



# Irish dairy and drystock farmers' attitudes and perceptions to planting trees and adopting agroforestry practices on their land

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## ABSTRACT

Due to the intensification of agriculture and transition to monoculture plantations, vast areas of native woodland have been lost from the Irish landscape. As these trees gradually vanished from agricultural land, the use of traditional, ancient agroforestry practices dwindled. Currently, forestry cover in Ireland is 25% lower than the European average, with the rate of afforestation remaining critically low. Agroforestry has been cited as a means to increase forestry cover in Ireland while continuing to produce viable high quality agricultural products on the same parcel of land. However, even with a range of afforestation schemes available, farmers exhibit an evident reluctance to adopt agroforestry. This research aimed to examine the main attitudes and perceptions of Irish dairy and drystock farmers to planting trees on their land and adopting agroforestry practices. The majority of farmers included within the dataset exhibited a positive attitude towards trees on their farms, with the main negative behavioural beliefs relating to impacts on pasture. Family and Teagasc (The Irish Agriculture and Food Development Authority) are the highest cited influential bodies while the majority of farmers exhibit high perceived behavioural control. Intention rates to plant trees are high, albeit mainly on marginal areas of the farm. Agroforestry knowledge is low in Ireland with the word itself eliciting negative responses amongst the farming community. The results provide a comprehensive understanding of the main attitudes, influential bodies and barriers that affect agroforestry uptake in Ireland.

## 1. Introduction

Agriculture faces increasing challenges to meet the growing needs of consumers while reducing its negative impacts on the environment (Foresight, 2011; FAO, 2014). As demands for agricultural products increased across Europe, the intensification of agriculture led to large areas of native woodlands being cleared. A steady decline in the abundance of trees within agricultural systems ensued to allow for more land to be used for production of both animal and crop products. Livestock across Europe gradually became excluded from forest systems with native species replaced with high-yielding commercial species. A similar decline in forest cover was witnessed in Ireland as forests were cleared for agriculture and industry, and by the beginning of the 20th century only 1% of Ireland's land surface was covered in trees (Dáil Éireann, 1928). A series of afforestation programmes which focussed initially on state afforestation and, more recently, on private afforestation has led to forest cover now accounting for 11% of the land cover (DAFM, 2021). The target forest cover by 2046 is 18% and annual afforestation targets are 8000 hectares (ha). However, if current low afforestation rates continue (i.e. 2000 hha in 2021) the target forest cover for 2046 will not be achieved (DAFM, 2018).

Nowadays, European forest and agriculture production systems such as those found in Ireland successfully provide high-value market products, however costs to ecosystem services regularly occur (McAdam and Curran, 2018; Chatterton et al., 2015). Agri-environmental measures have been introduced throughout Europe as a means to direct farmer decision making towards environmental stewardship and the creation of ecosystem services (Dobbs and Pretty, 2004) allowing for sustainable intensification (Garnett et al., 2013). The reintroduction of practices that integrate trees into agricultural systems, referred to in recent times as agroforestry (Raskin and Osborn, 2019), is proposed as a means to increase sustainability within agricultural systems. In the Irish context it may also help achieve Ireland's 18% tree cover target while continuing to produce high qualities of food.

Incorporating managed trees into agriculture has been shown to lead to both environmental benefits, such as pollution abatement (Correal et al., 2009; López-Díaz et al., 2011; Benhamou et al., 2013); carbon sequestration (Makumba et al., 2007; Gupta et al., 2009; Nair et al., 2009) and provision of biodiversity habitat (McNeely and Schroth, 2006; McAdam and McEvoy, 2008; Moga et al., 2009; Udawatta et al., 2019), and farm-based benefits, such as timber provision (Lewis et al., 1985; Sibbald, 1996; Palma et al., 2009) and improved

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animal health and welfare (Gregory, 2010; He et al., 2017). Nevertheless the uptake of agroforestry systems in Ireland has been limited despite the availability since 2014 of grants and subsidies to encourage farmers to adopt such systems on their farms (DAFM, 2015). To date, agroforestry has been established on only 51 ha of land using these subsidies; this is just over a quarter of the targeted land area of 195 ha to be planted between 2015 and 2020 (Curran, E. personal communication). Unlike Ireland, agroforestry is commonly practiced in various other European countries such as the reindeer husbandry systems in the Fennoscandia region or the dehesa in the Iberian peninsula (Augere-Granier, 2020).

While no specific study has been undertaken to date in Ireland to determine farmers' attitudes to, and interest in adopting, agroforestry, there have been a number of studies addressing farmers' attitudes to converting part of their farm to forestry. In recent years these studies have been motivated by the afforestation targets not being reached. They have identified a myriad of factors influencing farmers' attitudes to afforesting land including: the relative financial returns from agriculture and forestry (e.g. Breen et al., 2010); farmer demographics e.g. occupation, age and having a successor (Frawley and Leavy, 1999, 2001), and; farmer goals (Duesberg et al., 2013).

With the increasing emphasis on agroforestry as a means of achieving tree planting targets and contributing to more sustainable agroforestry practices, a qualitative study was undertaken to explore Irish dairy and drystock farmers' perceptions of and attitudes towards, and willingness to adopt, agroforestry practices through the planting of trees on their farms.

## 2. Theory

The Theory of Planned Behaviour (TPB) was used as the theoretical framework for the research (Ajzen, 1991). This theoretical framework has been used in previous socio-psychological research to determine the reasoning behind a farmer's willingness to adopt specific practices such as pig farming (Wauters et al., 2010; Alarcon et al., 2014), organic farming (Garforth et al., 2013), implementing a nutrient management plan (Daxini et al., 2019) and alley cropping (Beer and Theuvsen, 2019). The TPB is an extension of the Theory of Reasoned Action which was first published by Ajzen and Fishbein (1975). The extensive use of TPB across a range of research disciplines (Armitage and Christian, 2003) has made it one of the most cited cognitive theories aimed at understanding and predicting human behaviour under a specific time period (Ajzen, 2011; McEachan et al., 2016).

According to the TPB, the most reliable predictor of behaviour is intention. As measuring actual behaviour was beyond the scope of this study due to time constraints, participants' level of intention to plant trees was deemed a suitable alternative (Bamberg et al., 2007). To measure actual behaviour would require a long term study where farmers are revisited after a specified time period (e.g. five years) to determine whether they have complied to their intentions. The TPB states that intention to partake in a particular behaviour is determined by three independent socio-psychological constructs: attitude, subjective norm and perceived behavioural control (Ajzen, 1991) (See Fig. 1). Attitude relates to an individual's behavioural beliefs and their evaluation of specific outcomes of partaking in the behaviour. Subjective norms relate to an individual's influential bodies and their motivation to comply with the beliefs of such individuals or organisations. Perceived behavioural control is determined by an individual's evaluation of how difficult or easy the behaviour is to perform based on their own capabilities in conjunction with the presence of factors that may impede the successful undertaking of the behaviour.

