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Agroforestry Labelling's Potential to Incentivise Agrarian Tree Planting in The Republic of Ireland

A Case Study of County Cork

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Abstract

In response to the low afforestation rates in the Republic of Ireland, this study has assessed whether the development of a national AF label has the capacity to incentivise agrarian tree planting. The study employed an explanatory, sequential mixed methodology involving two distinct stages: Stage I and II. Stage I determined the WTP of consumers in Co. Cork through survey-based, quantitative methods. Additionally, the effects of consumer knowledge and socio-demographic characteristics on consumers' WTP were examined. Stage II investigated which factors are influencing the agrarian adoption of AF and which of these factors might impede AF labelling's potential to incentivise the agrarian adoption of AF, through an inductive qualitative approach. Through the discussion of the results from Stages I and II, it was determined that if certain factors are addressed, then AF labelling does have the capacity to incentivise agrarian tree planting in the Republic of Ireland. Furthermore, the study has suggested several avenues for future research and recommendations for actors or organisations seeking to pursue AF labelling in the Republic of Ireland.

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1. Introduction

1.1. Research Problem

As climate change and biodiversity loss threaten the socioecological systems on which human civilisation relies, the international community has largely focused on increasing tree cover. As seen in initiatives such as Trillion Trees, The Bonn Challenge, African Forest Landscape Restoration Initiative, EU Biodiversity Strategy to 2030, and the UK Nature for Climate Fund (Seddon et al., 2021). Although some commentators are criticising the current fixation on tree planting (Seddon et al., 2021), increasing tree cover has an important role to play in the mitigation of, and adaptation to, climate change, through the sequestration of atmospheric carbon, strengthening of biodiversity and provision of ecosystem services. (Cole et al., 2024; Dobbs et al., 2017; Foghlú, 2022; Psistaki et al., 2024; Seddon et al., 2021). Ecosystem services can be defined as “the benefits people obtain from ecosystems” and are commonly categorised as either provisioning, regulatory, cultural, or supporting services (Millennium Ecosystem Assessment, 2005). A list of the most common ecosystem services associated with trees and their scale of influence can be seen in Table 1.

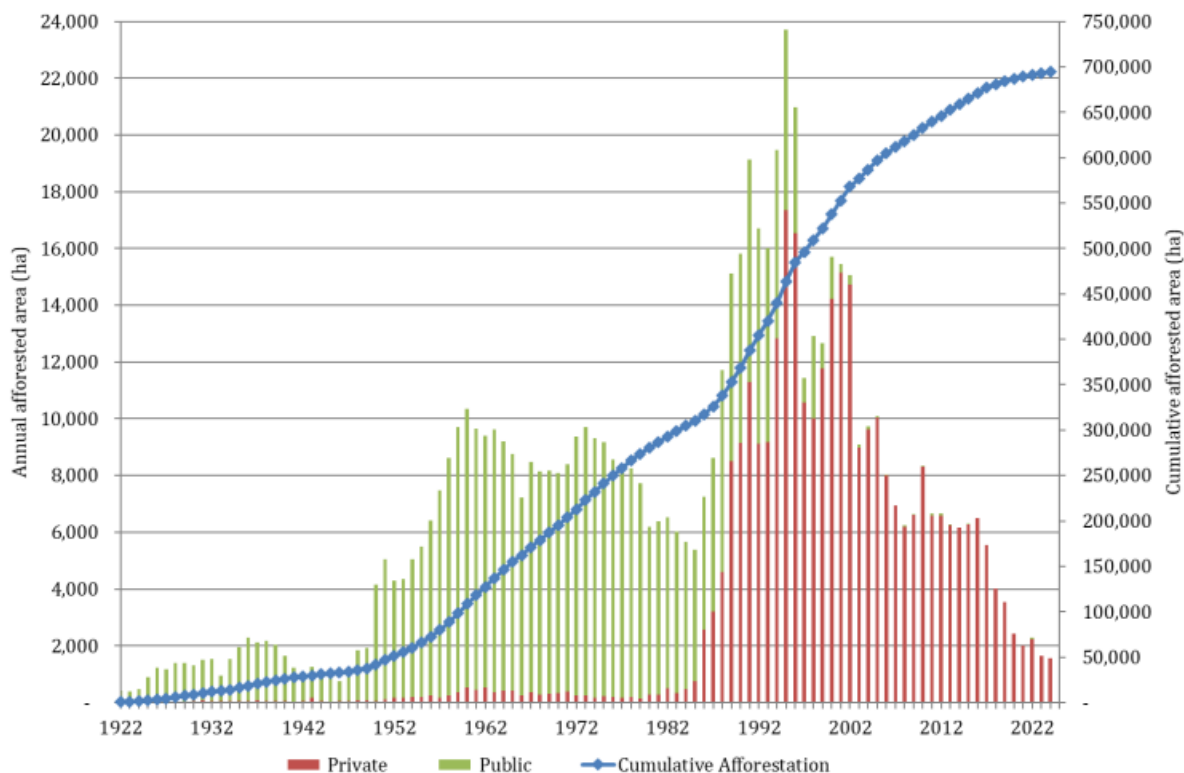
Table 1. *List of Ecosystem Services Provided by Trees and their Associated Scale of Impact*

Local	Regional	Global
Microclimate regulation	Air quality regulation	Global climate regulation
Flood regulation	Filtering of dust particles	Maintenance of genetic and biological diversity
Storm protection	Habitat provisioning	
Maintenance of soil quality	Pollination and seed dispersal	
Noise reduction	Raw materials	
Food security	Natural heritage and education	
Recreation		
Aesthetic		
Sense of place		
Ecotourism		

Note. Adapted from Dobbs et al. (2017)

During the 20th century, forest coverage of Irish land increased from a historical low of approximately one percent to a contemporary coverage of eleven percent (Irwin et al., 2025). This increase was achieved primarily through the planting of non-native conifers on public land. Despite the increase, Irish forest coverage remains twenty percent lower than the European average (Foghlú, 2022), and Ireland has recently been ranked as the 13th least biodiverse country in the world (Mullan-Jensen et al., 2024). Recognising the importance of increasing national tree cover further, the Irish state has developed a new Forestry Programme for the period 2023-2027. The programme largely focuses on encouraging private planting through the provision of grants to rural communities and landowners (Department of Agriculture, Food and the Marine, 2024, 2025). The policy shift prioritising private rather than public planting is due to the relative ownership of Irish land, over 70% of which is held in private agricultural holdings, and the subsequent inability of the state to meet its national planting commitments solely on public land (Foghlú, 2022). Despite the increase to grant premiums and durations contained within the new Forest Programme, afforestation across the country is the lowest it has been in the last seventy-five years, as seen in Figure 1.

Figure 1. *Annual state and private afforestation area (ha) (1922-2024).*



Note. From Department of Agriculture, Food and the Marine (2025)

1.2. The State of Irish Agroforestry

Since 2015, agroforestry has been promoted to farmers by the Department of Agriculture, Food and the Marine as an alternative agricultural land use strategy which could be used to meet national planting targets (Irwin et al., 2025). Agroforestry (AF) can be defined as “a collective name for land-use systems in which woody perennials (trees, shrubs, etc.) are grown in association with herbaceous plants (crops, pastures) or livestock, in a spatial arrangement, a rotation, or both; there are usually both ecological and economic interactions between the trees and other components of the system” (Smith et al., 2013, p. 81). Although active management of AF is uncommon in the Republic of Ireland, it does show potential to support Irish agricultural systems through the diversification of farm products, the enhancement of animal welfare, through enabling planting on land unsuitable for agricultural use, flood reduction, and through a reduction of costs associated with inputs such as fertilisers or pesticides (Cole et al., 2024; Foghlú, 2022; Millard, 2011; Smith et al., 2013). Furthermore, AF supports long-term productivity by reducing the land degradation often caused by intensive agricultural systems and by supporting local biodiversity. Simultaneously generating ecosystem services which farmers may be compensated for, through government grants or market mechanisms (Cole et al., 2024; Foghlú, 2022; Millard, 2011; Smith et al., 2013). Additionally, the adoption of AF as a standard could develop cultural understanding, strengthening the agricultural and forestry sectors, while contributing to the adaptation and mitigation of climate change (Cole et al., 2024; Foghlú, 2022; Irwin et al., 2025; Smith et al., 2013). Hence, the adoption of AF presents itself as a promising opportunity to increase national tree cover, while enabling farmers to continue practising agricultural activities on that same land parcel (Cole et al., 2024; Foghlú, 2022; Millard, 2011; Rois-Díaz et al., 2018; Smith et al., 2013).

However, there is a common consensus amongst many Irish farmers and agricultural actors that trees are not a suitable addition to farm systems (Foghlú, 2022; Irwin et al., 2022, 2025). In extreme cases, they are considered mutually exclusive undertakings (Irwin et al., 2022). This damning perception of tree planting has its roots in generations of conversion of what was considered unproductive woodland into productive agricultural land (Foghlú, 2022; Irwin et al., 2025), resulting in a strong disconnect between the agricultural and forestry sectors in Ireland (Irwin et al., 2025). The gap between these sectors has been reinforced in recent years, by state failures regarding the licensing process, which is required to enable farmers to plant and fell trees, and the departmental mismanagement of plantations leading to the loss of biodiversity and public confidence (Foghlú, 2022). In the case of AF specifically, the impact of these

undermining conditions has been exacerbated by the lack of a unified coalition of agricultural actors promoting AF and confusion regarding AF's categorisation as a forestry rather than agricultural scheme (Irwin et al., 2025).

The cultural opinion that the presence of trees on agricultural land may have negative impacts on farm profitability is largely rooted in a productionist mindset regarding grass yield (Foghlú, 2022; Irwin et al., 2022). A mindset which has gone mostly unchallenged due to the lack of empirical evidence coming from research conducted within an Irish context (Irwin et al., 2025). Furthermore, current government schemes seeking to incentivise the adoption of AF by compensating farmers for the establishment costs have been identified as insufficient in many cases (Irwin et al., 2022, 2025). Additionally, competing options, such as leasing agricultural land, are often considered more appealing than forestry schemes because they can be equally lucrative while avoiding changes to land designation (Foghlú, 2022). In Ireland, designation to forest land is carried out on any agricultural land which adopts systems of integrated tree management, such as AF. Once designated as forest land, that land must remain as forest land forevermore. This manifests in Irish legislation through the Forestry Act 2014, as a replanting obligation which is agreed to as part of the initial planting licence (Office of the Attorney General, 2014). The replanting obligation leads to a considerable devaluation of agricultural land which has undergone tree planting (Foghlú, 2022; Irwin et al., 2025). Finally, tree planting has a reputation as a risky economic venture due to the possible destructive impacts of storms, disease and deers (Foghlú, 2022; Irwin et al., 2022).

1.3. Research Gap and Study Aim

Evidence from several studies suggests that profitability is farmers' primary concern when considering the adoption of AF (Graves et al., 2009; Mercer, 2004; Pannell, 1999). Unfortunately, few Irish farmers and agricultural actors are aware of the myriad ways in which the adoption of AF may economically support their farm enterprise (Foghlú, 2022; Irwin et al., 2022, 2025). Furthermore, even if aware, much of the infrastructure, research and knowledge necessary in order to enable Irish farmers to generate profits through AF adoption is missing (Foghlú, 2022; Irwin et al., 2025). In particular, national market mechanisms which connect financial flows from consumers to farmers who have adopted AF have been identified as missing in the Republic of Ireland (Irwin et al., 2022, 2025). Such market mechanisms are recognised as essential in validating the feasibility of AF as a profitable enterprise for farmers (Gold et al., 2009; Irwin et al., 2025; Millard, 2011; Rois-Díaz et al., 2018). One common

market mechanism which can be used to financially support farmers who undertake optional sustainable practices, such as AF, is the certification of their products through ecolabelling (Drexler et al., 2018; Millard, 2011; van Osch et al., 2017). Ecolabelling indicates “... a company’s engagement in environmentally sensitive production” (Drexler et al., 2018, p. 442) and products labelled as such (eco-products) are commonly accompanied by a premium price (Bolduc et al., 2023; Drexler et al., 2018; Millard, 2011). Premium prices help support the adoption of environmentally sensitive practices by mitigating the adoption costs incurred by producers and by increasing its appeal through larger profit margins (Millard, 2011; Rois-Díaz et al., 2018; Zhang et al., 2018). Thus, the creation of a national AF label has the potential to incentivise agrarian tree planting by connecting consumers’ willing to pay premium prices for AFP, with farmers who have adopted AF, as organic or fair trade labelling has done in their respective missions (Cole et al., 2024; Drexler et al., 2018; Millard, 2011).

The desire from Irish farmers to market their agroforestry produce (AFP) through ecolabelling is recognised, and ecolabelling has been identified as a suitable method to incentivise the adoption of AF in Ireland (Irwin et al., 2022, 2025). However, research is required to verify whether Irish consumers are willing to pay price premiums for products labelled as AFP (Gold et al., 2009; Irwin et al., 2025; Millard, 2011). Evidence from consumer studies carried out throughout Europe and the UK suggests that consumers are willing to pay premium prices for AFP (Cole et al., 2024). Furthermore, indications exist that there may be such a consumer market in Ireland (Irwin et al., 2025). However, no such consumer study has been carried out confirming this. Additionally, in order to interpret the significance of any results from such a consumer study, verifying whether there are factors which would undermine AF labelling’s success is necessary. Although studies determining farmers’ perceptions of AF have been conducted (Irwin et al., 2022) and the barriers to its uptake investigated (Irwin et al., 2025), additional research is warranted to understand whether elements such as those identified in these studies would impede the success of an AF label. Such research could provide insights for the development of future policies and/or guide economic development. As such, this study will contribute to the literature by determining whether Irish consumers are willing to pay price premiums for AFP, and secondly, by investigating which factors might impede AF labelling’s potential to incentivise the agrarian adoption of AF. In line with these contributions and addressing the issues identified in the first paragraphs of this introduction, this study aims to determine Irish consumers’ willingness to pay price premiums for AFP and to investigate which factors might impede AF labelling’s potential to incentivise the agrarian adoption of AF.

2. Objectives and Research Questions

2.1. General Objectives

Assessing whether the development of a national AF label has the capacity to incentivise agrarian tree planting in the Republic of Ireland.

2.2. Specific Objectives

- a. To determine Irish consumers' willingness to pay price premiums for agroforestry produce.
- b. To investigate which factors might impede AF labelling's potential to incentivise the agrarian adoption of AF in the Republic of Ireland.

2.3. Research Questions

- i. Are consumers in County Cork willing to pay the same price for agroforestry produce as for conventional produce?
- ii. Are consumers in County Cork willing to pay premium prices for agroforestry produce?
- iii. Does informing consumers in County Cork about agroforestry's ecosystem benefits influence their willingness to pay?
- iv. Which factors are influencing the agrarian adoption of AF in the Republic of Ireland?
- v. Would any of the identified factors impede AF labelling's ability to incentivise the adoption of AF in the Republic of Ireland?

3. Theoretical framework

3.1. Willingness to Pay

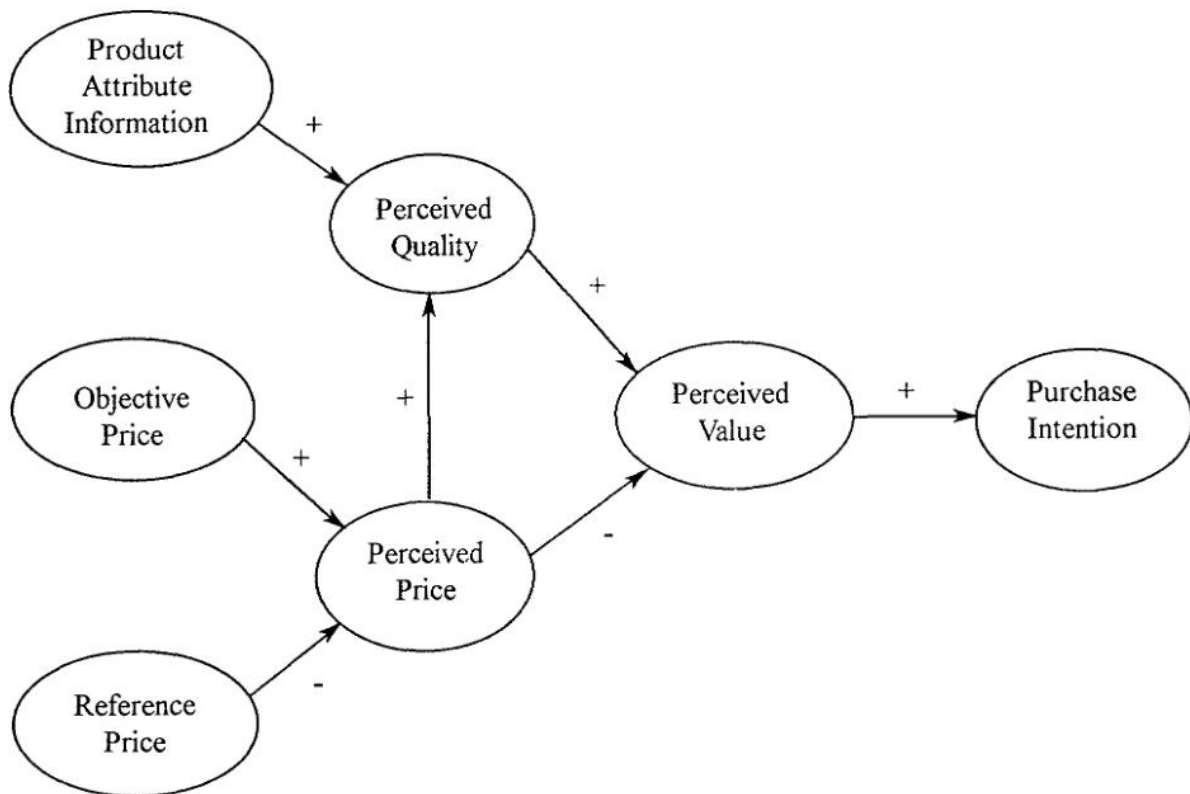
Price is a well-established factor determining purchase behaviour (Chang & Wildt, 1994; Lancaster, 1966; Le Gall-Ely, 2009; Zhang et al., 2018). The quantity of a product purchased by the public is typically understood to be inversely proportional to its price (Chang & Wildt, 1994; Le Gall-Ely, 2009). Thus, the price at which a product is marketed will largely determine its market share and entrepreneurial appeal. Willingness to pay (WTP) can be defined as “the maximum price a buyer accepts to pay for a given quantity of goods or services” (Le Gall-Ely, 2009).

According to Lancaster’s (1966) consumer theory, consumer behaviour is determined by the value a consumer assigns to a product. With that value dependent on that product’s attributes. Hence, purchasing decisions between goods which are substitutable, i.e. serve the same function, will be largely based on consumers’ subjective value of their different attributes (Lancaster, 1966). These theories operate under the assumption that consumers are rational agents who seek to maximise their acquired value through purchasing decisions (Uzawa, 1989). Hence, higher prices are conceptualised as a net loss in value and must be compensated for by other product attributes (Chang & Wildt, 1994). Therefore, consumers’ WTP will be largely determined by the value the consumer has ascribed to a product. These relationships are summarised in Figure 2. For this study, price is considered as one of the product’s attributes in accordance with Lancaster (1966), and as commonly found in studies regarding WTP (Bolduc et al., 2023).

Ecolabelling adds value to products by appealing to the value consumers assign to goods produced through systems adhering to a given environmental standard (Drexler et al., 2018). However, different standards result in specific product attributes which are in turn valued differently. Unlike organic products, which also directly appeal to consumers' health values, consumer demand for AFP largely stems from concerns for animal welfare and/or the environment (Cole et al., 2024; Millard, 2011). Therefore, consumers’ WTP for AFP may not be the same as for other eco-products. Studies examining consumers’ WTP for eco-products have identified several non-product-specific factors which influence consumers’ WTP. Namely, consumers’ socio-demographic characteristics (Bolduc et al., 2023; Otter & Langenberg, 2020; van Osch et al., 2017), their knowledge about production practices and their

associated ecosystem service functions (Bolduc et al., 2023; Chen & Liu, 2025; van Osch et al., 2017), their perceptions about agriculture and their value of nature (Otter & Langenberg, 2020). Considering the novelty of AF in an Irish context, consumers' knowledge of the dominant production system, the newly proposed system and their respective ecosystem service function is expected to be a significant determinant of their WTP for AFP.

