Farm afforestation in Ireland: A multi-method study exploring farmers’ decision-making with regard to forestry as an alternative land-use option

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To Paula and Carl.

And to Georg.

*Your love, support and belief in me gave me the strength to take on, go through and finish this task.*
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Abstract

Ireland has one of the lowest forest covers in the European Union. Only about 12% of its land surface is covered with trees. The natural conditions, however, are favourable to tree growth. On the other hand, some agricultural land-uses, especially cattle and sheep farming in the West of Ireland, are economically not viable. The Irish Government intends to increase the forest cover to 17% mainly by financially supporting the private afforestation of farmland. It is expected that such growth will lead to the establishment of a range of wood-processing industries bringing additional employment opportunities to rural areas while at the same time offering farmers who struggle to make a living from farming an option to diversify their businesses. For this purpose, an afforestation scheme was established in 1989, which pays farmers who afforest an annual premium and covers all establishment and maintenance cost. The interest in planting was high in the early years. Over the years, however, planting rates have dropped significantly. Although the incentives to afforest were improved, planting rates did not recover and the Government’s planting targets were not met. This research project set out to explain this shortfall in planting and to recommend alternative policy tools encouraging more farmers to plant. For this purpose, a multi-method approach was used, employing a qualitative and a quantitative study. The aim was, first, to explore farmers’ goals and values influencing their decision-making with regard to farming in general and to afforestation of farmland in particular. A number of different monetary and non-monetary reasons for not joining the afforestation scheme were identified as playing a role in the afforestation decision, with the non-monetary reasons being more important to the majority of farmers. These non-monetary reasons were influenced by a number of intrinsic, social and expressive farming values. To establish the importance of these values in relation to farm-structure and socio-demographic factors and their relevance for designing alternative policy tools was the second objective of the study. The third objective was to develop a model describing a farmer’s probability to join the afforestation scheme based on farm structure and socio-demographic variables as well as the identified goals and values with regard to afforestation.
Statement of Original Authorship

I hereby certify that the submitted work is my own work, was completed while registered as a candidate for the degree of Doctor of Philosophy, and I have not obtained a degree elsewhere on the basis of the research presented in this submitted work.

Format of the thesis

This thesis is submitted for examination in the format of a collection of three papers, which have been published in peer-reviewed international journals.

Publications associated with this work

Duesberg, Stefanie; O’Connor, Deirdre; Dhubháin, Áine Ní (2013): To plant or not to plant—Irish farmers’ goals and values with regard to afforestation. Land Use Policy 32, pp. 155-164.


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1 Introduction

1.1 Overview
The study sets out to explore Irish farmers’ decision-making with regard to farm afforestation. The structural and political context in which such decision-making is embedded will be briefly sketched out in the following chapter. First, a brief overview of the current state of agriculture and rural development in Ireland is given. Second, the conditions for forestry in Ireland are portrayed. Furthermore, an account is given of the policy framework supporting farm afforestation in Ireland. The chapter also states the study problem, the objectives of the study and the structure of this thesis. It also outlines the methodological approach taken in the overall research project and highlights the utility of the study.

1.2 Agriculture and rural development in Ireland
In Ireland all farms heavily rely on direct payments (Hennessy et al., 2011). Without them, particular farming systems such as cattle and sheep farms in the North and West where soils are poorer and the climate is more extreme than in the South-East of the country – wouldn’t be viable as on average their market output is negative (ibid). In addition farm sizes in the West are smaller when compared to the South and the East (CSO, 2012). Between 1995 and 2009 average farm incomes in Ireland declined by 43% when adjusted for inflation (Connolly et al., 2010). Furthermore, farm incomes have become increasingly volatile and dependent on the world market situation for agricultural produce, fuel and other input goods. Due to the continued decline of farm income, the role of off-farm employment in securing the viability of the farm is becoming increasingly important to farm households. About a third of all farms in Ireland wouldn’t be viable without off-farm income (Hennessy et al., 2011). The education levels of Irish farmers (holders), however, are low with about 70% of all farmers having only lower secondary education (Behan et al., 2007). Furthermore, there is regional variation with farmers in the West of Ireland having the poorest education levels (ibid). During the Celtic Tiger period, large numbers of construction and manufacturing jobs became available and provided off-farm income mainly to
male workers with low education levels (Meredith, 2011). These employment opportunities collapsed with the economic recession beginning in 2008 and as a consequence the increase in unemployment rates in rural areas and for male workers has been higher than the national average (ibid). Furthermore, due to the overall decline in farm incomes, the number of jobs available in agriculture had decreased further reducing opportunities for male workers with no or little training (ibid).

1.3 Forestry conditions in Ireland
Under natural conditions Ireland would be completely covered with trees. However, due to human agricultural activities, colonization and wartime needs, forest cover continually declined over the centuries (Neeson, 1991). The lowest percentage of forest cover was reached at the beginning of the 20th century. In 1904 only 1.5% of the land area was forested (Forest and Wildlife Service, 1980). Today about 12% of Ireland is woodland and just over half of the forest area is owned by the State (Forest Service, 2011).

In Ireland 50% of the land is classified as marginal for agricultural use and is eligible for support under the EU’s Less Favoured Areas-scheme (EUROSTAT, 2008; Gardiner and Radford, 1980). The conditions for tree growth, however, are very favourable in Ireland. The Gulf Stream has a warming effect in winter and a cooling one in summer. Winter temperatures are 16°C above of regions such as Poland or Quebec located on the same latitude as Ireland. This and an average annual precipitation between 750 and 1250 mm results in an average yield class twice as high as the European average (Gardiner, 1993). Thus, afforestation is regarded as a beneficial addition to farm enterprises especially in areas with poor soil quality.

1.4 The Irish farm afforestation scheme and its objectives
To encourage farmers to plant trees on their land, the Irish farm afforestation scheme pays an annual premium for the duration of 20 years to bridge the income gap from the time of planting until the first revenues from timber harvestings are due. Furthermore, all establishment and maintenance cost are covered by a grant. When
compared to cattle and sheep farming, planting a forest under the scheme would be more profitable (Behan and McQuinn, 2005; Frawley, 1998). When the scheme was first set-up in 1989, the level of interest was high and so were planting rates (Figure 1, p. 43). The premiums increased significantly after the scheme was transformed into an Accompanying Measure according to EC regulation 2080/92 (Forest Service, 2009). As a consequence, planting rates peaked in 1995 when 17,000 hectares of farm were afforested (DAFF, 1996). In 1996 the Government published a long-term afforestation strategy which set out to increase Ireland’s forest cover to 17% (DAFF, 1996). To achieve this target, the strategy outlined planting levels of 25,000 hectares per annum until the year 2000, and 20,000 hectares per annum from 2000 until 2030 (ibid). A forest cover of 17% had been calculated as the minimum amount necessary to ‘make true competition and the operation of market forces possible and to support a range of processing industries’ (DAFF, 1996, p. 2). However, after the strategy was published planting rates declined. Between 1996 and 2012 only about half of the targeted area had been planted.

The Irish farm afforestation scheme pursues a number of economic and social objectives (DAFF, 1996). In terms of economic targets, it aims to increase timber output, stimulating the rural economy and providing farmers with alternative income streams. Due to declining farm incomes, farm households are becoming increasingly dependent on alternative incomes, so forestry and its related industries could provide alternative job opportunities in rural areas, especially for farmers with little formal education (Bacon, 2004; Meredith, 2011). With regard to public goods for the society, it is expected to create environmental benefits by increasing the variety of wildlife habitats as well as recreational and leisure services. However, the main objective of the scheme is to increase the island’s forest cover (DAFF, 1996).

The financial incentives were improved a couple of times over the years, but planting rates did not increase. For example the premiums increased in 1995, 1999, and 2007, bringing the minimum premium paid in 2012 to 369 Euros per hectare and year (Figure 1, p. 43). In 2005 the Government allowed farmers who planted to consolidate the Single Farm Payment, which meant they could continue to receive direct agricultural
payments on the afforested land. An additional Forest Environment Protection Scheme (FEPS) was introduced in 2007 to attract those farmers receiving payments under the Rural Environmental Protection Scheme (REPS). The REPS scheme had been identified as one of the barriers for farmers to join the afforestation scheme (Bacon, 2003). The REPS scheme had been introduced as part of the reform of the Common Agricultural Policy in 1993 to encourage farmers to carry out specific farming activities in an environmentally friendly way. It offered farmers a competitive alternative to forestry that did not require a change in land use (Bacon, 2003). The costs of complying with the REPS scheme were minimal for those operating cattle and sheep farms – which traditionally had been the farming types most likely to be converted to forestry. A further attraction of REPS for farmers was that the land enrolled could be withdrawn after the period of five years, whereas the decision to afforest is irreversible under current legislation (DAFF, 2010). FEPS was introduced to offset the competition between the afforestation scheme and REPS. It paid farmers in REPS who established a forest of high nature value a premium for the duration of five years. In addition, REPS farmers were allowed to continue to receive the REPS payments on the rest of the land, which would otherwise have been lost if afforesting without FEPS support. Notwithstanding FEPS being in place, planting rates did not recover.