The choices and behaviours exhibited by individuals are ultimately governed by their rational choices (Ajzen and Fishbein, 1975; Ajzen, 1985, 1991). If the individual is capable of assessing their beliefs about the specific behaviour, there is a greater likelihood that they can determine an outcome. Before an individual partakes in a behaviour, they first evaluate the positive and negative consequences of partaking

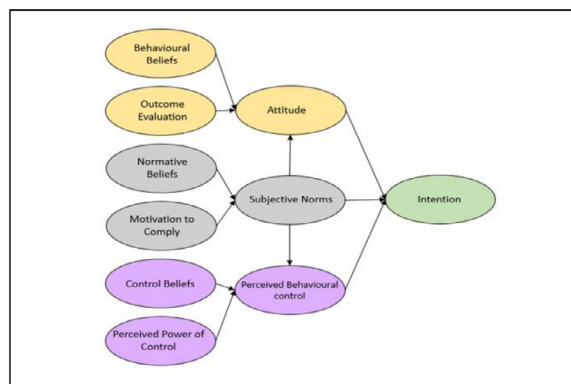


Fig. 1. Theory of Planned Behaviour (adapted from Ajzen, 1991).

in that behaviour (Cheng et al., 2006). As the process of planting trees on farm land requires a long-term commitment involving great planning and decision making on behalf of a farmer, the TPB was considered to be a suitable and appropriate theoretical framework with which to understand farmers' intentions with respect to tree planting.

## 3. Material and methods

### 3.1. The target population

The target population was dairy and drystock farmers in Ireland. This subset of the population of Irish farmers was chosen as the target as the Irish agricultural sector is dominated by grass-based systems (DCCAE, 2017). Of the over 135,000 farms in Ireland, over 85% of these relate to grass-based systems with a total of over 74,000 specialist beef production farms, over 17,000 specialist sheep production farms, over 15,000 specialist dairy farms and over 8500 mixed grazing farms (CSO, 2020).

For data protection reasons it is not possible to get access to a list of names of such farmers in Ireland. Thus an alternative approach has to be used. The sampled population was dairy and drystock farmers who were involved in Teagasc (The Irish Agriculture and Food Development Authority) discussion groups.<sup>1</sup> Discussion groups within six of the 12 Teagasc advisory regions of Ireland were selected to represent a geographical spread. The advisors who led each individual discussion group were contacted in order to provide names of willing participants.

### 3.2. Data collection and survey design

A qualitative approach was adopted in this study to allow the authors to probe deeper into the areas of interest, to explore and elaborate on emergent themes and topics and to generate richer contextual data to better understand the factors influencing behavioural, normative and control beliefs that influence Irish dairy and drystock farmers intentions to plant trees. The interviews were guided by a predetermined schedule of exploratory, open-ended questions as outlined below. As a method of data generation, qualitative interviews provided the flexibility necessary to explore emergent topics of interest or for the interviewees to elaborate.

Information on the behavioural, normative and control beliefs that influence Irish dairy and drystock farmers to plant trees on their farm was elicited through online interviews with a sample of farmers. Furthermore, information relating to the cognitive foundation of behaviour

<sup>1</sup> Discussion groups are groups of farmers normally engaging in the same farming enterprise within a similar geographical location who partake in regular meetings to discuss issues and share information.

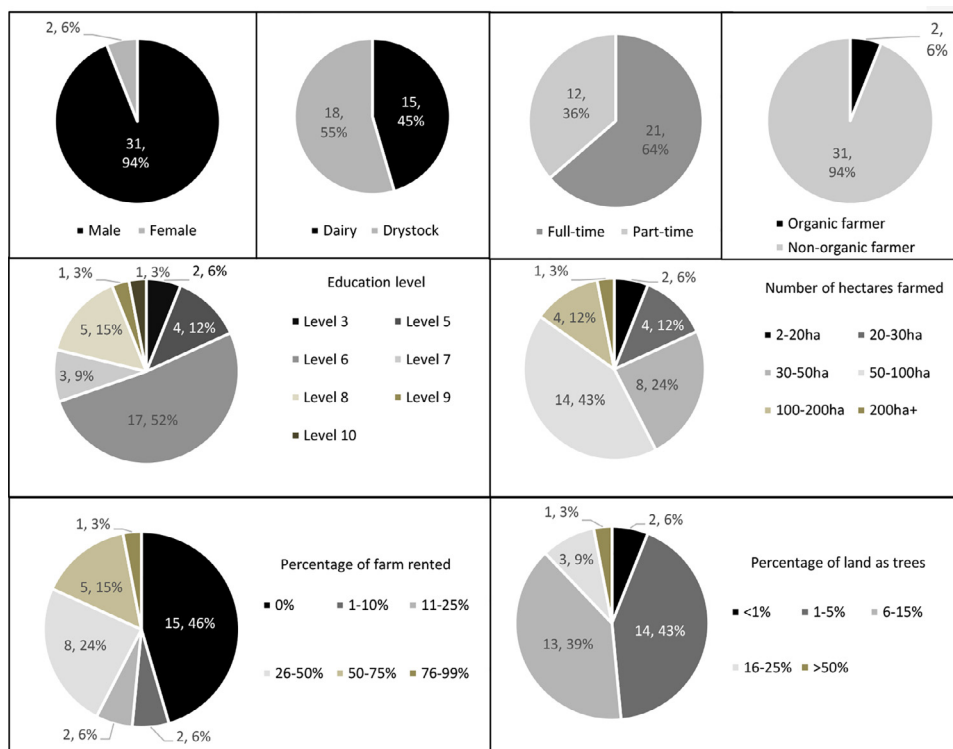


Fig. 2. Demographic information of participants who took part in the interviews.

including the beliefs, feelings, thoughts and intentions of the farmers interviewed was also collected (Ajzen, 2019). The knowledge of the study participants of agroforestry and current grant schemes available in Ireland was also queried. A set of open ended questions was used. As agroforestry is currently being practiced by such a small number of farmers, the phrase “trees on farms” was used in the questionnaire as well as the term “agroforestry”.

The interview was divided into three sections: questions relating to participants’ demographic information; questions relating to participants’ salient beliefs; and, questions relating to their knowledge of agroforestry. Demographic information requested included the participant’s age, level of education, main farming enterprise, farm size, percentage farm leased, and whether the participant was a part-time or full-time farmer. Participants were also asked to indicate whether they classed their farm as organic or conventional. To conclude the demographic information collection, participants were requested to estimate the percentage of their farm which was occupied by trees to include individual trees, woodlands and linear systems using the following categories: “<1%”, “1–5%”, “6–15%”, “16–25%”, “26–50%”, and, “>50%”.

The second part of the interview consisted of open-ended questions relating to participants’ salient beliefs. Questions included:

- “What do you think are the main advantages to planting trees on your land?”;
- “How would you describe the feelings of those important to you regarding your intentions to plant trees?”;
- “Are there any reasons you should be expected to plant trees on your farm?”
- “Is the decision to plant trees on your farm entirely up to you?”;
- “Are there any barriers that may make planting trees on your farm difficult?”; and,
- “Are you confident in your abilities to plant trees?”.

The final section relating to participants’ knowledge and understanding of agroforestry practices. Questions included:

- “What is your understanding of agroforestry?”;

- “If I was to ask these questions using the term agroforestry instead of trees on farms, would your answers be different?”; and,
- “Are you aware of any agroforestry grants available currently?”