Figure 2. *Extended Relationship between Price, Product Attribute Information, and Purchase Intention*



Note. From (Chang & Wildt, 1994)

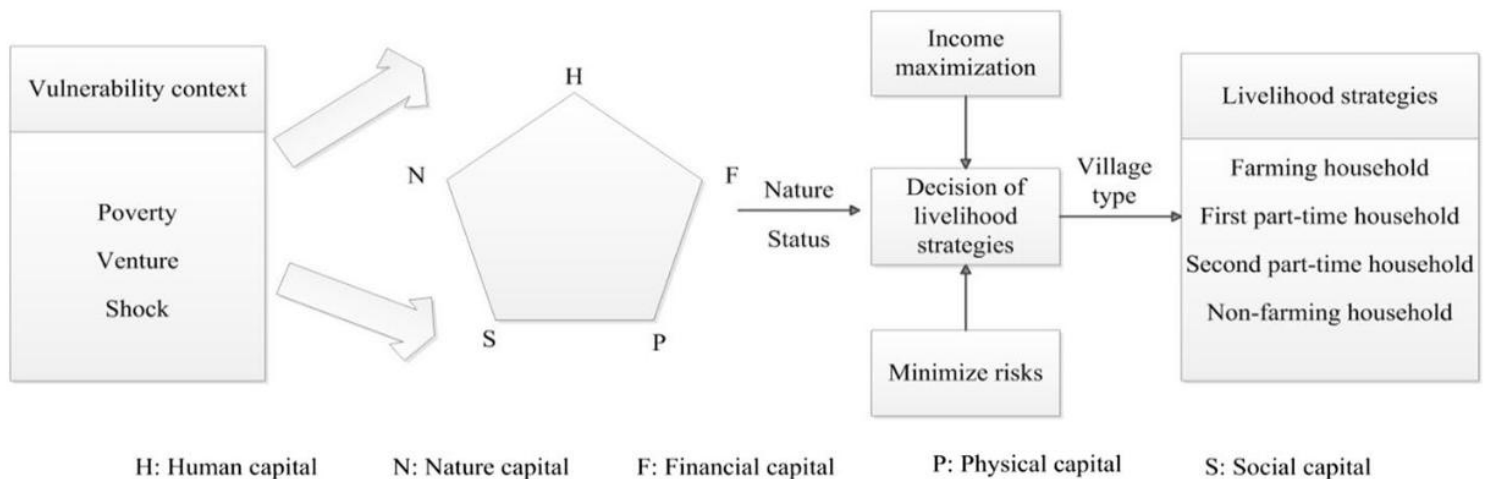
3.2. Profitability

Evidence from several studies suggests that profitability is farmers' primary concern when considering the adoption of AF. Thus, the creation of an AF ecolabel should significantly incentivise the adoption of AF if consumers are willing to pay price premiums for AFP. The following theories position the importance of price premiums in the decision-making process leading to the adoption of AF.

The agrarian adoption of AF can be conceptualised as a diversification of livelihood strategies. Livelihoods "comprise the capabilities, assets (stores, resources, claims and access) and

activities required for a means of living ...” (Chambers & Conway, 1992, p.6), while their associated strategies “indicate the scope and combination of activities and choices carried out by rural households to achieve their livelihood goals” (Xu et al., 2019). The agrarian adoption of AF may be considered as a diversification of livelihood strategies because it does not intend to fully replace any other strategy, but rather to add to the variety of strategies employed (Ellis, 2000). Livelihood decisions are commonly conceptualised through the use of livelihood frameworks, which position decision-making as responsive to the certain context within which they are made, as constrained by the availability of capital(s) and as goal-oriented (Nunan, 2015). Income maximisation is a dominant factor when considering changes to livelihood strategies, in particular through diversification (Israr et al., 2014; Rois-Díaz et al., 2018; Xu et al., 2019), as seen in the below livelihood framework.

Figure 3. *The sensitivity of rural households’ livelihood strategy to livelihood capital*



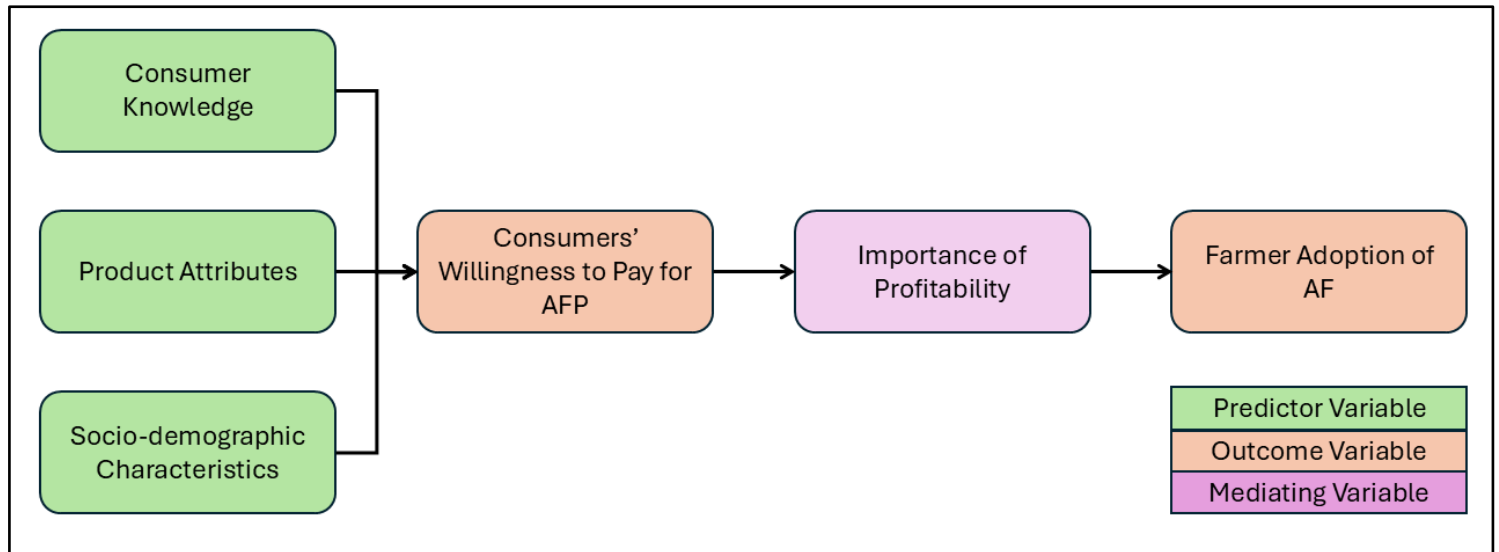
Note. From (Xu et al., 2019)

Furthermore, the adoption of AF may be conceptualised as the adoption of a technological innovation (Irwin et al., 2025). A technological innovation can be broadly defined as a novel element which impacts production in an uncertain way (Mercer, 2004). From the introduction, it is evident that in an Irish context AF adheres to this definition. At a conceptual level, four preconditions have been identified for the agrarian adoption of technological innovations. Namely, that the farmer is aware of why the innovation is worth considering, that there is a realistic possibility of trialling the innovation, that there is the scope for the full adoption of a trial and that the innovation meets farmers’ objectives (Pannell, 1999). In studies assessing the factors leading to the adoption of AF as a technological innovation, increased financial revenues were once again highlighted as a dominant objective (Amare & Darr, 2020; Mercer, 2004).

3.3. Conceptual Framework

In accordance with the theories discussed, it is the author's understanding that if profitability is the primary factor influencing the agrarian adoption of AF, then consumers' WTP for AFP should exert a dominant influence on farmers' decision to adopt. This process is depicted in Figure 4. as the conceptual framework which will be used throughout this study.

Figure 4. *Conceptual Framework*



4. Methodology

This study has used an explanatory sequential mixed-method design to address the two specific objectives described in section 2.2. A sequential study employs multiple stages of research consecutively (Creswell & Creswell, 2018). These stages have been referred to as ‘Stage I’ and ‘Stage II’ hereafter, and address specific objectives a. and b. respectively. Stage I has investigated Irish consumers’ WTP for AFP and its relationship to consumer knowledge and socio-demographic characteristics through survey-based, quantitative methods. Survey-based, quantitative methods were chosen, as no previous consumer study regarding AFP had been conducted in the Republic of Ireland. Therefore, there was a need to establish a sufficiently large dataset from which statistically significant inferences could be made. Additionally, quantitative methods are best suited to identify whether the proposed predictors would influence consumers’ WTP (Creswell & Creswell, 2018). In this case, WTP is referred to as an outcome variable, while consumer knowledge and socio-demographic characteristics are referred to as the predictor variables, as appropriate for survey method studies taking place outside of controlled settings (Creswell & Creswell, 2018).

Stage II will investigate which factors might impede AF labelling’s potential to incentivise the agrarian adoption of AF, by firstly exploring which factors are influencing the agrarian adoption of AF. The quantitative, survey-based methodology observed in Stage I will be replaced by an inductive qualitative approach in Stage II. Previous sections have already called to attention that several barriers are undermining agrarian tree planting in Ireland, and that the adoption of AF is a complex livelihood decision. Therefore, there is a need to develop a detailed understanding of how these issues might impede AF labelling’s ability to incentivise AF adoption. Given this complexity, a qualitative approach was deemed the most suitable method to uncover these nuances (Creswell & Creswell, 2018; Oranga & Matere, 2023). Together, these designs can be considered as constituting an explanatory, sequential mixed methodology, as they involve cross-disciplinary methods, will be conducted in stages, and the second stage will be used to expand upon the meaning and significance of the first (Creswell & Creswell, 2018).

4.1 Stage I

4.1.1. Study Site and Population

The population of interest is Irish consumers in line with the first specific objective of the study (Hossan et al., 2023). However, due to constraining factors, a case study approach will be used.

As such, the population of County Cork (Co. Cork) will serve as the target population for Stage I of this research (Hossan et al., 2023). The total population of Co. Cork is 584,156, 11.3% of the population of Ireland, as of the most recent census in 2022 (CSO, 2023). The demographic profile of both Ireland and Co. Cork can be seen in Tables 2. and 3., respectively. Since the initial stage of this research concerned itself with the investigation of consumer purchasing behaviour, the population considered was those aged 15 years and over. The resulting population is shown under each table.

Table 2. *Socio-Demographic Description of The Republic of Ireland*

Socio-Demographic Variable	%
Female : Male	51 : 49
15-24 : 25-34 : 35-44 : 45-54 : 55-64 : 65+	15.6 : 15.2 : 19.2 : 17.2 : 14 : 18.8
Employed : Retired : Student : Unemployed : Other	56.1 : 15.9 : 11.1 : 5.1 : 11.8

Note. From (CSO, 2023).

Note. Population 15+ : 4,136,852.

Table 3. *Socio- Demographic Description of Co. Cork (inclusive of Cork City and Suburbs)*

Socio-Demographic Variable	%
Female : Male	50.9 : 49.1
15-24 : 25-34 : 35-44 : 45-54 : 55-64 : 65+	15.6 : 14.8 : 19 : 17.3 : 14.3 : 19
Employed : Retired : Student : Unemployed : Other	56.2 : 15.7 : 11.6 : 4.1 : 12.4

Note. From (CSO, 2023).

Note. Population 15+: 470,489.

Due to time and resource restrictions it was not possible to sample from the whole of Co. Cork. Instead, sampling took place within Cork City and its surrounding suburbs, labelled as “red zone” by the national transport agency (TFI) and seen in Figure 5. A digitized version is presented in Figure 6 with the red zone’s furthest vertices labelled for reference – beyond which the “green zone” commences as seen in Figure 5.

In order to estimate the population of the red zone, census data was aggregated through the use of electoral divisions (EDs). EDs are the smallest legally defined geographical unit in Ireland and, as such, presented the finest scale with which to aggregate the census data (Tailte Éireann, 2026b). EDs which were either contained within or intersected by the red zone were included

in the analysis. This produced a selection of 108 EDs (refer to Annex B), which can be seen in Figure 7., and whose demographic spread is visible in Table 4.

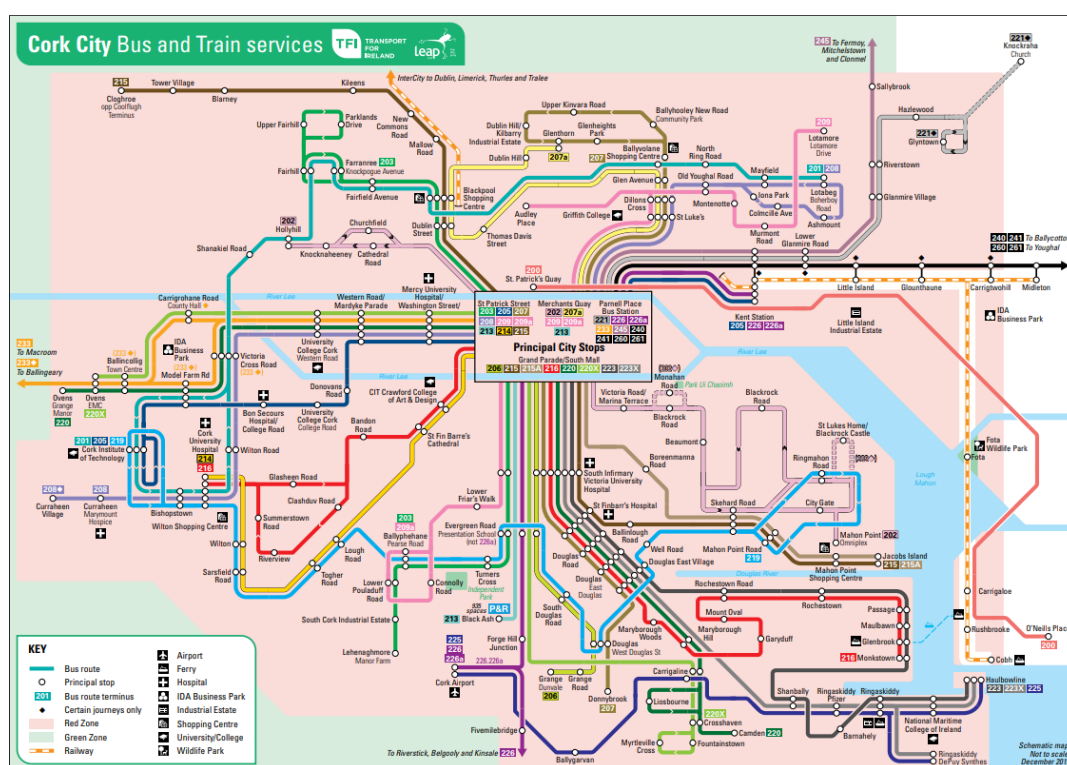
Table 4. Socio-Demographic Description of Cork City and Suburbs (Red Zone)

Socio-Demographic Variable	%
Female : Male	51.3 : 48.7
15-24 : 25-34 : 35-44 : 45-54 : 55-64 : 65+	16.5 : 17.3 : 19.1 : 16 : 13.6 : 17.5
Employed : Retired : Student : Unemployed : Other	56.2 : 14.8 : 12.3 : 4.5 : 12.2

Note. From (CSO, 2023).

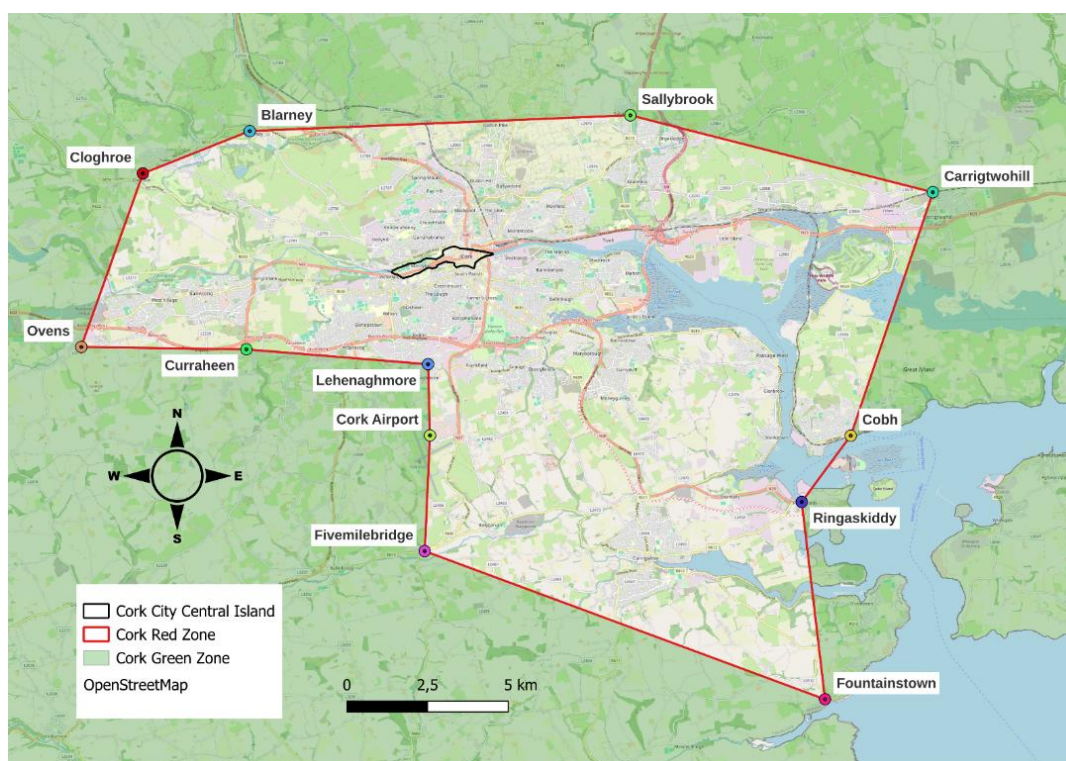
Note. Population 15+: 241,478.

Figure 5. Cork City Bus and Train Services



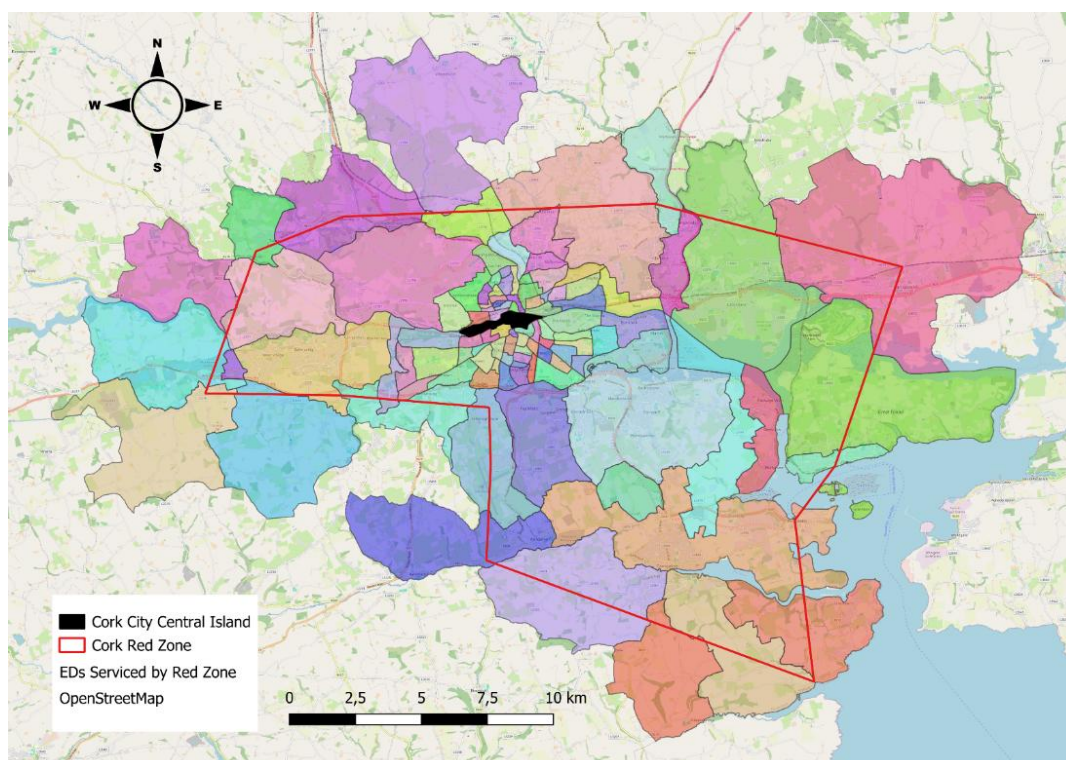
Note. From (TFI, 2026).

Figure 6. *Red zone digitised and represented on OpenStreetMap*



Note. Author's own work in conjunction with data derived from (Tailte Éireann, 2026a)

Figure 7. *Electoral Divisions Serviced by Red Zone*



Note. Author's own work in conjunction with data derived from (Tailte Éireann, 2026b)

4.1.2. Data Collection

A survey was chosen as the data collection instrument because it was not possible to analyse customers' revealed preferences regarding AFP (Breidert et al., 2006). The survey was conducted in-person, outside small, food-related shops. Shops were considered small if they mainly served a single type of product or service. It was decided that conducting the survey outside smaller shops, as opposed to supermarkets, would increase the percentage of willing participants. Food-related shops were exclusively chosen in order to increase the chances that members of the public would be interested in participating in the survey. A list of possible shops from which the survey could be conducted was created using Overpass Turbo (Raifer, 2026). The red zone, as shown in the previous section, was used as the boundary for the selection of shops, and a list of tags used to identify suitable shops can be seen in Table 5.