1.5 Problem statement

Despite the financial incentives being offered, planting rates did not recover and failed to meet the Government’s targets. Hence, the Department of Agriculture, Fisheries and Food states in its Rural Development Programme that ‘the major difficulty with the [afforestation] programme at the moment is the low rate of take-up’ (DAFF, 2010, p. 60). As a consequence of the afforestation targets not being met according to the projected estimates, it will not be possible for a range of processing industries to develop. This, however, would be crucial in order to provide much needed economic stimulus in rural areas that suffer from structural deficiencies, as it would provide alternative income streams in times of declining farm incomes. In the current policy context, this is to be achieved by encouraging more farmers to afforest.
1.6 Study Objectives

In the context of understanding the decision-making process of Irish farmers with respect to farm afforestation a number of studies – economic models as well as empirical studies – have been conducted to explain the shortfall in planting rates. However the phenomenon of farmers refraining from afforestation despite its financial attractiveness has not been not fully explained. The existing body of literature on farmer participation in voluntary schemes suggests that factors other than economics – such as structural or socio-demographic factors play an important role in this process. A great number of other such factors have been described in the literature about farmer participation in voluntary schemes, among them are concepts such as attitudes, goals and values, personality, and social capital. For the purpose of this thesis, they will be subsumed under the heading ‘individual farmer factors’. The nature and role of these individual farmer factors in terms of farm afforestation in Ireland has hardly been explored in-depth to date. In particular, there is little emphasis on qualitative approaches giving Irish farmers the opportunity to explain the rationales for this decision from their own point of view. Furthermore, there appear to be few attempts to develop a holistic model describing Irish farmers’ propensity to plant – capturing individual farmer factors as well as farm structure and socio-demographic variables.

The objective of this study is to first understand and explore the range of potential barriers to farm afforestation from an individual farmer’s point of view. In order to create policy relevant outcomes these results had to be quantified (Cloke, 1997). Also, as Burton (2004) argues, studies combining both structural and individual farmer factors are appropriate in particular for investigating farmer response to policy schemes. Therefore, the second objective of this study is to quantify the identified afforestation barriers, to recognize their importance for the wider farming community in Ireland and to assess the relevance of the findings as to the design of more effective policy tools. The third objective is to identify the combined effect of individual farmer factors, socio-demographic and farm structure variables on a farmers’ propensity to plant. This necessitated developing a holistic model explaining Irish farmers’
afforestation decision based on the range of individual farmer factors as well as the farm structure and socio-demographic variables identified.

1.7 Structure of the thesis

The findings of the research project were presented in three research articles published in peer-reviewed international journals; they form the core of this thesis. As well as this introductory chapter, the thesis comprises a chapter reviewing the relevant bodies of literature (chapter 2), the three articles (chapters 3, 4 and 5) and a final chapter, which presents a summary, discussion and conclusions (chapter 6).

The remaining two sections in chapter 1 introduce the overall methodological approach taken to address the outlined research objectives and state the potential utility of the study.

The topic of the thesis builds upon multiple research areas such as agriculture, rural development, forestry, decision-making, policy design and modelling farmers’ behaviour. Chapter 2 gives insights into these related bodies of literature. It provides the context in terms of policy background with regard to agriculture, rural development and forestry. It also reviews the literature on farmer decision-making with regard to land use in general, as well as the more specific literature on farmer decision-making with regard to farm afforestation in Ireland. It also outlines the role of policy tools in decision-making and policy tool choice. The chapter closes with a review of the literature on modelling farmer decision-making based on a combination of structural and individual farmer factors.

The literature review chapter is followed by the three chapters representing the research articles mentioned above. They present the key study results as well as providing detailed accounts of the relevant underlying theory and methodologies as well as discussions and conclusions relevant to the particular findings. The first article (chapter 3), deals with the study’s first objective of exploring farmers’ goals and values with regard to land-use in general and afforestation in particular. The subject of the
second article (chapter 4) relates to the study’s second objective of quantifying the identified afforestation barriers, recognizing their importance for the wider farming community in Ireland and assessing their relevance for the design of more effective policy tools. The third article (chapter 5) addresses the study’s third objective, which is to develop a holistic model explaining Irish farmers’ afforestation decision based on the individual farmer, farm structure and socio-demographic variables previously identified as playing a role.

As this thesis is composed of a collection of three stand-alone research articles there inevitably is an amount of overlap in terms of the introductory, background and theory sections of the three article chapters. This was accepted in order to keep the integrity of the articles intact and allow the reader to approach each of the three chapters as the stand-alone articles they are.

The three articles are followed by a final chapter (chapter 6) discussing the study’s overall findings and drawing conclusions in a more general manner than was possible in the individual research papers. It also highlights possible future research objectives.

1.8 Methodology
The above outlined objectives are characterised by two different theoretical perspectives on the perception of reality: The first objective of understanding and exploring how farmers make the decision of afforesting farm land deals with the reality as perceived by the farmers, a reality that is internally experienced, socially constructed and interpreted through the actors. According to Quinn Patton (2002, p. 21) it is qualitative approaches that allow the researcher ‘to understand the world as seen by the respondents’. For this reason a qualitative approach was chosen to address the first research objective. Furthermore, to date, quantitative approaches have dominated the studies undertaken on Irish farmers’ decision-making with regard to afforestation (see also chapter 2.4). In past studies, farmers were mainly confronted with predefined questions and possibilities of answers rather than being given the opportunity to articulate their own views. To let them talk about their personal
reasoning behind the decisions of land-use in general, and afforestation in particular, thus is crucial to gain a deeper understanding of the decision-making process and the goals and values influencing it and to close the qualitative gap in the literature.

The second and third objective of the research project on the other hand dealt with questions underlined by a positivistic research paradigm such as measuring the importance and examining the relationship of the variables identified as influencing farmers’ decision making with regard to afforestation for the wider farming community in Ireland. As the study was very much an applied one, another goal of the research project was to make policy recommendations that are based on a sound database. Thus, the second and third objective was approached by quantitative methods. Overall, this resulted in the application of a multi-method research approach.

The main objective of the first part of the research project was to explore and identify farmers’ main barriers to planting. To date, no in-depth explorative, qualitative study had been conducted on this topic in Ireland. Thus, in order to gain knowledge on as many planting barriers as possible, the chosen method needed to be open and non-constraining. At the same time, a number of quantitative studies had been conducted researching farm afforestation in Ireland, the UK and elsewhere as well as an even larger number of studies looking at farmer decision-making in general. This body of knowledge provided theoretical ideas upon which this study builds. This approach is supported by Layder’s (1998) ‘adaptive theory’, which attempts to combine an emphasis on prior theoretical ideas and models, which feed into and guide research while at the same time attending to the generation of theory from the ongoing analysis of data. When compared to a ‘grounded theory’ approach as first developed by Glaser and Strauss in 1967, the advantage of the adaptive theory approach is that it includes prior knowledge and thus increases the explanatory power of the collected data.

For the purpose of creating a theory that is based on an existing body of knowledge in the data the collected data needed to be organised in a way that allowed it to be
analysed in a structured manner. For this purpose 62 in-depth interviews were conducted with farmers on their farms. A guidance note (Appendix 8.1, p. 143) structured the in-depth interviews while at the same time allowing enough room to explore topics brought up by the farmers during the interviews. Where goals and values were discussed, the guidance note was developed based on the theory of goals and values of farmers developed by Ruth Gasson (1973), who had described four groups of farming values, which are instrumental, intrinsic, expressive and social values (see section 2.6 for more details). The interviews were conducted in areas where the dominant farming systems are those that can potentially benefit most from afforestation, i.e. in regions where cattle and sheep farming dominate. The chosen study areas were counties Sligo, Roscommon and Westmeath (Figure 3, p. 54).

The objective of the second part of the research project was addressed through two research questions: First, it aimed to reveal the importance of those barriers that had been identified among the wider farming community. The second objective was to link barriers to planting to structural or socio-demographic factors on farmers’ afforestation decision-making in order to determine which policy tool or mix of tools would be most appropriate in further encouraging farm afforestation. For this purpose a quantitative study was conducted in form of a mailed questionnaire. The questionnaire was sent out to a random sample of 4,000 farmers, of which 1,529 forms were sent back, resulting in a response rate of 38%. The survey form (Appendix 8.2, p. 145) comprised questions on structural and socio-demographic variables such as farm size, enterprise type, education, age and marital status; questions on the planting barriers identified in the in-depth interviews; and questions that were informed by the theory of behavioural assumptions underlying policy tools developed by Schneider and Ingram (1990). Based on this theory three potential policy tools were identified for the further encouragement of farm afforestation in Ireland. These were identified as incentive, capacity and symbolic tools. (Those tools will be described in more detail in section 2.7). The questionnaire was designed in order to establish which of the potential alternative tools – or which mix of them – would be appropriate to encourage farm afforestation in Ireland. As the objective of this part of the study was to establish the significance of planting barriers among the wider farming community
in Ireland, the questionnaire was sent out nationwide and included farmers from all farming and socio-demographic backgrounds.