Once their awareness of the availability of grants was determined, participants were also given information about the grant support that is available for the establishment of agroforestry, including the level of grant aid available, the annual premium funding and duration, and the conditions of the scheme. They were then asked whether they considered that this scheme is sufficient to increase the uptake of agroforestry practices in Ireland.

Individual interviews with the study participants were conducted over Zoom and lasted between twenty-five and ninety minutes. Interviews were conducted between May to July 2021 and continued until the researcher was satisfied that data saturation was reached. In total, thirty-three farmers were interviewed.

With participants’ consent, interviews were recorded using the recording option on Zoom which records both audio and video while producing an audio transcript. Any personal information of names mentioned within the interviews were replaced with [name removed] and participants’ names were replaced with pseudonyms.

### 3.3. Participant demographics

The majority of participants were male ( $n = 31$ ) and had completed a Level 6 degree as their highest education level ( $n = 17$ ) (Fig. 2).<sup>2</sup> Almost two-thirds were full-time farmers. Participants farmed most commonly areas between 50 and 100 ha. Almost half of the participants did not lease any land while eight participants stated that 26% to 50% of their farmed area was under lease. A minority was engaged in organic farming. ( $n = 2$ ) Most commonly trees occupied between one and five percent of the area of participants’ farms ( $n = 14$ ).

<sup>2</sup> According to the Irish National Framework of Qualifications, a Level 6 is obtained upon completion of a Higher or Advanced Certificate, such as the QQI Level 6 Advanced Certificate in Agriculture.

**Table 1**  
Attitude and positive behavioural beliefs towards tree planting on farms.

| Question   | Theme                                | Frequency (n)                     | Percentage (%) |    |
|--|--------------------------------------|-----------------------------------|----------------|----|
| What is your attitude to trees on farms?                                   | Positive to trees in general         | 26                                | 79             |    |
|  | Positive to hardwoods                | 5                                 | 15             |    |
|  | Negative attitude to blocks of trees | 1                                 | 3              |    |
|  | Negative to trees in general         | 1                                 | 3              |    |
| What do you think are the main advantages of planting trees on your farm?* | Farm benefits                        | Shelter                           | 22             | 67 |
|  |                                      | Aesthetics                        | 11             | 33 |
|  |                                      | Drying out land                   | 5              | 15 |
|  |                                      | Financial                         | 3              | 9  |
|  |                                      | Fuel source                       | 3              | 9  |
|  |                                      | Health and safety from boundaries | 1              | 3  |
|  |                                      | Stock proofing                    | 1              | 3  |
|  | Environmental benefits               | Social licence                    | 1              | 3  |
|  |                                      | Wildlife                          | 15             | 45 |
|  |                                      | Carbon sequestration              | 9              | 27 |
|  | None stated                          | Environment                       | 8              | 24 |
|  |                                      | 1                                 | 3              |    |

Notes: \* many participants gave multiple responses to this question.

### 3.4. Data analysis

The transcripts of the interviews were transferred to NVivo to facilitate content analysis and descriptive analysis (Richards, 1999). NVivo is a software program used within qualitative research to organise and analyse data while enabling the researcher to identify themes and produce insights into the data. It also aided the researcher in producing memos. The data from the transcripts were coded based on the open coding procedure whereby nodes were created of each of the phrases and words identified within the interviews. The nodes created within NVivo were grouped into major categories reflecting the TPB constructs as follows: the advantages and disadvantages of planting trees on the farm; overall attitude to planting trees on farms; the barriers to planting trees on farms; the people and organisations who influence participants; and, factors or circumstances that make planting trees on farms easier. Focused coding was then performed on the data to develop themes and identify the core categories (Emerson et al., 1995). A thematic analysis approach was used to systematically identify, organise and generate insight into patterns of meaning across the data set (Braun and Clarke, 2012). Themes were first constructed using exact phrases or words from the participants. Once all the data had been analysed and placed into individual nodes that represented a specific theme, the data were then re-grouped and placed under broader themes that reflected the context of the information. The data were separated during the re-grouping process to contextualise the information which is deemed crucial for qualitative research. In the results section that follows quotes from the transcripts are used, where appropriate, for illustrative purposes.

## 4. Results

### 4.1. Attitude

A positive attitude towards trees in general was expressed by the majority (79%) of participants, while five participants stated their positive attitude related to hardwoods only (15%) (see Table 1). A negative attitude towards softwoods, commonly referred to as “*pine trees*” or “*sitka spruce*”, was a common theme throughout the interviews.

“I absolutely love trees on farms as long as they’re deciduous trees. I detest, I detest pine trees...” (W\_DA\_A)

When asked what advantages would arise from planting trees on their farms, the most popular response ( $n = 22$ , 67%) was the provision of shelter.

“Well, I suppose, the main advantage we’ll say is shelter is one thing you know and shade for cattle and, of course, they look very, very nice in the countryside.” (W\_DA\_A)

Landscape aesthetics was the second highest stated behavioural belief, followed by trees drying out land (see Table 1). The most common stated environmental benefit of trees was their advantage to wildlife ( $n = 25$ , 45%). Other environmental benefits stated were carbon sequestration and the benefit of trees to the environment in general. Many of those interviewed identified a number of benefits.

“I suppose the main advantages of having trees is... to use up our carbon dioxide, you know and... transfer into a breathable fresh air and more cleaner oxygen you know, and also, I like the idea of some trees on farms for to give a shelter area and also... the natural beauty they bring to the landscape as well.” (M\_DR\_C)

The most common disadvantage cited by participants was the negative impact of trees on pasture ( $n = 14$ ; 42%). These negative impacts included trees slowing the drying out of land, blocking out sunlight and reduced palatability of the neighbouring sward (see Table 2).

“... And blocking sunlight, you know what I mean and then depending on where they’re [trees] facing to be honest with you the advantages way outweigh the disadvantages...” (S\_DA\_C)

Other behavioural beliefs stated include that trees can act as a hazard, can restrict agricultural activities when inappropriately placed, can increase workload, can introduce pests and diseases and negatively impact the surrounding environment. Financial disadvantages were also stated and included licence to harvest requirements ( $n = 2$ , 6%), impacts on Single Farm Payment ( $n = 1$ , 3%) and the overall cost of establishment ( $n = 1$ , 3%).

“And I think disadvantages to plant trees on a farm look it I suppose there is a risk, maybe have some wildlife that maybe can bring diseases onto your farm. Other disadvantages from what I’ve heard recently about the problems getting licenses to cut your forestry when it’s ready to.” (M\_DA\_A)

The majority of participants exhibited a behavioural belief that planting trees on their farm would fail to impact on the profitability of their enterprise ( $n = 23$ , 70%). Seven participants (21%) stated a positive impact on profitability while three participants (9%) stated a negative impact. Almost all participants (97%) exhibited the belief that trees belong within an agricultural context.