Table 5. *List of Shop Tags Derived from the “Food” and “Beverages” Categories*

Included	Returned Empty	N/A
bakery	cheese	alcohol
butcher	confectionary	beverages
chocolate	dairy	brewing_supplies
coffee	farm	convenience
deli	ice_cream	water
food	nuts	wine
frozen_food	pasta	
greengrocer	tortilla	
health food		
pastry		
seafood		
spices		
tea		

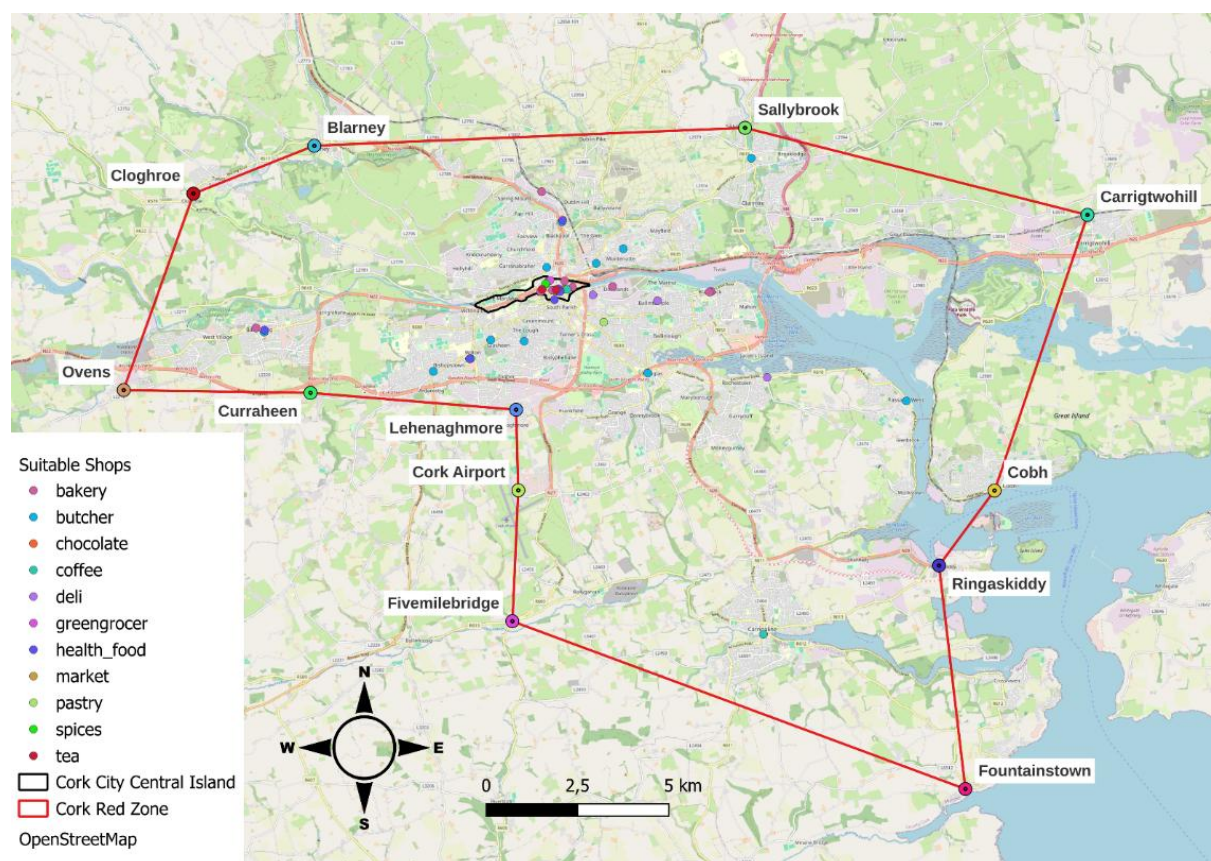
Note. Author's own work in conjunction with data derived from (OpenStreetMap Wiki, 2025).

Note. Tags highlighted in red did not provide any suitable shops after verification was completed.

A total of 96 shops were collected using the above tags. Of these 96, 28 were located in one market area, known as the “English Market”. These locations were summarised into one point, after which a total of 69 shops remained. Each shop was then verified via Google Maps. After mislabelled, out-of-date, and duplicate shops were removed, 43 shops were left. Due to the

abundance of shops being located within The English Market, it was entered into the final list of shops four times, one time for each entrance into the market. In the figure below, it remains represented by a single point feature. In total, 46 unique locations at which the survey could be conducted were collected. Their geographic distribution throughout the red zone is visible in Figure 8.

Figure 8. *Shops Suitable for Data Collection*



Note. Author's own work

Each shop was assigned a number and was chosen randomly using RANDOM.ORG (Haahr, 2026). Each day of surveying was completed at a single shop, randomly chosen that morning. Once chosen, shops were removed from the pool of possible shops to visit for future surveys. Surveying occurred outside the shop with the owner's permission. Adjustments to the exact location of surveying occurred as needed. A systematic approach, involving asking every n th pedestrian to participate in the survey, was employed. If encountered again, previous participants were not given another opportunity to complete the survey. Respectively, these form a purposeful, random and systematic sampling strategy with replacement (Hossan et al., 2023).

4.1.2.1. Questionnaire Design

Due to the chosen sampling strategy, a brief and concise questionnaire was considered paramount in order to ensure efficient recruitment of participants. As such, the questionnaire was one page long and was complemented by an A3 poster for participants to consider during its completion (refer to Annex A). Before completion of the questionnaire, participants were given a brief introduction to the research, the concept of AF and verbal confirmation of their willingness to participate in the study was obtained. Due to the length of the questionnaire, it was not possible to include an exhaustive list of socio-demographic variables. Those chosen, age, gender and occupation, were specifically selected to align with the socio-demographic information available on the populations of Co. Cork and Ireland. ‘Preferred shop’ was included as a possible predictor variable, as expert sources indicated that if significant, its practical implications would be considerable. The influence of consumers’ knowledge of the respective farming practices and their associated ecosystem service functions was investigated by pre-informing approximately half of the participants (99 of 207) about these aspects. These participants were given a brief description of some of the **key ecosystem services provided by AF. This description included trees' capacity to capture carbon, their role in water management and in the reduction of air pollutants, the role they play in strengthening biodiversity and the increased quality of life they provide livestock (shade, wind/rain-break, more nutrients).**

Following this, participants were asked to complete a **choice experiment**, where their WTP was investigated. Choice experiments are common instruments used in market studies (van Osch et al., 2017), and are considered more robust than directly asking consumers for their WTP (Bolduc et al., 2023; Breidert et al., 2006). Choice experiments are rooted in Lancaster’s (1966) consumer theory, and can be used to investigate how consumers’ WTP for a product changes as you change that product’s attributes (van Osch et al., 2017). The two attributes which were altered in order to determine consumers’ WTP were production system, i.e. AF or conventional, and price. Whole milk was chosen as the product to include in the choice experiment after considering the different potential customer bases of the shops suitable for surveying, possible dietary limitations of participants and the popularity of milk within Ireland (National Milk Agency, 2026). Consumers’ WTP for AF whole milk was examined by asking participants to choose between AF whole milk and conventional whole milk when their price was the same, and then again, when the AF whole milk was 30% more expensive. Ideally, a larger series of paired tests would have been conducted with a larger range of prices, using smaller increments (Le Gall-Ely, 2009). However, this was not possible given the available time and resources.

The first price increment (no price difference) was chosen to establish a baseline for consumers' WTP for AFP. The second price increment (AFP = 30% more expensive) was chosen after considering the lowest price premium available for organic products in the Republic of Ireland, as the literature suggested that AF would not add more value than organic (Cole et al., 2024; Millard, 2011). A price premium of 30% was calculated by comparing the prices of supermarket brand milk. This was repeated with supermarket beef to ensure the consistency of the premium calculated. The calculations determined that, on average, organic whole milk and beef are 28.45% and 29.09% more expensive than their conventional counterparts, respectively.

The questionnaire concluded by thanking participants for their time and providing a further opportunity for any questions or comments of theirs. Relevant comments were recorded as a short open question in each questionnaire. A full list of their recorded comments can be seen in Annex C.

4.1.4. Data Analysis

Table 6. presents an overview of the questions and accompanying methods which have been used to determine the significance of the relationships between predictor and outcome variables. The binomial test was used to determine with 95% certainty what percentage of the target population can be expected to choose AF milk when its price matches that of conventional milk. Similarly, the binomial test was used to determine with 95% certainty what percentage of the target population can be expected to choose AF milk when it costs 30% more than conventional milk.

Firth's Bias-Reduced Logistic Regression was used to determine the relationship between predictor and outcome variables, and the significance of their relationship. A logistic regression was used because the outcome variables are binary. Firth's Bias-Reduced Logistic Regression was used specifically because the collected data has multiple sparse categories (e.g. unemployed) and incidences of complete separation within the data matrices (Heinze G, Ploner M, Jiricka L, Steiner G, 2025; Heinze & Schemper, 2002). Together, the survey, questionnaire and quantitative analysis aim to address specific objective a. by answering research questions i., ii. and iii.

Table 6. *Questions, Relevant Variables and Associated Methods of Analysis*

Question	Predictor Variable	Outcome Variable	Test
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What percentage of consumers in Co. Cork would choose to purchase AFP over conventional produce when their price is the same?	N/A	Likelihood to purchase	Binomial Test (one-sided)
Does informing participants about the benefits of AF affect the likelihood that they would choose to purchase AFP rather than conventional produce when their price is the same?	Consumer knowledge	Likelihood to purchase	Firth's Bias-Reduced Logistic Regression
Is the likelihood that participants would choose to purchase AFP rather than conventional produce when their price is the same correlated with their socio-demographic characteristics?	Socio-demographic characteristics	Likelihood to purchase	Firth's Bias-Reduced Logistic Regression
What percentage of consumers in Co. Cork would choose to purchase AFP over conventional produce when the AFP costs 30% more?	N/A	Willingness to pay premium prices	Binomial Test (two-sided)
Does informing participants about the benefits of AF affect the likelihood that they would choose to purchase AFP rather than conventional produce when the AFP costs 30% more?	Consumer knowledge	Willingness to pay premium prices	Firth's Bias-Reduced Logistic Regression
Is the likelihood that participants would choose to purchase AFP rather than conventional produce when the AFP costs 30% more correlated with their socio-demographic characteristics?	Socio-demographic characteristics	Willingness to pay premium prices	Firth's Bias-Reduced Logistic Regression

4.2. Stage II

4.2.1. Scope

The population of interest is Irish farmers in line with the second specific objective of the study. Several constraining factors shaped the methodological approach carried out in this section of the study. Namely, and most prominently, a limited timeframe to collect and complete the analysis, the lack of available team members to collect and process the data and a lack of previous contact with active farmers. Due to these constraining factors, it was not possible to conduct sufficient interviews exclusively with farmers, nor to create an exhaustive map of the factors influencing farmers' adoption of AF. Instead, through a limited number of interviews with key informants, this stage of the research aims to identify the factors which are most likely to have an effect on AF labelling's potential to incentivise the agrarian adoption of AF.

4.2.2. Data Collection

Considering the scope, the data collection strategy employed in this stage of the research has been adapted from the approaches and principles characteristic of the rapid evaluation and assessment methods (REAM), outlined by McNall & Foster-Fishman (2007). Namely, a limited time frame, the use of key informants, an informal, semi-structured interview approach and an ongoing adaptation of the data collection instrument.

The use of key informants has been accepted as a legitimate strategy with which to conduct community-based research. However, when doing so, special attention is required to avoid an overly narrow interpretation of the issue or question (McKenna & Main, 2013). In light of this, potential key informants were classified based on their primary professional role as either agricultural, governmental, supply chain or academic, with the intention of interviewing one of each. Key informants were purposefully found through an online review of relevant Irish organisations and amongst the author and supervisor's personal networks. Informants were considered relevant if they were primarily involved in the Irish agricultural sector. Informants were contacted through email, with the use of a follow-up communication where necessary. Of the twenty-four individuals/organisations which were contacted, five were available and willing to participate in an interview.

The development of the interview instrument was guided by an emergent and adaptive philosophy (Creswell & Creswell, 2018; McNall & Foster-Fishman, 2007). Questions were largely open-ended, and informants were encouraged to discuss unforeseen yet relevant topics.

Novel elements discussed in earlier interviews were considered as potential questions or discussion points for the following interviews. **Given enough time, this would have been carried out until theoretical saturation was reached** (McNall & Foster-Fishman, 2007). It was also necessary to alter the interview instrument in response to the informant's classification as one of the four previously mentioned categories. Alterations of this manner were guided by the relevant specific objective and research questions. Therefore, the interview instrument changed and evolved throughout the course of the data collection period, as suitable for qualitative research following an inductive philosophy, and typical of REAM (McNall & Foster-Fishman, 2007; Miles et al., 2014). A full list of the questions asked across the interviews, not including probing questions, and to which category of informant they were asked, is available in Annex D. Elements from questions which could reveal the informant's identity have been edited.

The first iteration of the interview instrument was developed under the advice of an expert informant and further refined through its limited distribution with a random selection of farmers at an agricultural convention. Responses received at the convention have not been included for analysis. The following interviews were held over the phone or through video call, depending on the informant's preference. Interview lengths ranged from 30 to 60 minutes. Interviews began with a description of the research objectives and the researcher's background, with an opportunity for questions from the informants. Informants were guaranteed that their identity would not be disclosed at any point throughout the study or within any subsequent publications. Interviews only continued beyond this point if verbal consent was given by the informant for the use of the interview material in this study.

4.2.2. Data Analysis

Due to the data collection method, full transcripts of interviews were not created. Instead, detailed notes were taken during the interview and then processed to create case summaries, which acted as the primary material for analysis. For this study, cases are defined as "individual accounts" (Ayres et al., 2003) and have been summarised using descriptive matrices (Miles & Huberman, 1984). Processing of interview notes into case summaries was carried out in order to formalise and recontextualise the collected data as needed for analysis (Miles et al., 2014). Each case summary is visible in Annex E. The use of interview notes and case summaries as the primary material for analysis, rather than verbatim transcripts, is considered a suitable data analysis method for research carried out under constraining circumstances (McNall & Foster-Fishman, 2007; Neal et al., 2015; Tessier, 2012; Vindrola-Padros & Johnson, 2020).

Case summaries were analysed through an iterative process of coding. Initially, first-order descriptive coding was carried out by hand for each case. During this stage of coding, codes were identified inductively as they emerged from the case summaries. First-order coding was conducted several times for all the cases in order to refine the codebook and ensure conceptual consistency within and between summaries. First-order codes were then used to identify themes through a second cycle coding process referred to as pattern coding by Miles et al. (2014). Themes were determined through their association with the concurrent specific objective of the study and the embedded research questions, referred to as foci by Neal et al. (2015). Using direct quotes and supporting evidence from the case summaries, the identified themes were used to develop cross-case narrative descriptions of the factors influencing farmers' adoption of AF. Narrative descriptions can be used as a means to synthesise the various data forms across informants into coherent descriptions addressing the research issue (Miles et al., 2014). Together, the analysis of case summaries through coding and the synthesis of narrative descriptions aims to address specific objective b. by answering research questions iv. and v.

5. Results

5.1. Stage I

Of the questionnaires carried out, six were not included in the study. Two of the six participants reported not drinking milk; they were excluded on the basis that their inclusion would not contribute to answering the research questions. The remaining four questionnaires necessitated exclusion on the basis that the gender identity which was reported was not reported a sufficient number of times in the total sample to conduct statistically significant analysis with. As such, the results of the statistical analysis to follow only pertain to individuals identifying as female or male.

5.1.1 Descriptive statistics

Table 7. shows the demographic spread of the surveyed population, including preferred shop and pre-informed as additional predictor variables.

Table 7. *Descriptive statistics of Research Sample*

Socio-Demographic Variable	%
Female : Male : Other	49.8 : 50.2
15-24 : 25-34 : 35-44 : 45-54 : 55-64 : 65+	25.1 : 21.2 : 13.5 : 9.7 : 12.1 : 18.4
Employed : Retired : Student : Unemployed	50.7 : 20.8 : 25.6 : 2.9
Additional Predictor Variables	%
Aldi : Dunnes : Lidl : Supervalu : Tesco : Other	19.3 : 30 : 19.8 : 5.8 : 7.3 : 17.9
Pre-informed about AF benefits No : Yes	52.2 : 47.8

Note. N = 207.

The recorded responses to the outcome variables Q.1, representing participants' WTP with no price difference, and Q.2, representing their WTP a premium price for AFP, can be seen in Table 8. Respondents who chose A indicated that they would not choose to purchase AF milk when the price was the same as conventional milk. While respondents who chose C indicated that they would not choose to purchase AF milk when there was a 30% price premium.

Table 8. *Dependent variables*

Q.1 (No difference in price)	Responses
A (No)	12 (5.8%)

B (Yes)	195 (94.2%)
Q.2 (Premium price)	Responses
C (No)	91 (44%)
D (Yes)	116 (56%)

Table 9. shows the count and percentages of respondents who chose each combination of options. The figures in bold refer to the total sample; i.e. 12 (5.8%) of 207 participants chose ‘A’, as in the table above. While the indented figures show the percentage of respondents who chose ‘C’ or ‘D’ relative to their parent categories, ‘A’ and ‘B’. That is to say that of the participants who chose ‘A’, all of them also choose ‘C’. Which is to be expected, as it indicates that all the participants who would not choose to purchase AF milk when the price was the same as conventional milk would also not choose to purchase AF milk when it was 30% more expensive than conventional milk.

Table 9. *Ratio of Dependent Variables*

Q.1:Q.2 Ratio	Count of Responses
A	12 (5.8%)
- C	- 12 (100%)
B	199 (94.2%)
- C	- 79 (40.5%)
- D	- 116 (59.5%)

5.1.2 Inferential statistics

5.1.2.1. Binomial Test

Table 10. shows the output of a binomial test run for each of the outcome variables. For the binomial test, a success was considered when a respondent chose to purchase AF milk.

Table 10. *Binomial tests*

Outcome Variable	No. of successes	Prob. of Success	Confidence Interval	P-value
Q.1	195 of 207	0.942029	0.9077654 - 1.0000000	< 2.2e-16

Q.2	116 of 207	0.5603865	0.4899031 - 0.6291152	0.09506
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In the case of Q.1, a one-tailed binomial test was conducted because it was assumed before beginning the data collection that more than 50% of respondents would choose to purchase AF milk when the price was the same as conventional milk. It is already visible in the descriptive statistics that this appears to be true, and is confirmed by the very low p-value. On the other hand, a two-tailed binomial test was conducted for Q.2. In this case, the null hypothesis was that the percentage of successes in the population does not significantly differ from 50%. The corresponding p-value was not significant at a 0.05 level of significance, indicating that the null hypothesis could not be rejected.

5.1.2.2. Regression Analysis – Q.1

In Table 11. a summary of the logistic regression conducted analysing the relationship between the 5 predictor variables and the first outcome variable, Q.1, is visible.

Table 11. *Summary output of Firth's Bias-Reduced Logistic Regression - Q.1*

Predictor	Coef.	SE	Lower 0.95	Upper 0.95	P-value
(Intercept)	2.991327	1.165336	0.502656	5.924243	0.017888
Age: 25-34	-0.62919	1.08513	-3.02743	2.086476	0.618749
Age: 35-44	-1.4129	0.961207	-3.69305	0.591228	0.166882
Age: 45-54	-0.18996	1.583992	-3.35598	4.948287	0.917045
Age : 55-64	-0.70989	1.517453	-4.01566	4.51189	0.712831
Age: 65+	-3.60501	1.876234	-11.3689	0.526865	0.091796
Gender: male	-0.61707	0.596398	-2.13409	0.705253	0.370998
Occupation: retired	2.066183	1.687189	-1.70559	9.688719	0.329294
Occupation: student	-1.57731	0.936818	-3.81086	0.457441	0.128046
Occupation: unemployed	-1.77381	1.447032	-4.73559	3.340897	0.378682
Shop: Dunnes Stores	1.048811	0.982817	-1.56281	3.407979	0.404217
Shop: Lidl	0.560751	0.988357	-2.09787	2.936021	0.657811
Shop: other	0.573393	1.372765	-2.32536	5.605348	0.719493
Shop: SuperValu	-1.0514	1.040242	-3.70953	1.284603	0.374281
Shop: Tesco	0.126746	0.950233	-2.40556	2.322747	0.915328

<i>Pre-informed: yes</i>	2.907321	0.973439	0.927452	7.673431	0.001396**
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Note. Method 2 – Profile penalised log-likelihood was used for each predictor.