The third major objective of the study was to develop a holistic model describing farmers’ propensity to afforest land depending on structural, socio-demographic and individual farmer factors. For this purpose, the data collected in the survey was used to undertake probability modelling, more specifically to create a logit model estimating a farmer’s probability to plant dependent on the surveyed variables.

1.9 Utility of the study

The study set out to explore farmer behaviour with regard to a specific decision-making situation from a farmer’s point of view and extrapolate the findings onto the wider farming community. Farmers’ decision-making with regard to land-use does not only influence the individual landowners’ businesses and lives. On an aggregate level, the decisions made by landowners also potentially affect the wider society by affecting a country’s agricultural output in terms of quantity and quality as well as the performance of rural economies and the state of the environment and the landscape.

These wider societal effects of aggregate farmer decision-making justify Governments trying to influence farmer behaviour and decision-making in a way that benefits both the individual landowner and society at large. Understanding the processes underlying farmers’ decision-making will help to effectively and efficiently have such influence. This is of particular use in times where agricultural policy objectives in the EU are pursued by non-regulatory, voluntary approaches and where it is the EU’s principle to allow policy decisions to be made at the lowest possible administrative level.

Furthermore, Siebert et al. (2006) in a review of 160 European and international studies looking at farmer participation in voluntary agri-environmental schemes found that most of the qualitative studies had been carried out at regional level and that attempts of systematic up-scaling or multidisciplinary approaches were lacking. Burton (2004) furthermore points out that the ‘cultural turn’ of rural studies taking place in the late 1980s and 1990s, has meant a move towards a more sociological perspective.
in rural studies and a marginalisation of quantitative approaches. More recently, the number of quantitative studies looking at farmers’ behaviour with regard to land-use change has increased again. While some of them included qualitative pilot studies (Jongeneel et al., 2008; Wauters et al., 2010), there is a tendency to focus on quantitative approaches at the expense of previous in-depth exploration of the study topic (Hansson et al., 2013; Mettepenningen et al., 2013; Poppenborg and Koellner, 2013; Yiridoe et al., 2010). Hence, combining a qualitative and a quantitative research approach to study Irish farmers’ afforestation decisions has the potential to further add knowledge to the general body of literature on farmer decision-making and behaviour.

1.10 Conclusion

In Ireland, there is a necessity to provide farmers who operate low-income farms with alternatives to diversify their businesses. When looking at the natural conditions, forestry would be a suitable alternative on many farms. An increased forest cover would also benefit rural economies in terms of supporting timber-processing industries, which could provide much-needed jobs in rural areas. To encourage such diversification, the State has established an attractive incentive scheme available to farmers. However, the take-up rate by farmers is not high enough to support a range of processing industries (DAFF, 1996). A number of studies have been conducted to date in order to explain this shortfall. However, the phenomenon has not been fully explained. Among the studies conducted, a lack of explorative qualitative approaches can be identified, as well as a dearth of attempts to develop an explanation combining structural, socio-demographic and individual farmer factors. To close this gap, a multi-method research project was undertaken that also aimed to identify alternative policy tools to further encourage farm afforestation in Ireland. A pre-requisite for this analysis is an understanding of the bodies of literature on which the study is built. More specifically the following chapter will describe the development of the political rationale for supporting farm afforestation from the wider perspective. It will furthermore give an account of the literature on decision-making of farmers with regard to land-use in general and forestry in particular. Finally an overview is given of
the role and significance of policy tools in decision-making and the literature on modelling farmer behaviour.
2 Literature review

2.1 Overview

The following chapter provides insights into the various bodies of literature upon which this thesis is built. The first two sections place the Irish farm afforestation scheme into its wider political context in order to illustrate the political and societal rationale for farm diversification through afforestation. Section 2.2 provides this background from a rural development perspective by tracing the changing paradigms in European rural development and agricultural policies since the end of World War II until today. Section 2.3 follows the changing role of forestry for societies at large and more specifically as an instrument in rural development during the same period.

Sections 2.4 and 2.5 provide reviews on the research literature related to farmer decision-making. It locates the approach taken in this study within this literature as well as the wider sociological theory underpinning it. Section 2.4 highlights the main findings made on farmer decision-making with regard to afforestation of farmland in Ireland and elsewhere. In section 2.5 the development of the literature on farmer decision-making is sketched out in a more general sense. Section 2.6 discusses the main theories underpinning the research of farmer decision-making and rationalises the theory choice to investigate research objective one, to understand and explore the range of potential barriers to farm afforestation from a farmer’s point of view. The theories relevant to research objective two and three are discussed in section 2.7. It reviews the various policy tools available and the significance of choosing the appropriate policy tools or mix of tools in order to achieve a desired policy outcome. It also highlights the role of the various tools in the decision-making process of a target population in terms of whether to comply with a policy or not. Finally, section 2.8 provides an insight into the literature on modelling farmer behaviour with regard to land-use change and rationalises the analytical approach taken to address research objective three.
2.2 Rural development in the European Union

Rural areas in Europe have gone through fundamental changes in the past decades. Agriculture in the second half of the 20th century was revolutionised by science and technological innovations (Lowe, 1992). A key driver of this change was the EC’s Common Agricultural Policy (CAP). Its main objectives after its establishment in 1962 were to secure food supply at reasonable and stable prices, as well as to safeguard and enhance the livelihood and living standards of farmers. Primary agricultural production was perceived to be the basis for such development and for social and economic life in rural areas (Burton and Wilson, 2006; Marsden, 1995). Productivity of labour and land grew quickly and farming became increasingly industrialised through intensification, concentration and specialization (Hoggart et al., 1995; Ilbery and Bowler, 1998). The success of the modernisation model was based on increased margins between costs and revenues of agricultural production (O’Connor et al., 2006b; Ward, 1993). Agricultural modernisation, however, did not occur uniformly in all rural areas. There was an uneven, differentiated development between the member states of the European Union but also within them (Marsden, 1995). While some rural areas benefited from agricultural modernisation and the settlement of industrial firms, others struggled to find alternatives to replace economic activities lost due to structural changes in the agricultural sector and experienced job losses and depopulation.

The effects of agricultural modernisation and rural restructuring in Ireland

When Ireland joined the (then) EEC in 1973, some rural areas and agricultural enterprises benefited from the modernisation model and the support payments. Larger farms with higher outputs received higher support payments compared to their less thriving counterparts. This led to a situation where dairy and tillage farmers in the East and South of the country benefited from the accession, while small cattle and sheep farms in the West and North of the country became increasingly marginalised (O'Connor et al., 2006a). Due to Ireland’s natural conditions and history there has always been a gap between larger, more prosperous farms in the Southeast and East of the country and small farms on poor soils in the West and Northwest. This gap,
however, widened further after Ireland had joined the EEC (O'Connor et al., 2006a). This process of the West being marginalised was further amplified by the rapid economic development of the Celtic Tiger-years that began in the early 1990s, offering huge numbers of well-paid off-farm jobs in urban areas. Between 1971 and 1996 the population in the north-western counties on average declined by 19% and the employment by 24% (Leavy, 2001). At the same time population and service employment increased in rural areas adjacent to bigger towns like Cork, Limerick and Waterford.

The crisis of productivist agriculture

By the end of the 1970s productivist agriculture in Europe was in crisis (Lowe, 1992; Ward, 1993). According to Commins (1990) the economic mechanism of improved margins started to slow down from the mid 1970s, when production costs grew faster than the prices for agricultural produce. This cost-price squeeze even increased in the 1990s as economic returns stagnated or even declined, while costs increased more than ever (O'Connor et al., 2006b). Today about half of all Irish farm households engage in off-farm employment to support the viability of the farm (Hennessy et al., 2011). Continued agricultural modernisation policies also induced massive overproduction, the disposal of which had put the EEC’s budget as well as its relationships with trade partners under pressure (Colman, 2001; Harvey, 1997; Laffan and O’Mahony, 2008). Furthermore, due to increased labour and land productivity, average farm sizes had increased and large numbers of agricultural jobs were lost. From the early 1980s there also was growing public concern about the negative environmental externalities of industrialised agriculture (Erjavec et al., 2009; Lowe, 1992; Potter, 1998; Ward, 1993). A growing urbanised society expected rural areas not only to provide food but also public goods such as pleasant landscapes for recreation and living as well as natural values such as a rich wildlife and a healthy environment (Marsden et al., 1993; van der Ploeg et al., 2000).