“Absolutely. Before the land was... actually developed. That was the natural there was natural forests in Ireland. So really going back and give a little bit back to the natural way we got our fields you know and our countryside.” (M\_DR\_C)

One participant believed that trees are an “*industrial process*” that take land out of “*agricultural use and into a different setup and scenario*”

**Table 2**  
Negative behavioural beliefs, effect of trees on profitability and the belonging of trees within an agricultural context.

| Question  | Theme                                   |  | Frequency (n) | Percentage (%) |
|---|---|--|---------------|----------------|
| What do you think are the main disadvantages of planting trees on your farm? *                        | Negative impacts on pasture             | Land slower to dry out                                 | 6             | 18             |
|   |   | Blocks out sun   | 5             | 15             |
|   |   | Unpalatable grass                                      | 3             | 9              |
|   |   | Can't return to pasture                                | 1             | 3              |
|   |   | Water uptake from crop                                 | 1             | 3              |
|   | Hazard                                  | Damage to buildings                                    | 7             | 21             |
|   |   | Dangerous  | 1             | 3              |
|   |   | Safety of livestock                                    | 1             | 3              |
|   |   | When poorly placed (restricts agricultural activities) | 3             | 9              |
|   | Increases workload                      | Cause issues when in the middle of field               | 3             | 9              |
|   |   | Cause issues when in the way                           | 3             | 9              |
|   |   | Impedes machinery operation                            | 3             | 9              |
|   |   | When too many trees planted together                   | 1             | 3              |
|   | Pests and diseases                      | Leaves   | 4             | 12             |
|   |   | Maintenance  | 3             | 9              |
|   |   | Time constraints                                       | 1             | 3              |
|   | Financial disadvantages                 | Attract pests  | 2             | 6              |
|   |   | Diseased trees   | 2             | 6              |
|   |   | Licence to harvest                                     | 2             | 6              |
|   |   | Single Farm Payment                                    | 1             | 3              |
| Negatively impacts environment  | Cost                                    | 1  | 3             |                |
|   | Harmful to environment                  | 1  | 3             |                |
|   | Negatively impacts landscape aesthetics | 1  | 3             |                |
| Do you believe that adding more trees to your farm would affect the profitability of your enterprise? | None stated                             | 2  | 6             |                |
|   | No effect                               | 23   | 70            |                |
| Do you believe trees belong within an agricultural context?   | Negative effect                         | 7  | 21            |                |
|   | Positive effect                         | 3  | 9             |                |
|   | Yes                                     | 32   | 97            |                |
|   | No                                      | 1  | 3             |                |

Notes: \* many participants gave multiple responses to this question.

**Table 3**  
Attitude towards tree products.

| Question   | Theme                                |                 | Frequency (n) | Percentage (%) |
|--|--------------------------------------|-----------------|---------------|----------------|
| What is your opinion about tree products?                                | Positive attitude to tree products   |                 | 25            | 76             |
|  | No opinion                           |                 | 6             | 18             |
|  | Positive to hardwoods only           |                 | 2             | 6              |
| Which tree products do you think could be produced viably on your farm?* | Heat sources                         |                 | 17            | 52             |
|  | Commercial market                    | Construction    | 4             | 12             |
|  |                                      | Sawmills        | 3             | 9              |
|  |                                      | Thinning        | 3             | 9              |
|  |                                      | Arts and crafts | 2             | 6              |
|  |                                      | Commercial      | 2             | 6              |
|  |                                      | Fencing         | 1             | 3              |
|  |                                      | Fruit           | 1             | 3              |
|  | Whichever market had the most profit | 1               | 3             |                |
|  | Keep in place                        |                 | 9             | 27             |
| Non-commercial   |                                      | 4               | 12            |                |
| Don't know   |                                      | 2               | 6             |                |

Notes: \* many participants gave multiple responses to this question.

forever” and once that land is planted “you have literally signed over the land forever back to the government to tell you what you do with it, and what you can do with” (NW\_DR\_A).

When queried on their attitude towards tree products, the majority of participants stated a positive attitude to tree products in general (n = 25, 76%) while six participants (18%) stated they had no opinion on the matter (see Table 3).

“...so many things that we buy is produced from trees like so you know pallets that meal is delivered on, fertiliser. And you're building a shed you need timbers for the roof, and the timber for so many things that you do on the farm so I suppose someone needs to be growing trees. If we're not we won't have no definitely yeah definitely we need products from trees and so would be positive attitude...”(M\_DA\_A)

Sources of home-use fuel, such as firewood, was the most frequently stated tree product that could be produced viably on participants' farms (n = 17, 52%). Commercial products were also mentioned by participants (52%) and included timber for the construction trade and

sawmills, fencing, and timber used for arts and crafts. Nine participants (27%) stated no intention to fell or collect products from the trees; the trees planted on their farm would “stay in place”.

The question worded “What comes to mind when you think about planting trees on your farm?” elicited a wide variety of responses. This question aimed to capture information and beliefs that failed to be captured by previous questions. Due to the wide variety of responses, responses were categorised into broader themes as follows: benefits of trees (n = 19); impact on workload (n = 14); negative aspects of trees (n = 11); grants (n = 2); suitability of the area in question (n = 2); and, trees would be planted after a bad days hedgcutting (n = 1) (see Table 4).

#### 4.2. Subjective norms

When asked their perceived reasons as to why they should be expected to plant trees, the majority of participants (79%) stated reasons relating to environmental benefits (see Table 5).

**Table 4**  
What comes to mind when you think about planting trees?.

| Question  | Theme   |                                | Frequency (n)            | Percentage (%) |   |
|---|---|--------------------------------|--------------------------|----------------|---|
| What comes to mind when you think about planting trees on your farm?* | Benefits  | Shelter                        | 4                        | 12             |   |
|   |   | Environmental benefits         | 4                        | 12             |   |
|   |   | Aesthetically pleasing         | 4                        | 12             |   |
|   |   | Planting for next generation   | 3                        | 9              |   |
|   |   | Adds to farm                   | 2                        | 6              |   |
|   |   | Carbon                         | 1                        | 3              |   |
|   | Workload  | Using up bad land              | 1                        | 3              |   |
|   |   | Protecting trees               | 4                        | 12             |   |
|   |   | More work                      | 3                        | 9              |   |
|   |   | Taking care of trees           | 2                        | 6              |   |
|   |   | Getting them planted           | 2                        | 6              |   |
|   |   | Coppicing required             | 1                        | 3              |   |
|   |   | Just get it over and done with | 1                        | 3              |   |
|   |   | Time constraints               | 1                        | 3              |   |
|   |   | Negative                       | Take away from grassland | 2              | 6 |
|   |   |                                | Don't like pine trees    | 1              | 3 |
|   | People talk about you                               |                                | 1                        | 3              |   |
|   | Not nice in blocks                                  |                                | 1                        | 3              |   |
|   | Lower farm output                                   |                                | 1                        | 3              |   |
|   | Last resort   |                                | 1                        | 3              |   |
|   | Ineligible land                                     |                                | 1                        | 3              |   |
|   | Grounding of electric fence                         |                                | 1                        | 3              |   |
| Grants  | Cost  | 1                              | 3                        |                |   |
|   | Commercial forestry has no place on productive land | 1                              | 3                        |                |   |
|   | Grants  | 2                              | 6                        |                |   |
|   | Suitability   | 2                              | 6                        |                |   |
| Plant a tree after a bad days hedgcutting                             | 1   | 3                              |                          |                |   |

Notes: \* many participants gave multiple responses to this question.