Likelihood ratio test=24.52764 on 15 df, p=0.056658, n=207

Wald test = 62.66171 on 15 df, p = 8.74363e-08

As can be seen in the Likelihood Ratio Test accompanying Table 11. the p-value for the overall model is greater than 0.05. This suggests that the model as a whole does not predict consumers' likelihood to purchase AF milk with statistical significance. However, the predictor "Pre-informed: yes" was found to be statistically significant with a 0.01 level of significance. Its corresponding coefficient of 2.9 suggests that **pre-informing participants about AF and its ecosystem service benefits did increase their likelihood of choosing AF milk, controlling for the effects of age, gender, occupation and preferred shop.**

This was corroborated using a Fisher Exact Test, which suggests that, independent of the other predictor variables, **pre-informing participants and participants' likelihood of choosing AF milk are significantly associated.** Furthermore, the descriptive statistics demonstrate that the only participants who did not choose AF milk when the prices were the same were participants who were also not pre-informed about the benefits of AF. Refer to Tables 12. and 13. respectively.

Table 12. *Fisher's Exact Test*

Odds Ratio	Confidence interval	P-value
Infinite	2.754234 : Infinite	0.0003977

Note. The odds ratio and confidence interval approach infinity due to complete separation within the data, as visible in Table 13.

Table 13. *Pivot table Showing Ratio Between Pre-informed and Q.1*

Pre-informed : Q.1 Ratio	Count of Responses
No	108 (52.2%)
- A	- 12 (11.1%)
- B	- 96 (88.9%)
Yes	99 (47.8%)
- B	- 99 (100%)

Note. Table 13 demonstrates that of the 99 (99 of 207) participants who were pre-informed, 100% of them chose to purchase AF milk when there was not price difference.

5.1.2.3. Regression Analysis – Q.2

In Table 14., a summary of the logistic regression conducted analysing the relationship between the 5 predictor variables and the second outcome variable, Q.2, is visible.

Table 14. *Summary output of Firth's Bias-Reduced Logistic Regression - Q.2*

Predictor	Coef.	SE	Lower 0.95	Upper 0.95	P-value
(Intercept)	-1.04906	0.674352	-2.45281	0.25791	0.116658
Age: 25-34	1.424825	0.630891	0.215762	2.753574	0.020477*
Age: 35-44	0.381236	0.660167	-0.92166	1.727119	0.566216
Age: 45-54	1.681235	0.788632	0.172087	3.340301	0.028517*
Age: 55-64	0.771533	0.746074	-0.68238	2.304107	0.300897
Age: 65+	1.655932	1.050324	-0.37355	3.880434	0.111018
Gender: male	-0.4219	0.310017	-1.04244	0.188061	0.175654
Occupation: retired	-1.25782	0.841589	-3.11896	0.334936	0.12459
Occupation: student	-0.02195	0.592273	-1.17583	1.214583	0.97082
Occupation: unemployed	-0.32173	0.901325	-2.09971	1.683161	0.732933
Shop: Dunnes Stores	0.628063	0.447879	-0.24871	1.53114	0.161137
Shop: Lidl	0.517491	0.484652	-0.43701	1.490064	0.28837
Shop: other	1.158507	0.725443	-0.25781	2.678946	0.10946
Shop: SuperValu	0.712647	0.635836	-0.54355	2.003711	0.265805
Shop: Tesco	0.71742	0.520097	-0.30411	1.763859	0.169239
Pre-informed: yes	0.739246	0.309397	0.13322	1.358779	0.016708*

Note. Method 2 – Profile penalised log-likelihood was used for each predictor.

Likelihood ratio test=29.54797 on 15 df, p=0.01366, n=207

Wald test = 27.02606 on 15 df, p = 0.02852475

In this case, the overall model's ability to predict consumers' willingness to pay premium prices for AF milk was found to be significant at a 0.05 level of significance via the accompanying Likelihood Ratio Test. As with Q.1, pre-informing consumers was found to be a significant predictor of participants' WTP for premium prices for AF milk. Although the significance level was not as high (0.016708 as opposed to 0.001396). Additionally, age was found to be a significant predictor of participants' WTP premium prices for AF milk, with the age categories

‘25-34’ and ‘45- 54’ being associated with a higher likelihood to pay. Unlike for Q.1, pre-informing participants did not result in a unanimous WTP premium price for AF milk, as visible in the table below.

Table 15. *Pivot table Showing Ratio Between Pre-informed and Q.2*

Pre-informed : Q.2 Ratio	Count of Responses
No	108 (52.2%)
- C	- 58 (53.7%)
- D	- 50 (46.3%)
Yes	99 (47.8%)
- C	- 33 (33.3%)
- D	- 66 (66.7%)

Note. Table 15. demonstrates that of the 99 (99 of 207) participants who were pre-informed, 66.7% of them chose to purchase the AF milk with a price premium

Using a bootstrap model in RStudio, it was calculated that pre-informing participants increased their probability of choosing to pay premium prices for AF milk by 16.9 percentage points, within a 95% confidence interval of 0.03524874 - 0.31047427.

5.2. Stage II

A full list of informants' IDs, category, interview medium and date of interview is available in the table below.

Table 16. *Description of Data Collection Process*

Informant ID	Assigned Category	Interview Medium	Date of Interview
01	Agricultural (dry stock)	Phone call	06.07.26
02	Agricultural (dairy)	Phone call	08.07.26
03	Government	Phone call	21.07.26
04	Academic	Video call	29.07.26
05	Supply-Chain	Video call	29.07.26

In Table 17. a list of all the codes, their associated definitions and the themes which they were used to identify is available. The use of the word ‘trees’ as part of a code’s definition is inclusive of trees used to establish AF. SCA refers to supply chain actors, i.e. anyone who handles the

farmers' products in order for those products to reach consumers. Codes were identified inductively as they emerged during the coding process, as described in the methodology.

Table 17. *Codex*

Code	Abbr.	Definition	Theme
Tree Suitability	TS	About the suitability of trees in the farm system	The Farm Tree
Valuing Trees	VT	Indicators of how farmers value trees	The Farm Tree
Economic Question	EQ	About the impact farm trees have on farm profitability	The Farm Tree
Knowledge Gap	KG	Indicators of gaps in knowledge which are undermining the adoption of AF	The Farm Tree
Farm Culture	FC	About common attitudes amongst conventional farmers	The Farm Enterprise
Sustainability Interest	SI	About farmers' observed interest in sustainable practices	The Farm Enterprise
More than Money	MTM	Non-financial factors influencing farmer decision-making	The Farm Enterprise
Channel Dynamics	CD	About interactions between farmers and SCA	The Supply Chain
Support for Sustainable Practices - No	SSP-N	Indications of a lack of support from SCA towards the adoption of sustainable practices by farmers	The Supply Chain
Support for Sustainable Practices - Yes	SSP-Y	Indications of support from SCA towards the adoption of sustainable practices by farmers	The Supply Chain
Willingness to Pay	WTP	Pertaining to Stage I of the research and consumer's WTP	The Market
Labelling	L	Aspects relevant to the labelling of AFP	The Market
Label Barriers	LB	Aspects currently inhibiting the labelling of AFP	The Market

Sales Channel	SC	Descriptions of channels farmers use to sell their products	
Third-Party Support	TPS	Involvement of actors other than farmers or SCA	

Note. Codes highlighted in red were too uncommon to be used further in the data analysis.

5.2.1 Narrative Descriptions

Narrative descriptions have been formed through the use of first-order codes and themes, direct quotations from the informants and the case summaries available in Annex E. Narrative descriptions can be used as a means to synthesise the various data forms across informants into coherent descriptions addressing the research issue (Miles et al., 2014). In this case, the following narrative descriptions have been used to explore which factors are influencing farmers' adoption of AF. In doing so, they work towards addressing the second specific objective b. and answering research questions iv. and v., as described in the methodology.

5.2.1.1 The Farm Tree

The theme 'The Farm Tree' explores informants' perceptions of the direct impact(s) of having trees on farms and whether their adoption within the farm system is feasible.

Tree Suitability

The suitability of trees on farms, and by association AF, was a subject of much debate, with informants offering contrasting views on the matter. Both of the agricultural informants interviewed indicated that they did plant trees, but only along their farm's boundaries or within unproductive parcels. In particular, the agricultural informant who partook in dairying felt that AF was not a suitable land use for their farm and dairy farms in general *"It's an unsuitable land use for dairy"* (02). It was a common, if challenged conception that adopting AF would increase the management requirements of the farm, straining to capacity the farm system *"it's not an efficient land use"* (02), while simultaneously decreasing productive space on the farm *"taking land out of production is too serious, it's not practical, you can't be asking farmers to do that"* (02). This sentiment was mirrored by the supply chain informant who struggled to envision how AF could be suitable for high-intensity farming systems such as dairying. *"... I'm trying to imagine what it would look like and when I think of the intensity of dairying, the way in which they interact, I don't really know what they would look like"* (05)

On the other hand, multiple informants recognised that the suitability of AF was largely going to be determined by the farm type, and that in less intensive systems or in areas with marginal soils AF may be suitable “... *I’d imagine AF is a practice more so geared for those guys in the west*” (05), “*I’d imagine AF would pertain more to sucklers or maybe sheep, it just seems a bit more workable...*” (05), “*it might not be a net gain for dairy farms, but for a sheep farm maybe*” (03). The government informant explained that AF suitability would be largely determined by the farm’s productive objectives “*dairy farmers are obsessed with grass production*” (03) and the livestock specific management requirements “*the size of the cow matters, if you have large cows lumbering about you’d need robust trees*” (03). They felt that although the multitude of interacting elements complexifies the adoption of AF, it could in most cases be successfully adopted and serve as a benefit to the farm system “*it is a complicated decision that they are making*”, “*we want trees to be seen as an integral plant of the farm*”. Other informants were less optimistic “*someone ran with it and no one contradicted them*” (02) and suggested that initiatives which aimed to enhance farms, landscapes and biodiversity through the provision of ecosystem services should take a holistic approach rather than searching for a single solution “*you need a mix of ecosystems*” (02). They felt that this could give farmers the farm-specific flexibility required in order to support farm-centric tree planting.

Valuing Trees

Despite the unanswered question regarding trees' suitability as an integrated farm system feature, both agricultural informants indicated that they did value the trees on their farms and intended to maintain the amount of trees already present, if not plant more. The agricultural informant partaking in dry stocking observed that they felt the trees supported the welfare of their livestock “*I often see my cattle reaching over the fence, browsing on the willow, it’s clear they like the stuff*” (01), and the welfare of the land as a whole “*it (trees) provide for my farm but also the landscape at large*” (01). The academic informant confirmed that many of the farmers they had worked with over the years expressed similar feelings, indicating that those who had decided to embrace tree planting were often doing so for the auxiliary services they provided, such as decreased inputs and extended grazing periods “*farmers who do plant see the benefits (of planting), they aren’t only considering maximum production, they value the other benefits enough*” (04). Others expressed that, be it through direct or indirect means, economic gain was not the primary factor leading to their valuation of trees, but rather the valuing of nature as an end in itself:

“there used to be a spot up by the river which we left mostly alone, it wasn’t worth farming. It was always full of life, you’d turn a rock over and there’d be all kinds of bugs coming out. Long tufts of grass supporting the birds and the bees, plus the cows liked eating the native vegetation. I wanted that for the rest of my farm” (01).

Other informants highlighted that they planted trees despite the economic loss they felt they were undertaking by doing so *“you’re losing money with every tree planted” (02)*. In their case, they did so *“because it’s (planting trees) the right thing to do”* and they felt they were making up for the mistakes of past generations *“error of his ways” (02)*. Although tree planting was recognised as a bridge between conventional farmland and biodiverse ecosystems, questions regarding AF effectiveness as a habitat remained *“it’s not a natural environment” (02)*,

Economic Question

Thus far, the question of tree suitability and the dominant valuation of trees has occurred within a context presuming that the adoption of trees would lead to a loss of direct profitability, as indicated several times throughout the previous narratives. Although this possibility was considered a reality *“if you equate profitability with grass production that yes (it may be less profitable)...” (03)*, it was also challenged *“... but there are a multitude of payments and cost-reducing effects which can make up for that” (03)*. Multiple informants suggested that whether dry stocking or dairying, the profitability of the farm would not necessarily be decreased:

“If they are talking about the reduction in pasture yield, there is certainly a reduction, but then it also depends on the site, in X they found they can extend the grazing season for up to 17 weeks, because the AF dries out the soil during the shoulders of the grazing season, so they can get the animals out earlier in Spring and keep them out longer in Autumn. So if you design the AF so that you are planting somewhere wetter, so that the site would actually benefit from the AF, potentially you could actually increase your profitability” (04).

Furthermore, informants highlighted that the adoption of AF is grant-aided, with payments to cover the costs of establishment, maintenance and short-term reductions in profitability. Others still discussed the potential for the adoption of AF to act as an income diversification strategy. Be it through the diversification of products, through the availing of carbon schemes, or through potential price premiums which could become available for products labelled as AFP, *“the financial benefit always matters” (01).*

Knowledge Gap

Through the interviews, knowledge gaps were identified in several key areas undermining the adoption of AF. A common theme across the interviews and among all informants was an uncertainty regarding the economic impacts of AF adoption:

“it’s certainly something that we need more case studies of, owners who have set up agroforestry, and then calculate all the costs and revenues that they are getting for the entire farm enterprise, not just from the field with the AFS, because it can have implications for the entire farm.” (04).

Another knowledge gap was identified from a farm system perspective, with informants suggesting that without a variety of different demonstration sites and region specific empirical evidence supporting AF as a viable farming practice adoption would struggle to become main stream *“It needs to be demonstrated that it can work” (03)*, *“we need to be able to paint them a picture of what this is going to look like” (03).*

In order to implement AF, skills beyond those encountered in conventional agriculture are required. Despite public and private initiatives to support knowledge transfer and up-skilling, farmers and SCA alike expressed uncertainty about how to adopt AF *“we wouldn’t have the knowledge or infrastructure to help with that, so we’d just direct them to Teagasc, it’s all there” (05)*. Not only was actor knowledge identified as crucial yet undeveloped, but so was multi-generational understanding recognised as missing *“... do the next generation know what is the purpose of the AF, the vision, and how to manage it correctly?” (03).*

5.2.1.2. The Farm Enterprise

The theme ‘The Farm Enterprise’ explores and describes the contexts shaping farmers’ decision-making and their interest in sustainable initiatives.

Farm Culture

Regardless of personal value system, farmers were primarily recognised as entrepreneurs whose farms act as their business venture *“most farmers are productionists and grass is product” (03)*. They were seen as future-oriented individuals, whose objectives were largely to develop their farm such that it would not burden, but support, the farm’s inheritor *“farmers want to leave the farm as an asset for the next generation and that AF will only be seen as an asset if it is profitable... results matter” (03)*. In some cases this meant that the adoption of AF was seen as unlikely unless the given climate, both financial and geographical, incentivised it’s adoption

“the impacts of hot weather may begin forcing farmers to adopt” (04), “if AF can increase milk yields during extreme weather it may be used as a risk mitigation strategy” (04), “down the line farms may be penalised for emissions or even rewarded for carbon capturing carbon” (04).

On the other hand, the results already demonstrate that the presence of trees on farms is a common occurrence, even if mainly found along the perimeter and within hedgerows. Farmers were identified as often ignoring trees rather than integrating them into the farm system *“trees just kind of exist, but aren’t actively engaged often”; “in Ireland there is very little forest management (by private people)” (03).* This was described as a generational habit rather than an intentional action *“the knowledge base just doesn’t exist” (03).* Although recognising the current lack of engagement with trees, other informants also observed that cultural change within farm conventions had been occurring steadily throughout the years *“looking back over my college years, people were really farming on the ditches and it was cutting hedges every year, even taking ditches out of it, Jesus they loved clearing ditches ... (now) many are cutting biannually, letting hedgerows grow, you know” (05).* Informants were hopeful that the development of AF as a farming practice could validate trees’ value as farm system benefactors, solidifying their place in farm culture *“AF could bridge the gap” (03).* The results show that in some cases the process had already begun *“... I think guys are starting to see the benefits of letting animals shelter naturally and kind of the benefits of letting the hedgerows go...” (05).*

Sustainability Interest

The results show that informants’ perceptions of farmers’ adoption of AF were largely varied. Some informants felt that the uptake of tree planting initiatives has been increasing over the past years *“... particularly in the last few years, the grant has really pushed that along, the f18 has acquired one of the highest rates of applications from all the forest types” (04),* while others thought that the uptake was not occurring at a significant scale *“farmers like trees not forests” (03).* The supply chain informant indicated that both were the case, having observed a polarisation within the agricultural community between farmers who *“... are straight on that, asking how can I access this funding, to develop my farm x, y, z” (05)* and those that *“... doesn’t want to change the way he has been doing things all his life” (05).* However, they felt that the adoption of sustainable practices was in principle universally appealing to farmers because economic sustainability was recognised as fundamentally interlinked with environmental sustainability *“what they are most interested in is how to be sustainable, and the knock-on effects of that ...” (05).*

Several barriers were identified as preventing farmers' serious consideration of sustainable practices. Namely, the cost of adoption, bureaucratic burden and, in the case of AF specifically, land designation. In order for adoption to be feasible financial support was identified as a prerequisite *"if I suggested that before this fund came in lads would be laughing at you ... whereas when the funding is there, they think it's a bit of weird suggestion, but the money is there so they are willing to give it a go"* (05), *"all roads lead back to the pursue ..."* (05). Many farmers were recognised as feeling overwhelmed by the ever changing legal requirements and proscriptive practices governing the agricultural sector *"the amount of paperwork has become insurmountable, there's so much to do and adapt to, it can make things a real hassle for farmers"* (05). In such a sector, the adoption of optional practices was considered largely too great a management burden for many farmers *"guys who have had a bad experience can be angry, nobody wants to be controlled ..."* (05), *"... it's a worrying time for farmers"* (05). Land designation to forest land and its associated consequences, as discussed in the introduction, were observed by informants as a major barrier inhibiting farm adoption of AF *"farmers like trees, but not that they can't change their mind"* (03). So much so, that the results indicate that until a compromise is reached in many cases adoption will never be considered *"finances can come into the picture after"* (04).

More than Money

In most cases, farm decision-making was identified as a process involving much more than sole consideration of immediate economic gains. As previously mentioned, the farm is considered an asset which is developed and passed on through the generations, such that its value can increase. Such considerations were identified as the source of the inhibitory effect caused by the current land designation policy *"... lots of landowners would feel if they plant and that happens they would be limiting the options of future generations"* (04).

The results show that the integration of trees as key components in farm systems is for most farmers a novel, if not foreign idea. A process of value reorientation, *"a journey of awareness"* (01), was observed by one of the informants as often needed for farmers to accept the possibility that AF could be a suitable farming practice *"we don't know much, the surface of things, we have so much to learn from nature"* (01). How much of a revelation this would entail was described as varying *"farmers can be demons as much as they can be custodians"* (01), and the ease of the process would largely depend on that farmer's community's values *"this one farmer I knew had started practising some sustainable methods but they didn't want it known publicly"*

for fear that his neighbours would think different of him” (01). The direct support of family, friends and neighbours was identified as often needed in order to validate the transition from conventional farming to alternative practices *“most people don’t want to be seen as an outsider” (03).* Furthermore, many farmers were seen as existing in an environment characterised by the prevalence of echo chambers *“then urea comes in and you know farmers be chatting and gossiping about, is this working, what’s this like, protected urea isn’t great, that’s a rumour that would spread and go through the circles until my dad would be like oh no we can’t use protected urea” (05)* and that it was important for them to hear other opinions *“they (other farmers) need not to be just listening to the propaganda” (01).* As such, the development of networks between farmers who had already begun to transition away from conventional practices *“some farmers are real champions” (01)* and those who were considering adoption was seen as crucial *“peer-to-peer learning is what’s needed” (01).*

5.2.1.3. The Supply Chain

The theme ‘The Supply Chain’ investigates actors’ influence over the adoption of sustainable farming practices across the supply chain.

Channel Dynamics

For both dry stock and dairy systems, engagement with SCA, such as co-ops, processors or retailers, was identified as necessary in order to rely on farm sales as a primary source of income *“to process (dairy) at scale you need machines, infrastructure and to meet regulations” (02).* This dynamic places SCA in a position to heavily influence the decisions of farmers and their practices. Adherence to SCA standards was described as a prerequisite, lest farmers lose the capacity to sell larger quantities of products *“devil you know” (02).* Furthermore, it was acknowledged that in some cases, the increased profit received by SCA through the sale of goods adhering to higher environmental standards never reached the primary producers *“I don’t know if it would trickle down to the farmer (the premium price), and from a business perspective I think it’s us (the organisation) that sees the benefit of the premium products” (05).*

Support for Sustainable Practices – No

Furthermore, farmers who were interested in the adoption of AF and other sustainable practices described receiving no support from SCA and were not hopeful that any financial incentives would be provided in the future *“I’m just happy to have somewhere to sell my product” (01), “I have to sell my organic milk as conventional because no one will collect it” (02).* One

informant thought that certain SCA were actively discouraging the adoption of sustainable practices such as AF *“many of the members and the directors (of the co-ops) would be against it (reduced production in favour of biodiversity)”* (02), because the promotion of such practices would signal to consumers that conventional practices are not sustainable *“it wouldn’t be good for the Bord Bia brand”* (02). It was suggested that by doing so, SCA relying on conventional farming practices would be at risk of losing dominance over the consumer market *“(they) would have so much to lose ... no one would buy from their own one (brand) anymore”* (02). This was identified as a deep source of frustration and contention for farmers who felt that they should be compensated for the ecosystem services they provided by undertaking sustainable practices.

