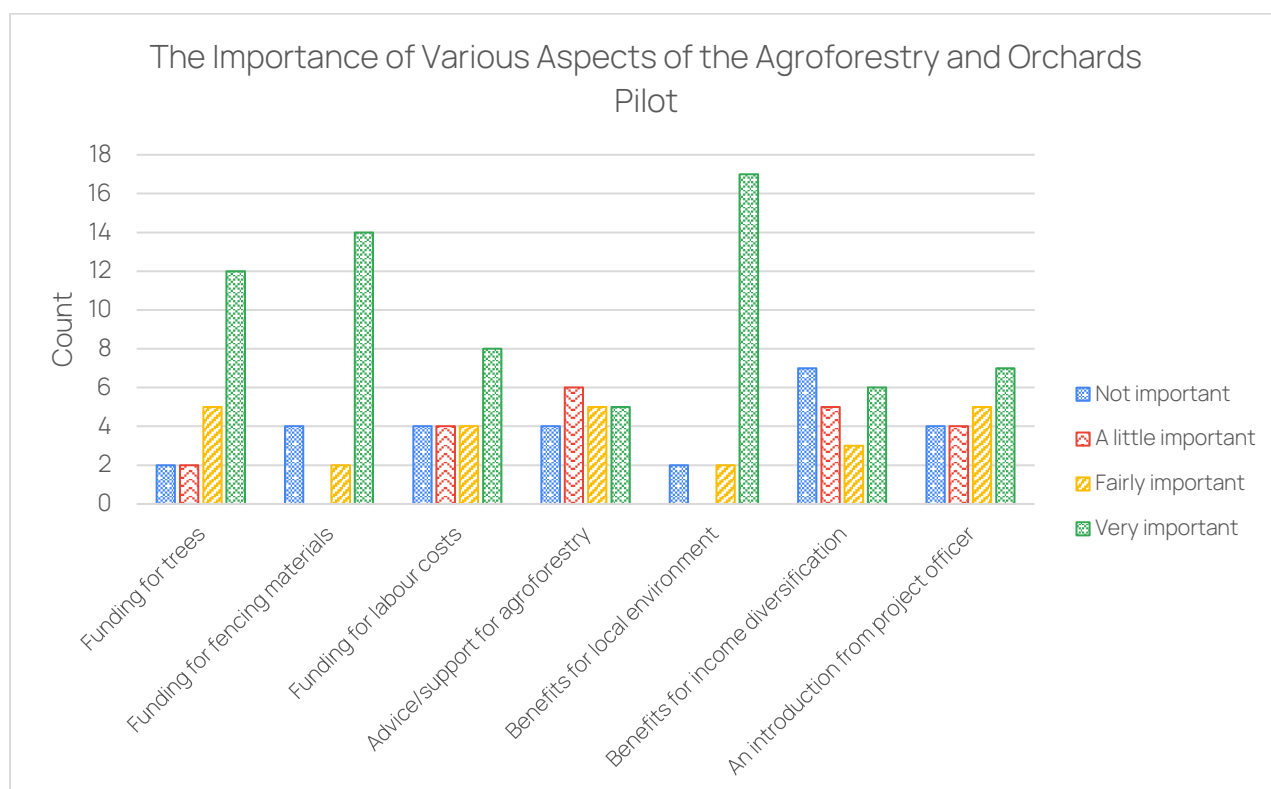


Figure 7. Respondents’ responses when asked about the importance of various factors when deciding to apply for the Agroforestry and Orchards Pilot. A breakdown of this figure comparing agroforestry projects and orchard projects can be found in the appendix.

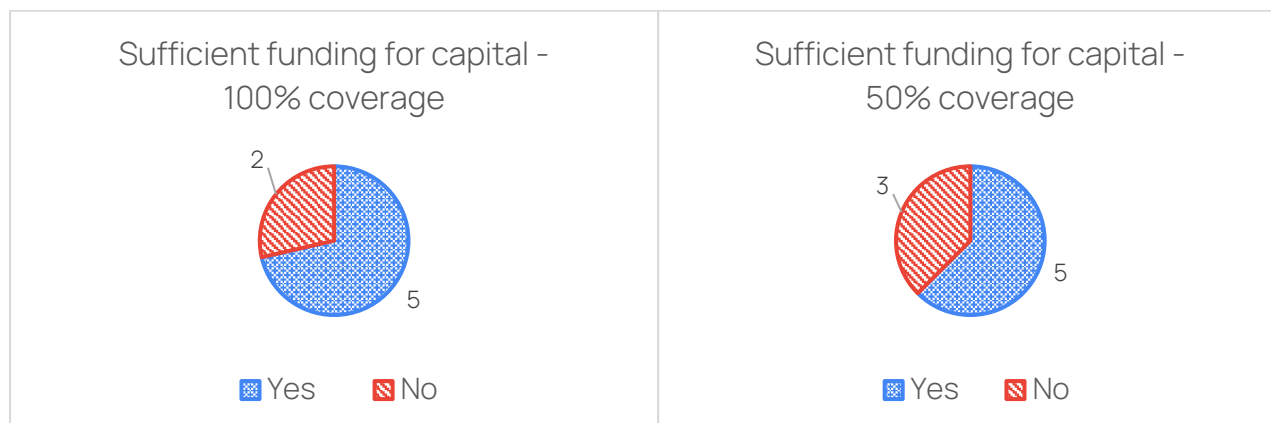
### 2.2.2 Funding from the Pilot

Following from the initial ratings, these questions explored in more detail how sufficient the levels of funding were, as well as some longer-term financial considerations.

A key aspect of the pilot was the variance of funding coverage offered between two years. The 2021-22 applicants were offered 100% coverage of capital costs, while 2022-23 applicants were only offered 50% funding. 15 survey respondents were able to be associated with each of these groups, 7 participants receiving 100% coverage and 8 participants receiving 50% coverage. Given the small sample sizes for each group, statistical analysis would not be appropriate. Nonetheless, visual comparisons can and are made between results where they are relevant.

Overall there were mixed views on whether funding for the capital costs and labour costs had been sufficient. For capital costs a small majority considered that the funding was sufficient, while the opposite was true for labour costs. When capital costs weren't completely covered by the funding, mulch/woodchip and fencing/plant protection were the most likely aspects not to be covered. When funding for labour was insufficient, it was typically the work for fencing and tree planting that were not covered.

When separated by the level of funding received there was little difference in the results when asked if the funding were sufficient for their project (Figure 8). This lack of difference is potentially reflective of good planning, with those only given 50% funding accounting for this in their budget and design. Therefore, a reduction in funding offered doesn't necessarily lead to an increase in the frequency of overbudget projects, however it may lead to a change in the type and scale of projects.



**Figure 8. Respondent's opinion on if funding was sufficient by the two groups who received 100% and 50% funding respectively.**

When considering the longer-term financial costs, 57% stated that they didn't have any intention on creating any return on investment. Those that had planned for a long-term financial return estimated, on average, for a return to start after nearly 7 years, with the range being 2-10 years. Of these respondents there was no clear consensus if the return would cover the associated management costs in the future, with only 29% anticipating that it would, while 33% thought it wouldn't, and 38% of respondents not knowing.

90% of respondents were interested in further planting. Of these individuals, 84% would require additional funding for early tree management i.e. re-stocking/pruning. When asked about the

amount of funding, respondents gave a variety of answers. One suggested £3000 per 100 trees for 5 years, with a £500 grant for restocking. Another suggested £1500 over 5 years although gave no indication of how this would scale with size or number of trees. A third suggested that a scheme similar to the England Woodland Creation Offer, £300 per ha for 10 years, would be suitable.

Payment support (lack of) and the wider economics of agroforestry systems are frequently cited as a barrier to uptake (Defra, 2017; Soil Association, 2020; Staton, et al., 2022). This was well represented in the results for the pilot as respondents agreed that the amount of funding on offer was an important factor when applying. A similar study by The Woodland Trust found that two-thirds of farmers would plant trees if funding was offered (Woodland Trust Research & Macleod Research, 2020). Salam et al (Abdul-Salam, et al., 2022) found that the high upfront costs associated with establishing agroforestry was a major barrier which was mitigated by offering to fund 80% of upfront costs. The pilot offered a similar proposal, although depending on the project specifics the level of upfront funding offered ranged from 100% to 50% of the total project budget. One of the costs that was less likely to be covered by the funding offered was labour and this has been identified as a barrier in previous studies (Staton, et al., 2022). The sufficiency of funding for upfront costs (labour and capital) varied and some participants had to limit their designs due to a lack of payment available. Ensuring that each project receives appropriate levels of funding for their specific scenario is an important quality for any funding program and may be an area for further exploration in the future.

There was a range of perspectives on the importance of generating a return on investment. Understandably, those who found upfront funding limiting were also keener to earn a return on investment in order to recoup personal costs. Respondents estimated, on average, 7 years until the start of ROI. Whitehall Farm, which operates an alley cropping system of apples (the most common tree in the pilot), also reports a time of 7 years before generating a ROI, with 5 of those years waiting for the trees to become fully mature (Soil Association, 2020; Briggs, 2022). Much higher ROI values would be expected for timber production and some other products.

Most of the participants in the agroforestry and orchards pilot were interested in carrying out further planting, corroborating the findings of other studies (The Woodland Trust, 2022). Some of the participants would like to see additional funding for planting through the agroforestry and orchards pilot, which could come in the form of a longer-term maintenance payment, although this desire for additional planting could also lead to participation in other more applicable schemes. Longer-term payments exist for the England Woodland Creation Offer (£300 per ha for 10 years) and the Irish Agroforestry Grant (variable rates for 5 years), although in the past there has been criticism of Defra for not supporting long-term tree management (Defra, 2022; DAFM, 2020; Westaway, et al., 2023). In a survey of farmers' attitudes toward agroforestry, Meyer (2012) reported that farmers would expect payments of £101-300 ha<sup>-1</sup> yr<sup>-1</sup>. How and what a long-term payment should look like is beyond the scope of this report, however, the importance of these types of

payments are further re-enforced with increasing concern over the effects of pests and disease on tree health and may become more of a barrier in future years as the climate changes (Defra, 2020; Woodland Trust Research & Macleod Research, 2020).