**Table 5**  
Reasons to plant trees.

| Question  | Theme   |                      | Frequency (n) | Percentage (%) |
|---|---|----------------------|---------------|----------------|
| Are there any reasons why you should be expected to plant trees on your farm? | Environmental benefits                                  | Environment          | 14            | 42             |
|   |   | Carbon sequestration | 7             | 21             |
|   |   | Climate Change       | 2             | 6              |
|   |   | Aesthetics           | 3             | 9              |
|   | Haven't been stated yet                                 | 4                    | 12            |                |
|   | None  | 4                    | 12            |                |
|   | Green image   | 2                    | 6             |                |
|   | Alternate enterprise if food producing market collapses | 1                    | 3             |                |
|   | Tax benefits  | 1                    | 3             |                |
|   | Everybody has to plant                                  | 1                    | 3             |                |

“Well, obviously, the main...reason... down the line would be for if we were accredited for our carbon sequestration or for... taking in carbon and bigger social licence” (NW\_DA\_B)

4.2.1. Influential people

“Family” was the most influential group in the everyday life of participants (see Table 6). However, with respect to the most influential body in regard to participants’ agricultural enterprises, only 12% identified “Family” as the most influential. Instead “Teagasc” was the highest cited (n = 28; 85%) body of influential status (see Table 6). “Other farmers” (n = 17) and “Media” (n = 11) were also highly cited amongst participants.

When queried on how their influential people and organisations would respond to them planting trees on their land, twenty-one participants stated they would be positive while nine participants stated their influential people would have a negative attitude towards them planting trees. Ten participants stated their influential people would be indifferent.

“They wouldn’t disapprove any... of those people but I know if ... if I planted trees in one area here and I blocked the view that they [neighbours] would disapprove just on one line here but other than that they wouldn’t have a problem.” (SE\_DR\_A)

Participants were also asked to identify individuals or groups that they perceive would be in favour of tree planting (see Table 7). The most frequently cited responses included “Co-ops” (n = 11, 33%) and “Everybody” (n = 10, 30%). Participants were also requested to identify any individuals or organisations that they perceive would disapprove of trees being planted on participants’ farms. Responses included “Neighbours” (n = 7, 21%), “Dairy farmers” (n = 2, 6%) and specific people (n = 3, 9%).

“I suppose there are some... dairy farmers. I suppose local to me they don’t like to see trees being set on good agricultural ground... they want to see every bit around them green and growing grass or. General it’s a pity to have those type of people as well because if they look at themselves, it would have their own biodiversity and help everyone ... because in the end of the day, we need the birds and the bees, you know it’s as simple as that that’s part of the environment that’s what we will walk with like, and they should know better.” (SW\_DR\_A)

Table 8 displays the results of the additional questions relating to subjective norms. As shown in this table, the majority of participants stated that the decision to plant trees was solely dependant on them. Almost half of participants stated that tree planting was not considered a major decision to them (n = 14, 43%) (see Table 8). The size of the proposed planting and the impact on the landscape influenced the response

**Table 6**  
Main influential bodies stated by participants.

| Question   | Theme                       | Frequency (n) | Percentage (%) |
|--|-----------------------------|---------------|----------------|
| When it comes to decision making in your everyday life, who are your most influential people or organisations?*                  | Family                      | 24            | 73             |
|  | Local people                | 5             | 15             |
|  | IFA members                 | 4             | 12             |
|  | Close friends               | 3             | 9              |
|  | Media                       | 3             | 9              |
|  | Policy makers               | 3             | 9              |
|  | Discussion groups members   | 2             | 6              |
|  | No one                      | 2             | 6              |
|  | Teagasc                     | 2             | 6              |
|  | Colleagues                  | 1             | 3              |
|  | Specific organisations      | 1             | 3              |
| When it comes to decision making regarding your agricultural enterprise, who are your most influential people or organisations?* | Some in the arts            | 1             | 3              |
|  | Teagasc                     | 28            | 85             |
|  | Other farmers               | 17            | 52             |
|  | Media                       | 11            | 33             |
|  | Other farming organisations | 6             | 18             |
|  | Family                      | 4             | 12             |
|  | Environmentalist            | 2             | 6              |
|  | Professional body           | 2             | 6              |
| Everybody  | 1                           | 3             |                |
|  | Trade                       | 1             | 3              |

Notes: \* many participants gave multiple responses to this question.

**Table 7**  
Perceived opinions of bodies of influential status.

| Question   | Theme  | Frequency (n) | Percentage (%) |
|--|--|---------------|----------------|
| How would you describe the feelings of those important to you regarding your intentions to plant trees?* | Positive   | 21            | 64             |
|  | Indifferent  | 10            | 30             |
|  | Negative   | 9             | 27             |
|  | Co-ops   | 11            | 33             |
| Explain your thoughts about any individual or group who would approve of your intentions to plant.*      | Everybody  | 10            | 30             |
|  | Government   | 4             | 12             |
|  | Neighbours   | 4             | 12             |
|  | Big companies  | 1             | 3              |
|  | Owners of local amenities  | 1             | 3              |
|  | Explain your thoughts about any individual or group who would disapprove of your intentions to plant.* | Neighbours    | 7              |
| Specific people were negative  |  | 3             | 9              |
| Dairy farmers  |  | 2             | 6              |
| People who were stated to be indifferent.*   | No one would approve or disapprove answer  | 4             | 12             |
|  | Co-ops   | 3             | 9              |
|  | Discussion group   | 1             | 3              |
|  | Wouldn't make a difference   | 1             | 3              |

Notes: \* many participants gave multiple responses or no response to this question.

with the planting of large blocks of trees being considered a major decision.

#### 4.3. Perceived behavioural control

The interviews aimed to capture participants' perceived behavioural control through asking questions relating to their perceived power and their control beliefs. The requirement to replant when agricultural land is re-categorised as forestry land was the most commonly cited barrier to planting trees ( $n = 18$ , 55%). When land is categorised as forestry land, there is a legal requirement to replant once the trees have been felled. Following this, location constraints relating to such aspects as Natura 2000 site designation restrictions, leased land and altitude were commonly cited by participants (see Table 9 for further details). Participants also cited aspects relating to financial barriers, lack of knowledge, and difficulty during initial establishment.

*“Lack of knowledge, I suppose. It would be good if I could go and spend a day with somebody that would know how to do yeah I suppose I put it that way, and I would learn that way” (SW\_DR\_A)*

The factors that participants identified would make planting easier for them included: increasing the amount of grants available; a higher income from forestry; and a better market for tree products (see Table 9). Educating farmers and increasing knowledge transfer on planting and managing trees were also mentioned.

Nineteen participants considered that they have the resources required to plant trees (58%); nine of which indicated they would have on a phased basis or planting a small amount of trees (see Table 9 for further details). Ten participants indicated they lacked the required resources (30%) including machinery, knowledge, time, financial resources.