Support for Sustainable Practices – Yes

On the other hand, the results also show the presence of programs developed by SCA which do offer farmers financial compensation for their adoption of sustainable practices *“... I think 95% of our suppliers engage with X because it pays ...”* (05). Additionally, although not directly compensating farmers who had adopted sustainable practices, the demand for premium products from international SCA was identified as a factor which increased the market power of products coming from such farmers *“I believe McDonald's have started exclusively using free range eggs”* (04). At a local scale, the recent development of sections in supermarkets promoting and exclusively stocking products coming from sustainable practices was thought to have a similar impact. Other initiatives, which did not focus on immediate financial gain, such as knowledge transfer programs and trainings, were also offered and considered as important by certain SCA *“... it’s good to see those guys who might not have had the chance to go to university or do the green cert back in the 60,70 or 80s reengage back with education, so there is definitely a demand from the supplier base, and then it comes full circle with our own interest”* (05). However, the direction of these programs was recognised as being largely top-down rather than bottom-up *“... Europe wanted us to focus on ...”* (05), thus limiting farmer autonomy.

5.2.1.4. The Market

In this theme, informants’ opinions regarding the consumer study are explored, and AF labelling’s potential is positioned in the current consumer market.

Willingness to Pay

It was recognised by several informants that there is a consumer demand for sustainably produced products “*consumers appreciate the quality of the milk ...*” (05). However, informants were sceptical whether the public had sufficient knowledge about agricultural practices to understand what an agroforestry label was actually marketing “*are consumers educated enough?*” (02), and whether they knew why such a label merited a premium price “*people feel like they shouldn't be paying more for AF/org. because there is less inputs*” (03).

The validity of the results from the consumer study were called into question “*there's people pleasers, that would guess what kind of answer you are looking for, I won't disappoint you, that 50% I would take with a pinch of salt, but it's encouraging*” (04), with informants citing an already high cost of living as a destabilising condition “*it's a lifestyle choice, which requires enough disposable income, would they really pay for it?*” (03). One informant highlighted that many Irish products produced through conventional methods are being left on shelves in favour of cheaper imports “*it begs the question why are we doing all this, if beef which doesn't comply is going to be put on the same shelf anyway and then snatched up, while our stuff is left there*” (05).

Labelling

It was recognised that AF would be a suitable candidate for labelling “*the organic model could work with a premium for AF, generally the public like to see trees, they associate trees with good things*” (04) and that such a model would incentivise the adoption of AF as an agricultural practice “*if the AF trees can be used to create a premium payment for farmers than that is certainly going to grease the wheels of having AF on farms ...*” (04). Furthermore, means by which farmers could be compensated for the provision of ecosystem services were identified as largely missing. However, it was called into question whether the introduction of an AF label was appropriate, considering the current market, in which **already established sustainability labels are encountering difficulties remaining marketable** “*it's a struggle for organic farmers to stay afloat*” (02). Some believed that the introduction of another label would do more harm than good “*adding another label to the mix would be mental and could undermine current sustainable initiatives*” (02). Others thought that this wouldn't be necessary in the first place, because AF was sufficiently similar to organic that any farm in search of premium payments should adopt both “*there wouldn't be much point going through all the work to develop a dedicated AF label when organic is only a few extra steps*” (03). Despite differing opinions,

what many of the informants did agree on was that the development of a sustainability label which incorporated AF but was not limited to it might be more suitable *“What about using a nature value score? Something that could work in conjunction with other land practices”* (01). It was posited that such a label should focus on the direct benefits which adopting such practices can have at a farm level *“it can’t be just about ecosystem services, it needs to be about the benefits farmers get”* (04), *“reduced costs is the same as increased profit after all”* (03).

Label Barriers

Several other barriers inhibiting the establishment of an AF label were further identified. Firstly, the certification and accreditation bodies necessary to ensure the reliability of such a label were recognised as currently unavailable. Along with the financial resources to establish them *“Who’d verify the farms? Who’d verify the certifiers? Where’d the money come from to do so?”* (02). Furthermore, the agricultural practice of AF was deemed in need of standardisation in order to ensure that products labelled as AFPs were indeed coming from such systems *“currently we don’t have the means or standards with which to verify if a product is an AFP”* (04). It was posited that even if these bodies and standards were in place, a simultaneous mass adoption of AFS would be needed in order to produce a sufficient volume of products for marketing *“AF is mostly only starting”* (03). Finally, how exactly a label would demonstrate the positive impacts of AF to consumers was undecided *“how are you going to quantify the value of the trees to the buyer?”* (01).

A plethora of factors influencing farmers’ adoption of AF are visible throughout the narrative descriptions. Which of these, if any, might influence AF labelling’s potential to incentivise agrarian tree planting will be discussed and elaborated on in section 6.1.2. of the discussion.

6. Discussion

6.1. Results

6.1.1. Stage I

Through the discussion of the results of Stage I, specific objective a. will be addressed and research questions i., ii. and iii. will be answered.

6.1.1.1. Representativeness of the Sample

The socio-demographic descriptions of the Republic of Ireland, Co. Cork and Cork City and suburbs were found to be approximately identical, ± 1 percentage point (refer to section 4.1.1., Tables 2., 3. and 4., respectively). This suggests that from a socio-demographic perspective Cork City and suburbs had the potential to provide a sample which was representative of the Republic of Ireland. Nonetheless, considering the limited number of socio-demographic variables used in the study and the potential for a significant fluctuation of cultural values across the country, the results of the quantitative survey are considered to only be statistically representative of the population of Co. Cork, rather than the whole of the Republic of Ireland. Despite this, the reported results may still be used as an indication for what is likely to be the case in the rest of Ireland and for whether further research is warranted throughout the country.

The socio-demographic description of Cork City and suburbs was observed to be relatively similar to that of the 207 participants who participated in the study (refer to section 5.1.1., Table 7.). The most significant deviations between the two were observed in the relative percentage of ages and occupations. Specifically, the age categories of '15-24' and '25-34' were overrepresented, while the age categories of '35-44' and '45-54' were underrepresented in the sample. Perhaps as a direct consequence of this, the occupation category 'student' was overrepresented in the sample, while all the other occupation categories were slightly underrepresented. The effects of these deviations will be discussed in the following section.

6.1.1.2. Consumers' Willingness to Pay

Of the 207 participants in the survey, 195 (94.2%) indicated they would choose to purchase AF milk when its price was the same as conventional milk. 116 (56%) indicated they would choose to purchase AF milk when it was 30% more expensive than conventional milk (refer to section 5.1.1., Table 8.). Based on these results, the binomial tests indicate that within the target population it can be assumed with 95% certainty that the percentage of individuals who would

pay for AF milk when there is no difference in price is between 91% and 100%, and that the percentage of individuals who would pay for AF milk when it was 30% more expensive is between 49% and 63%, respectively. This indicates that consumers in Co. Cork significantly value AF as an agricultural practice and that approximately 50% of individuals would be willing to pay a 30% price premium for AF milk. These indications further suggest that there may be a substantial consumer market for AFP in the Republic of Ireland and that the development of a national AF label could incentivise the agrarian adoption of AF.

Amongst the variables which impacted participants' WTP, price was a significant determinant. This is visible in the approximate 40% decrease in participants willing to pay for AF milk when its price was increased by 30%. Several participants indicated as such during the survey: *"30% is a lot, I'd have to think about it long-term"*, *"If the price difference was less I would pay the premium"* and *"Times being what they are, whatever is cheapest like"*. This supports the theories developed in section 3., which predicted that as price increased, the value individuals assigned to the product would decrease, and with it, their WTP. Such findings have been corroborated in several studies assessing consumers' WTP for eco-products (Bolduc et al., 2023; Zhang et al., 2018). Furthermore, the results confirm that consumers in Co. Cork considerably value eco-products, in this case AFP. The value added to whole milk by coming from an AF system is evident in the exclusivity with which it was chosen when there was no price difference. This was expressed by several participants while completing the survey: *"Well isn't it obvious (to pick AF)"*, *"I'd always pick the more sustainable option"* and *"For the same price it's a no brainer"*. From a marketing perspective, it is worth considering which is more valuable: the 30% price premium or the potential total dominance of the whole milk market which the results suggest AF milk might achieve when its price was not increased.

Of the remaining predictor variables, consumer knowledge and socio-demographic characteristics, consumer knowledge was shown to be a significant predictor of participants' WTP for AFP in both pricing scenarios. Such results are supported by the findings of similar studies (Bolduc et al., 2023; Chen & Liu, 2025; van Osch et al., 2017). The effects of consumer knowledge were examined by providing approximately half of the participants with a brief description of some of the key ecosystem services provided by AF. This was represented in the regression summary outputs by the predictor 'Pre-informed: Yes'. Beginning with the scenario in which there was no price difference between the products, **consumer knowledge was found to be the only statistically significant predictor of participants' WTP for AFP**. This was evidenced in the Logistic regression analysis and using Fisher's Exact Test (refer to section

5.1.2.2., Table 11. and 12., respectively), with both returning a highly significant result. These results suggested that accounting for the effects of the other predictor variables, and independent of their effect, the presence of consumer knowledge increased the likelihood that a participant would choose to pay for the AFP rather than the conventional product. This is evident in the descriptive statistics, which show that when there was no price difference, all the participants who were pre-informed chose to pay for the AF milk (refer to section 5.1.2.2., Table 13.). A similar result was found in the scenario in which the AF milk was 30% more expensive than the conventional milk. Although in this case multiple age categories were also found to be significant (refer to section 5.1.2.3., Table 14.). In this scenario, pre-informing participants was found to be significant at a 0.05 level of significance, while the magnitude of its effect equalled an increase of approximately 17 percentage points. This indicates that, controlling for the effects of all the other predictor variables, participants who have been pre-informed are approximately 17 percentage points more likely to choose to pay for AF milk with the price premium rather than conventional milk. Additionally, several of the comments submitted by participants support these results *“If I knew more about it, I might pay the premium”*, *“I wouldn’t have picked the premium if you hadn’t told me why it (AF) mattered”* and *“If I’d known the benefits beforehand I would have paid the premium”*.

Of the several socio-demographic variables included in this study, very few of their predictor categories were found to be statistically significant, if any. This result is surprising considering that age (Chen & Liu, 2025; Otter & Langenberg, 2020; van Osch et al., 2017), gender (Bolduc et al., 2023; Chen & Liu, 2025; Otter & Langenberg, 2020; van Osch et al., 2017) and occupation (van Osch et al., 2017) have been reported as statistically significant in other studies examining consumers’ WTP for eco-products. In the scenario in which there was no price difference between the products, age, gender, occupation and preferred shop were all found to be statistically insignificant predictors of participants’ likelihood to pay for AF milk. In this case, this may be explained by the overwhelmingly powerful effect of consumer knowledge. In the other scenario, age categories ‘25-34’ and ‘45-54’ were the only predictor categories found to have a statistically significant effect on participants’ WTP. Both age categories were associated with a higher likelihood of choosing to pay for AF milk. Recalling the respective over- and underrepresentation of the age categories ‘25-34’ and ‘45-54’ in the sample, it is fortunate that both categories were found to be positively significant predictors of WTP. Their associated coefficients were 1.4 and 1.6, respectively (refer to section 5.1.2.3., Table 14.). As

such, it is assumed that the under- and over-representation witnessed in the sample would not have skewed the results to a considerable degree.

6.1.1.3. Specific Objective a.

With respects to research questions i., ii. and iii., the results show that between 91% and 100% of consumer in Co. Cork were willing to pay the same price for AFP as for conventional produce, that between 49% and 63% of consumer in Co. Cork were willing to pay a 30% price premium for AFP and that informing participants about AF's ecosystem benefits increased their WTP. These findings suggest that Irish consumers are likely willing to pay premium prices for AFP, thus addressing specific objective a. of this study.

6.1.2. Stage II

The discussion of the results of Stage II will address specific objective b. and answer research questions iv. and v.

6.1.2.1. Factors Influencing Farmers' adoption of AF

The results show that the development of an AF label, which enabled farmers to receive premium prices for the sale of their AFP, has the potential to considerably incentivise the agrarian adoption of AF. The increase in farm profitability which such a label would entail was identified as an important mechanism with which adopters could be compensated for their provision of ecosystem services. These findings support the theories referenced in the theoretical framework, which suggested that income maximisation (Israr et al., 2014; Rois-Díaz et al., 2018; Xu et al., 2019) and economic objectives (Amare & Darr, 2020; Mercer, 2004) are factors which considerably influence the agricultural practices adopted by farmers. However, the narrative descriptions revealed several issues, which if not addressed before the creation of such a label, would undermine its efficacy to incentivise AF adoption. These issues will be positioned in the lives of farmers using the theories developed in the theoretical framework. Beginning with the preconditions needed for the adoption of a technological innovation as outlined by Pannell (1999), and continuing with elements from the Sustainable Livelihoods Framework as outlined by Nunan (2015).

Preconditions for the adoption of a technological innovation

Considering AF's status as a technological innovation in the Republic of Ireland, four preconditions have been identified which mediate farmers' assessment of its feasibility. Namely, that the farmer is aware of why the innovation is worth considering, that there is a

realistic possibility of trialling the innovation, that there is the scope for the full adoption of a trial and that the innovation meets farmers' objectives (Pannell, 1999). From the narrative descriptions, it is evident that none of the preconditions has been fully met.

The awareness of AF amongst farmers and agricultural actors was identified as largely lacking, although indications suggested that this was changing. Consequently, what exactly AF entails, the benefits of adopting such a system and the best practices by which the system should be judged were not common knowledge. Such findings were mirrored in Irish studies assessing farmers' perception of AF (Irwin et al., 2022) and barriers to adoption (Irwin et al., 2025). The impacts of this are two-fold, considering the multi-generational nature of AF. Pannell (1999) suggests that until farmers (and their heirs) are aware of those aspects which position AF as practical and relevant in their lives, it won't be seriously considered. This is supported by the findings of a European study which found that an unfamiliarity with AF was undermining its adoption (Rois-Díaz et al., 2018).

Uncertainty regarding the impacts of AF adoption and its subsequent compatibility with conventional practices was a prominent issue observed throughout the narrative descriptions. Compatibility was theorised to be dependent on farm type, favouring less intensive systems. While questions regarding the feasibility of farm-wide adoption, considering the establishment and maintenance costs, remained a factor of concern despite the availability of compensatory grants. The lack of mature sites with which to look for answers to these questions was identified as a significant factor contributing to farmer uncertainty. Furthermore, empirical evidence on the economic impacts at a farm scale was also absent. These findings are supported by other Irish studies which have identified the absence of mature sites and the lack of empirical economic evidence as barriers to the adoption of AF (Irwin et al., 2025). The ease with which farmers could trial AF was largely compromised by the binding designation to forest land which would accompany such a trial. The accessibility of trials, both for those attempting to conduct the trial and for those who would consider doing so, is recognised as an important factor influencing farmers' perception of innovation suitability (Graves et al., 2009; Pannell, 1999).

Maximising profitability through short term productivity was recognised as a common objective amongst conventional Irish farmers. Consequently, the potential impacts of AF adoption on farm productivity were a source of considerable concern. In such cases where productivity was expected to be negatively impacted by the adoption of AF, the availability of premium prices alone was seen as potentially insufficient to justify the undertaking. On the

other hand, within systems where AF would not have a major impact on productivity, premium prices were recognised as a stronger incentive for adoption. In some cases, farmers were identified as already willing to accept possible declines in productivity because they valued trees for their synergies with the existing farm system. Such as reduced inputs, extended grazing seasons and strengthened animal welfare. Others were willing to plant trees because they valued nature, considering it an end in itself. In cases where AF does not negatively impact productivity to a significant degree or when farmers are willing to adopt regardless, the availability of premium prices for AFP was considered to be an important resource which could support farmers in achieving their objectives, be they economic or environmental. Therefore, the availability of an AF label with an associated price premium would contribute to AF's capacity to meet farmers' objectives. The potential for an innovation to meet farmer objectives has been identified as theoretically essential (Pannell, 1999) and studies have found that economic objectives tend to take precedence (Amare & Darr, 2020; Graves et al., 2009; Mercer, 2004; Pannell, 1999).

The value of the farm as an asset for future generations was also identified as a priority amongst farmers. As such, increasing the farm's value was a common long-term objective. The designation of land as forest land, which would occur after the adoption of AF, was considered a dominant issue undermining the adoption of AF. This has been corroborated in various Irish studies (Irwin et al., 2022, 2025), which indicate that economic devaluation of land designated as forest land and loss of farmer autonomy are the resulting concerns (Foghlú, 2022; Irwin et al., 2025). The narrative descriptions indicate that the availability of price premiums would not, in most cases, be considered sufficient compensation for the loss of land value and/or farmer autonomy. As such, and considering the impact land designation has on farmers' capacity to trial AF, designation of land to forest land is considered one of the most significant factors inhibiting the efficacy with which premium prices for AFP could incentivise the adoption of AF.

Sustainable Livelihoods Framework

The Sustainable Livelihoods Framework will be employed to position those issues which are not best represented using the previous theoretical model. Please refer to the theoretical framework developed in this study and the works of Nunan (2015) for an overview.

Transforming Structures and Processes

Transforming structures and processes refer to the institutions, organisations, policies and legislation which “influence whether, or how, people can access resources and how they may use and benefit from the assets they have in pursuing different livelihood strategies” (Nunan, 2015, p. 113). The narrative descriptions revealed structural and procedural issues regarding contemporary supply chain dynamics and market uncertainties

Supply chain dynamics refer to the organisational realities and power balance amongst the actors which enable farmers’ produce to reach consumers. In Ireland, these typically include primary producers, co-ops, processors and retailers. Several aspects which could undermine the efficacy with which AF labelling would incentivise the adoption of AF were identified. Firstly, it was recognised that farmers’ receipt of premium prices for the sale of eco-products would largely depend on whether a co-op/processor was willing and able to process their produce as an eco-product. Evidence from the narrative descriptions suggests that this may not always be the case. Furthermore, it was called into question whether the increased revenue from the sale of eco-products with an associated premium price would actually reach farmers. Uncertainty regarding with what assurance this could be expected was exacerbated by the fact that in order to rely on the sale of produce as a primary income source, operating through direct sales alone was deemed insufficient. On the other hand, certain SCA were recognised as providing supporting services for farmers interested in adopting environmentally sensitive practices. Although these did not yet extend towards the adoption of AF, it may be an indication that certain SCA are interested in supporting the development and dissemination of an AF label.

It was recognised that if labelling could provide premium prices for farmers who had adopted AF, then that would be a considerable factor influencing the adoption of AF. However, even if that was available, several issues pertaining to the consumer market were identified. Namely, concerns regarding whether consumers’ WTP could be guaranteed consistently considering the current cost of living, whether a sufficiently large pool of consumers valued AF practices and whether future competition could undermine the marketing potential of products labelled as AFP. Furthermore, several infrastructural deficiencies were recognised which undermined the feasibility with which farmers could reliably label their products as AFP. **Namely, the lack of appropriate certification and accreditation bodies, the absence of dedicated processors, a lack of funding or commitment to develop these and the absence of a contemporary production base to merit their creation at scale.**

Human, Social and Cultural Capital

Human, social and cultural capital refer to an individual's mental resources and physical abilities, the networks and ties which they can rely on and the social context which enables or prohibits actions, respectively (Nunan, 2015). These have been grouped for this discussion as they share many interacting aspects.

A lack of the additional skills and knowledge needed to implement and/or support the adoption of AF was identified amongst farmers and SCA. This increases the difficulty with which farmers might adopt AF, thus influencing their considerations. Furthermore, the opinions of family, friends, neighbours and communities were recognised as powerful factors influencing adoption decisions. In many cases, community attitudes towards tree planting were observed as negative, exacerbating the inhibitory effect of the identified skill and knowledge gap. This was further reinforced by the presence of a schism dividing agricultural and forestry cultures. On the other hand, the presence of farmers who have adopted AF and are willing to showcase the adoption process had a positive influence on prospective farmers' adoption decisions. Furthermore, the presence of networks promoting peer-to-peer learning and providing advisory services was also identified.