### 2.2.3 Knowledge and Learning

Prior to participating in the project the majority of respondents indicated they had an average or slightly less than average knowledge of agroforestry. Some project areas offered a Learning Voucher. Only two respondents utilised the vouchers and rated them as being useful. Of those who didn't use Learning Vouchers, 56% weren't aware that that they were available, while 44% didn't have the time to use them. One respondent noted that they felt the council already provided enough information and so didn't feel the need to use the Learning Voucher.

All respondents used a variety of information sources to learn about agroforestry, some of which were rated as being more useful than others (Figure 9). Two-thirds of respondents found that websites were either fairly useful or very useful. 41% of respondents rated books, leaflets, handouts and other similar content as being a fairly useful type of resource, although 24% also didn't utilise such resources or found them not useful. There were mixed reviews for webinars and other online events with 30% of respondents finding them both very useful and not useful/not used respectively. In-person events were noted by over half of respondents as not being used or not proving useful. On the contrary, 1-to-1 discussions with project officers were found to be fairly or very useful to 70% of the respondents. Finally, visits to the respondent's farm from project officers was of mixed impact with one third of respondents not availing themselves of this opportunity or not finding it useful, while just over 50% found it fairly or very useful.

Other resources that respondents utilised and found useful included training courses specifically relating to tree management (e.g., pruning), conferences such as Groundswell and the Oxford Real Farming Conference, and visits to existing agroforestry sites on demonstration/open days.

When a reduced level of funding was offered, respondents found knowledge resources more useful compared to those who had 100% of capital costs covered (Figure 16). One explanation for this difference could be the increased amount of person financial investment in the projects. One might expect that these participants have a greater incentive to ensure the trees are kept alive, healthy and well managed, thus placing a greater level of importance upon this type of knowledge and its source.

Respondents were also asked how they rated their level of knowledge on certain areas relevant to agroforestry (Figure 10), with the aim of identifying where there is sufficient high-quality information available and where there may be a lack of accessible resources. Some 81% of respondents stated they had some knowledge, and 86% greater than average knowledge, about planting designs and layout, tree species and their suitability, tree protection methods, tree management processes, and marketable products from trees. No more than one respondent

indicated that they were very knowledgeable on any of these categories, apart from in the case of tree protection methods on which three respondents stated they were very knowledgeable.

A regularly identified barrier to agroforestry is a lack of knowledge and expertise (Defra, 2017; Soil Association, 2020; Staton, et al., 2022). The findings from this report indicate that knowledge is certainly a pertinent area for participants, although understandably different individuals vary in their level of knowledge, desire to learn more, and methods of learning. Most individuals from the pilot found websites, books, and leaflets/booklets as the most useful methods of learning. The workshop analysis of the Agroforestry ELM Test 2020-23 (part of Defra's Tests & Trials co-design process) found that books and similar media were ranked joint 6<sup>th</sup> by participants, suggesting that the use of specific sources is highly variable between groups (Tosh, et al., 2022). The workshop instead found the most popular source of knowledge was farmer-to-farmer interactions followed by case studies/demonstration farms and independent advisors. Of equivalence to independent advice are the 1-to-1 discussions with project officers from the pilot which was generally regarded as useful by 70% of respondents. There was no option for farmer-to-farmer interaction, although during semi-structured interviews the importance of this link was raised by multiple interviewees and would be an important area to explore in future work (see Bradford Estates Case Study).

A strong agreement between the findings of this pilot project and the Agroforestry ELM Test also exists in relation to topics of knowledge. The pilot results suggest that tree protection was the area of greatest knowledge among participants, while there was a lack of knowledge, possibly due to a lack of information sources, on planting design, tree species suitability, tree management, and tree products. These topics were also highlighted as knowledge gaps in the Agroforestry ELM Test workshops. Notably, the economics (i.e. products) of agroforestry, tree species selection, and maintenance effort/costs (joint with biodiversity/ecology) were the top three ranking topics. Design and planning was fourth, followed by tree protection (joint with carbon capture). The similarities in results between the two studies underline that these areas are of most concern and should be prioritised when developing new information sources or providing learning opportunities.

Learning Vouchers as a concept were also strongly supported during the ELM Test workshops, although received less support when implemented in the pilot. Only two individuals reported using the Learning Vouchers, although they did find them useful. The vouchers were brought in late in the program and only in limited locations. If expanded to a larger audience and well marketed from the beginning, they may have been better received.

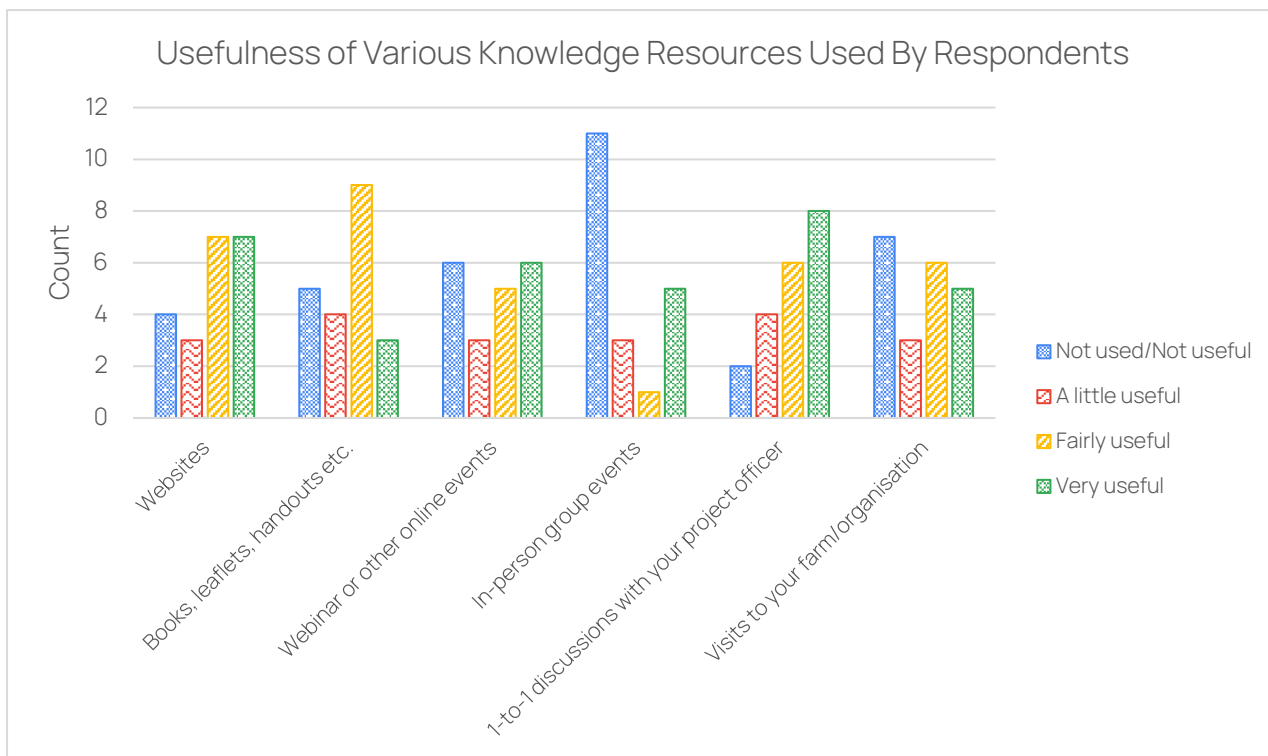


Figure 9. Respondents’ rating of different sources of knowledge on agroforestry.

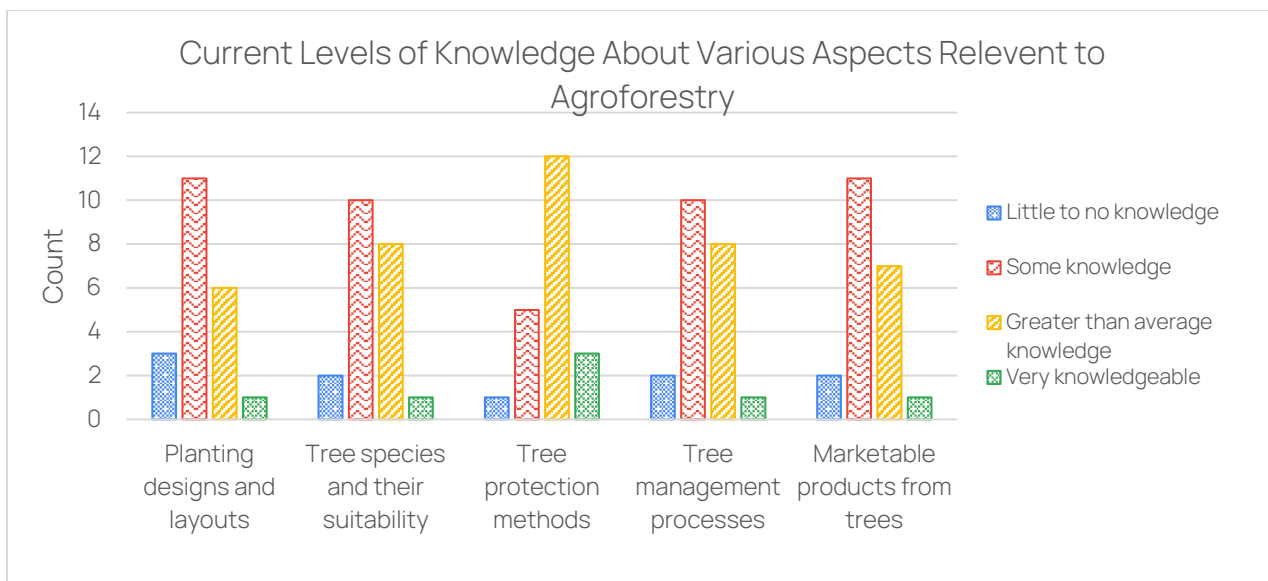


Figure 10. Respondents’ level of knowledge on various aspects which are relevant to agroforestry.