Just under half of the participants (45%) believed that their knowledge of planting trees was sufficient. A slightly smaller percentage (39%) considered they had the necessary knowledge to successfully manage

**Table 8**  
Additional questions relating to subjective norms.

| Question   | Theme                                 | Frequency (n) | Percentage (%) |
|--|---------------------------------------|---------------|----------------|
| Is the decision to plant trees on your farm entirely up to you/ dependant on others? | Up to farmer                          | 21            | 64             |
|  | Family decision                       | 8             | 24             |
|  | dependant on others (non-specified)   | 2             | 6              |
|  | dependant on policy                   | 1             | 3              |
|  | dependant on the land owner           | 1             | 3              |
| Is planting trees considered a major decision for you?*                              | No                                    | 14            | 42             |
|  | Small scale, no                       | 9             | 27             |
|  | Yes                                   | 8             | 24             |
|  | Yes, change the landscape             | 2             | 6              |
|  | Big blocks, yes                       | 2             | 6              |
| What do you expect the reaction of important stakeholders to be?                     | Hedgerows, no                         | 2             | 6              |
|  | Co-ops would have a positive attitude | 10            | 30             |
|  | Co-ops would have a muted opinion     | 3             | 9              |
|  |                                       |               |                |

Notes: \* many participants gave multiple responses to this question.

**Table 9**  
Barriers impeding tree planting on farms.

| Question  | Theme                         | Frequency (n)                               | Percentage (%) |    |
|---|-------------------------------|---|----------------|----|
| Are there any barriers that may make planting trees on your farm difficult? | Requirement to replant        | 18  | 55             |    |
|   | Location                      | Leased land                                 | 4              | 12 |
|   |                               | SAC   | 4              | 12 |
|   |                               | Depends on where you put them               | 1              | 3  |
|   |                               | Exposed areas on farm                       | 1              | 3  |
|   |                               | Location                                    | 1              | 3  |
|   |                               | Overhead power lines                        | 1              | 3  |
|   |                               | Wet conditions                              | 1              | 3  |
|   |                               | Altitude                                    | 1              | 3  |
|   |                               | Financial                                   | 4              | 12 |
|   |                               | Lack of knowledge                           | 3              | 9  |
|   | Hard to get started           | 3   | 9              |    |
|   | None                          | 3   | 9              |    |
|   | Large quantities              | 1   | 3              |    |
|   | Long-term requirement         | 1   | 3              |    |
|   | Not soul decision maker       | 1   | 3              |    |
|   | Objections                    | 1   | 3              |    |
| Time  | 1                             | 3   |                |    |
| Are there any factors or circumstances that may make planting easier?       | Financial                     | Grants                                      | 24             | 72 |
|   |                               | Sufficient income                           | 2              | 6  |
|   |                               | Market                                      | 1              | 3  |
|   | Education                     |   | 7              | 21 |
|   |                               | Availability of resources                   | 3              | 9  |
|   |                               | Better tree shelters                        | 1              | 3  |
|   |                               | Availability of trees                       | 1              | 3  |
|   | Removal of legal requirements | Remove forestry designation                 | 2              | 6  |
|   |                               | Removal of Natura designation               | 1              | 3  |
|   |                               | Less red tape                               | 1              | 3  |
|   | Health                        |   | 1              | 3  |
|   |                               | Stop big companies buying land for forestry | 1              | 3  |
|   | None stated                   |   | 1              | 3  |
| Do you have the available resources to plant trees?                         | No                            | 17  | 52             |    |
|   | Yes                           | 10  | 30             |    |
|   | Yes (small number of trees)   | 8   | 24             |    |
|   | Yes (phased)                  | 3   | 9              |    |
|   | Yes if scheme was available   | 1   | 3              |    |
| Are there any resources lacking that reduce your ability to plant trees?    | None                          | 12  | 36             |    |
|   | Machinery                     | 10  | 30             |    |
|   | Knowledge                     | 9   | 27             |    |
|   | Time                          | 5   | 15             |    |
|   | Would bring in a contractor   | 4   | 12             |    |
|   | Labour                        | 3   | 9              |    |
|   | Financial                     | 2   | 6              |    |
|   | Uncertainty                   | 1   | 3              |    |
|   | Would have to hand plant      | 1   | 3              |    |



**Table 10**  
Additional perceived behavioural control questions.

| Question                    | Theme                             | Frequency (n) | Percentage (%) |
|-----------------------------|-----------------------------------|---------------|----------------|
| Knowledge of planting trees | No                                | 18            | 55             |
|                             | Yes                               | 15            | 45             |
| Knowledge of managing trees | No                                | 18            | 55             |
|                             | Yes                               | 13            | 39             |
|                             | Hedgerows yes but not other trees | 2             | 6              |
| Planting successful         | Yes                               | 33            | 100            |
| Confidence                  | Yes                               | 32            | 97             |
|                             | Yes for hedgerows                 | 1             | 3              |

**Table 11**  
Intention to plant trees in the next five years.

| Question  | Theme                                | Frequency (n)                 | Percentage (%) |    |
|---|--------------------------------------|-------------------------------|----------------|----|
| Do you intent to plant trees on your farm in the next five years?                           | Yes                                  | 13                            | 39             |    |
|   | Yes, but only hedgerows              | 12                            | 36             |    |
|   | No                                   | 6                             | 18             |    |
|   | Yes, but only replacing felled trees | 2                             | 6              |    |
| Where do you believe would be the most beneficial area for you to plant trees on your farm? | Linear boundaries                    | Along field boundaries        | 15             | 45 |
|   |                                      | Riparian buffer strip         | 3              | 9  |
|   |                                      | As windbreak                  | 1              | 3  |
|   | Low output pasture                   | Least profitable part of farm | 9              | 27 |
|   |                                      | Wetter soil                   | 8              | 24 |
|   |                                      | Marginal land                 | 7              | 21 |
|   | Corner of field                      | 7                             | 21             |    |

trees on their farm (see Table 10). All participants stated that planting trees on their farm would be successful, and almost all exhibited confidence in their planting abilities.

“...whatever I go to do I want to make sure it's done well and done right and will not waste time like so I'd make sure it was [done] the right way that it would be successful yeah.” (M\_DA\_A)

#### 4.4. Intention

Overall, intention to plant trees amongst farmers was high with thirteen participants (39%) intending to plant trees in the next five years, while a further twelve participants (36%) intended to plant hedgerows.

“yeah we would plant it without regardless if the policy comes or not we will and the other thing too it's like planting the multi species or anything is that if it does come down the line we will have more knowledge that we will have tried it out first. We were just going to do along a couple of hedgerows where we pulled out a couple of old fences at home.” (NW\_DA\_B)

Only six participants (18%) did not intend to plant trees on their farm in the next five years. Some farmers stated their hesitation to plant was due to a lack of knowledge of and confidence in future planting schemes.

“If I plant all the farm, that means I'm no longer in cows. So even to plant a fraction of it... decreases the size of my herd anyway” (SW\_DA\_B)

Along field boundaries was the location most commonly cited by participants as the most beneficial area to plant trees on their farm. Other locations such as the “the least profitable part of the farm” wetter soils, on marginal land or corners of fields, were also common responses (See Table 11: Intention to plant trees in the next five years).

#### 4.5. Agroforestry knowledge

The current extent of knowledge of agroforestry amongst participants was also investigated. When asked to provide a definition of what they perceive to be agroforestry, just over 60% exhibited some knowledge; examples of definitions provided by these participants included:

- “Planting trees on farms for the benefit of the environment”;
- “...not being in a commercial state like it's incorporated into everyday farms...”;
- “Agroforestry... is you plant lines of trees through the field is that it?”;

- “Well isn't agroforestry the same as what we have been talking about planting trees on land and for whatever reason, let it be climate change or to farm trees”;
- “No, no because..., [agroforestry is] just a fancy word for doing the same thing [as planting trees on farms].”