6.1.2.2. Factors Impeding AF Labelling's Strength as an Incentive

The potential to access premium prices through the use of AF labelling was recognised as a strong incentive which would significantly promote the agrarian adoption of AF. However, several factors influencing farmers' adoption of AF were identified. Namely, the novelty of AF as an agricultural practice, limited trials and empirical evidence regarding its impacts on the farm system, uncertainty regarding changes to farm productivity, consequences associated with land designation, bottlenecks in the supply chain, uncertainties regarding the consumer market, insufficient infrastructure to market products as AFP, insufficient human capital and negative attitudes amongst key stakeholders. Amongst these factors, several were identified which were thought to considerably impede AF labelling's success: uncertainty regarding changes to farm productivity, consequences associated with land designation, bottlenecks in the supply chain, uncertainties regarding the consumer market and insufficient infrastructure to market products as AFP. Resolving these issues would entail providing comprehensive empirical evidence at the farm scale indicating in which situations AF adoption would result in a net productivity gain, revising the land designation legislation, developing clear sales channels such that produce labelled as AFP could be sold to the consumer consistently with a guarantee that

increased revenues would trickle down to the farmer, further consumer research and a commitment towards the development of the infrastructure required to market AFP, respectively. These factors are considered the most likely to impede AF labelling's success because they were either identified as more important than profitability, as was the case with land designation, or they fundamentally undermine the mechanisms with which AF labelling could provide premium prices to farmers. As such, until these issues are addressed, it is considered highly unlikely that AF labelling could succeed in its mission to incentivise the agrarian adoption of AF through the provision of premium prices.

The remaining factors were considered less consequential because they were identified as already beginning to change. Indications from the results suggest that knowledge of AF as an agricultural practice is becoming more common, farmers willing to adopt AF are showcasing the process, organisations offering advice and training are available, and community attitudes are evolving. That is not to suggest that further interventions regarding these factors are not necessary or would not be beneficial, but only to say that these factors are not considered to impede AF labelling's ability to incentivise the agrarian adoption of AF to the same degree as the other factors.

6.1.2.3. Specific Objective b.

With respect to research question iv., the discussed findings suggest that several factors are influencing the agrarian adoption of AF. Namely, the novelty of AF as an agricultural practice, limited trials and empirical evidence regarding its impacts on the farm system, uncertainty regarding changes to farm productivity, consequences associated with land designation, bottlenecks in the supply chain, uncertainties regarding the consumer market, insufficient infrastructure to market products as AFP, insufficient human capital and negative attitudes amongst key stakeholders. With respect to research question v., the discussed findings suggest that five of these factors significantly impede AF labelling's ability to incentivise the adoption of AF in the Republic of Ireland. Namely, uncertainty regarding changes to farm productivity, consequences associated with land designation, bottlenecks in the supply chain, uncertainties regarding the consumer market and insufficient infrastructure to market products as AFP. By doing so, these findings address specific objective b. of this study.

6.1.3. General Objective

The discussion of the results from Stages I and II indicates that if certain factors are addressed, then AF labelling does have the capacity to incentivise agrarian tree planting in the Republic of

Ireland. This conclusion is based on the WTP reported in Stage I and the evidence collected from interviews with key informants in Stage II. Together, these stages address the general objective of the study.

6.2. Methods and Limitations

6.2.1. Stage I

Several methodological limitations have been identified throughout the study. Beginning with Stage I, the first potential issue of note is whether the 207 participants sampled from Cork City and suburbs are representative of Co. Cork as a whole. Although the population of Cork City and suburbs does account for half the total population of Co. Cork, regional differences in the county may be present. A study conducted in Germany suggests that such effects do occur and may be significant (Otter & Langenberg, 2020). Furthermore, the selection of shops at which the survey was carried out may have introduced a bias by favouring consumers with particular lifestyles. Specific lifestyles can be recognised by “how consumers live and spend their time and money” (Ryan et al., 2004). Research conducted in Ireland has identified six distinct lifestyles, characterised by unique interests and values which motivate their purchase decisions (Ryan et al., 2004). The effect of lifestyles may be particularly important, considering that it might have also impacted individuals’ willingness to participate in the study in the first place. As such, this reveals a two-fold limitation of the methodology regarding the representativeness of the sample. Firstly, that the selection of shops at which the survey was conducted may have unintentionally excluded customers with certain lifestyles, and secondly, that as a consequence of the survey topic and its face-to-face nature, individuals of a specific lifestyle may have been more or less likely to participate. As such, follow-up studies to confirm the results reported in this study are recommended.

Although discrete choice experiments have been recognised as a robust method with which to measure consumers’ WTP (Bolduc et al., 2023; Breidert et al., 2006), concerns regarding their validity have been raised (Rakotonarivo et al., 2016). In a review examining their reliability and validity, it was found that there is some uncertainty regarding how accurately discrete choice experiments capture customers’ actual purchasing decisions. However, the same study found that the results from discrete choice experiments are usually supported by other methods which investigate consumers’ stated preferences. Therefore, the criticism regarding its validity may be more appropriately applied to the whole category of methods examining stated preferences. Unfortunately, until real products with an AF label are available in the market,

researchers often have no alternative but to rely on stated preferences. Nonetheless, this suggests that the WTP reported in this study should be viewed with some degree of scepticism.

6.2.2. Stage II

Many of the methodological limitations with respect to Stage II of the research have been outlined already in section 4.2., however, a deeper discussion is warranted. Firstly, the use of a small number of key informants, as opposed to a larger number of farmers from around the country, may have limited the study's capacity to capture all the potential factors which could significantly impede AF labelling's ability to incentivise the agrarian adoption of AF. The reasons are two-fold. Firstly, the use of key informants may have unintentionally excluded factors which the informants would not be aware of (McKenna & Main, 2013). Secondly, due to the small number of interviews conducted, it is unlikely that theoretical saturation was reached and probable that the results derived from the interviews are heavily influenced by the informants' positionality. In this case, theoretical saturation refers to the completeness of the list of recorded factors when compared to the hypothetical list containing all of the relevant factors. Informants' positionality refers to their specific opinions, values and experiences. As such, reliance on only a few key informants may misrepresent common perceptions within the community (McKenna & Main, 2013). Additionally, although the use of interview notes and case summaries has been recognised as acceptable data analysis methods for research carried out under constraining circumstances (McNall & Foster-Fishman, 2007; Neal et al., 2015; Tessier, 2012; Vindrola-Padros & Johnson, 2020), several studies have questioned their reliability. In particular, their use has been associated with a loss of information or nuance and with the development of incomplete or biased interpretations (Neal et al., 2015; Tessier, 2012). Together, these limitations suggest that there may be additional impeding factors which were not captured in Stage II of this study.

6.3. Future Research and Recommendations

Through the discussion of the study's results, several avenues for further research have been identified. Firstly, considering the WTP reported in Stage I, further research is warranted to confirm the finding for Co. Cork and to verify whether similar results are true across Ireland. Methodological alterations which could be particularly valuable include using smaller price increments and an extended range of price premiums, comparing both consumers' WTP for AFP and organic produce in the same study to develop a baseline with which to verify how reliably the discrete choice experiment captures actual purchase behaviour, varying the

ecosystem service benefits participants were informed of and replicating the study with different types of produce, e.g. beef. Furthermore, future studies should aim to achieve a larger sample sizes in order to avoid sparse categories and complete separation within the data. Additionally, further research could aim to discover if there are any other factors which would impede AF labelling's ability to incentivise agrarian tree planting. Subsequently, individual studies could be conducted on each of the factors which were determined to significantly impede AF labelling's success.

Several recommendations for actors and organisations intending to pursue AF labelling in the Republic of Ireland have arisen from the results and their discussion. Firstly, in regard to the marketing of all eco-products in the Republic of Ireland, the results suggest that raising consumers' awareness of the additional ecosystem services provided by their associated agricultural practice could be an effective way to increase their market share. In the case of AF, several specific recommendations have emerged. Considering AF's status as a technological innovation in the Republic of Ireland, the development of an AF label could signal to farmers its relevancy as an agricultural practice. Such signalling might contribute to bridging the divide between the forestry and agricultural sectors. Alternatively, there is the potential to create a coalition between farmers and actors pursuing different types of ecolabelling, such that AF becomes part of a more holistic labelling process. In that case, knowledge of the factors currently impeding AF labelling's potential success is certain to be relevant. Additionally, it is of note, that the results suggest that as is, economic incentives alone have a limited capacity to incentivise AF adoption. This is an important finding with respect to the Department of Agriculture, Food and Marine's current strategy to incentivise AF adoption primarily through the provision of grants.

6.4. Conclusion

In conclusion, this study has assessed whether the development of a national AF label has the capacity to incentivise agrarian tree planting in the Republic of Ireland, by addressing two specific objectives and their embedded research questions. The research issue was chosen after recognising the importance of national tree cover globally, the low national tree cover in the Republic of Ireland and research gaps in the literature. The study employed an explanatory, sequential mixed methodology involving two distinct stages: Stage I and II. Stage I determined the WTP of consumers in Co. Cork through survey-based, quantitative methods. The results from this stage show that between 91% and 100% of consumers in Co. Cork were willing to

pay the same price for AFP as for conventional produce and that between 49% and 63% of consumers in Co. Cork were willing to pay a 30% price premium for AFP. Stage II investigated which factors might impede AF labelling's potential to incentivise the agrarian adoption of AF through an inductive qualitative approach. The results from this stage identified five factors which would significantly impede AF labelling's ability to incentivise the adoption of AF in the Republic of Ireland. These factors were: uncertainty regarding changes to farm productivity, consequences associated with land designation, bottlenecks in the supply chain, uncertainties regarding the consumer market and insufficient infrastructure to market products as AFP. Together, the discussion of the results from Stages I and II indicates that if certain factors are addressed, then AF labelling does have the capacity to incentivise agrarian tree planting in the Republic of Ireland. Furthermore, the study has suggested several avenues for future research and recommendations for actors or organisations seeking to pursue AF labelling in the Republic of Ireland.

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Annex A – Questionnaire and Accompanying Material

Master Thesis Research

Conducted by Giacomo Degano



Date:

Location:

Age

☐ under 18 ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65+

Gender

☐ Female ☐ Male ☐ Non-binary ☐ Prefer not to say

Occupation

☐ Student
☐ Unemployed
☐ Employed as: _____
☐ Retired

Where do you shop most often?

☐ Aldi
☐ Lidl
☐ Dunnes Stores
☐ Tesco
☐ SuperValu
☐ Other: _____

Q.1

Which would you buy?

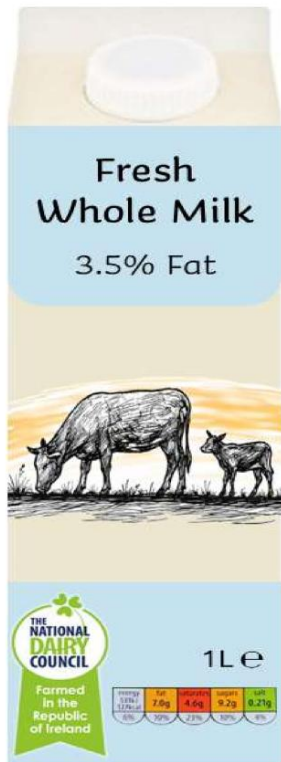
☐ A. ☐ B. ☐ Neither

Q.2

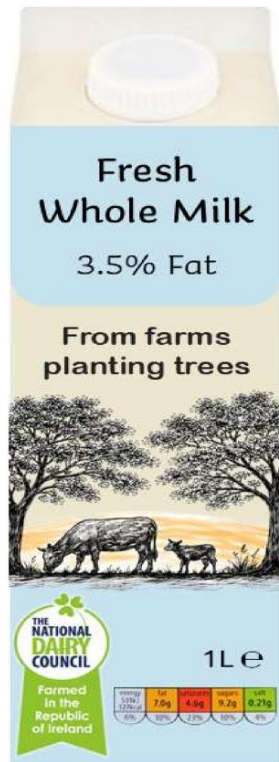
Which would you buy?

☐ C. ☐ D. ☐ Neither

Q.1 Which would you buy A or B?

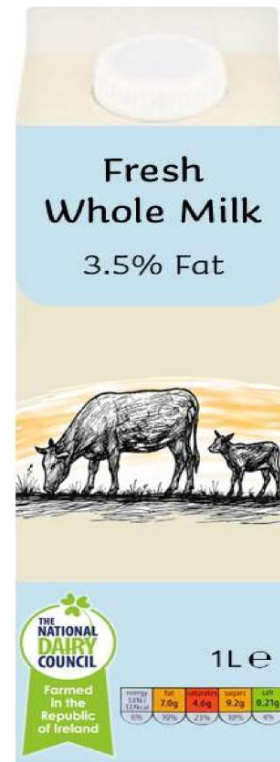


A. €1.16/L

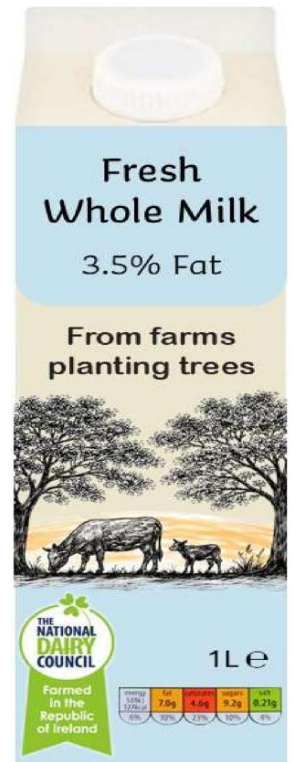


B. €1.16/L

Q.2 Which would you buy C or D?

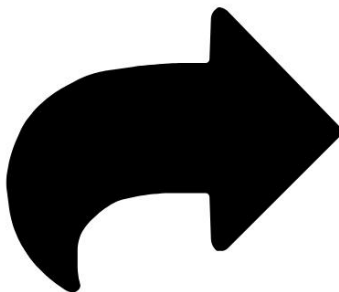


C. €1.16/L



D. €1.49/L

University Masters
Research
No money involved



1 page questionnaire,
only takes 5 minutes

Master Thesis Research
Conducted by Giacomo Degano



Date:
Location:

Age

☐ under 18 ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65+

Gender

☐ Female ☐ Male ☐ Non-binary ☐ Prefer not to say

Occupation

☐ Student
☐ Unemployed
☐ Employed as: _____
☐ Retired

Where do you shop most often?

☐ Aldi
☐ Lidl
☐ Dunnes Stores
☐ Tesco
☐ SuperValu
☐ Other: _____

Q.1

Which would you buy?

☐ A. ☐ B. ☐ Neither

Q.2

Which would you buy?

☐ C. ☐ D. ☐ Neither

Annex B – Electoral Divisions

AREA NAME	AREA CODE
BALLINCOLLIG	2ae19629-1f18-13a3-e055-000000000001
BALLINCOLLIG	2ae19749-1f5b-13a3-e055-300000000001
BALLINLOUGH A	2ae19629-214b-13a3-e055-000000000001
BALLINLOUGH B	2ae19629-214c-13a3-e055-000000000001
BALLINLOUGH C	2ae19629-214d-13a3-e055-000000000001
BALLYGARVAN	2ae19629-1f39-13a3-e055-000000000001
BALLYGARVAN/LEHENAGH	316a25a0-f7b6-4d01-b188-5efd7bd804c5
BALLYGROMAN	2ae19629-1f43-13a3-e055-000000000001
BALLYPHEHANE A	2ae19629-214e-13a3-e055-000000000001
BALLYPHEHANE B	2ae19629-2157-13a3-e055-000000000001
BISHOPSTOWN	2ae19629-1efc-13a3-e055-000000000001
BISHOPSTOWN A	2ae19629-2158-13a3-e055-000000000001
BISHOPSTOWN B	2ae19629-2159-13a3-e055-000000000001
BISHOPSTOWN C	2ae19629-215a-13a3-e055-000000000001
BISHOPSTOWN D	2ae19629-215c-13a3-e055-000000000001
BISHOPSTOWN E	2ae19629-215b-13a3-e055-000000000001
BLACKPOOL A	2ae19629-215d-13a3-e055-000000000001
BLACKPOOL B	2ae19629-215e-13a3-e055-000000000001
BLARNEY	2ae19789-1f5b-13a3-e055-700000000001
BROWNINGSTOWN	2ae19629-215f-13a3-e055-000000000001
CAHERLAG	2ae19629-1f5b-13a3-e055-200000000001
CAHERLAG	2ae19629-1f2f-13a3-e055-000000000001
CARRIGALINE	2ae19629-1f49-13a3-e055-000000000001
CARRIGALINE	2ae19629-1f48-13a3-e055-000000000001
CARRIGALINE/MONKSTOWN RURAL/DOUGLAS	591bceee-1721-4c8d-865f-1e0bd869b6ad
CARRIGROHANE BEG	2ae19629-1f5b-13a3-e055-000000000001
CARRIGROHANE BEG	2ae19849-1f5b-13a3-e055-140000000001
CARRIGTOHILL	2ae19629-1f68-13a3-e055-000000000001

CENTRE A	2ae19629-2160-13a3-e055-000000000001
CENTRE B	2ae19629-2161-13a3-e055-000000000001
CHURCHFIELD	2ae19629-2162-13a3-e055-000000000001
CITY HALL A	2ae19629-2163-13a3-e055-000000000001
CITY HALL B	2ae19629-2164-13a3-e055-000000000001
COBH RURAL	2ae19629-1f3f-13a3-e055-000000000001
COBH URBAN	2ae19629-1f40-13a3-e055-000000000001
COMMONS	2ae19629-2165-13a3-e055-000000000001
DOUGLAS	2ae19629-1ef6-13a3-e055-000000000001
DOUGLAS/LEHENAGH	7c85cece-22eb-4ebb-8d1f-9c0f734eaea8
EVERGREEN	2ae19629-2166-13a3-e055-000000000001
FAIR HILL A	2ae19629-2167-13a3-e055-000000000001
FAIR HILL B	2ae19629-2172-13a3-e055-000000000001
FAIR HILL C	2ae19629-2173-13a3-e055-000000000001
FARRANFERRIS A	2ae19629-2174-13a3-e055-000000000001
FARRANFERRIS B	2ae19629-2175-13a3-e055-000000000001
FARRANFERRIS C	2ae19629-2176-13a3-e055-000000000001
GILLABBEY A	2ae19629-2178-13a3-e055-000000000001
GILLABBEY B	2ae19629-2179-13a3-e055-000000000001
GILLABBEY C	2ae19629-217a-13a3-e055-000000000001
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GLASHEEN B	2ae19629-217c-13a3-e055-000000000001
GLASHEEN C	2ae19629-217d-13a3-e055-000000000001
GREENMOUNT	2ae19629-217e-13a3-e055-000000000001
GURRANEBRAHER A	2ae19629-217f-13a3-e055-000000000001
GURRANEBRAHER B	2ae19629-2180-13a3-e055-000000000001
GURRANEBRAHER C	2ae19629-2181-13a3-e055-000000000001
GURRANEBRAHER D	2ae19629-2177-13a3-e055-000000000001
GURRANEBRAHER E	2ae19629-2182-13a3-e055-000000000001
INISHKENNY	2ae19809-1f5b-13a3-e055-900000000001
KILPATRICK	2ae19629-21e8-13a3-e055-000000000001
KNOCKNAHEENY	2ae19629-2183-13a3-e055-000000000001
KNOCKREA A	2ae19629-2184-13a3-e055-000000000001

KNOCKREA B	2ae19629-218c-13a3-e055-000000000001
LISCLEARY	2ae19629-216a-13a3-e055-000000000001
MAHON A	2ae19629-218d-13a3-e055-000000000001
MAHON B	2ae19629-218e-13a3-e055-000000000001
MAHON C	2ae19629-218f-13a3-e055-000000000001
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MATEHY	2ae19769-1f5b-13a3-e055-500000000001
MAYFIELD	2ae19629-2191-13a3-e055-000000000001
MONKSTOWN RURAL	2ae19629-21eb-13a3-e055-000000000001
MONKSTOWN URBAN	2ae19629-2122-13a3-e055-000000000001
MONTENOTTE A	2ae19629-2192-13a3-e055-000000000001
MONTENOTTE B	2ae19629-2193-13a3-e055-000000000001
OVENS	2ae19629-2118-13a3-e055-000000000001
OVENS	2ae19819-1f5b-13a3-e055-110000000001
POULADUFF A	2ae19629-2194-13a3-e055-000000000001
POULADUFF B	2ae19629-2195-13a3-e055-000000000001
RATHCOONEY	2ae19779-1f5b-13a3-e055-600000000001
RIVERSTOWN	2ae19629-1f5b-13a3-e055-100000000001
SHANAKIEL	2ae19629-2196-13a3-e055-000000000001
SHANDON A	2ae19629-2197-13a3-e055-000000000001
SHANDON B	2ae19629-2198-13a3-e055-000000000001
SOUTH GATE A	2ae19629-2199-13a3-e055-000000000001
SOUTH GATE B	2ae19629-219a-13a3-e055-000000000001
St. MARY'S (EAST)	6b896afd-b53d-4ebc-bd6e-0154e333b3af
St. MARY'S (WEST)	2ae19629-21cb-13a3-e055-000000000001
St. PATRICK'S A	2ae19629-21a6-13a3-e055-000000000001
St. PATRICK'S B	2ae19629-21a7-13a3-e055-000000000001
St. PATRICK'S C	2ae19629-21a8-13a3-e055-000000000001
SUNDAY'S WELL A	2ae19629-21a9-13a3-e055-000000000001
SUNDAY'S WELL B	2ae19629-21aa-13a3-e055-000000000001
TEMPLEBREEDY	2ae19629-21ec-13a3-e055-000000000001
THE GLEN A	2ae19629-21ab-13a3-e055-000000000001
THE GLEN B	2ae19629-21ac-13a3-e055-000000000001