The development of a post-productivist paradigm

The crisis of productivist agriculture initiated the development of a new paradigm in agriculture. At policy level, responses to the problems associated with industrialised
agriculture in some EU member States were apparent in rural development measures introduced as early as in the 1960s (O'Connor and Dunne, 2009). From the early 1980s, the CAP was continuously reformed. First implemented were quotas, set-aside and extensification regulations. Later on, with the MacSharry reforms in 1992, agri-environmental measures and also the general support for the afforestation of agricultural land followed. As the focus of these policies was on support decoupled from agricultural output, researchers in the field of geography and rural sociology in the early 1990s conceptualised this new rural development paradigm as post-productivist (Cloke and Goodwin, 1992; O'Connor et al., 2006b; Potter and Burney, 2002; van der Ploeg et al., 2000; Ward, 1993). According to Ilbery and Bowler (1998) productivism is characterised by an intensified, industrial agriculture driven primarily by increased output and productivity. In contrast they describe a post-productivist regime as a transition from intensification to extensification, from concentration of agricultural resources to the dispersion of resources and from agricultural specialisation to diversification (ibid). While such categorisations are widely deployed in explaining the fundamental shift that has taken place in post-war agriculture, the dualistic nature of the productivist/post-productivist discourse has been criticised as potentially deceiving, leading to a simplistic categorisation in which underlying processes of change often remain unspecified (Evans et al., 2002; Marsden, 1999; Wilson, 2001). Lowe et al. (1993) argue that rather than a single-trajectory development from a productivist to a post-productivist phase taking place, features of both categories co-exist next to each other. While in some rural areas, agricultural productivity still plays a pivotal role in the local economy, other rural areas depend less on agricultural incomes due to the presence of industrial firms (Marsden, 1995). As a consequence, rural areas today facilitate a multitude of production (e.g. agriculture, industrial and service firms, forestry and other biomass) and consumption activities (e.g. various active and passive forms of recreation) (Marsden et al., 1993).

**Farm level adoption strategies to declining farm incomes**

At farm level, farmers all over Europe have developed various adoption strategies to the cost-prize-squeeze based on the market, policy and technology opportunities available (van Der Ploeg, 2000). These strategies include the development of farm-
based as well as off-farm activities (O’Connor et al., 2006b). Van der Ploeg et al. (2002) classified three groups of farm level adoption strategies: Deepening, Regrounding and Broadening. Deepening strategies engage in expanding or re-linking traditional core production activities to increase the value added to the produce (e.g. organic farming, on-farm processing). Regrounding takes place where new resources or a new mix of resources is used to increase the viability of the farm (e.g. off-farm employment or low input farming). Broadening strategies include creating new on-farm activities such as tourism or the production of energy; it also includes the afforestation of agricultural land (O’Connor et al., 2006b; Slee, 1989).

Current policy developments

The post-productivist policy paradigm outlined above is coming under pressure itself. In 2007 and 2008, a series of extreme weather events around the world triggered severe food shortages, which were pronounced by the growing world population and increasing food demands in the emerging economies. Pressure has also come from the increased use of agricultural land for the production of bio fuels (Pimentel et al., 2009). Furthermore agricultural commodities are more and more used in the finance sector for speculation, further driving up prices (Ghosh, 2010). In the light of these events, the demand for agricultural output is rising again. As a consequence, the EU abolished set-aside regulations in order to bring agricultural land lying fallow back into production. These circumstances set the scene for the latest major CAP reform in 2013. Farmers on the ground are very anxious to optimally position their farm businesses for these changes. They are not only worried about cuts in payments; they have also experienced higher price volatilities in the past due to previous CAP reforms, extreme weather events and the global food crises. The European Commission acknowledges these developments by stating in its proposals to the CAP reform that ‘the pressure on agricultural income is expected to continue as farmers are facing more risks, a slowdown in productivity and a margin squeeze due to rising input prices’ (European Commission, 2011). Rutz et al. (2012) identified among the speeches and proposals made in preparation of the CAP reform, a commitment by the Commission to a continued income support for agriculture in order to provide food security in both short and long-term. With regard to the CAP reform, the EU’s Parliament, Council of
Ministers and Commission have agreed to continue the support of the afforestation of farmland through grants and annual premiums (European Commission, 2013a).

2.3 The changing role of forestry in rural development

Similarly to agriculture, the role of forestry in rural development in the post-war period initially was dominated by a productivist paradigm. Afforestation policies up until the 1970s were geared towards the highest possible timber output in order to reduce timber shortages (Elands and Wiersum, 2001; Marey-Perez and Rodriguez-Vicente, 2009; Mather, 2001; Milbourne et al., 2008). Such planting was typically undertaken by the State on poor quality land in remote areas with low population density and was supposed to provide income and employment in marginal rural areas (Hyttinen et al., 2000; Marey-Perez and Rodriguez-Vicente, 2009; Mather, 1998). For this purpose, predominantly fast-growing conifers were planted on marginal agricultural land such as dunes, coastlands and mountainous areas (Carvalho Oliveira and Monteiro Alves, 1993; Mather, 1998; Slee, 2006; Watkins et al., 1996). Mirroring the shift in European agricultural policies from the productivist to a post-productivist paradigm, the rationale for supporting farm afforestation changed gradually. While region-specific EEC farm afforestation schemes still supported the afforestation of marginal agricultural land in disadvantaged areas in order to stimulate rural economies, they also addressed environmental problems such as soil erosion, drought and fire risks (Council of the EEC, 1979, 1980).

Another change in the objectives of the EEC’ afforestation policies took place when agricultural overproduction became obvious. As a consequence, food prices declined and farm households struggled to make a living from farming, especially in areas where the natural conditions were less favourable to farming. The support of the afforestation of agriculturally used land rather than uncultivated land offered the possibility to provide farmers with an alternative income and at the same time address overproduction as well as provide environmental management functions (Lowe et al., 2002). In 1985, the first EEC-wide farm afforestation scheme was introduced (Council of the EEC, 1985). Additionally, when in 1988 the EEC introduced set-aside
programmes, forestry was allowed as a non-agricultural land-use on set-aside land. It was expected that farmers would choose forestry over leaving the land fallow as it had the potential to give some return in the future. However, up until 1991, only 2% of land was afforested under the set-aside regulation (Anz, 1991). Farm afforestation support was further improved by Council Regulation 2080/92. It allowed and supported payment for the establishment and maintenance cost plus an annual premium, payable for the first 20 years (now 15 years) after planting, to compensate the farmers for the income loss incurred during the non-productive period of the established forest (Council of the EEC, 1992; European Commission, 2005). Under this regulation, a number of countries in Europe set up premium payment schemes for farm afforestation.

**Difficulties with afforestation schemes**

Despite the presence of financial incentives for farm afforestation, planting rates did not always meet expectations and were volatile throughout all countries (Edwards and Guyer, 1992; Mather, 1998). Furthermore, planting in Finland, France, Germany, Ireland, Italy, Spain and the UK had still mainly been done on unproductive, poor land such as heath land, mountainous areas or bog land (Barbero, 2000; Mather, 1998). Thus the contribution of afforestation to reducing agricultural outputs was marginal (Breil du Pontbriand, 2000). Another issue with farm afforestation in Ireland is that the average size of farmer owned plantations is only about nine hectares. They are typically isolated plots of forests and not adjoining to form a larger forest estate, as it is the case in some countries in mainland Europe. Farrelly (2006b) found that areas smaller than nine hectares have difficulties in terms of getting thinning operations carried out as the timber volume is too small to be attractive to potential buyers. However, even farm forests with a size greater than nine hectares might have problems to sell their produce if located far from potential buyers (ibid). Another issue with farm forests is that due to a lack of forest management, the produced log sizes will not satisfy market requirements (Bacon, 2004). Similar experiences with regard to plantation sizes and timber quality have been made in France (Buttoud et al., 1991).
The development of a multifunctional forestry paradigm

The change in afforestation objectives from increasing timber outputs to reducing agricultural outputs happened at a time where EU land-use policies in general and forestry policies in particular moved towards a post-productivist paradigm (Mather, 2001; Milbourne et al., 2008; O’Connor et al., 2006b; Potter and Burney, 2002; van der Ploeg et al., 2000). A defining feature of this post-productivist paradigm was the notion of multifunctional land-use (Lowe et al., 2002; Potter and Burney, 2002). In Central Europe, forests had been multifunctional for centuries before their role as timber producers went centre stage. Due to growing populations and resource exploitation, forest areas had dramatically declined in a number of European countries by the late 18th century (Farrell et al., 2000). In Ireland the most severe deforestation took place during the colonisation and settlement period under the reign of Elizabeth I. With the plantation of English and Scottish farmers, a systematic exploitation of Irish forests began. By 1711 Ireland was mainly treeless and a net importer of timber (Neeson, 1991). During the 18th and 19th century trees only were planted on the demesnes of English gentlemen (O’Carroll, 2004). Several Land Acts were introduced in Ireland at the end of the 19th and the beginning of the 20th century, which obliged the English landlords to sell their land cheaply to their Irish tenants. As a consequence, many landlords felled the trees on their properties and sold the timber to take out as much profit as possible, further reducing forest cover (ibid).

In Europe, during the age of Industrialisation, timber for fuel and construction became increasingly important. In the 18th and 19th century, forestry schools were established in Germany, France and Austria, which looked at forests from a productivist viewpoint in order to create a sustained yield of timber (Farrell et al., 2000). This was achieved through establishing fast-growing, single-specied conifer forests and an intensified use of fertilizer and pesticides. Similar to productivist agriculture, however, productivist forestry entailed a number of ecological problems, such as ground and fresh water pollution through fertilizers and chemicals (ibid). Forestry in Ireland in the past has been criticised in terms of its negative environmental impact such as the acidification and eutrophication of ground- and surface waters as well as the destruction of rare habitats such as blanked bogs (Tomlinson and Fennessy, 2009). According to Mather
forests in mainland Europe even became a symbol for the state the environment was in, with a clear-felled forest, or one suffering from diseases or air pollution, being a symbol of an environmental malaise or a dysfunctional human-environment relationship.