The remaining participants (39%) stated they had no knowledge on the subject. Nevertheless they were asked to provide a definition of what they perceived the term agroforestry to mean. Some answers from this cohort included:

- “... it's just a commercial forest like whether it be private or semi-state...”; “...it sounds more commercial...more formalised.”
- “Well I suppose agroforestry, it sounds like a business. And trees on farms it's I suppose it's a visual thing isn't it, so I prefer trees on farms... I suppose, if I saw if I was reading the journal today and I saw agroforestry, I would say, well that's... obviously they want you to plant a couple of acres of pine trees” (W\_DA\_A)
- “Mass produced trees, I suppose that the way only way mass produce you know acres and acres of pine trees that's, the only way I could describe [agroforestry].” (SW\_DR\_A)

Participants were then asked whether the use of the word agroforestry instead of trees on farms would have influenced their answers to interview questions. A definition of agroforestry was provided stating that agroforestry is the inclusion of managed trees on farms with crops and or livestock. Eighteen participants stated the word agroforestry would not impact their responses (55%), while fifteen participants stated that their answers would have been different (45%). Of the participants who stated that their answers would be different, the majority stated they would have a more negative attitude towards the term “agroforestry”; three participants stated the term “agroforestry” would confuse them and as such, would not be able to answer the questions.

The majority of participants ( $n = 25$ , 76%) were unaware of agroforestry grants or any other financial aid available for planting trees on farms (see Table 12). Participants were then informed of the details of the agroforestry grant available in Ireland known as GPC 11. When asked their opinion on the grant, just over 50% stated it was enticing to them. Extending the premium would increase uptake, while changing the initial payment was also cited as a means to increase uptake. Six participants suggested altering the number of trees required.

**Table 12**  
Additional questions regarding grant funding.

| Question   | Theme                  | Frequency (n)                         | Percentage (%) |    |
|--|------------------------|---------------------------------------|----------------|----|
| Are you aware of any agroforestry grants available currently or any other financial aid for planting trees?<br>Reactions to GPC 11 | No knowledge           | 25                                    | 76             |    |
|  | Forestry Grants        | 5                                     | 15             |    |
|  | GLAS                   | 4                                     | 12             |    |
|  | Enticing               | 15                                    | 45             |    |
|  | Longer premium         | 12                                    | 36             |    |
|  | Change Initial payment | Larger one off payment, no premium    | 2              | 6  |
|  |                        | Larger initial payment, lower premium | 1              | 3  |
|  |                        | 100% costs funded                     | 5              | 15 |
|  | Change number of trees | 400 trees around farm                 | 5              | 15 |
|  |                        | Reduce the number of trees            | 1              | 3  |
|  |                        | Wouldn't incentivise them             | 5              | 15 |
|  | Identify areas in BPS  | 2                                     | 6              |    |
|  | If mainly hedgerows    | 2                                     | 6              |    |
| 80% sufficient, no need for premium  | 2                      | 6                                     |                |    |
| Whichever is bigger payment  | 1                      | 3                                     |                |    |
| What is the largest width of equipment you own currently or your contractor owns?  | 1–2m                   | 4                                     | 12             |    |
|  | 3–5m                   | 1                                     | 3              |    |
|  | 6–10m                  | 19                                    | 58             |    |
|  | 11m+                   | 9                                     | 27             |    |

Participants were also asked what their largest width of equipment used on the farm is. A variety of responses were provided (Table 12).

## 5. Discussion

The findings of the survey suggest that in general, the Irish dairy and drystock farmers interviewed have an overall positive attitude to trees on farms and recognise their benefits. This may be evidence that, although trees have increasingly been lost from Irish agricultural landscapes due to a shift from traditional and ancient agroforestry systems to intensively managed monocultures, farmers still recognise trees as being a valuable asset to their enterprise. The main benefit to tree planting perceived by participants in this study was the provision of shelter. This finding is similar to that of Flexen et al. (2014). Similarly, shelter provision was the most common reason given by Irish farmers for planting trees in an earlier study (Ni Dhubháin, 1994). Environmental benefits, such as the benefit of trees to birds and other wildlife, were also frequently given as an advantage to planting trees. This reflects an increasing awareness amongst farmers of the importance of biodiversity from a wildlife perspective; in earlier studies, the environmental benefits from tree planting either from a biodiversity or carbon sequestration perspective were not referred to (e.g. Ni Dhubháin, 1994). Graves et al. (2009) also found that the majority of farmers they surveyed considered environmental benefits to be the main benefits of incorporating trees into their farming enterprise. Additionally, in the current study the majority of participants stated environmental benefits as the main reasoning behind why they should be expected to plant trees indicating these benefits play an important role in social norms. The financial benefit of planting trees was not mentioned during the interviews.

The most common disadvantage given to planting trees on farms was the negative impact of trees on pasture. Interestingly however, the majority of participants stated that adding more trees would have no effect on the profitability of their enterprise. This may suggest that although trees are perceived to impact both the palatability and growth of the understory sward, this impact is perceived to have a negligible impact on the overall profitability of the enterprise. Furthermore, the relatively low frequency of negative financial behavioural beliefs may further explain this perceived negligible impact on overall profitability. All of the participants who anticipated that planting trees would have a negative impact of profitability still intended to plant trees. Additionally, the farmers within this study indicated trees within agricultural land negatively impacted machinery operation, particularly when the placement of the trees was poor. The negative impact of trees on

machinery operation also ranked highly amongst English farmers who partook in the study by Graves et al. (2017).

The results of the study demonstrate that farmers regard the opinions of their families highly when making everyday decisions, while Teagasc and other farmers highly influence decision making regarding the agricultural enterprise. Daxini et al. (2018) also recorded a positive influence of farm advisors such as those employed by Teagasc on farmers' decision making regarding adopting nutrient planning. An Irish study on the social networks of forest owners found the most trusted persons and organisations included Teagasc, family, friends and neighbours, and similar forest owners (Stoettner and Ni Dhubháin, 2019). As such, promoting the use of trees within agricultural enterprises through Teagasc advisors and the use of demonstration farms may provide a viable means to increase the uptake of tree planting amongst Irish dairy and drystock farmers. Participants felt that the majority of influential people/bodies would think positively of their intention to plant. However, a significant minority would have a negative attitude resulting in a negative social pressure towards tree planting; mainly attributed to neighbours. This stems from the belief that neighbours' views of the landscape would be negatively impacted by tree planting. The results of the study demonstrate an overall positive normative belief regarding tree planting. However a low motivation to comply with the views of their influential people is evident due to a high number of participants stating decision making regarding tree planting is solely up to themselves.

A major barrier for farmers is the requirement to replant any trees they establish if removed resulting in the land being tied up for future uses. As a result, once their land is planted, farmers exhibit a low perceived power of control; they feel restricted in regards to their decision making for that specific land parcel. These results agree with those of both Flexen et al. (2014) and Rois-Díaz et al. (2018). In Ireland, planting trees can be seen by farmers as a long-term commitment devoid of flexibility. As such, it removes the potential for the land to be used for alternative enterprises that may prove more profitable (Duesberg et al., 2014a; Flexen et al., 2014). According to McDonagh et al. (2010), the relatively small average farm size in Ireland has created a belief amongst farmers that all their land is required for food or crop production and is a major barrier to afforestation. Although previous studies have identified the long-term commitment of forestry to be a barrier to afforestation in Ireland, almost half of the participants of the current study did not perceive tree planting to be a major decision. As such, the results of this study fails to reflect the permanency of the decision to plant trees.