THE LOUGH	2ae19629-21ad-13a3-e055-000000000001
TIVOLI A	2ae19629-21ae-13a3-e055-000000000001
TIVOLI B	2ae19629-21af-13a3-e055-000000000001
TOGHER A	2ae19629-21b0-13a3-e055-000000000001
TOGHER B	2ae19629-21b1-13a3-e055-000000000001
TRAMORE A	2ae19629-21b2-13a3-e055-000000000001
TRAMORE B	2ae19629-21b3-13a3-e055-000000000001
TRAMORE C	2ae19629-21b4-13a3-e055-000000000001
TURNER'S CROSS A	2ae19629-21b5-13a3-e055-000000000001
TURNER'S CROSS B	2ae19629-21b6-13a3-e055-000000000001
TURNER'S CROSS C	2ae19629-21b7-13a3-e055-000000000001
TURNER'S CROSS D	2ae19629-21c0-13a3-e055-000000000001
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WHITECHURCH	2ae19629-213a-13a3-e055-000000000001

Annex C – List of Comments Contributed by Survey Participants

Q.1	Q.2	COMMENTS
b	d	30% is a lot, I'd have to think about it long-term.
b	d	Anything that helps sustainability.
a	c	Didn't think cows and trees were related.
b	c	I wouldn't support organic either.
b	d	For the same price it's a no brainer.
b	d	I don't think everyone would understand why this matters.
b	d	How much does it actually cost to set up the AF and maintain it?
b	c	How would you know it was real?
b	d	I buy organic as is.
b	d	I buy super milk.
b	d	I can afford it but I don't drink loads of milk, there's only two of us.
b	c	I couldn't do the price difference long term.
b	d	I didn't know that about trees (after my explanation).
b	d	I don't drink much milk so I can afford the price jump.
b	c	I had a "conventional" farm myself so it'd be close (Q.1).
b	c	I hate monocultures but farmers get away with murder as it is.
b	d	I wouldn't have picked the premium if you hadn't told me why it (AF) mattered.
b	d	I wouldn't think to look for AF products, wouldn't notice them if they were there.
b	d	I'd alternate between the more and less expensive.
b	d	I'd always pick the more sustainable option.
b	d	I'd firstly choose organic.
a	c	I'd get what I was familiar with, maybe if the design was more eye catching...
b	d	I'd go for the more expensive because it seems like better quality.
b	c	Why do they need more money for tree planting?
b	c	I'd have paid the premium if you'd told me the benefits (of AF) before.
b	d	If I knew it was actually going to the farmers I'd pay.

b	c	If I knew more about it, I might pay the premium.
b	c	If the price difference was less I would pay the premium.
b	c	If I'd known the benefits beforehand I would have paid the premium.
b	c	If the premium was less I would have paid.
b	c	If the price difference was smaller I'd pay the premium.
b	d	I'll pay (the premium) while I can afford it.
b	d	I'm living at home so I can afford it.
a	c	Is it still a farm if it has trees?
b	d	It just sounds right (to have trees on a farm).
b	d	Knowing it'd contribute to more sustainable farming, I'd pay the premium.
b	d	Over the last few months I've been convinced climate change is real and that we need to do something. I wouldn't have paid the premium before.
b	d	The higher price would convince me of its quality, that it was real.
b	d	The price difference isn't very much.
b	d	The trees are more eye catching (still bought it because of the sustainability element).
b	c	Times being what they are, whatever is cheapest like.
b	d	Well isn't it obvious (to pick AF).
b	c	Whatever is cheapest.
b	c	Whatever is cheapest.
a	c	What's the relation to milk? I can see why trees matter, but not how buying milk is connected to more trees.
b	c	Whichever is cheapest, it doesn't matter to me. I do like the look of the trees on the landscape though
b	d	Why would you pick a?
b	d	I would pay the premium and I am on a pension
a	c	I don't know what AF is...

Annex D – List of questions asked across the 5 interviews, not inclusive of probing questions

INFORMANT CATEGORY	QUESTION
Agricultural, Government, Academic, Supply-Chain	What is your background?
Agricultural	Are you currently interested in planting tree on your farm? - Why/Why not?
Agricultural	Do you think consumers would be more likely to buy / be willing to pay more for your product if it was associated with trees?
Agricultural	Does consumers' observed WTP convince you to adopt AF?
Agricultural	How do your products reach consumers currently?
Agricultural	Does your dairy coop/processor/retailer encourage the implementation of sustainable farming practices?
Agricultural	Do you think your dairy coop/processor/retailer would pay more for your produce if they were coming from an AFS?
Agricultural	Do you currently receive an increased profit from the sale of goods produced through sustainable practices?
Agricultural	Would you be interested in AF labelling?
Government, Academic	Has AF labelling been considered? - If not, is it worth considering?
Government, Academic	Are farmers showing interest in tree planting?
Government, Academic	Does the adoption of AF lead to a loss of economic profitability?
Government	Is AF suitable for all farmers?
Government	What would be needed for farmers to feel secure in their decision to adopt AF?
Government	Is there support for farmers who want to adopt AF?

Academic, Supply-Chain	Do farmers express that their primary concern with AF is the lack of financial incentive/security?
Academic	Is consumers' observed WTP indicative of a reliable market niche for AFP?
Academic	If the central issues are not financial why is the conversation so often about money?
Academic	Do you think that intensive conventional farmers are ever likely to adopt AF?
Academic	In your experience have you seen supply chain actors supporting AF?
Academic	In your experience does the public display adequate knowledge about AF?
Academic	Is there sufficient infrastructure in place to support AFPs labelled as such?
Supply-Chain	Was your sustainability program developed because of top-down or bottom-up demand?
Supply-Chain	Is AF practiced by your suppliers?
Supply-Chain	What are the sustainability measures you promote? - Is AF one of them?
Supply-Chain	Which measures are unpopular amongst your suppliers? - How popular is planting trees?
Supply-Chain	Are products coming from suppliers who have completed the sustainability program labelled differently?
Supply-Chain	Is there a demand from retailers for sustainably produced products?
Supply-Chain	Are most of your suppliers' products exported?
Supply-Chain	Does your organisation contact farmers directly to encourage the adoption of sustainable measures?
Supply-Chain	What is the atmosphere amongst farmers around the adoption of sustainable agricultural practices?
Supply-Chain	Could your organisation help your suppliers adopt AF?

Annex E – Case Summaries

Participant ID 01			
Interview Question	Summary of Response	Accompanying Quote	First Order Codes
Are you currently interested in planting tree on your farm? Why/Why not?	They are currently planting trees along hedgerows, riparian corridors and to fill unused corners. (TS) They mainly do so as a form of water management, to make use of marginal land, to build biodiversity, provide ecosystem services¹ and to increase their livestock's welfare². (VT)	1. "it (trees) provide for my farm but also the landscape at large" 2. "I often see my cattle reaching over the fence, browsing on the willow, it's clear they like the stuff"	Tree Suitability (TS) Valuing Trees (VT)
Do you think consumers would be more likely to buy / be willing to pay more for your product if it was associated with trees?	They indicated affirmatively, stating that as an organic farmer they recognise that there is a niche market for products coming from sustainable agriculture. (LB) They highlighted that the marketing strategy would need to be well thought out³ and that it may be better to use a biodiversity/sustainability score⁴ rather than an AF specific indicator. (L)	3. "how are you going to quantify the value of the trees to the buyer?" 4. "What about using a nature value score? Something that could work in conjunction with other land practices"	Labelling Barriers (LB) Labelling (L)
Does consumers' observed WTP convince you to adopt AF?	They stated that it wasn't enough to outright convince them to adopt AF. (MTM) They indicated that adopting AF was not going to be just about the money for farmers, that it would have more	5. "farmers can be demons as much as they can be custodians" 6. "peer-to-peer learning is what's needed"	More Than Money (MTM) Economic Question (EQ)

	to do with the farm's structure, the age of the farmer, future ownership of the farm, their current values⁵, their communities values⁶ and what kind of examples they have around them⁷. (MTM) In their experience there wasn't enough encouragement for farmers who were on the fence about adopting alternative farming practices^{8,9}. They described that in their own life adopting sustainable methods had been a journey of becoming aware¹⁰ of nature and its' benefits¹¹. (MTM) They believe that farmers should be compensated for the ecosystem services they provide through the adoption of sustainable farming practices and they felt that the observed WTP would make a significant contribution¹² to supporting farmers after their government grants had elapsed. (EQ) (SSP-N)	7. "some farmers are real champions" 8. "this one farmer I knew had started practising some sustainable methods but they didn't want it known publicly for fear that his neighbours would think different of him" 9. "they (other farmers) need not to be just listening to the propaganda" 10. "a journey of awareness" 11. "we don't know much, the surface of things, we have so much to learn from nature" 12. "the financial benefits always matter"	Support for Sustainable Practices – No (SSP-N)
How do your products reach consumers currently?	They sell their calves directly to other farmers, while their pork is sold through a variety of methods including directly to consumers, through speciality retailers and through online platforms. (SC)		Sales Channels (SC)
Does your dairy coop/processor/retailer	They stated that they received no encouragement from their retailers to		SSP-N

encourage the implementation of sustainable farming practices like planting trees?	adopt further sustainable farming practices. (SSP-N)		
Do you think your dairy coop/processor/retailer would pay more for your produce if they were coming from an AFS?	They stated that they did not believe that their retailer would pay them extra or incentivise them in any way to plant trees on their farm ¹³ . (SSP-N)	13. “I’m just happy to have somewhere to sell my product”	SSP-N
Do you currently receive an increased profit from the sale of goods produced through sustainable practices?	They stated that the economic benefit was not why they went organic. They stated that the reason they went organic (and why they now plant trees) was seeing the impacts conventional farming had on the land ¹⁴ . (VT)	14. “there used to be a spot up by the river which we left mostly alone, it wasn’t worth farming. It was always full of life, you’d turn a rock over and there’d be all kinds of bugs coming out. Long tufts of grass supporting the birds and the bees, plus the cows liked eating the native vegetation. I wanted that for the rest of my farm”	Willingness to Pay (WTP) VT
Further comments:	They mentioned the growing opportunity for corporate support for afforestation on farms in order to acquire carbon credits. (EQ) They described partaking in a scheme called Refarm in which they agreed with a company on a planting commitment to be undertaking by themselves (the farmer) and the financial compensation for doing so. They described liking the process	15. “very little bureaucracy” 16. “Was it a fair deal?”	EQ Third Party Support (TPS)

	because it was very simple and whatever finances were not spent on the planting they got to keep hassle free¹⁵. The only issue they mentioned was being unsure if they were receiving just compensation for their planting commitment¹⁶. (TPS) They also mentioned that AF might have some relevance to support shorter supply chains for certain products and could look for support from projects such as the mid-west short food supply chain. (TPS)		
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Participant ID 02			
Interview Question	Summary of Response	Accompanying Quote(s)	Identified Themes
Are you currently interested in planting tree on your farm? Why/Why not?	They have 300 trees over 40 acres, predominantly in hedgerows and along farm boundaries. They stated that they were not interested in planting them on internal parts of the farm. (TS) They state that their father started planting trees after realising the impact of conventional farming¹. They continue to plant having inherited the farm as they are willing to sacrifice a degree of profitability for the biodiversity value². (VT) (EQ) In their opinion, AF does not provide strong enough biodiversity benefits³ to	1. “error of his ways” 2. “your losing money with every tree planted” 3. “it’s not a natural environment” 4. “it’s not good value for money” 5. “you’d be better off planting all the trees in one area to create a natural woodland”	TS VT EQ

	be worth the financial loss⁴ and doesn't create intact ecosystems⁵. (VT) (EQ) They believed that it would be too difficult to manage giving all the fencing, risk to livestock, grazing patterns, loss of grass production and extra workload⁶. (TS)	6. "It's an unsuitable land use for dairy"	
Do you think consumers would be more likely to buy / be willing to pay more for your product if it was associated with trees?	They were unsure if consumers had sufficient knowledge about farming practices to notice the difference between AF milk and conventional ⁷ . (WTP)	7. "Are consumers educated enough?"	WTP
Does consumers' observed WTP convince you to adopt AF?	They stated that no, it would not convince them currently⁸, because you'd need simultaneous mass adoption by farmers in order to supply a quantity of milk which could be marketed as AF. (LB) In their opinion AF just isn't suitable for dairy production^{9,10,11} due to the common operational structure of dairy farms (and for the reasons mentioned previously). (TS)	8. "price wouldn't matter at all" 9. "someone ran with it and no one contradicted them" 10. "it's not an efficient land use" 11. "taking land out of production is too serious, it's not practical, you can't be asking farmers to do that"	LB TS Labelling (L)
Would you be interested in AF labelling?	They stated that no they would not be. They raised concern over the reliability of any label which was currently developed ¹² . They thought that without government intervention ¹³	12. "Who'd verify the farms? Who'd verify the certifiers? Where'd the money come from to do so?"	LB TS L

	sufficient infrastructure would never be in place to enable it. (LB) They reiterated that in order for a label to reach the market in a meaningful way you'd need a lot of farmers to adopt AF and in their opinion that would never happen^{14,15}. (LB) In their opinion the difficulties encountered at farm level far outweigh the positives¹⁶. (TS) They mentioned that a much more feasible system is a 'space for nature' system, in which all kinds of natural ecosystems are included as a percentage of the total area. (L) In their opinion, this set up would be much more flexible, allowing farmers to include the nature in a more complete sense (rather than single trees), and in a way which suits the farm better¹⁷. (TS) They mentioned that a 'space for nature' label already exists but that farmers won't go near it because they are scared of losing conventional supply channels¹⁸. They added that even then, who would verify each farm's unique composition to ensure that it was legit^{19,20}? (LB)	13. "a major injection" 14. "AF just isn't for milk" 15. "asking farmers to leave 2m buffers by their hedgerows is already a lot." 16. "price (increase) wouldn't matter at all" 17. "you need a mix of ecosystems" 18. "it would show up the industry for what it is" 19. "Who judges what counts as natural ecosystems?" 20. "who would pay for the certification process?"	
How do your products reach consumers currently?	They stated that all dairy (including theirs) goes through a coop, unless you are selling locally. In which case, it's a small enterprise and you could not rely	21. "to process dairy at scale you need machines,	Channel Dynamics (CD)

	on it as your only source of income ²¹ . (CD)	infrastructure and to meet regulations”	
Does your dairy coop/processor/retailer encourage the implementation of sustainable farming practices?	They stated that there was no incentive along the supply chain to carry out sustainable farming practices, even organic practices never mind planting trees, suggesting a lack of infrastructure and dedicated processors/coops being the main bottleneck²². (SSP-N) They described that there is no incentive giving because much of the dairy industry is all for intensive agricultural systems²³. They described that given the status quo it would not be in many coops immediate financial interest to encourage a new label^{24,25}. They added, that the middle men, be it the coop, processors or retailers, are disincentivising the labelling of goods as nature friendly because they would lose face by admitting that current practices aren’t nature friendly²⁶. (SSP-N) They commented that the only way to sell milk labelled as nature friendly would be through direct sales to consumers and then you risk losing on sales through competing with the coops, stating that farmers would choose the safest option²⁷. (CD)	22. “I have to sell my organic milk as conventional because no one will collect it” 23. “many of the members and the directors (of the coops) would be against it (reduced production in favour of biodiversity)” 24. “would have so much to lose” 25. “no one would buy from their own one anymore”. 26. “it wouldn’t be good for the Bord Bia brand” 27. “devil you know”	SSP-N CD

Do you think your dairy coop/processor/retailer would pay more for your produce if they were coming from an AFS?	They said that there was no indication that financial compensation would be given by anyone along the supply chain and that the market is already uncertain ^{28,29} . (L)	28. “it’s a struggle for organic farmers to stay afloat” 29. “adding another label to the mix would be mental and could undermine current sustainable initiatives”	L
Do you currently receive an increased profit from the sale of goods produced through sustainable practices?	In their opinion there’s no profit in it at all, they do it because they feel a moral duty to ³⁰ , it is a financial loss. (VT) (EQ) They added that even government incentives only enact superficial change ³¹ and don’t meet the mark as far as genuine change goes ³² . (TPS)	30. “because it’s the right thing to do” 31. “tick box exercise” 32. “with the current grants it doesn’t matter whether you are getting paid for the nature or the milk, you’re getting the grant all the same”	VT
Further comments:	They reckon that AF became a bit of a trend, that it can work situationally but by in large it’s not suitable for the majority of farms (from a practical standpoint). (TS)		TS

Participant ID 03			
Interview Question	Summary of Response	Accompanying Quote(s)	Identified Themes
Has AF labelling been	They described that within an Irish context, as far as they knew, AF	1. “AF is mostly only starting”	LB WTP

considered? If not, is it worth considering?	labelling had not been seriously considered yet. They explained that there was not yet a sufficient output of AFPs in Ireland to consider labelling¹. (LB) They expressed uncertainty around the current consumer market and were doubtful whether consumers would actually follow through with the WTP observed in the previous stage of the research². They further questioned whether there was sufficient education within the public to understand why a premium price for AF is merited³. (WTP) They questioned what were the essential differences between organic and AF labelling, considering that to qualify for AF within Ireland farmers must also adhere to expanded restrictions on inputs^{4,5}. (L) They again questioned whether consumer knowledge was high enough to distinguish the two⁶. (L)	2. “it’s a lifestyle choice, which requires enough disposable income, would they really pay for it?” 3. “people feel like they shouldn’t be paying more for AF/org. because there is less inputs” 4. “AF is essentially organic” 5. “their wouldn’t be much point going through all the work to develop a dedicated AF label when organic is only a few extra steps” 6. “can people distinguish the two?”	L
Are farmers showing interest in tree planting?	They expressed that there was little interest coming directly from farmers to undertake integrated planting initiatives⁷. They described that farmers do recognise the benefits of some trees, but any benefit is overshadowed by the	7. “farmers like trees not forests” 8. “farmers like trees, but not that they can’t change their mind” 9. “AF could bridge the gap”	Sustainability Interest (SI) MTM Farm Culture (FC)

	permanent land use change which accompanies planting⁸. (MTM) (SI) They stated that AF could be a powerful land use by integrating the two sectors, which have historically remained separate⁹. (FC)		
Does the adoption of AF lead to a loss of economic profitability?	In their opinion it was highly debatable and farm dependent whether the implementation of AF should be considered a financial loss^{10,11}. (EQ) They mentioned the potential for carbon sequestration streams and product diversification to provide the opportunity for other income sources. There was some doubt whether adapting AF for income maximisation would reduce its applicability as an ecosystem service provider¹². (EQ)	10. “if you are a sheep grazer you are already operating in a less intensive system, the sheep can still graze, you’ll have an extended grazing season leading to less costs for feed, housing and vet bills” 11. “if you equate profitability with grass production that yes (it may be less profitable), but there are a multitude of payments and cost-reducing effects which can make up for that” 12. “the carbon sequestration capacity of broadleaves is lower than coniferous”	EQ
Is AF suitable for all farmers?	We discussed how the loss of profitability associated with the adoption of AF may differ between farm types¹³. They continued to discuss that profit margins, tolerances and needs may differ from farm to farm¹⁴. They added that the implications of having groups of trees differ depending on your livestock¹⁵. They stated that the need for premium prices	13. “dairy farmers are obsessed with grass production” 14. “it might not be a net gain for dairy farms, but for a sheep farm maybe” 15. “the size of the cow matters, if you have large cows lumbering about you’d need robust trees”	EQ TS Knowledge Gap (KG)