Slee (2007) points out that those negative environmental externalities were the starting point for a paradigm shift towards post-productivist forestry policies in the second half of the 20\textsuperscript{th} century. Later, when the public became more demanding in terms of the amenity services of forests, the social values of forests such as recreation and their importance for nature conservation, local cultures and livelihoods have moved into the focus of forest policies (Mather, 2001; Slee, 2007). In Ireland about three quarters of all forests consist of non-native tree species with Sitka Spruce dominating (52\% of trees), followed by Lodge pole Pine (11\%) and Norway Spruce (4\%) (Forest Service, 2007b). Many rural dwellers regard the dominance of non-native conifer species as having a negative impact on the landscape (Fléchard et al., 2006). They would prefer more broadleaf trees to be planted because of their benefits for landscape, wildlife and recreational services (Carroll et al., 2009; Collier et al., 2002).

**The multiple roles of forests and farm forests**

Deploying the multiple forest resources in a sustainable way has become more and more important in the light of globally increasing pressure on natural resources e.g. for renewable energy or food for a growing population (Slee, 2012). For contemporary forests, a broad pool of potential functions has emerged. Glueck (1998) classified these functions into the production of timber and non-timber goods (food and non-food) and public goods such as environmental, social and cultural benefits. The concept of multifunctionality today dominates forest policies in Western Europe. Although forestry is not a designated policy area of the European Union, the EU influences it through other policy fields such as agriculture, rural development and environment. A European forest strategy harmonizes the EU’s forestry targets in the various policy fields (European Commission, 2006). The overall guideline for this strategy is to create multifunctional forests that provide economic values as well as environmental, social and cultural benefits (European Commission, 2005, 2006). However, Marsden et al.
(2003) and Milbourne et al. (2008) point out that despite the post-productivist forestry paradigm being widely adopted in policies, the transition to a post-productivist ethos has not been all-encompassing. Marsden et al. (2003) found that, for example, in Great Britain, forest authorities are ‘still caught in the shadows of a policy of productionism’.

With a multitude of potential functions being described for forests in general, it is clear that no forest can deliver them all. Depending on the geographical, structural and political context, different sets of objectives might apply. As to Irish farm forestry, objectives from forestry, agriculture and rural development policies are relevant. First, farm forests are to be multifunctional in the broad sense of the overall EU forestry guidelines. Second, farm forests are expected to create an alternative income source to farmers (DAFF, 2010). Third, from a rural development perspective it is assumed that farm forestry and related services and industries contribute to the development of rural economies (DAFF, 1996). In Scotland – which has a similar forestry history when compared to Ireland – the government’s target for woodland expansion includes identifying the types of land that are best suited for tree planting, in particular in the context of other land-based objectives. Based on this target, the Scottish Woodland Extension Advisory Group recommends to pursue a more integrated approach to forestry extension in the future (WEAG, 2012). The group called for an approach that supports the establishment of a variety of woodland types that fit well with existing land uses, respects other objectives for the land, and delivers the range of ecosystem services that future generations will need. These woodland types should be designed to integrate with other land uses and environmental needs at a variety of scales, from small woodlands on farms, through to larger woods and forests fitting well into the landscape.

**Outlook for farm afforestation policies in the EU**

As mentioned before, due to the world food crisis of 2007 and 2008, the pressure of global food demand increased and the set-aside regulation was abolished. As a consequence, the current rationale of supporting the afforestation of agricultural land to reduce output has become anachronistic. A new rationale will have to be outlined in order to justify continued afforestation subsidies.
Another issue for the support of farm afforestation in the EU arises from the ‘Greening’ of direct payments agreed on for the next CAP reform. From the next funding period on, one third of the direct payments will be linked to a choice of three environmental measures, one of which is to keep permanent grassland (European Commission, 2013b). Farmers who keep permanent grassland will be entitled to a higher rate of direct payments. In Ireland, cattle and sheep farms are almost exclusively operated on permanent grassland. However, it is those enterprises that would benefit most from afforestation. Once the ‘Greening’ mechanism is activated, it could become a major barrier for further farm afforestation in Ireland.

2.4 Farmer decision-making with regard to afforestation

A number of studies have been conducted in Ireland to explain the shortfall in planting rates, mainly looking at the influence of economic and socio-demographic factors. Few studies included individual farmer factors such as farmers’ values and their attitudes towards forestry.

The majority of studies trying to explain the shortfall in planting rates compared the economic returns of afforested land to those of the displaced agricultural use. They were based on the assumption that farmers’ decisions to afforest are influenced by profit maximisation goals. The results of these studies were mixed. Wiemers and Behan (2004) employed a real options model to calculate forestry returns that would trigger afforestation on various land-use types. According to that study, Irish farmers in the past made economically optimal decisions with regard to not planting. However, Collier et al. (2002), Behan (2002 cited in Wiemers and Behan 2004), Duesberg (2008) and more recently Breen (2010) have shown that forestry returns would exceed those from drystock beef and sheep farming. In 2005, farm afforestation was made more attractive by allowing farmers who planted to continue to receive agricultural direct payments on the afforested land. According to calculations done by Wiemers and Behan (2004) and Bacon (2004), this reform should have had a positive effect on farm afforestation. In reality however, planting declined from around 10,000 hectares in 2005 to 6,000 hectares in 2008.
Empirical studies have looked at the relationship between Irish farmers’ afforestation intentions and farm structure as well as socio-demographic variables such as farm size, enterprise type, off-farm employment, education level, age, marital status, successor situation and region (Collier et al., 2002; Farrelly, 2006c; Frawley and Leavy, 2001; Hannan and Commins, 1993; Ní Dhubháin and Gardiner, 1994). Some of the results were mixed. For example, according to Frawley and Leavy (2001), having an off-farm job made afforestation financially more attractive. Similarly, Collier (2002) found that part-time farmers were more likely to afforest. However, Hannan and Commins (1993) and Kinsella et al. (2009) concluded that the majority of farmers who planted did not have an off-farm job.

Both Collier’s (2002) and Frawley and Leavy’s (2001) studies also looked at the successor status of farms – with contradictory results. In Collier’s study, only 24% of forested farms had successors as opposed to 40% of all farms, while in Frawley and Leavy’s work 84% of forest farmers had a potential successor.

Ní Dhubháin and Gardiner (1994) looked at the combined influence of age, education level, marital status, off-farm employment status and farm size. They found that only farm size had a significant influence on the decision to plant trees. Respondents with larger than average farms were more likely to plant trees than those with small farms.

To summarize, the only variable that consistently emerged as having an influence on farm afforestation in Ireland was farm size – farmers with larger than average farms were more likely to plant (Frawley, 1998; Frawley and Leavy, 2001; Ní Dhubháin and Gardiner, 1994). Studies conducted on farm afforestation in the UK came to the same result (Ilbery, 1992; Mather, 1998; Watkins et al., 1996).

A couple of studies looked at individual farmer factors such as attitudes to explain Irish farmers’ decision-making with regard to afforestation. Collier et al. (2002) and similarly Frawley and Leavy (2001) found that farmers in general recognize the need for a greater forest cover in Ireland. However they do not want forests on their own land or in close vicinity. As Fléchard et al. (2006) observed, some rural dwellers associated
forestry with bringing isolation and depopulation to their areas. However, according to O’Leary et al. (2000), people in areas with a greater forestry tradition, such as County Wicklow, in general have a more positive attitude towards forestry. In an earlier study, Ní Dhubháin and Gardiner (1994) asked farmers who did not intend to afforest land in the near future what would encourage them to do so. Interestingly, 67% could not think of any factor positively influencing such a decision. McDonagh et al. (2010) discovered that the main barriers to planting for Irish farmers were the inflexibility resulting from afforestation and their belief that they needed all their land for agriculture. A number of earlier studies also found that the majority of farmers only considered afforesting land that could not be used agriculturally or was ‘good for nothing else’ (Collier et al., 2002; Frawley, 1998; Frawley and Leavy, 2001; Hannan and Commins, 1993; Kearney, 2001; McCarthy et al., 2003; Ní Dhubháin and Gardiner, 1994; Ní Dhubháin and Kavanagh, 2003). Furthermore, the majority of the land already planted typically was used for rough or summer grazing and planting it did not make a major impact on farm management (Frawley and Leavy 2001). This finding is underpinned by the fact that private forests in Ireland are mainly growing on land considered marginal for agriculture such as peat (30%), poorly drained gley soils (30%) or podzols (10%) (Farrelly, 2006a). Similar findings have been made in England, Spain, Finland, Scotland, Northern Ireland and USA, where farmers were also found to be more willing to afforest marginal land such as fallows, unimproved bog or rough grazing ground (Clark and Johnson, 1993; Edwards and Guyer, 1992; Marey-Perez and Rodriguez-Vicente, 2009; Raedeke et al., 2003; Selby and Petäjistö, 1995; Watkins et al., 1996). According to Mather (1998), the attitude that forests make good use of marginal land and good land should be used for food production prevailed especially in areas where the population had experienced food shortages, such as Ireland, which had suffered from a traumatic famine in the 19th century. Farmers in the South-East of Ireland, where soils are in general more fertile and suitable for a wide range of agricultural land-uses, were found to be more likely to plant than farmers in the Border (North)-Midland-West Region (Collier et al., 2002). This might be explained by the fact that farms in the Southeast are on average larger than those in the Northwest, leading to the assumption that farm size plays an overriding role in the afforestation decision. Another barrier to farm afforestation is the long-term nature of planting. As
Potter and Gasson (1988) found in a study in the UK, the majority of farmers participate in short-term set-aside programmes rather than in afforestation.