## Bradford Estates

Based in Shropshire but with land across the UK, Bradford Estates farms arable and livestock on a rotation. Their project offers the opportunity to diversify income as well increase community engagement.

This agroforestry project covers an area of 4 ha on a north-facing slope. The field is currently in the ley grassland phase of the rotation and will be converted to arable in the next few years. The tree planting consists of a variety of apples, on different rootstocks, planted in 3 m wide rows between the cropped alleys. Tree rows are 24 m apart and there is a 12m headland, designed for manoeuvring farm machinery.

Entire tree rows are fenced off with metal stakes and heavy-duty wire for livestock protection. This fencing can be taken up and re-used elsewhere if future planting takes place. There is hope to expand this planting to neighbouring fields; the current funding wasn't sufficient to extend the planting in this initial phase. The funding that was provided covered some planting and fencing costs; additional funding was generated through participation in a separate hedge planting scheme.

The apples will be harvested and juiced for selling in vending machines or at farm events. While this offers some income return there are also additional benefits that the planting has provided. A future project will involve the exploration and development of an automated fruit harvesting machine in collaboration with engineering students. Likewise, the site will host multiple events for farmers and the local community, through which the Estate will be able to share their knowledge of agroforestry practice and build up its reputation.

If this trial is successful then the Estate will be more likely to consider covering some of the costs of future tree planting themselves. However, the ability to have the majority of costs covered as part of the trial was a significant factor for initially applying to the pilot. Another positive aspect of the pilot was the lack of bureaucratic forms and admin. This is in part due to the co-design approach that was possible through Shropshire Council and Bradford Estates ensuring both parties were catered for from the outset.

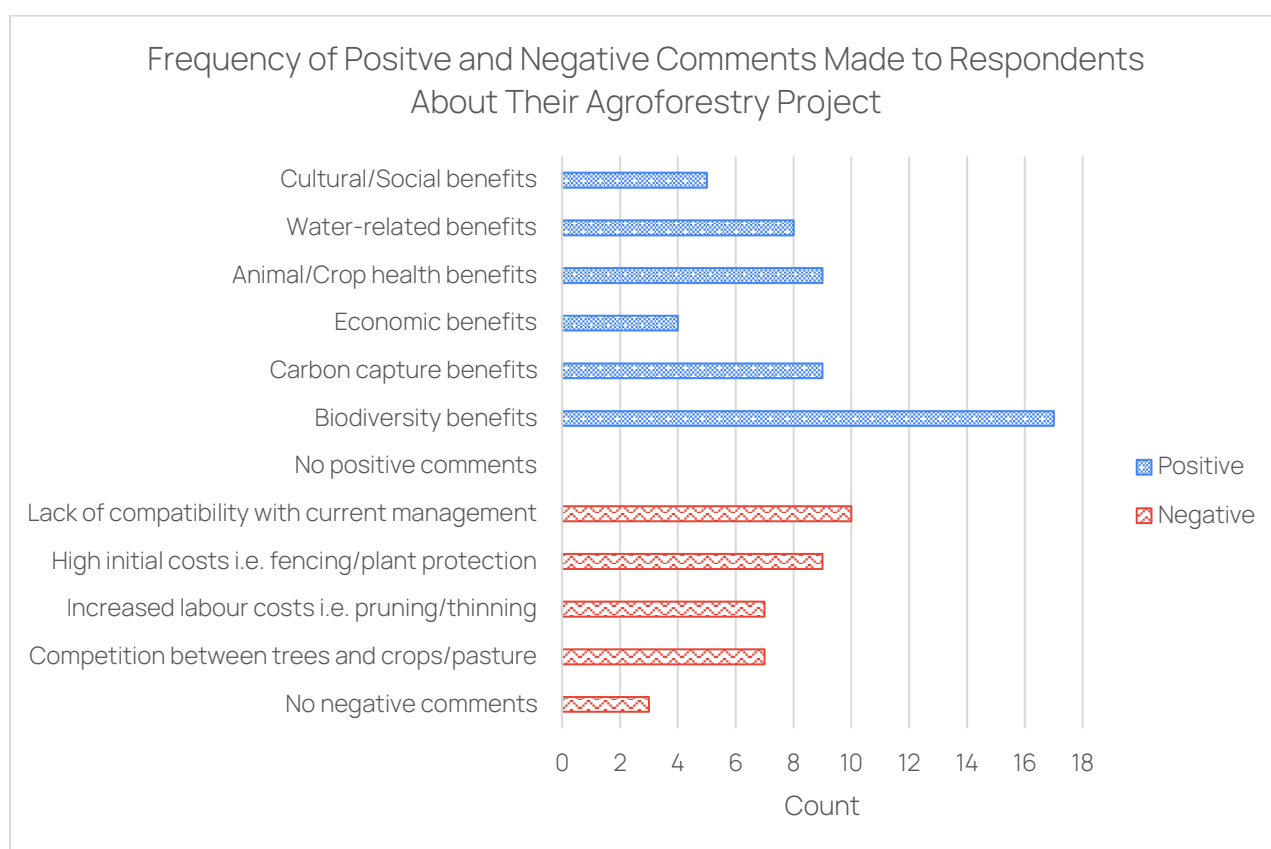
While the Estate hopes to use the site as a demonstration for local farmers, they also believe that a lack of farmer-focused communication, both about the pilot and the general benefits of agroforestry, is a significant barrier to uptake. So far, they have received plenty on interest from locals but this is not matched by the amount of information available, e.g. articles in Farmers' Weekly.

### 2.2.4 Social Influence

76% of survey respondents suggested that they had received interest from other farmers and landowners about their agroforestry or orchard planting. With regard to the nature of positive

comments received, there was a clear emphasis on the biodiversity benefits, noted by 81% of respondents (Figure 11). Of lesser but still frequent mention were carbon capture benefits (43%), animal/crop health benefits (43%) and water-related benefits (38%). The least expressed positive comments around agroforestry were cultural/social benefits (24%) and economic benefits (19%).

Some negative comments on agroforestry were also frequently expressed by other farmers/landowners known to the participants (Figure 11). Lack of compatibility with current farming systems was of greatest concern, being heard by 48% of respondents. High initial costs (43%), increased labour (33%), and competition between crops and trees (33%) were also noted. Finally, three respondents noted that they hadn't directly heard any negative comments from others about their agroforestry project.



**Figure 11. Frequency of positive and negative comments heard by respondents in relation to their agroforestry projects.**

Farmers and farming communities have a complex relationship of influence (Oreszczyn, et al., 2010). Identifying what other members of the community have said about the agroforestry projects also provides an insight into the opinions of the wider public, a topic which is frequently explored through research (Meyer, 2012; Defra, 2017; Soil Association, 2020).

The results from the survey indicated that the projects funded through the pilot were perceived positively by farmers and others with whom the participants interacted. Biodiversity was reported as a perceived positive benefit of agroforestry in 81% of projects. This has also been found in other

studies. Notably, when the Woodland Trust's Trees for Your Farm Scheme conducted a survey of their participants, two-thirds stated they had received feedback from local communities on their agroforestry, the majority of which was positive (The Woodland Trust, 2022). The broader public view on agroforestry tends to focus on particular benefits and costs. A review of the audience for the Agroforestry Handbook found that the most popular positive aspects of agroforestry were biodiversity increase, landscape resilience, and farm resilience (Soil Association, 2020). This matches with the positive comments experienced from the pilot projects, suggesting that biodiversity as a primary argument for agroforestry in the UK. Carbon sequestration and animal health and welfare were important outcomes of agroforestry according to the results of both the pilot and the Agroforestry Handbook survey.

Another study by Meyer (2012) that focused on conventional farmer perceptions of agroforestry found similar results, with biodiversity being a highly ranked answer both in terms of frequency of recognition and perceived level of importance. Interestingly, while there were few comments about economic products and diversification of income as a benefit of agroforestry from the pilot, these factors were noted as relatively important by farmers in the Meyer study. Cultural and social benefits were also ranked higher than animal health and welfare or carbon capture benefits, contrary to the results of the pilot.

Many of the barriers perceived by the Agroforestry Handbook survey respondents did not match the negative comments elucidated in the pilot, mostly due to a difference in objective and goals. One shared concern was the lack of capital investments. 70% of Agroforestry Handbook survey respondents stated the high requirements for capital investment as a major barrier. This was reflected in the results for the pilot as high capital costs were the second most common negative comment heard by respondents.

The barriers identified by Meyer (2012) matched strongly with those identified in the pilot. Rankings differed, however, with loss of profits due to competition being most recognised in the Meyer study, followed by the high establishment costs, lack of comparability with mechanisation, and finally increased labour.

The differences in perceived positives and negatives around agroforestry when comparing these studies may be a reflection of different methods, sample audiences, sample sizes, time of study or other factors. Some trends do exist, such as the importance of biodiversity as a widely recognised benefit, but ultimately we can conclude that there are a wide range of positives and negatives and it is important to acknowledge this in any strategy to increase uptake of agroforestry.

#### 2.2.4 Flexibility and Ambition

The lack of strict standards and regulation around the design and species selection in the Agroforestry and Orchards Pilot has been a significant attraction to participants. 52% of respondents listed this flexibility as vital in making their project work for them. None of the

respondents stated that flexibility was not important and only one individual classed it as of little importance. This quality is also reflected in the willingness of respondents to adapt their farm management processes to fit in with the tree planting. 48% of respondents would be willing to make a small change, such as managing the tree undergrowth for wildflowers. A further 29% would be willing to make medium-sized changes to their farm management e.g. changing grazing methods/crop selection. Only two individuals would make large changes and three respondents indicated that they would not accept any change to their farm.