	(therefore standardised labelling) may differ between farms¹⁶. (EQ) (TS) We discussed that AF and organic farming systems require higher degrees of investment and different skill sets than conventional farming, which not everyone will have. (KG)	16. “In a dairy farm the premium (price) would really matter”	
What would be needed for farmers to feel secure in their decision to adopt AF?	They described the productionist mindset with which many farmers operate¹⁷. (FC) We discussed how important it was to have the whole process mapped out, that farmers needed developed demonstration sites for various farm types within various scenarios, and that the benefits associated with AF could be quantified and monetised¹⁸. (KG) They mentioned that a farmers local community and their perceptions are guiding decisions at the farm level^{19,20}. (MTM) We discussed how the need for long-term projections of AFS’s effect, which are backed up by empirical evidence, was essential. Especially considering the growing period of trees^{21, 22}. (KG) They discussed how succession planting was an area in which their organisation wanted to raise more	17. “most farmers are productionists and grass is product” 18. “It needs to be demonstrated that it can work” 19. “family, friends and neighbours are driving farm decision making” 20. “most people don’t want to be seen as an outsider” 21. “in 10, 20 years’ time what is this going to look like?” 22. “we need to be able to paint them a picture of what this is going to look like” 23. “succession planting, if they’ve opted for it, do the next generation know what is the purpose of the AF, the vision, and how to manage it correctly?” 24. “trees just kind of exist, but aren’t actively engaged often”, “in	FC KG MTM

	awareness for and develop tools to support up-coming generations²³. (KG) They described this as been a being a central concern, because in their experience, in forestry, many heirs to land parcels just ignore the forestry^{24,25}. They stressed that farms are future oriented enterprises²⁶. (FC)	Ireland there is very little forest management (by private peoples)” 25. “the knowledge base just doesn’t exist” 26. “farmers want to leave the farm as an asset for the next generation and that AF will only be seen as an asset if it is profitable... results matter”	
Is there support for farmers who want to adopt AF?	They described their organisation’s role in providing trainings, in conjunction with the Irish Agroforestry Forum, for farmers who want to learn the skills necessary to adopt AF, and mentioned that they were in the process of developing demonstration sites around the country. They described a plenitude of free organisational and online resources available to farmers who wanted to plant²⁷. (KG) They stressed that adding trees to a farm system is a complex undertaking, but that they believe that trees can be integrated successfully^{28,29}. (TS)	27. “be it free services through Teagasc, which provide comprehensive advise for the whole tree planting, farm management plan and farm integration process, or the IAF and EURAF which provide detailed resources explaining the technical aspects of AF by using demonstrations, examples and a decision support tool”. 28. “it is a complicated decision that they are making” 29. “we want trees to be seen as an integral plant of the farm”	KG TS
Further comments	They mentioned that a lot of farmers already practice AF through the maintenance of hedgerows, and questioned if this could be counted as AF? In either case, they reckon	30. “organic-lite” 31. “a bone of contention”	FC L

	that what is needed is a more deliberate management and inclusion of AF as a farm resource in order to bridge the gap between the sectors. (FC) Discussing AF's relationship with organic, they thought that there was a risk of creating unwanted competition between the two labels^{30,31}. They thought that since the added value of AF would not be higher than org. from a consumer standpoint, that instead of competing for premium prices it could be worth focusing on the cost-reduction provided by AF^{32,33}. (L)	32. "reduced costs is the same as increased profit after all" 33. "animal welfare benefits have value to farmers"	
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Participant ID 04			
Interview Question	Summary of Response	Accompanying Quote(s)	Identified Themes
Are farmers showing interest in tree planting?	They responded that interest has gone up across the board. From people taking advantage of the increased grant premiums associated with government schemes and independent planters¹. They stated that in both cases however, adoption was being undermined by the land redesignation associated with planting². (SI) (MTM)	1. "Yes particularly in the last few years, the grant has really pushed that along, the ft8 has acquired one of the highest rates of applications from all the forest types" 2. "One of the barriers that we have known about for a long time is the redesignation, lots of landowners would feel if they plant and that happens they	SI

		would be limiting the options of future generations”	
Do farmers express that their primary concern with AF is the lack of financial incentive/security?	In their opinion the financial incentive is not the biggest issue, land designation is, and that financial incentive alone would not be able to overcome that barrier. (MTM) They felt that a redesigning of the land designation regulations was necessary, such that greater independence was giving to farmers and the farm’s inheritors⁴. (MTM) They felt that by doing so AF would have a greater chance of being integrated into contemporary farming practices and culture. (FC)	3. “For some farmers that is the case, but for the majority it wasn’t the biggest barrier, certainly you throw more money at something and some people will change their mind but that doesn’t feel like it’s the right way around it” 4. “What I would like to see is where there is a time limit put on, so that instead of the land becoming forest land and forever remaining forest, rather you plant and can’t fell a tree for say 40 years, so that if you do fell within the 40, you have to replant, but afterwards you could switch back to agriculture. I would find that my successor, because they have grown up with the trees there, they’d be happy to keep the trees, especially if AF was proving itself to be beneficial.”	MTM FC
Has AF labelling been considered? If not, is it worth considering?	To the best of their knowledge AF labelling had not been seriously considered. Mainly because of the complex bureaucratic burden and lack of complementary infrastructure to support the certification and	5. “labelling is certainly something that has been mentioned but I don't think there is serious research yet considering it. There’s a lot of administration involved in setting up a labelling, how is it going to be regulated, as a	LB L

	accreditation of such a label⁵. (LB) They thought that a model similar to the organic model could work for AF, and mentioned several examples of retailers and processors who did incorporate trees into their product designs^{6,7}. They thought that if a label was created which could ensure premium payments for farmers who had adopted AFS than the uptake of AF would increase accordingly⁸. (L)	consumer how can I be sure that that the product labelled as AF is actually coming from an AF system?” 6. “the organic model could work with a premium for AF, generally the public like to see trees, they associate trees with good things” 7. “I have a photo of an Avenmore milk carton were they used one side of the milk carton to show the virtues of the trees they have planted” 8. “if the AF trees can be used to create a premium payment for farmers than that is certainly going to grease the wheels of having AF on farms and having an AF label with an associated consumer premium price would help that”	
Is consumers’ observed WTP indicative of a reliable market niche for AFP?	They were not certain to what degree people could be relied on to act in the same way they indicated they would during the survey ⁹ . (WTP)	9. “there’s people pleasers, that would guess what kind of answer you are looking for, I won’t disappoint you, that 50% I would take with a pinch of salt, but it’s encouraging”	WTP
Does the adoption of AF lead to a loss of economic profitability?	They acknowledged that establishing and maintaining an AFS does incur extra costs, but that there are government	10. “there is certainly a cost in the establishment, but if you take up the grant, the grant can cover in a lot of cases the cost in that”	EQ KG

schemes in place to largely cover those costs^{10,11}. They also highlighted that unlike other afforestation schemes through AF you continue to generate agricultural income from the farm. In their opinion the schemes are there to supplement the temporary loss in profitability which may occur while establishing the AFS¹². (EQ)

They explained that if profitability was being calculated through pasture yield than its impact on profitability would depend largely on the farm design. They were confident that if designed correctly AF could improve the profitability of many farms¹³. (EQ)

They described a desire to have more evidence and empirical data on how exactly AF does impact the profitability of the farm enterprise. Suggesting that good examples are currently missing¹⁴. (KG)

11. “certainly there would be some costs for the management of the trees over the years replacing tree shelters and that kind of thing, and that's where I view the premium payments (from the government schemes) as a management payment to cover the cost in those early years”

12. “... the afforestation schemes are to compensate for revenue forgone, you cannot produce agricultural revenue from the land any more, but that's not the case in AF, you still get agricultural revenues, so I view it as a management tool which helps maintain the profitability of the agricultural enterprise”

13. “If they are talking about the reduction in pasture yield, there is certainly a reduction, but then it also depends on the site, in X they found they can extend the grazing season for up to 17 weeks, because the AF dries out the soil during the shoulders of the grazing season, so they can get the animals out earlier in Spring and keep them out longer in Autumn. So if you design the AF so that you are planting somewhere wetter, so

		that the site would actually benefit from the AF, potentially you could actually increase your profitability” 14. “it’s certainly something that we need more case studies of, owners who have set up agroforestry, and then calculate all the costs and revenues that they are getting for the entire farm enterprise, not just from the field with the AFS, because it can have implications for the entire farm.”	
If the central issues are not financial why is the conversation so often about money?	They felt that the economic reality is always going to be relevant but that until the issues surrounding land designation are addressed the majority of landowners won’t pursue AF regardless of the economic incentives^{15,16}. (MTM) They also stressed the fact that farmers who do currently plant are often looking beyond the immediate economic gain (price per L) towards other benefits. Such as decreased inputs, higher animal welfare, extended grazing periods all of which in-directly increase profits¹⁷. (VT)	15. “whatever they do in their farm is going to have implications for the food on their table” 16. “finances can come into the picture after” 17. “farmers who do plant see the benefits (of planting), they aren’t only considering maximum production, they value the other benefits enough”	MTM VT

Do you think that intensive conventional farmers are ever likely to adopt AF?	They thought that intensive farmers, giving the example of dairy farmers, were unlikely to adopt until the cost of not adopting was sufficiently great. Be it by climate change ¹⁸ , through demonstrations of the effects of AF on animal welfare ¹⁹ , or if other economic incentives come into force ²⁰ . (FC)	18. “the impacts of hot weather may begin forcing farmers to adopt” 19. “if AF can increase milk yields during extreme weather it may be used as a risk mitigation strategy” 20. “down the line farms may be penalised for emissions or even rewarded for carbon capturing carbon”	FC
In your experience have you seen supply chain actors supporting AF?	They mentioned that plenty of large corporations are developing green policies which will increase the demand for sustainably produced ingredients ²¹ . Similarly they mentioned that supermarkets will typically have sections dedicated to sustainably produced ingredients which could support the visibility of such products. (SSP-Y)	21. “I believe McDonalds have started exclusively using free range eggs”	Support for Sustainable Practices – Yes (SSP-Y)
In your experience does the public display adequate knowledge about AF?	In their opinion the public was not sufficiently informed about AF or its benefits ²² and there was an over emphasis on benefits for the ecosystem, when the conversation really needs to be about the benefits for farmers ^{23,24} . (WTP) (L)	22. “so much more education is required for consumers and farmers” 23. “the public likes the idea of environmental services, but does the farmer know what benefits they will get?”	WTP L

		24. “it can’t be just about ecosystem services, it needs to be about the benefits farmers get”	
Is there sufficient infrastructure in place to support AFPs labelled as such?	In their opinion, given the current state of the sector, AF labelling could only work through direct sales from farmers to consumers at the local level ²⁵ . (LB)	25. “currently we don’t have the means or standards with which to verify if a product is an AFP”	LB

Participant ID 05			
Interview Question	Summary of Response	Accompanying Quote(s)	Identified Themes
Was your sustainability program developed because of top-down or bottom-up demand?	They thought that it was developed with demand from both sides. They mentioned that there was more interest from the supplier side in the initial years of the program and they have had to adapt since then to keep new members joining¹. (SI) They noted that lot of the demand from the supply side was because on a farm environmental and economic sustainability are closely interlinked². They further highlighted that most farmers are interested in adopting more sustainable practices but can’t if the initial or maintenance costs are too high³. (SI)	1. “as we continue through the cycles we’ve caught all the low hanging fruit of guys who are keen to participate in the programs and we are now trying to appeal to those who may be working full time or have other commitments” 2. “there is a great desire from our supplier base to improve on those metrics of sustainability for the reasons that environmental sustainability is it’s really closely linked to economic sustainability and you know that's really important for viability on farms and that's going to get guys interested”	SI SSP-Y

	From the organisation's side they felt that knowledge transfer was a valuable and an effective method to support the adoption of sustainable practices which was in line with their agenda⁴. (SSP-Y)	3. "everyone wants to be sustainable but it also needs to be done in a way which can improve the economic sustainability and it also needs to be done in a way such that it does not incur a massive cost for the supplier to engage in those processes" 4. "mean age of farmers in Ireland is old enough, its over 40 so it's good to see those guys who might not have had the chance to go to university or do the green cert back in the 60,70 or 80s reengage back with education, so there is definitely a demand from the supplier base, and then it comes full circle with our own interest"	
Do farmers express that their primary concern with AF is the lack of financial incentive/security?	They felt that there were two main factors governing farmers' decision to adopt sustainable practices in general. They've observed varying degrees of willingness to adopt, from eager to disinterested. In their opinion those who are quick to adopt one measure will often adopt another⁵ and vice versa⁶. (SI) They felt that adoption was massively governed by individual's proclivities, their background⁷,	5. "there would be guys who are straight on that, asking how can I access this funding, to develop my farm x,y,z" 6. "he doesn't want to change the way he has been doing things all his life" 7. "my brother graduated with a degree in agricultural and my father has been a farmer all his life ... my brother would be like well here is the science"	SI MTM

what their community is saying⁸ and then the norm set by their processor⁹. (MTM)

They felt that cost of implementation and the expected returns mattered massively in of itself¹⁰ but also within the context that farmers are constantly asked to adapt their farms in line with changing regulations. In their opinion this puts a lot of pressure on farmers financially and mentally, leaving them too occupied to consider adopting additional practices¹¹. They did feel however, that with sufficient financial incentive and if grants covering the establishment costs are provided then farmers would consider adopting new measures¹². (SI)

8. “then urea comes in and you know farmers be chatting and gossiping about, is this working, what's this like, protected urea isn't great, that's a rumour that would spread and go through the circles until my dad would be like oh no we can't use protected urea”
9. “there'll be the guys who follow on after we do our comms pieces”
10. “and then obviously investment and the cost is massive, because at the end of the day what's the price you are going to get per litre”
11. “when that goes up lads are going to need way more slurry storage, and most people are tight enough as it is and that will have an effect on the nitrates derogation and how highly people can stock the land, so a dairy farmer for the most part wants to stock as heavily as you can because that's how you make your money, that's the way they see it, so they will have to invest in slurry storage, most guys don't want to because the price of concrete right now

		is really expensive and the price of building is quite expensive, so it is a worrying time for farmers” 12. “if I suggested that before this fund came in lads would be laughing at you, no one’s going to put their money into this, this could cost 10000 euro, whereas when the funding is there, they think it’s a bit of weird suggestion, but the money is there so they are willing to give it a go”	
Is AF practiced by your suppliers?	They were not overly familiar with AF themselves and felt that based on the location of their organisation’s supplier base not many of them would be practicing AF either. (KG) They thought that AF might be more suitable for regions with poorer soils, such as in the West of the country¹³. Similarly they struggled to imagine AF working well for dairying, suggesting instead that it might be more suitable for sheep or suckler farms¹⁴. (TS) (KG)	13. “we really have a belt of really good land, mostly brown earth soils, not so much forestry in those areas, I’d imagine AF is a practice more so geared for those guys in the west” 14. “I’d imagine AF would pertain more to sucklers or maybe sheep, it just seems a bit more workable, cause I’m trying to imagine what it would look like and when I think of the intensity of dairying, the way in which they interact I don’t really know what they would look like”	KG TS
What are the sustainability measures you promote? Is AF one of them?	They explained that they mainly promoted the adoption of sustainability measures through a program which involved the	15. “planting so many hedges, planting trees, use low crude protein feed, having a nutrient management plan in place,	SSP-Y SI

	completion of 7 out of 20 sustainability actions. Farmers who had completed the program would receive a premium price per litre of milk¹⁵. (SSP-Y) They mentioned that their current focus was mainly on encouraging practices which increased the efficacy of farm's water and nitrogen management systems, because they were set as priorities by the EU¹⁶. (SSP-Y) They stated that the measures which most interested farmers were those that could decrease the cost of their inputs¹⁷ or those from which they could receive subsidies for¹⁸. They mentioned that many of their suppliers had become more interested in organic production because of the subsidies, while other adopted it as a lifestyle choice¹⁹. (SI)	engaging with the ASSAP program or the farming for water EIP, using recommended low index bulls, engaging in the milks solid program, which is another program in the company which focuses on maximising milk solids output per litre, so I think 95% of our suppliers engage with X because it pays, and many of them are already doing lots of these actions because of derogation” 16. “the last renewal of the derogation water quality was a priority Europe wanted us to focus on, for the next round now of the habits directive they want us to look at that as well” 17. “what they are most interested in is how to be sustainable, and the knock on effects of that like if they can reduce their fertiliser and feed, if they can increase their forage or silage, they can lower the cost of those inputs which will have a knock on effect on the nitrogen balance” 18. “all roads lead back to the pursue really, i mean that's the bottom line really, obviously other things come into that”	
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		19. “some guys just really love to do things differently”	
Which measures are unpopular amongst your suppliers? How popular is planting trees?	They said that farmers will prioritise completing the measures which are most within their reach²⁰. Such as, measuring grass, clover incorporation, milk recording, low emissions slurry spreading, protected urea. Others, such as, genotyping is not commonly practiced. (SI) She describes that farmers’ attitudes towards hedgerows has changed with time. When once it would have been common practice to maximise space on the farm through the excessive maintenance of hedgerows and the removal of ditches²¹, now it has become more common for farmers to let hedgerows develop and maintain ditches²². Partially from the benefits to animal welfare which larger hedgerows can provide and in part due to schemes which financially incentivise their integration into the farm²³. They added that even if hedgerows were popular, tree planting outside of the hedge was still not very common. (FC)	20. “look people go for the low hanging fruit, they want the things they’ve kind of already done, but look some of the guys will go above and beyond, they might have nearly all the actions done” 21. “looking back over my college years, people were really farming on the ditches and it was cutting hedges every year, even taking ditches out of it, Jesus they loved clearing ditches” 22. “many are cutting biannually, letting hedgerows grow, you know” 23. “apart from being a great natural defence or a fence, I think guys are starting to see the benefits of letting animals shelter naturally and kind of the benefits of letting the hedgerows go, lots of guys would uptake the hedgerows or tree planting measures from the EIP”	SI FC
Are products coming from suppliers who have completed the	They indicated that there was no such classification carried out ²⁴ . (L)	24. “there would be no labelling or identification, it is just based on the price”	L

sustainability program labelled differently?			
Is there a demand from retailers for sustainably produced products?	In their experience they found that it was the large international processors/retailers who would be most interested in premium products²⁵ and most willing to pay premium prices²⁶. This was considered to be operationally convenient for their organisation as they would be the buyers placing the largest orders²⁷. (SSP-Y) They described being unsure of how much of the increased profit from the sale of premium products travelled down the supply chain to their suppliers²⁸. (CD) They wondered at a consumer level how reliable the market for premium products could be²⁹. Especially considering new competition with products coming from outside of the EU³⁰. (WTP)	25. “I’ve seen the biggest demand from guys for sustainable products is from the larger players” 26. “they would pay a premium for the high environmental standards that we place on our supplier base” 27. “consumers appreciate the quality of the milk but its large manufacturers who will place a large cheddar order for example” 28. “I don’t know if it would trickle down to the farmer (the premium price), and from a business perspective I think it’s us (the organisation) that sees the benefit of the premium products” 29. “even I, as a consumer, it’s a fine line whether I would be willing to pay for a premium product, it can depend on the day and a lot of guys are just reaching for the cheapest thing on the shelves, it’s the way a lot of people go, reaching for the cheapest bag of biscuits”	SSP-Y CD WTP

		30. “it begs the question why are we doing all this, if beef which doesn’t comply is going to be put on the same shelf anyway and then snatched up, while our stuff is left there.”	
Are most of your suppliers’ products exported?	They stated that yes, a large amount of their products would be exported, because Ireland produces much more dairy than it needs nationally ³¹ . It was noted that it is their organisations intention to continue to develop themselves in the international market ³² . (SC) On the other hand, they observed that most of their suppliers were indifferent about where the products went unless it effected the price they received ³³ . (FC)	31. “our self-sufficiency with butter is like 500%, we have much more than we need” 32. “we want to enter the global market and expand, but the farmers, once it leaves the gate...” 33. “of course everyone is proud to see their milk on the shelves but unless it made a difference for price I don’t think they care much where it goes”	SC FC
Does your organisation contact farmers directly to encourage the adoption of sustainable measures?	They stated that it is taking more outreach to get new participation because they have observed the position of farmers become quite polarised, between farmers who already have a high level of adoption and those who have very little. (SI)	34. “the supplier base is somewhat polarised between people who have and are engaged and those who haven’t and wont, there isn’t much movement anymore”	SI
What is the atmosphere amongst farmers around the adoption of sustainable agricultural practices?	They stated that there is a range of attitudes amongst farmers, from those who have had bad experiences and would prefer no longer to be involved in schemes to those who feel that participating is a way to strengthen the industry ³⁵ .	35. “guys who have has a bad experience can be angry, nobody wants to be controlled and it’s a mixed bag, some would walk on by and leave it all behind, others would like to	

	In either case, they highlighted that the bureaucratic burden on farmers is intensifying and that many farmers are finding it too difficult to manage ³⁶ . (SI)	participate and try increase milk prices.” 36. “the amount of paperwork has become insurmountable, there’s so much to do and adapt to, it can make things a real hassle for farmers”	
Could your organisation help your suppliers adopt AF?	They indicated that they could not ³⁷ . (KG)	37. “we wouldn’t have the knowledge or infrastructure to help with that, so we’d just direct them to Teagasc, it’s all there.”	KG

Annex F – Declaration of Originality

Declaration of Originality

I, Giacomo Degano hereby declare that this Master thesis entitled “Agroforestry Labelling’s Potential to Incentivise Agrarian Tree Planting in The Republic of Ireland“ is my own original work and all the other sources of information used are duly acknowledged. This thesis and any parts of it have never been submitted to any other university for any academic award.

Date 31/08/2026

Signature

A handwritten signature in black ink, appearing to read 'G. Degano', written over a light blue circular stamp.

Annex G – Declaration of Availability at SLUB

Declaration of Availability at SLUB

Herewith I entitle the SLUB, Branch Library of Department of Forest Sciences to make available my master thesis for general library usage, including the direct usage in its facilities.

Date: 31/08/2026

Signature:

A handwritten signature in black ink, appearing to read 'Guley', is written over a light blue circular stamp.