Few studies have been conducted to explore farmers’ attitudinal barriers to afforestation of farmland. Burton (1998) studied the influence of farmers’ self-identity on their participation in a community woodland scheme in England. He found that farmers gain little satisfaction from the management of woodland and thus are disinclined to establish one. According to Ní Dhubháin and Wall (1999), the negative attitude of Irish farmers towards forests arises, in part, from the historical association of trees with land-owning gentry. Additionally, the extensive area of bogs that are found in many parts of the country allowed the population to turn to peat as the primary fuel source once the forests were cleared away (Feehan, 2005). This further contributed to the lack of interest in establishing trees and the development of a farm forestry tradition. Furthermore, the unwillingness to afforest land fit for agricultural use might be rooted in farmers’ general productivist working-ethos, which remains prevalent despite the general shift of agricultural policies towards a post-productivist paradigm (Burton, 2004b; Burton and Wilson, 2006; Walford, 2003; Ward, 1993). This is paralleled by British and US farmers’ afforestation priorities: they predominantly planted out of considerations to improve the landscape and wildlife habitats rather than to produce timber (Mather et al., 2006; Raedeke et al., 2003).

To date, none of the studies looking at Irish farmers’ afforestation decisions have employed an in-depth qualitative approach giving farmers the opportunity to outline the rationale of this decision from their own point of view.

2.5 The evolution of research regarding farmer decision-making

Similar to other post-productivist rural development schemes that have been set up across European member states, the participation in the Irish farm afforestation scheme is voluntary. The success of such voluntary schemes relies on the number of individuals participating. Determining which factors influence farmers’ decisions in favour or against an envisaged action has long been on the research agendas of
various academic sectors such as agricultural economics, geography, rural sociology and psychology. Initially, up until the 1960s, research on farmer decision-making primarily focussed on the adoption and diffusion of new ideas and technologies by farmers (Ruttan, 1996), which mirrored the productivist ethos prevailing in agriculture at that time. Such research was primarily constructed around the hypothesis that farmer decision-making was based on an economic rationale (Burton, 1998; Edwards-Jones, 2006; Renting et al., 2009). Since the mid to late 1960s, more psychological factors such as attitudes, goals and values have been incorporated into these studies in order to more holistically explain farmers’ behaviour. Of great influence has been Ruth Gasson’s (1973) work on the goals and values of farmers. Based on empirical findings she identified four different value-groups that influence farmers’ behaviour. Within this classification, monetary as well as non-monetary values were shown to guide a farmer’s behaviour. Since the 1980s, an increasing body of literature across Europe studied farmers’ participation in post-productivist policy measures such as agri-environmental schemes and multifunctional farming as well as afforestation. Looking at studies investigating the decision-making of a farmer with regard to land-use it becomes clear that such a process is complex. Among the non-economic factors that have been researched and found to be influential are the farmer’s self-identity, personality, attitudes and values (Austin et al., 2001; Battershill and Gilg, 1997; Burton, 1998; Collier et al., 2002; Davies and Hodge, 2006; Edwards and Guyer, 1992; Frawley and Leavy, 2001; Morris and Potter, 1995; Ní Dhubháin and Gardiner, 1994; Niska et al., 2012; Schneider et al., 2010; Selby and Petäjistö, 1995; Sutherland, 2010; Watkins et al., 1996; Wauters et al., 2010), social norms (Burton, 2004b; Raedeke et al., 2003; Schneider et al., 2010; Sutherland, 2010), social capital (Mathijs, 2003; Sutherland and Burton, 2011), knowledge and awareness about schemes (Edwards and Guyer, 1992; Kassioumis et al., 2004), severity of change (Battershill and Gilg, 1997; Morris and Potter, 1995), and the lack of resources such as land or skills (Edwards and Guyer, 1992; Hannan and Commins, 1993; Kassioumis et al., 2004; Kearney, 2001). A number of studies conducted for the British Department for Environment, Food and Rural Affairs (DEFRA) focused on the importance of structural and attitudinal heterogeneity of farmers on decision-making and behaviour-change (Dwyer et al., 2007; Garforth and Rehmann, 2006; Pike, 2008; Slee et al., 2006). These
studies conclude that understanding how the motivations and barriers for decision-making – in particular when it comes to environmental behaviour – are shared by different groups of farmers can help develop a set of policy mechanisms to suit each of the identified groups and thus improve the policy response. Siebert et al. (2006) analysed 160 European studies concerned with factors influencing farmers’ participation in biodiversity schemes. They concluded that while economic factors are important in the decision to join such schemes, they are not the only determining factor.

The diversity of findings made with regard to factors influencing farmer decision-making demonstrates that it is subject to a number of factors, which vary according to the specific decision situation. Ruth Gasson argued in 1973 that ‘people desire to achieve all valued ends, but in situations where these are mutually exclusive, it is the relative ordering of values which determines how they decide to act’ (Gasson, 1973, p. 525). Thus, in order to gain a deeper understanding of farmers’ decision-making or behaviour, it is necessary to look at the specific situation in question. In the case of farm afforestation, this is even more important as it is very distinct from other land-use-change decisions – due to the time scale involved. Farm afforestation is a strategic decision changing the potential future course of the farm business as well as the day-to-day work chores on the farm and thus altering life on the farm considerably and in many ways.

Battershill and Gilg (1997), Edwards-Jones (2006) and Burton (2006) conceptualise farmers’ behaviour and decision-making as being influenced by structural as well as by individual farmer factors. Typical structural factors would be economic conditions, the policy environment and farm characteristics, while individual farmer factors include for example socio-demographics, attitudes, goals and values and personality. A broader sociological theory that is in line with this concept is Anthony Giddens’ theory of structuration (Giddens, 1984). According to Giddens, social practices such as land-use and land-use change are influenced by structure as well as by individual agents’ actions. He defines structure as the ‘rules’ (e.g. agricultural policies) and ‘resources’ (e.g. farm structure) of a structuration process, but argues they are also the outcome
of agents’ actions (‘duality of structure’). Agent factors that influence social practices for example are socio-demographic factors and attitudes, goals and values. The process of structuration combines both agency and structure, which interact with each other to ‘structure’ a society or social system (Burton and Wilson, 2006; Giddens, 1984).

2.6 Review of relevant theories regarding objective one: Decision-making and behaviour

A very commonly used methodology to investigate farmers’ decision-making behaviour is Fishbein and Ajzen’s (1991) ‘Theory of planned behaviour’ (TPB), which they later developed into the ‘Reasoned Action Approach’ (RAA) (Fishbein and Ajzen, 2010) (e.g. by Beedell and Rehman, 2000; Bieling, 2004; Fielding et al., 2003; Fielding et al., 2008; Hansson et al., 2013; Poppenborg and Koellner, 2013; Sutherland, 2010; Wauters et al., 2010; Zubair and Garforth, 2006). It assumes that people’s behaviour originates from their intentions to perform a specific behaviour. A central construct in RAA is attitude, which is a summary evaluation of the individual’s disposition to a psychological object or behaviour. (Fishbein and Ajzen, 2010). The RAA suggests that to generate an intention for performing a specific behaviour, a positive attitude towards the behaviour is not enough; the individual also needs to hold a perception that others in the social network support the behaviour and to feel control over the behaviour (ibid). The former refers to the construct ‘subjective norm’ and measures people’s perception of what ‘important others’ think of the behaviour in question. The latter refers to the construct ‘perceived behavioural control’ and measures people’s perceptions of their voluntary control of a particular behaviour. One criticism of RAA is that it does not directly include factors such as age, gender, or more specifically farm size and farm type (Beedell and Rehman, 2000). Supporters of the RAA claim that these factors indirectly have an effect as background factors on behavioural, normative and control beliefs. From the literature on farmers’ decision-making with regard to afforestation we know that these factors play a pivotal role in this process and thus should be treated with specific attention (see chapter 2.4). Furthermore, Burton (2004) points out, that a strict application of the RAA is not suitable where a
more general assessment of a policy scheme is envisaged, as it is not capable of producing a broad enough picture of farmer motivation. In such cases an approach should be chosen that is less rigorous in its limitations than the RAA.