There was no difference between the two funding groups (50% and 100%) when considering the importance of flexibility in the program. Despite this there was a difference in the level of adaptation that the respondents would be willing to make to their farming system to accommodate the tree planting (Figure 12). Those who received full funding were less likely to accept system changes compared to those who only received partial funding. Once again this difference could be due to the increased personal financial investment in the trees, encouraging the participants to tolerate greater levels of change to their system to ensure their investments in the trees pay off.

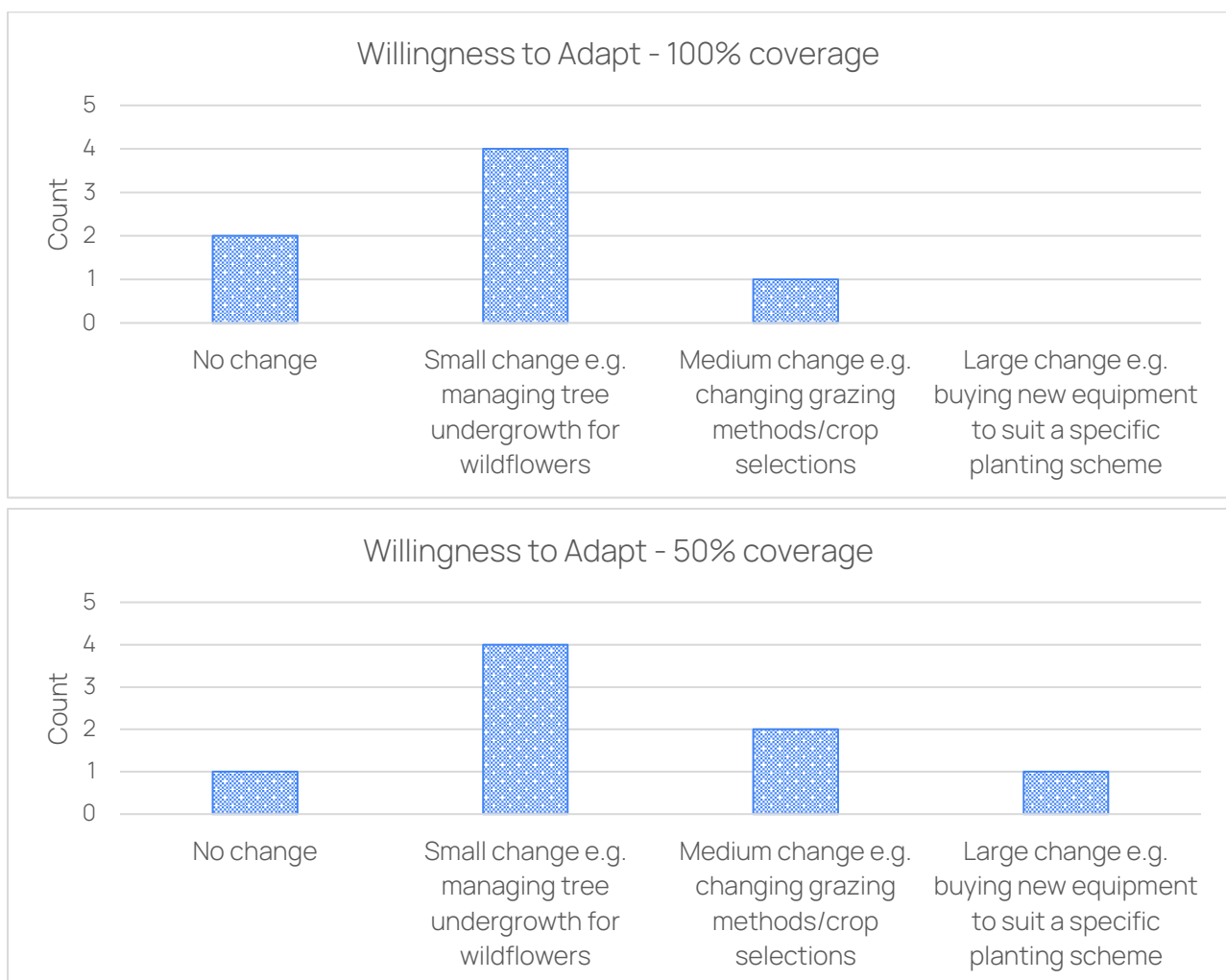


Figure 12. Comparison of respondent's willingness to adapt when offered 100% funding and 50% funding respectively.

Overall, 76% of respondents weren't able to complete all of the planting they wanted to do. The Agroforestry and Orchards Pilot provided a suitable starting point but additional barriers clearly remained. When queried on why they weren't able to complete their additional planting there were a range of responses. The use of the project as a trial was one common reason with many respondents indicating that they would like to expand planting if the trials go well. The second most frequent comment was that a lack of funding limited the amount of planting they could do.

None of the participants who received funding for 50% of the capital costs felt as though they were able to achieve all of their planting ambitions through the Agroforestry and Orchards Pilot. This was not the case with participants who received full funding as 3 respondents were able to achieve their planting ambitions. This difference suggests that a lack of full funding was a limiter in the scale of planting that participants were able to implement.

A lack of flexibility has been identified as a major barrier in previous studies (Soil Association, 2020; Abdul-Salam, et al., 2022). The Irish Agroforestry Grant has a particular issue with flexibility as the land which is entered into the scheme can no longer be classified as agricultural land, effectively making silvo-arable systems impossible (DAFM, 2020). Whilst this specific issue may not be applicable to the UK, it demonstrates how future policy decisions will need to take into account knock-on effect for the types of agroforestry that are supported and the attractiveness of such policies to landowners.

Issues around farm restructuring being required have been raised in previous studies and are also noted as an important barrier (Defra, 2017; Meyer, 2012). Little research has been done to understand the level of change that farmers are willing to make to implement agroforestry into their system. However, the results from the pilot suggest that relatively small changes (e.g. managing undergrowth for wildflowers) to medium changes (e.g. changing grazing methods/crop types) would be acceptable. The increased amount of flexibility offered through a lack of prescriptive conditions attached to the funding would further increase the attractiveness of such a program, as landowners would be able to adapt their design to minimise the changes required.

A large number of respondents wanted to plant more trees but were unable to do so through the Agroforestry and Orchards Pilot. Respondents gave several reasons why, from lack of specialist stock to limited funding. Similar studies have found that a third of participants underestimated the difficulties associated with planting trees, while a quarter found planning harder than expected (The Woodland Trust, 2022). Ensuring there are sufficient support systems in place for when landowners are struggling to achieve their planting goals is another relatively unexplored area. It is challenging for funders to strike the right balance between encouraging a conservative approach to ensure planning and planting is completed and being flexible enough to allow for large-scale projects. The experience of the Agroforestry and Orchards Pilot may be instructive here and present one solution. By only planting a few rows as a trial, the landowners can get a greater

understanding of the requirement and effort of implementing agroforestry, allowing them to design and expand their planting at a later stage (see Great Wollaston Farm Case Study). Therefore, a two-stage process of an initial flexible planting trial followed by a larger-scale expansion would be beneficial.

## Great Wollaston Farm

Based in Shropshire, Great Wollaston Farm is a mixed arable and dairy farm. The farm is also a LEAF demonstration site and thus is already familiar with a number of sustainable agriculture methods.

The project planting is situated over two fields, one in the arable stage of rotation and another in the ley/pasture stage. The tree planting is organised into single rows of fruit trees in the middle of the fields. The species include a range of apples, cherry, plum, quince and others. The trees are spaced 15 m apart, allowing for the 12 m wide sprayer to fit between each tree. The individual trees are also protected using heavy duty metal mesh and thick wooden stakes to ensure they are livestock-proof. The selection of the fields was also strategic, being two largest fields on the farm, maximising the amount of space to work in.

Despite the small amount of planting there are plans in place to harvest the fruit for juicing. Mechanical harvesting will be used as lightly damaged fruit is useable for this end product. This approach will offer additional income diversity to the farm if the trial is successful and planting expanded. The funding covered planting, fencing and some labour costs, while the farmer's own money will fund any re-stocking provided the costs aren't too large.

The planting is viewed by the current farmer as a long-term investment in the farm which will be passed onto his son. Notably, the enthusiasm shown by the son to take over the farm was a significant factor in deciding to go ahead with the project. In contrast, the lack of permanence associated with the pilot was also a significant factor. The freedom to remove trees in future years if they fail to be productive was a major positive, although it was noted that carbon credits or similar schemes could offer financial incentives to keep unproductive trees in place.

Overall the pilot has been a positive experience at Great Wollaston, allowing for the trialling of agroforestry in fields to promote farm diversification, long-term investment, and flexibility for expansion or removal in the future.