The lack of sufficient knowledge on managing and planting trees was evident however was not perceived as a barrier *per se* to many

participants. This lack of knowledge may be because agriculture and forestry have been seen as two separate land use practices in many agricultural institutions within Ireland and as such, a disconnect between forestry and agriculture has been created (Barbier et al., 2010). Furthermore, in contrast to other countries, there is no tradition of tree planting amongst Irish farmers (Stoettner and Ní Dhubháin, 2019). Lack of knowledge of agroforestry amongst conventional farmers was also cited by Reeg (2011). Graves et al. (2017) found most conventional farmers that were surveyed failed to exhibit comprehensive knowledge of agroforestry. Rois-Díaz et al. (2018) discovered a similar lack of knowledge and awareness amongst both silvoarable and silvopastoral farmers. Specific knowledge of agroforestry was evident in over half of the participants of our study through the definitions they provided; nevertheless specific terminology (e.g. silvopasture etc.) was not mentioned by anyone.

The majority of participants who exhibited a lack of knowledge and understanding on agroforestry said they would change their answers if agroforestry had been used instead of the term “trees on farms”. Although both terminology refers to the same concept in the context of this study, the more negative views towards the former demonstrate the low presence of agroforestry within the agricultural community in Ireland. There was also an evident lack of knowledge and awareness on the agroforestry grant scheme. Awareness of other general afforestation schemes and grants aimed at increasing tree cover on Irish farms was also lacking amongst the surveyed participants. Increasing awareness of the agroforestry scheme and extending the premium duration were proposed by participants as viable means to increase uptake. The lack of awareness of specific forestry schemes and grant aid available amongst the farming community has been identified in previous studies such as Duesberg et al. (2014b), and Edwards and Guyer (1992). Throughout the interviews, when the agroforestry scheme was explained to participants, many were perplexed as to why they had not been informed of this grant from their advisors. Agricultural advisors therefore, may lack the awareness or fail to obtain in-depth knowledge of other land management schemes outside their discipline and may be cautious to deviate from such land management practices they specialise in.

All participants stated they were confident to plant trees on their land, suggesting a high perceived behavioural control. The majority of participants stated that they exhibited the required resources to plant trees; this also contributes to a high perceived behavioural control. The absence of suitable machinery was a negative control belief stated by eleven of the participants. However, the absence of such machinery was not considered a major barrier due to the option to use a contractor.

Eight-two percent of participants intended to plant trees on their land in the next five years. The most beneficial area to plant trees was along linear boundaries while one quarter stated the least profitable part of their farm. These results concur with those of Flexen et al. (2014) who found that both non-agroforesters and agroforesters in Northern Ireland were more willing to plant on marginal land that was either unsuitable for farming or the least profitable part of the farm. This attitude was also evident amongst farmers across Europe in the study conducted by Rois-Díaz et al. (2018). It has been well documented in literature that Irish farmers are more willing to afforest land regarded as of poor quality or on areas of marginal land (Hannan and Commins, 1993; Frawley, 1998; Frawley and Leavy, 1999; Collier et al., 2002; Ni Dhubháin and Kavanagh, 2003; McCarthy et al., 2003). In relation to perceptions of forestry in Ireland, Ni Dhubháin and Gardiner (1994) observed a widespread unwillingness to plant land, with 90% of farmers surveyed indicating no intention to plant. Forty percent of farmers who indicated a reluctance to plant stated that as their land was of a high agricultural quality, it would be wasted if planted.

In the current study, only 18%, i.e. 6 participants, did not intend to plant trees within the specified time period suggesting a much more positive attitude to tree planting than has been noted heretofore. The greater willingness to plant trees may be attributed to a number of factors. In recent years, a heightened social emphasis on environmental

services such as carbon sequestration and water quality is evident. Furthermore, there is now a greater awareness of the harmful impacts that agricultural activities can have on the environment and as such, farmers feel more pressure to alter their farming practices. Increasing tree cover on farms may be seen as a way to offset emissions and aid farmers in meeting the expectations of both policy makers and consumers.

Another factor that may explain this greater willingness to plant could be terminology. As previously mentioned, specific terminology impacted participant responses in this study. Over 35% of participants stated they would have a more negative attitude if the term “agroforestry” was used while a further 10% stated the term would confuse them. Perhaps the use of “trees on farms” rather than “agroforestry”, “woodlands” or “farm forestry” may explain the relatively higher intentions to plant trees within this study in comparison to similar studies conducted in Ireland. It may be that one of the main barriers to agroforestry uptake in Ireland is the actual term “agroforestry”: the inclusion of “forestry” may immediately explicit negative misconceptions about the land management practice and as forestry is often regarded as a rival to agricultural, impedes its adoption before further information can be gained. Further research needs to be conducted on the impact of terminology on uptake of agroforestry

The aim of this qualitative study was to inform a larger quantitative study as well as provide the authors with a richer understanding of the main barriers and perceptions of farmers to agroforestry in Ireland. It also provides the researcher with directions of further study relating to the adoption of agroforestry in Ireland, specifically relating to how terminology can affect views.

## 6. Conclusion

Research on farmer’s attitudes and perceptions of agroforestry is lacking in Ireland; the term itself is not widely publicised. This is evident from the lack of knowledge on agroforestry observed from the results of the study with the term itself commonly eliciting negative responses. Overall, farmers exhibit a positive attitude and perceived behavioural control to trees on farms and intention to plant within the next five years. Hesitation from the remainder who exhibited low intentions to plant trees were mainly due to doubt surrounding new proposed environmental schemes and incentives. Bodies with the highest influential status within this cohort of farmers are Teagasc, family and other farmers. As such, promoting agroforestry practices through such bodies may prove viable in increasing tree cover on Irish farms. The results of this exploratory study provide useful insight into the main attitudes, influential people, intentions and barriers to planting trees on agricultural land in Ireland. This study has the potential to inform the design of further research using a larger sample of the farming population in Ireland.

## Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests  
Rachel Irwin reports financial support was provided by Teagasc.

## Data availability

The data that has been used is confidential.

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## Appendix A

During the final stage of the interviews, participants were provided information regarding the grant/ premium category (GPC) 11; the main grant aid available for the establishment of agroforestry in Ireland. This scheme provides funding for combining evenly spaced trees with grazing and silage with an initial stocking rate of 400 to 1000 trees per hectare; acceptable trees include oak, cherry and sycamore with 15% of fruit or nut producing trees such as apple or hazelnut. The minimum plot size is 0.5 ha. GPC 11 funds 80% of the eligible costs of setting up the system with an additional fencing allowance of €600 or €450. The initial grant is paid in two instalments (€4215 and €1405) and an annual premium available for 5 years of €645 (for areas less than 10 ha) or €660 (for areas greater than 10 ha). Only grazing of young stock or sheep and silage making is permitted for the first 6 to 8 years during the spring and summer periods so long as adequate tree guards of 1.5 m in height with two supporting posts are in place.

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