A concept that explains the different responses farmers make to structural changes in agriculture is van der Ploeg’s ‘farming styles’. According to van der Ploeg there are discrete sets of farming styles of which farmers themselves are aware (van der Ploeg, 1994). Van der Ploeg describes a farming style as ‘a systematic and constant attempt to create congruence’ (van der Ploeg, 2003, p. 111). It furthermore is a way in which farmers organise and manage a farm that is generally accepted by a more or less connected group of farmers. By participating in a style, farmers contribute to the evolution of that style over time. The styles are created, not only through socio-cultural dynamics, but also as a response to structural forces – different styles exist for different market situations of different farmers. The concept was developed to describe agricultural diversity in specific regions and why traditional farming practices continue to survive despite the growing influence of global economic forces (van der Ploeg, 2003). The ‘farming styles’ concept has been criticised for failing as a method to underpin empirical studies geared at behavioural change of farmers (Vanclay et al., 2006). Vanclay et al. (2006) based their own empirical studies on the ‘farming styles’-concept and found that farmers in Australia are neither themselves aware of different farming styles nor could they identify themselves exclusively with a single farming style. They concluded that ‘farming styles’ are ideal types developed by researchers, which are not empirically observable. So far, there is little evidence of distinct farming styles in Ireland and no showing they would be related to afforestation rates. The literature rather shows that in Ireland forestry is not regarded as an agricultural activity. This suggests that even if different farming styles were identified the reluctance to afforest would not necessarily be part of to them.

A sociological theory that examines the relationship between individuals, structures and social processes leading to change is Bourdieu’s notion of ‘field’ and ‘habitus’ (Bourdieu, 1977). It has been employed in empirical research in the area of agriculture (see for example Shucksmith 1993, 2002; Burton 1998, Raedeke 2003, Slee et al.,
A ‘field’ according to Bourdieu is external in nature and consists of a network or configuration of relations between positions. In a ‘field’ actors compete for resources such as economic, social and cultural capital. Society consists of a number of fields such as higher education, arts or agriculture. In contrast to ‘field’, ‘habitus’ is internal in nature and refers to the taken-for-granted, shared meanings and behaviours of individuals of a social group. ‘Habitus’ can be defined as durable dispositions. Habitus-behaviour follows a practical or pragmatic logic and in contrast to behaviour in rational choice theory is not objective, conscious or rational. According to Bourdieu change does not happen because of these internalised structures, which make agents ‘reproduce the structures of which they are a product’ (Bourdieu, 1977, p. 72). The concept of ‘habitus’ offers a social explanation of farmers’ resistance to adjustment during changed circumstances and thus the possibility as to how to address such resistance (Shucksmith and Herrmann, 2002). Thus, it would provide a concept for analyzing as to why farmers in Ireland are reluctant to change farmland into forestry. However, the concept of ‘habitus’ has been criticised for not conceiving the self as made up of multiple-identities and therefore has no means of explaining why one behaviour may be selected in one instance and a different choice is made in another situation (Burton 1998). However, empirical studies in agriculture in Ireland and the UK as well as the literature on social psychology suggest that decision-making processes actually do vary depending on the situation in question (e.g. Gasson 1973, Burton 1998).

Ruth Gasson’s early study on farmers’ orientation to work led her to develop a list of dominant values influencing farmers’ decision-making with regard to the farm (Gasson, 1973). According to Gasson (ibid) values serve as a guideline to categorise situations, objects or events into being good or bad, right or wrong. They influence the decision to pursue one goal or another. Goals are defined as ends or states in which the individual desires to be. They are satisfiable and achievable. Based on the literature and her own empirical research, Gasson classified the following value groups prevalent among farmers:
• **Instrumental**: i.e. making the maximum income, making a satisfying income.
• **Intrinsic**: i.e. enjoyment of work tasks, preference for a farming life-style, purposeful activity, control over land.
• **Social**: i.e. farming for the sake of interpersonal relationships, continuing the family tradition.
• **Expressive**: i.e. farming as a way of self-expression, meeting a challenge, exercising special abilities or aptitudes, pride of ownership.

Gasson (1973; p. 525) furthermore described values as being organised in systems and that ‘people desire to achieve all valued ends, but in situations where these are mutually exclusive, it is the relative ordering of values which determines how they decide to act.’ It is this ordering of values we need to know, in order to understand the course of actions taken in specific decision-making situations such as farm afforestation.

Researchers in the field of behavioural studies have developed more complex and sophisticated models of farmers’ decision-making as for example in the Edinburgh Study on decision making on farms (Willock et al., 1999) (see chapter 3. 5). Such complex models are important to draw an all-encompassing model of farmers’ behaviour. However, the authors of the ESDMF study point out that ‘whilst this observation might be interesting from an academic viewpoint, the policy relevance of such results is less apparent.’ (Willock et al., 1999a, p. 300). They furthermore contend that there are problems with integrating structural and attitudinal variables in models in terms of practicability, as large data sets would be required. Instead they recommend that in order to gain a deeper understanding of the factors influencing farmers’ decision-making processes, farmers’ behaviour in specific domains should be explored (Willock et al., 1999a). Gasson’s assumption of a value order that can change depending on the specific decision-making situation underpins this request.
2.7 Review of relevant theories regarding research objective two and three: Policy tools and their potential to encourage farm afforestation

As Vedung (2011) points out, the issue of finding the most appropriate mix of policy tools to achieve a desired policy objective is crucial for policy makers. In other words, the way policy design elements are chosen and linked together determines whether policies help to solve problems or make them worse (Schneider and Ingram, 1997). Therefore, it is useful to examine the categorisation of policy tools in order to provide an overview of the available tools and their mechanisms (Bemelmans-Videc et al., 2011). The design of policy tools according to a theory developed by Schneider and Ingram (1990) is based on behavioural assumptions about the targeted population. Policy tools, they contend, can be categorised according to these behavioural assumptions. Schneider and Ingram (1990) identified five different tools, which are incentive (positive or negative), capacity, symbolic, authority and learning tools. Each of these five policy tools assumes and addresses a different kind of behaviour among the target population. Incentive tools use positive (tax breaks, subsidies) or negative incentives (sanctions, charges) to induce the desired behaviour. Capacity tools are employed for example to address a lack of information, resources or skills. Symbolic tools are based on the assumption that the target population does not co-operate because they disagree with the values and outcomes of a policy. Authority tools are rules or guidelines that are obeyed without tangible pay-offs simply because of the authority implicit in the issuing body (e.g. guidelines for Government agents). Learning tools such as mediations, evaluations and hearings have the purpose to establish the nature of a problem and the solution to it as well as the appropriate follow-on tool to induce the desired behaviour of a target population. Bemelsman-Videc et al. (2011) developed a more simple, nonetheless similar, classification of policy tools. They categorise policy tools into carrots, sticks and sermons, with carrots being subsidies and grants encouraging a specific action; sticks being regulations that restrict or prohibit a certain behaviour and sermons referring to informational tools aimed at changing the views and attitudes of a target population. The literature on forest policy tools usually distinguishes the same three groups of different instruments – which are subsidies (e.g. incentives, tax breaks for afforestation, concession); regulations (i.e. management rules, felling licences, certifications); and education and research.
(Cubbage et al., 2007; Sterner, 2003). According to Cubbage et al. (2007), Governments typically use subsidies such as premium payments and tax-breaks to encourage afforestation. Another widely employed set of tools is extension services that provide information about existing schemes and encourage the establishment and management of privately owned forests through training and support. In Ireland farm afforestation extension is provided through the national agricultural research, knowledge transfer and education body *Teagasc*. In more recent years, alternative incentive, capacity and symbolic tools such as carbon benefits and emission trading systems (e.g. in Canada, Australia, New Zealand), payments for ecosystem services (e.g. Indonesia), spatial planning instruments (e.g. in the Netherlands), the redistribution of property rights e.g. from the state to the community level (e.g. India), and image building (e.g. Netherlands, UK) have emerged (Anderson et al., 2010; Cubbage et al., 2007; Renaud et al., 2013; Sterner, 2003; van Gossum et al., 2009). In Ireland, the semi-state forestry body *Coillte* offers a farm partnership scheme, under which it establishes and manages forests on behalf of the farmer for a share in the profits.

Landry and Varone (2005) argue that different policy tools can be substituted, i.e. different tools with varying mechanisms can be utilised to achieve the same policy objective. They point out, however, that the choice of instruments is constrained by the institutional context of the actors involved and the social construction of values attributed to the policy problem to be solved. According to Sterner (2003), incentive-based policy tools in particular must be tailored to the social context and the institutions and their application needs to be accompanied by capacity building. As outlined in section 2.5 various structural, socio-demographic and individual factors can have an impact on farmers’ behaviour with regard to land-use and land-use change. They need to be taken into account when looking for appropriate policy tools to induce a desired change. A number of studies have looked at the specific implications of these factors on the design of policy tools for inducing land-use change (e.g. Fischer and Bliss, 2008; Janota and Broussard, 2008; Kauneckis and York, 2009; Pannell and Wilkinson, 2009). Fischer and Bliss (2008), in their ethnographic study on the behaviour of private forest owners with regard to oak conservation, concluded that
people’s motivations with regard to a policy objective can be multiple, complex and sometimes contradictory. Hence, a number of different policy tools might be required to address these various motivations. Similarly, Kauneckis and York (2009), in a study on private landowners’ forest conservation behaviour conclude that an array of policy instruments is needed to capitalise on the motives and constraints generated by the intersection of landowner and resource characteristics.