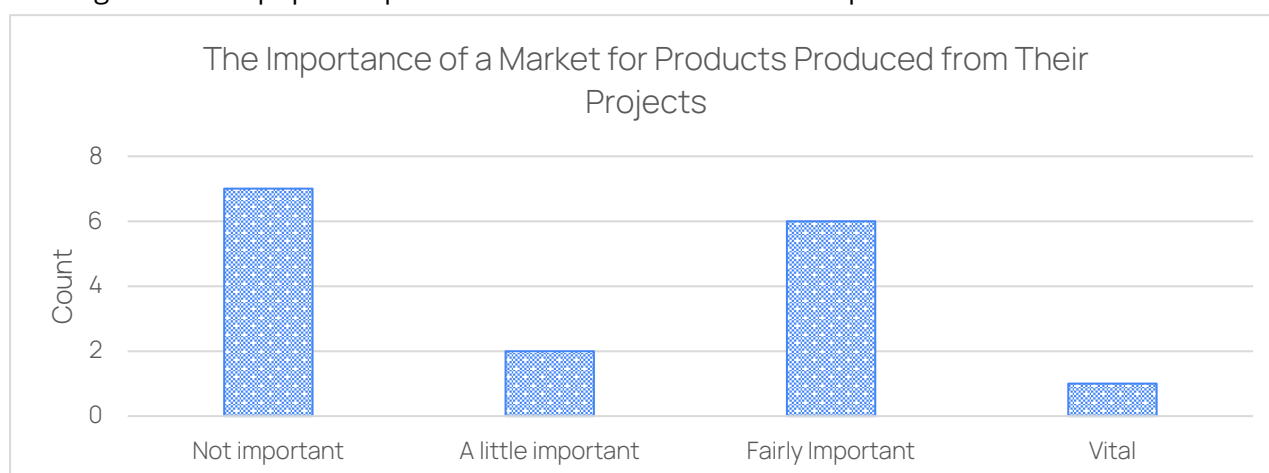
### 2.2.6 External Funding and Markets

Of the projects that were able to access additional government funded or privately funded agri-environment schemes, all those that participated in them reported that there was no impact or conflict between existing schemes and the Agroforestry and Orchards Pilot. Crucially, of the six participants with unrealised potential to access agri-environmental schemes, five indicated that they would be interested in participating in future schemes after experiencing the pilot project.

Only 24% of respondents had heard of schemes similar to the Agroforestry and Orchards Pilot. Those that had heard of other schemes but decided to participate in the pilot did so primarily because of the flexibility in project design (60%), followed by the amount of funding available (40%) and finally due to the access offered to additional information sources (20%).

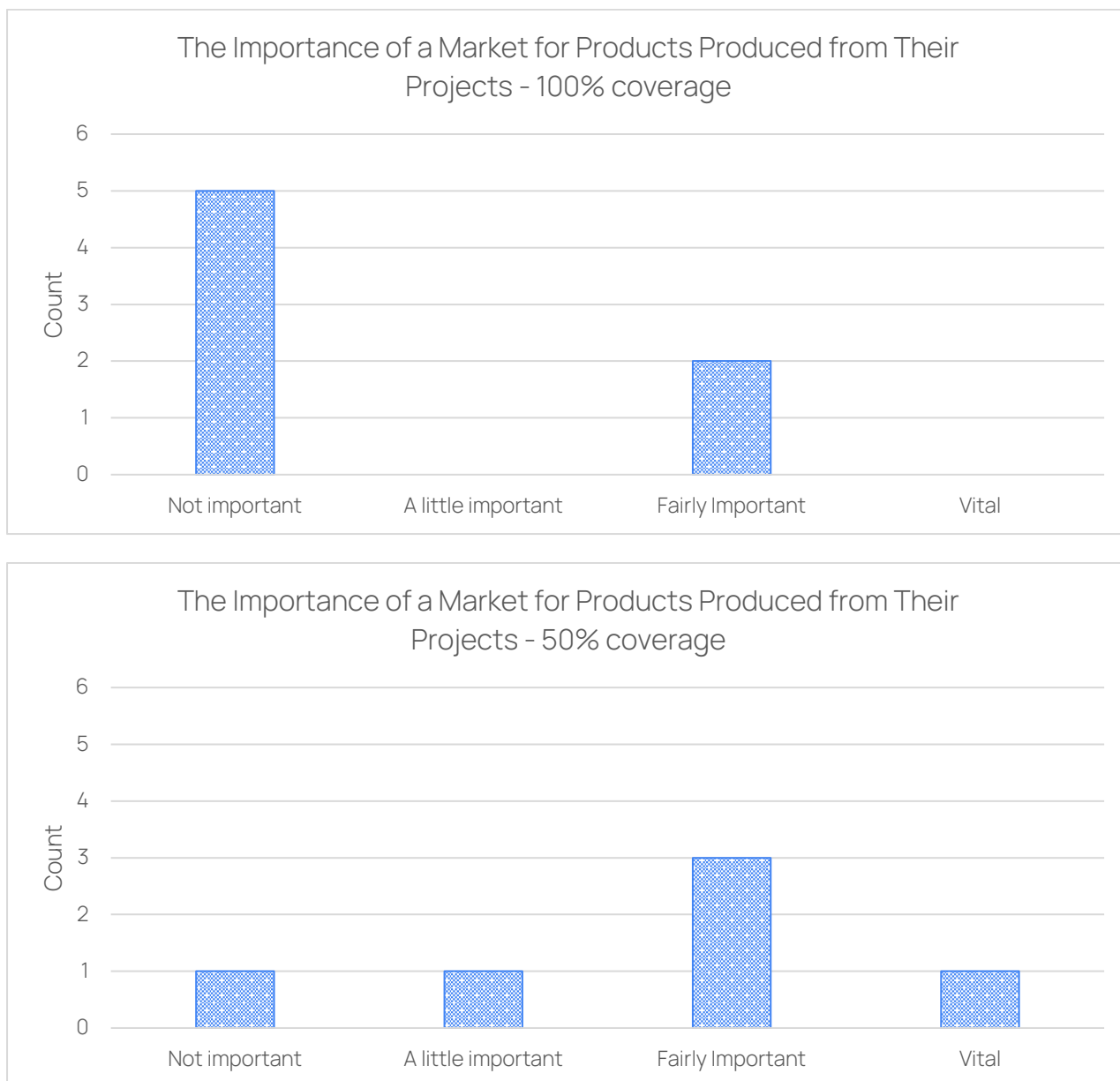
When considering the products generated from their agroforestry systems, 81% of respondents noted fruit as a primary product. This is expected due to the high frequency with which fruit trees have been utilised in pilot projects. The second most popular product identified was nuts (38%) followed by timber (19%), woodchip (14%) and coppice rods (10%). Other non-physical products were also identified by respondents including weather protection and medicinal benefits for livestock, biodiversity benefits, and community/social benefits.

For physical products, only six respondents had identified a route to market, in all cases based on selling through their own farm shop or local farmers markets and shops, and in most cases in relation to fruit/juice. Others indicated that they would consider markets once they had a product to sell, not unexpected given that some of the pilot projects have been small-scale trials which will need to be expanded to be economically significant. This relaxed approach to market considerations is also reflected in the responses to the importance of markets when applying for the pilot (Figure 13). Only one respondent noted markets as being vital in their decision to apply for the pilot. The remaining 15 respondents considered markets as being at most fairly important, although the most popular option was that markets were not important in their decision.



**Figure 13.** The importance when applying for the Agroforestry and Orchard Pilot of a market for the products generated from a respondent's project.

The majority of respondents who received 100% of their capital costs covered didn't consider markets as being of importance. Conversely, most of those who only received 50% funding found markets to be fairly important and vital. This difference could be reflective of the increased personal financial investment into the project for those with only 50% funding, with a greater interest from these participants to recoup this personal investment through selling their products.

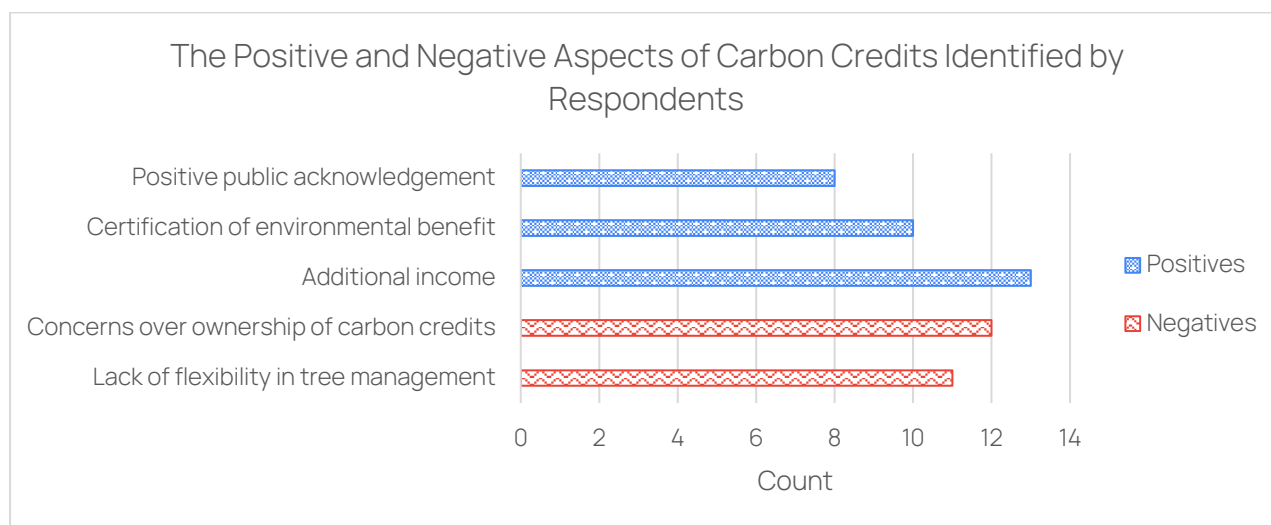


**Figure 14. Respondent's level of importance given to markets when grouped by level of funding coverage.**

Alternative sources of income are also a possibility for pilot projects. One of the more common examples is carbon credits. When queried about their willingness to enter their project into a carbon credit programme, 76% of respondents indicated they would be happy to do so. The major positive aspects of carbon credit schemes identified by respondents were additional income (76%), certification of environment benefits i.e. CO<sub>2</sub> capture (59%), and positive public acknowledgement



(47%) (Figure 15). The most important negative aspect of a carbon credit scheme was concerns over ownership of the carbon credits (64%) followed by the lack of flexibility that a carbon credit scheme offers in terms of tree management (58%).



**Figure 15. The positive and negative aspects of carbon credit schemes selected by respondents.**

There was no difference in opinion on carbon credits or similar scheme between those that received 100% funding and 50% funding. While those who received less funding might be encourage to look elsewhere for a top-up, carbon credits and similar schemes are still new and controversial enough to not be effected by this increased desire for additional funds.

The cohesion between funding schemes is vital as previous work has found that farmers who already take part in agri-environmental schemes have a greater chance of knowing about agroforestry (Meyer, 2012). Likewise the results from the pilot suggest that participants who took part in the pilot are more likely to subsequently take part in agri-environmental schemes, although further work to explore this relationship is needed.

Knowledge gaps regarding agroforestry products and routes to market have been cited as barriers to agroforestry uptake (Soil Association & Woodland Trust, 2018; Abdul-Salam, et al., 2022). Agroforestry systems that have a clear route to market have been shown to be more successful (Dupraz & Newman, 1997; Smith, 2010). Yet routes to market were not an important consideration for respondents in the current study. In some cases this can be explained as the products concerned (e.g. timber) will take several decades to become ready to market. In other cases, participation has been treated as a small-scale trial so the route to market isn't yet vital, although would become so if the trial is expanded. Once again, the research on routes to market for agroforestry products is a relatively unexplored area and thus may need additional support through information and guidance.

Carbon credits is an area of great debate and opinion, as represented by the results of the pilot survey. The utilisation of carbon credits and markets has been supported by some researchers as a

useful way to earn short-term income on long-term investments, with payments covering up to 88% of initial establishment costs (Staton, et al., 2022). Through the semi-structured interviews participants did bring up the potential of utilising Biodiversity Net Gain credits as an alternative payment source, although this is still conceptual (see The Lea Case Study). The point at which it becomes economically beneficial to implement agroforestry for carbon credits can and has already been calculated for various types of farm in the UK (Abdul-Salam, et al., 2022). However, the decision to take on these carbon credits (or similar scheme) also relies on a farmer's personal ethics, morals and desires. Offering opportunity and information on credit schemes would be a desirable approach but making it a necessary option risks alienating those who are opposed to such programs.

## The Lea

With only 6 hectares of pasture, this project takes advantage of the Agroforestry and Orchards Pilot's applicability to smaller parcels of land. The land itself also contains a diversity of habitats including wetland meadows, parkland, and woodland.

The project at The Lea is split into several styles of tree planting. The first is a small apple orchard with six different varieties on M25 and M111 rootstocks. The second type of planting is a short rotation coppice (SRC) of willow and alder, planted in double rows for alternate harvesting. The final layout is parkland-style with a range of native trees planted across the pasture to provide benefits for biodiversity, soil, and cattle.

The orchard and SRC have been sectioned off with heavy duty fencing to keep the livestock out. They have also been covered with a woodchip mulch. The parkland trees are individually guarded by cactus guards and have a mulch mat placed at the base. Half of this fencing was already paid for by the landowner and the remaining cost of material was covered by the pilot.

Heavy duty tree guards and fencing allow for the cattle to continue to be seasonally grazed on the land, maintaining a source of income. The apples may be juiced and sold or further processed into a range of artisanal products, although the small number of trees means this would be a limited income. The SRC will be harvested regularly for woodchip, specifically utilising the nitrogen and salicylic acid content to apply to the orchard and farm garden as mulch.

Around half of the total costs for implementing this project were funded via the Agroforestry and Orchards Pilot. The significant amount of personal investment in the project and limited generation of marketable products has led to exploration of carbon and Biodiversity Net Gain (BNG) payments, although the ethical issues associated with offsetting are a concern for the landowner.

This project pushed the limits of flexibility for funding through the pilot and if future funding is available then planting of a black poplar stand is of interest in the wetland meadow. In addition, some funding for information boards or other community engagement would have been welcome.

Overall, this project demonstrates the importance of flexibility and allowing smaller, more diverse land systems to participate in funding for tree planting.

## Conclusion

This report has brought together the results from the Agroforestry and Orchards Pilot, utilising applicant data, applicant surveys, semi-structured interviews, and literature reviews, looking in particular at the key questions of payment support, barriers and blended finance options.

The first area of interest was to investigate the levels of payment and support available and how that impacted on uptake of agroforestry. Overall the level of funding was positive with many applicants able to set up agroforestry systems. Despite this there were some issues: insufficient funding to cover both labour and capital costs, inability to plant at large scale due to budget limits, and a lack of a longer-term maintenance grant. The types of agroforestry projects designed, notably mostly fruit trees in alley cropping systems, may have been limited by the amount of funding on offer requiring participants to consider planting at a small scale and generate a quick return on investment. The uptake of the pilot despite some projects not getting 100% coverage of funding suggests that partial funding is still an attractive offer, however additional research into the reasoning behind those who didn't apply for or complete the pilot would be required to confirm the impact of variable funding coverage. The utilisation of the pilot as a means to trial agroforestry on their land before expanding at a later date presents a potential niche for a future agroforestry support scheme to explore if an increase in funding is not available.

In exploring the second aim the results of this report suggest there are still numerous barriers to the uptake of agroforestry. A lack of information on key topics such as agroforestry design, tree management, and tree products were all picked up on in this and other studies. The utilisation of learning vouchers provide a potential solution although the implementation needs to be refined in future iterations to ensure widespread awareness of the opportunities available. The acknowledgment of farmer-to-farmer learning as a key method for spreading the word about agroforestry is vital, although the wider public and farming community also need to be educated on the benefits and costs associated with agroforestry systems.

The final area of interest is carbon credits or other alternative funding sources. These are still an area of concern for some and opportunity for others. Those who were unsatisfied with the funding have considered alternative approaches to recover some of their private finance, although as of yet none have done so. The whole concept of a carbon or biodiversity market is relatively new and unexplored so providing suitable information to participants to make informed decisions themselves based on their own finances, flexibility, and ethics will allow for the benefits of blended funding to be realised for some but not forced upon all applicants.

Overall the Agroforestry and Orchards Pilot has shown the growing appetite for agroforestry support in the UK. A key positive to the pilot was the flexibility to implement multiple designs and potentially revert on their decision in subsequent years, removing trees if they don't work for their

farming system. Similarly while the limited funding was frustrating for some, it provided the opportunity for others to trial agroforestry and orchards on their land.

In future providing a clearer message around what opportunities are available, be they levels of funding, sources of information, or types of design possible, will help ensure that participants understand and maximise the potential for trees outside woodlands.

## References

Abdul-Salam, Y., Ovando, P. & Roberts, D., 2022. Understanding the economic barriers to the adoption of agroforestry: A Real Options analysis. *Journal of Environmental Management*, 302(Part A), p. 113955.

Agricology, 2023. *Stephen Briggs*. [Online]

Available at: <https://agricology.co.uk/farmer-profiles/stephen-briggs/>

[Accessed 14 06 2023].

Briggs, S., 2022. *Personal Communication* [Interview] (22 05 2022).

Cheshire, H., 2019. *Delivering Agroforestry in the UK - A partnership between farmers, a hotel chain, and the Woodland Trust*, Grantham: The Woodland Trust.

DAFM, 2020. *Afforestation Grant and Premium Scheme 2014-2020*, Dublin: Department of Agriculture, Food and the Marine.

Dartington Trust, 2023. *Agroforestry at Dartington*. [Online]

Available at: <https://www.dartington.org/about/our-land/agroforestry/>

[Accessed 14 06 2023].

DEFRA & Government Statistical Service, 2022. *Agriculture in the UK Evidence Pack*, London: Department for Environment, Food, and Rural Affairs.

DEFRA, 2017. *Agroforestry Review (Draft)*, London: Department for Environment, Food, and Rural Affairs.

DEFRA, 2020. *Farming for the future: Policy and progress update*, London: Department for Environment, Food, and Rural Affairs.

DEFRA, 2022. *England Woodland Creation Offer to transition into Local Nature Recovery scheme in 2025*. [Online]

Available at: <https://www.gov.uk/government/news/england-woodland-creation-offer-to-transition-into-local-nature-recovery-scheme-in-2025>

[Accessed 14 06 2023].

Dupraz, C. & Newman, S., 1997. Temperate Agroforestry: The European Way. In: A. Gordon & S. Newman, eds. *Temperate Agroforestry Systems*. Wallingford: CAB International.

European Union, 2023. [Online]

Available at: <https://www.agforward.eu/>

- Green, P., 2019. *Silvohorticulture: Vegetable agroforestry systems in the UK*. s.l.:Royal Horticultural Society.
- Howe, H. & Ross, M., 2019. Brexit's shades of green – (missing) the opportunity to transform farming in England?. *Journal of Environmental Law*, 31(3), pp. 413-441.
- Meyer, C., 2012. *Agroforestry: A study of farmer attitudes and perceptions in England*. Reading: University of Reading.
- Oreszczyn, S., Lane, A. & Carr, S., 2010. The role of networks of practice and webs of influencers on farmers' engagement with and learning about agricultural innovations. *Journal of Rural Studies*, 26(4), pp. 404-417.
- Shropshire Council, 2023. *Agroforestry/orchards system guide*. [Online]  
Available at: <https://www.shropshire.gov.uk/media/25518/agroforestry-systems-guide.pdf>  
[Accessed 14 06 2023].
- Smith, J., 2010. *The History of Temperate Agroforestry*, Newbury: Organic Research Centre.
- Smith, J. et al., 2013. *Can Agroforestry Deliver Production and Environmental Benefits in the Next Rural Development Programme?*, Newbury: Organic Research Centre.
- Soil Association & Woodland Trust, 2018. *Agroforestry in England: Benefits, Barriers & Opportunities*, Grantham: The Woodland Trust.
- Soil Association, 2020. *Agroforestry Handbook Reader Survey 2020*, Bristol: Soil Association.
- Staton, T. et al., 2022. Productivity, biodiversity trade-offs, and farm income in an agroforestry versus an arable system. *Ecological Economics*, Volume 191, p. 107214.
- The Agroforestry Hub, 2023. *Agroforestry Database*. [Online]  
Available at: <https://agroforestryhub.co.uk/agroforestry-database/>  
[Accessed 14 06 2023].
- The Woodland Trust, 2022. *Farming for the Future: how agroforestry can deliver for nature and climate*, Grantham: The Woodland Trust.
- Tosh, C. et al., 2022. *Thematic analysis of six regional workshops on agroforestry considering "payment" and "advice and guidance" options for ELM*, Newbury: Organic Research Centre.
- Tosh, C. & Westaway, S., 2021. *Incentives and disincentives to the adoption of agroforestry by UK farmers: a semi-quantitative evidence review*, Cirencester: Organic Research Centre.

Westaway, S., Grange, I., Smith, J. & Smith, L., 2023. Meeting tree planting targets on the UK's path to net-zero: A review of lessons learnt from 100 years of land use policies. *Land Use Policy*, Volume 125, p. 106502.

Woodland Trust Research & Macleod Research, 2020. *Woodland Research 2020*. Grantham: The Woodland Trust.



## Appendix

Comparison of agroforestry and orchard project responses on the importance of various aspects of the pilot project.

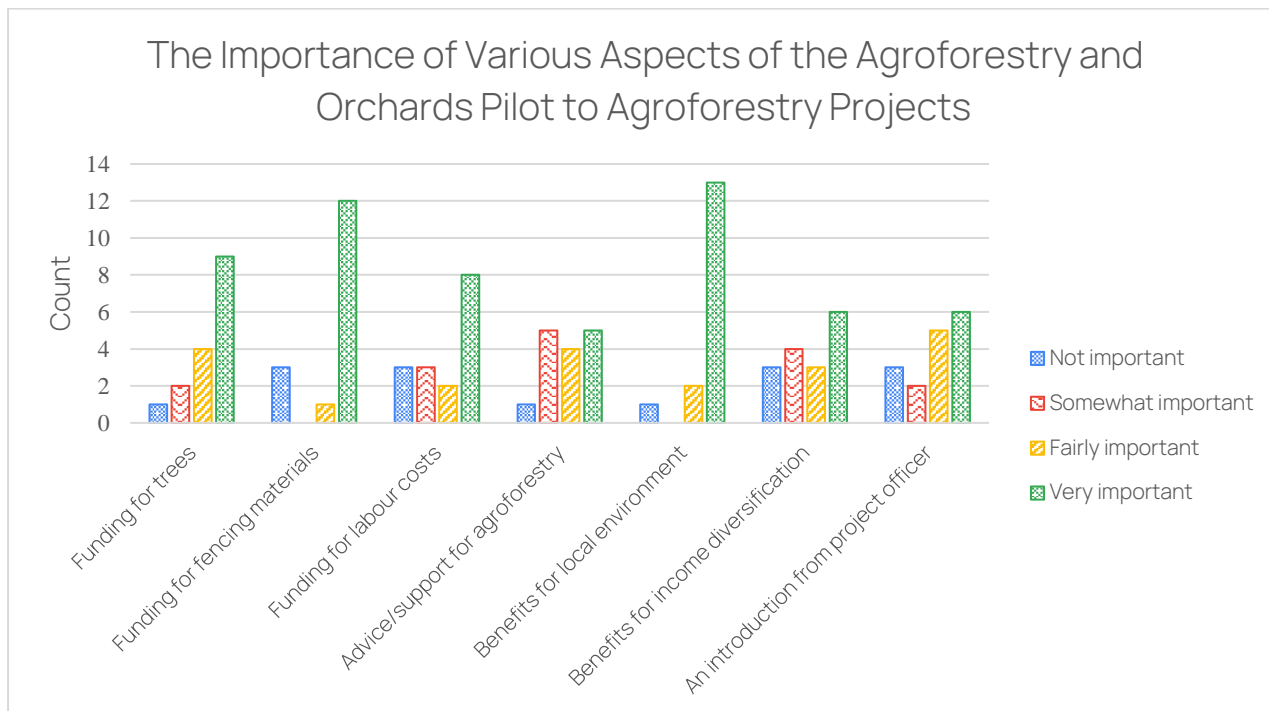


Figure 16. The importance of various aspects of the pilot project to respondents who implemented agroforestry projects.

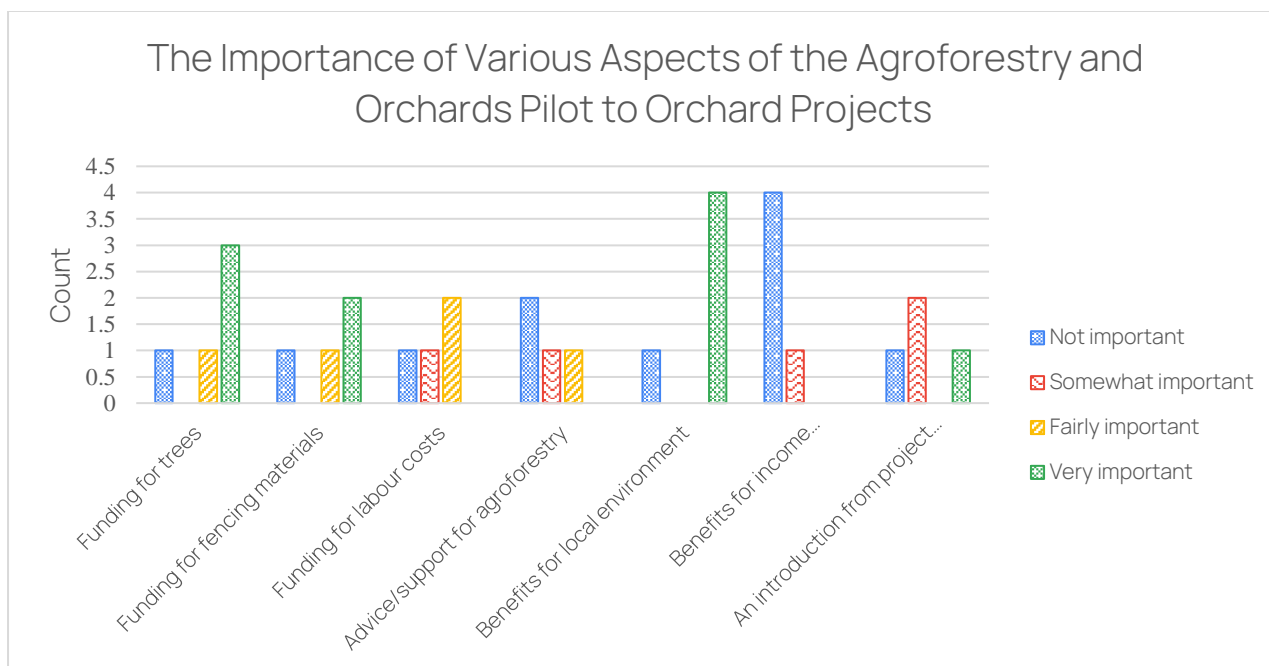


Figure 17. The importance of various aspects of the pilot project to respondents who implemented orchard projects.

### Comparison in usefulness of knowledge sources between individuals who received 50% funding and 100% funding.

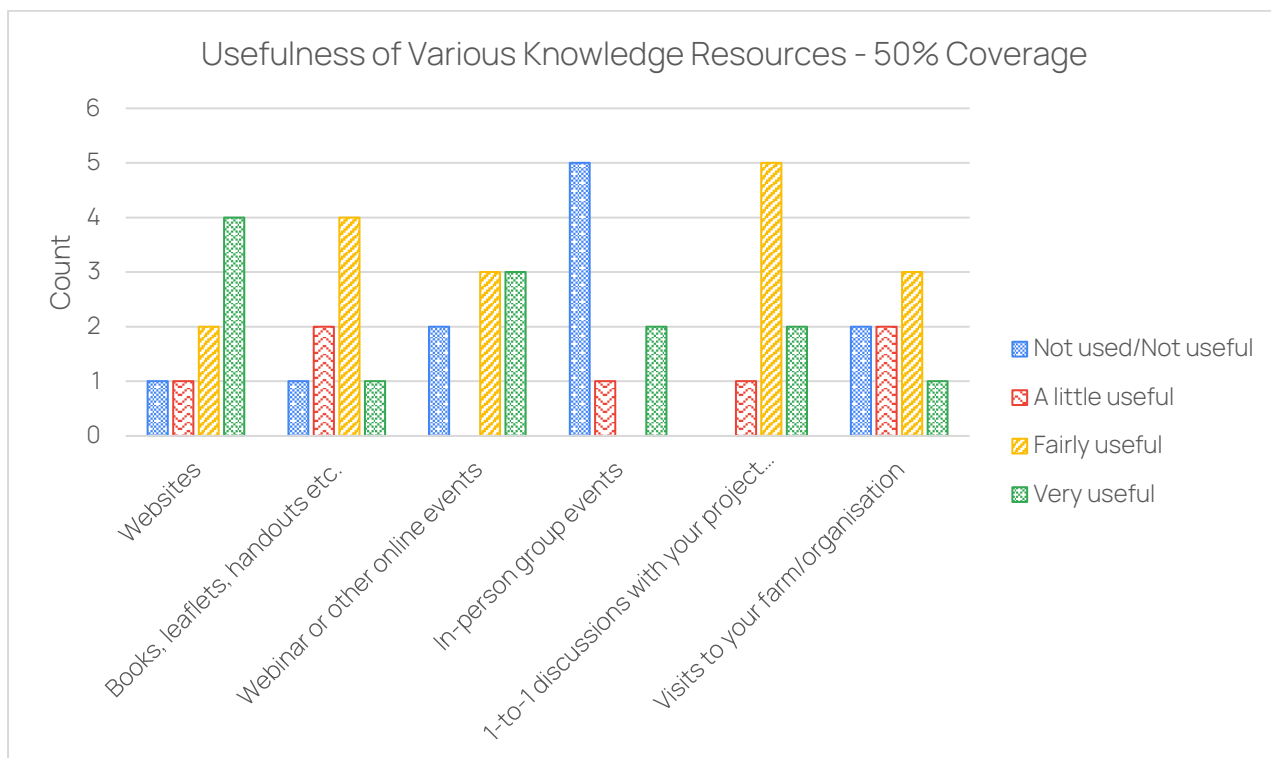
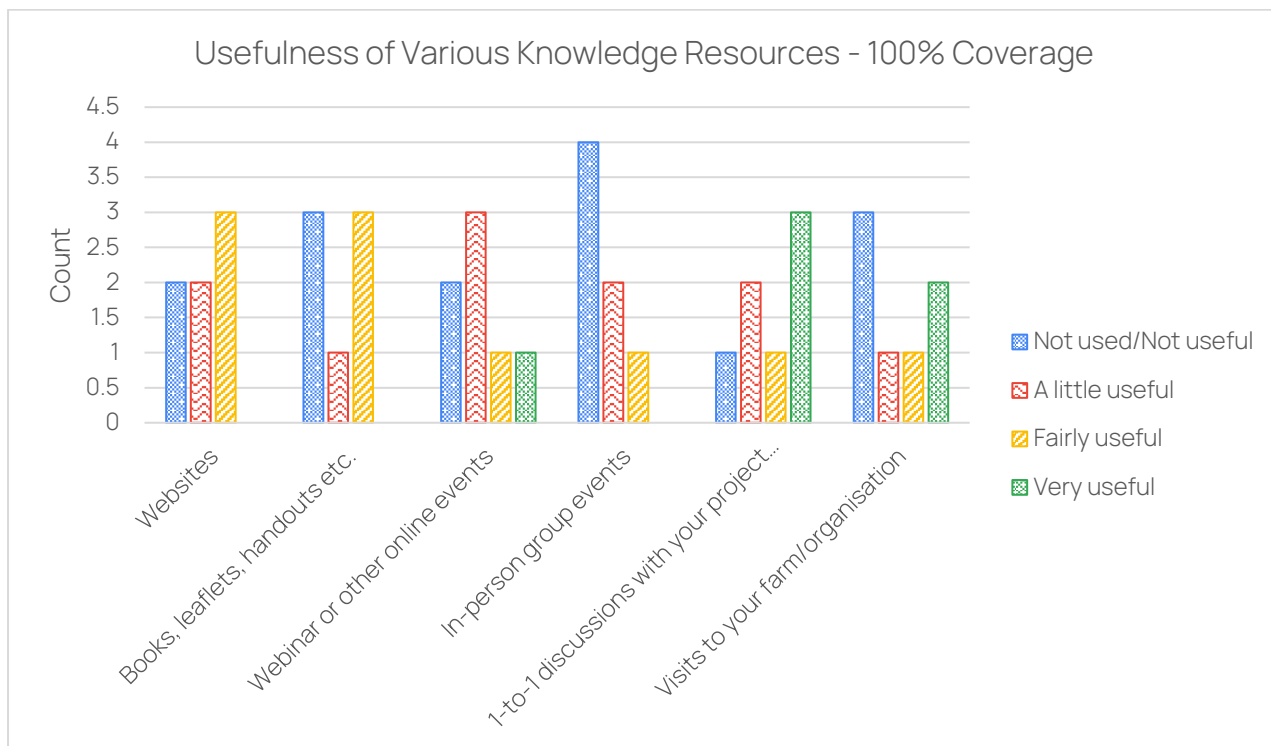


Figure 18. Comparison of respondent's reported level of usefulness around various knowledge sources when grouped by funding coverage.

## Survey Questions

### Question

*Answer options – if blank then open answer*

1. Before continuing, please acknowledge that you have read and understood the above statements regarding data privacy and GDPR for this survey.

*I have read and understood the statements regarding data privacy and GDPR for this survey*  
*I have not read and understood the statement regarding data privacy and GDPR for this survey*

2. Farmer and Farm/Organisation Name

3. Please rank how important the following options were to you when deciding to participate in the pilot programme?

*Ranked Not Important, A little important, Fairly important, or Very important*

*Funding received for trees*

*Funding received for fencing materials*

*Funding received for labour costs*

*Advice/support for implementing agroforestry*

*Benefits for the local environment*

*Benefits for farm/organisation income diversification/security*

*An introduction to the programme from the project officer*

4. If there are other aspects that we have missed which were important to you when deciding to participate in the pilot programme, please add them here

5. Was the amount of funding provided sufficient to cover the capital costs (e.g. fence posts, saplings, etc.) of your agroforestry/orchard project?

*Yes*

*No*

- a. What capital costs were not covered by the funding?

*Fencing/Plant protection materials*

*Plants (i.e. saplings, whips etc)*

*Stakes or other supports*

*Mulch/Woodchip ground covering*

*Other*

6. Was the amount of funding provided sufficient to cover the labour costs (e.g. setting up fencing, planting, etc.) of your agroforestry/orchard project

*Yes*

No

- a. What labour costs were not covered by the funding

*Setting up fence/tree protection*

*Planting*

*Other*

7. How many years will it take for your agroforestry project to make a financial return?

8. Do you think this financial return will cover the management costs e.g. re-stocking/pruning?

Yes

No

*I don't know*

9. If you were to scale up your agroforestry project, would you require additional funding support for early tree management i.e. re-stocking/pruning?

Yes

No

*Unable or not interested in upscaling*

- a. How much funding would you require for early tree management and for how many years?

10. How much knowledge did you have of agroforestry prior to hearing about the pilot?

*Scale of 1 (none) to 5 (Lots)*

11. Did you use the Learning Vouchers provided with the agroforestry pilot?

Yes

No

- a. How useful was the Learning Voucher in increasing your access to agroforestry information?

*Scale of 1 (Not useful) to 5 (Vital)*

- b. Please indicate why not:

*Not enough time*

*No useful information available*

*Not aware of opportunity to use learning vouchers*

*Other*

12. Please rank the usefulness of the following information resources that you have used

*Ranked Not Used/Not Useful, A little useful, Fairly useful, or Very useful*

*Websites*

*Books, leaflets, handouts, and other literature*  
*'An introduction to agroforestry' webinar or other online events*  
*In-person group events*  
*1-to-1 discussions with your project officer*  
*Visits to your farm/organisation from the project officer*

13. If you used resources other than those listed above, then please list them here

14. Please select how knowledgeable you are now about the following aspects of trees on farms

*Ranked Little to no knowledge, Some knowledge, Greater than average knowledge, or Very knowledgeable*

*Knowledge of different planting designs and layouts*  
*Knowledge of different tree species and their suitability to different scenarios*  
*Knowledge of tree protection methods e.g. fencing options*  
*Knowledge of management processes e.g. pruning/thinning*  
*Knowledge of different marketable products from trees e.g. fruit, nuts, timber etc.*

15. Are farmers/organisations you have spoken to about the programme interested in integrating trees on their farm?

*Yes*

*No*

16. What positive comments do they make about trees on their land?

*No positive comments*  
*Biodiversity benefits*  
*Carbon capture benefits*  
*Economic benefits*  
*Animal/Crop health benefits*  
*Water-related benefits*  
*Cultural/Social benefits*  
*Other*

17. What negative comments do they make about trees on their land?

*No negative comments*  
*Competition between trees and crops/pasture*  
*Increased labour costs i.e. pruning/thinning*  
*High initial costs i.e. fencing/plant protection*  
*Lack of compatibility with their current farming methods i.e. equipment size or grazing regimes*  
*Other*

18. How important is the flexibility of the programme, adapting the planting styles to work with your specific farm/organisation?

*Scale of 1 (Not important) to 5 (Vital)*

19. Have you or are you willing to adapt you wider farm/land management to accommodate your agroforestry or orchard project?

*No change*

*Small change e.g. managing tree undergrowth for wildflowers*

*Medium change e.g. changing grazing methods/crop selections*

*Large change e.g. buying new equipment to suit a specific planting scheme*

20. Did your application contain all of the tree-related work you wanted to implement on your land?

*Yes*

*No*

a. Why not and what else did you want to implement?

21. Do you participate in government-funded or privately funded agri-environment programmes or schemes?

*Yes*

*No*

*Not available*

a. How did the funding and actions carried out under this pilot affect your position in the other agri-environment scheme(s)?

*No impact*

*Some positive impact on participation of other agri-environment schemes*

*Some negative impact on participation of other agri-environment schemes*

*Had to stop participating in other agri-environment schemes*

b. Having participated in this pilot, would you now be more inclined to participate in other agri-environment schemes?

*Yes*

*No*

22. Are you aware of any alternative sources of funding for similar work to that which has been carried out in the agroforestry and orchards pilot e.g. Arla's C.A.R.E. programme?

*Yes*

*No*

a. Why did you select this pilot over the alternative programmes?

*Flexibility in project design*

*Amount of funding available*

*Access to additional resources i.e. knowledge*

*Other*

23. Please select which products the trees you planted are managed/grown for:

*Fruits*

*Nuts*

*Timber*

*Woodchip/Biomass*

*Coppice rods (or similar)*

*Not applicable*

*Other*

24. Please provide a brief description of the route to market for the products you have selected (leave blank if not applicable)

25. How important was the presence of this market in deciding to apply for the pilot programme? (Leave blank if not applicable)

*Scale from 1 (Not important) to 4 (Vital)*

26. If a carbon credit system for the trees you have planted was available, would you choose to participate in it?

*Yes*

*No*

27. What aspects of a Carbon Credit Scheme would most appeal to you?

*Additional income*

*Certification of environmental benefit i.e. capture of CO<sub>2</sub>*

*Positive public acknowledgement*

*Other*

28. What aspects of a Carbon Credit Scheme would put you off such a scheme?

*Lack of flexibility in tree management i.e. thinning and timber products*

*Concerns over ownership of carbon credits*

*Other*