In the UK, a holistic approach was employed utilising various tools to establish the ‘National Forest’. It focused on increasing the forest cover in a specific area by creating a mosaic of woodland, open country, farmland and settlements. A company was set up to manage the process of creating the National Forest. It employs a diverse mix of instruments – for example various incentives schemes (one acre wood scheme; 500-2000 scheme; changing landscape scheme); information and expert advice for landowners; information for the general public through various media; and image-building geared at individuals as well as companies (van Gossum et al., 2009). As van Gossum et al. (2009) argues, this strategy has proved quite successful as the forest cover in the targeted area increased from 6% in 1995 to 19.5% in 2012, compared to a 12% forest cover in all of UK (N.N., 2013).

The advantage of Schneider and Ingram’s (1990) classification of policy tools for the purpose of this study is that it includes a description of the behavioural assumptions underlying the tools. If the actual behaviour or preference of the target population with regard to a specific policy outcome such as farm afforestation is known, the appropriate tool can be chosen. The Irish farm afforestation scheme according to Schneider and Ingram’s theory is a typical incentive tool. The underlying behavioural assumption of the farm afforestation scheme is that the target population (i.e. farmers) positively responds to financial incentives by planting trees on their land. In the past the scheme has encouraged thousands of farmers to plant forests and thus this assumption holds true for that part of the farming community. However, as shown earlier, there are a number of farmers who refrain from planting despite the higher profitability of forestry when compared to farming. Thus, it can be assumed that at least a part of the farming community does not respond to incentives. Other tools such
as capacity or symbolic tools might be appropriate to encourage those farmers to plant. For the purpose of this study, authority and learning tools can be largely disregarded, as planting without tangible pay-offs (e.g. incentives) is unlikely to happen and learning tools are not necessary as the nature of the problem is given (in the form of a too low forest cover), as is the solution to it (encouraging farm afforestation).

2.8 Modelling farmer behaviour

There has been a long-standing academic interest in modelling how farmers use their land and run their businesses, mainly because of the wider societal impact of such decisions in terms of food security, productivity and environmental services. The objectives of such research have changed in parallel with the agricultural policy paradigms. For example, from the 1950s, the focus was on adoption-diffusion research, influenced by a productivist paradigm that aimed at increasing agricultural output by employing new technologies (Ruttan, 1996; Sheikh et al., 2003). While the diffusion of new technologies is still of interest, new topics have appeared on the research agenda with the emergence of post-productivist policy objectives. New adoption issues such as the uptake of environmentally friendly farming or landscape conservation practices became important (e.g. Barnes et al., 2011; Finger and El Benni, 2013; Jongeneel et al., 2008; Mathijs, 2003; Schneider et al., 2010; Wauters et al., 2010; Wilson, 1997; Yiridoe et al., 2010; Zubair and Garforth, 2006). While the practices to be adopted might be of a different nature, the underlying question of both productivist and post-productivist adoption topics is similar. What are the variables influencing a farmer to adopt or not adopt a new technology or land-use practice?

A commonly used approach to model farmer decision-making is the so-called ‘behavioural approach’. Burton (2004), based on Morris and Potter (1995), conceptualises the behavioural approach as one that a) seeks to understand the behaviour of individual decision-makers; b) focuses on psychological constructs such as values, goals or attitudes, c) employs quantitative methodologies.
Behavioural studies combining structural and/or socio-demographic factors with individual farmer factors to model farmers’ behaviour with regard to land-use change investigated questions such as farmers’ habitat conservation practices (Beedell and Rehman, 2000; Davies and Hodge, 2006; Jongeneel et al., 2008), practices affecting ground- and freshwater quality (Fielding et al., 2003), practices affecting soil conservation (Wauters et al., 2010), farm diversification and management (Austin et al., 2001; Hansson et al., 2013; Jongeneel et al., 2008; Poppenborg and Koellner, 2013; Sheikh et al., 2003), participation in agri-environmental schemes in general (Deffuant, 2001; Mettepenningen et al., 2013; Vanslembrouck et al., 2002; Wilson, 1997; Wilson and Hart, 2000; Yiridoe et al., 2010), forest management practices (Bieling, 2004; Rodriguez-Vicente and Marey-Pérez, 2009), and afforestation (Crabtree et al., 1998; Zubair and Garforth, 2006).

Depending on the specific research question, the studies employed various statistical techniques to determine the factors influencing farmers’ behaviour, ranging from ANOVA and chi-square tests (Beedell and Rehman, 2000; Wilson, 1997) to multinominal (Hansson et al., 2013) and ordinal regression (Davies and Hodge, 2006), structural equation modelling (Austin et al., 2001), as well as cluster analysis (Bieling, 2004). The most often applied modelling technique however is the logistic regression (Crabtree et al., 1998; Finger and El Benni, 2013; Jongeneel et al., 2008; Mettepenningen et al., 2013; Poppenborg and Koellner, 2013; Rodriguez-Vicente and Marey-Pérez, 2009; Sheikh et al., 2003; Wauters et al., 2010; Yiridoe, 2000; Zubair and Garforth, 2006), as the research questions typically lead to answers of binary nature such as whether or not farmers carry out an envisaged land-use change dependent on a number of variables.

The third objective of this study was to develop a model describing farmers’ decision-making with regard to afforestation under the State’s support scheme. The outcome of the model would be of dichotomous nature with the options ‘Yes’ for deciding in favour of afforestation and ‘No’ for deciding against afforestation. Thus, the dependent variable being the intention to afforest could only have two possible answers. In modelling terms the dependent variable can only take on two values, 1 for
‘Yes, I intend to plant’ and 2 for ‘No, I do not intend to plant’. As the outcome of the question to be answered was of a dichotomous nature a discrete binary choice model was used to analyse the data. The econometric literature describes three options of discrete binary choice models: The linear probability, the logit and the probit model (Dougherty, 2006; Maddala, 2001). The problem with the linear probability model is that the dependent variable can be greater than one or smaller than zero, which however are not options in the afforestation decision model to be created. Thus, for the afforestation decision model either a logit or probit analysis would be appropriate, as they are based on sigmoid-shaped functions, which never go above one or below zero. The logit model is based on the logistic and the probit model on the standard normal distribution function (Amemiya, 1994). According to Amemiya (1994) both distribution functions have similar shapes except that the logistic function has a slightly flatter tail. Either model produces similar results, unless the samples are very large and many observations fall near the tails (Sheikh et al. 2003, Maddala, 1983). Thus there was no theoretical reason to prefer one model to the other. For reasons of convenience the logit model was employed to analyse a farmer’s decision whether to afforest land under the afforestation scheme or not. Logit models have been widely used to describe farmers’ behaviour, first from the late 1950s on in adoption-diffusion research and more recently in farmers’ uptake of multifunctional farming or agri-environmental measures (Crabtree et al., 1998; Finger and El Benni, 2013; Jongeneel et al., 2008; Mettepenningen et al., 2013; Poppenborg and Koellner, 2013; Rodríguez-Vicente and Marey-Pérez, 2009; Sheikh et al., 2003; Wauters et al., 2010; Yiridoe et al., 2010).

2.9 Conclusion

Chapter 2 provided insights into the various bodies of literature upon which this thesis builds. It placed the Irish farm afforestation scheme into its wider political context in order to illustrate the political and societal rationale for farm diversification through afforestation. Furthermore, it reviewed the bodies of literature on farmer decision-making with regard to land-use in general and to afforestation in particular. Another section discussed relevant theories in farmer decision-making research and
rationalised the choice of Ruth Gasson’s theory on farmers’ goals and values to address research objective one. In addition, the theories on policy tools as underpinning research objectives two and three, and the significance of choosing the appropriate tools or mix of them in order to achieve a desired policy outcome, were highlighted. Lastly, a brief overview of the literature on modelling farmer behaviour with regard to land-use change was given.

The following three chapters present the study results in the form of three research articles associated with the thesis, which were highlighted previously. As well as providing more substantial accounts of the underlying theories and methods employed, they explain the associated data collection approaches and analysis, present results and provide discussion and conclusions. The first article (chapter 3) deals with the study’s first objective of exploring farmers’ goals and values with regard to land-use in general and afforestation in particular. The subject of the second article (chapter 4) represents the study’s second objective of quantifying the identified afforestation barriers, recognizing their importance for the wider farming community in Ireland and assessing their relevance for the design of more effective policy tools. The third article (chapter 5) engages with the study’s third objective, which was to develop a holistic model describing Irish farmers’ afforestation decision depending on the individual farmer, farm structure and socio-demographic variables previously identified as playing a role in this process. As the following three chapters represent a collection of three stand-alone research articles there inevitably is an amount of overlap in terms of the introductory, background and theory sections of the three article chapters.
3 To plant or not to plant—Irish farmers’ goals and values with regard to afforestation

3.1 Overview
This chapter presents the first of the three research articles outlined previously, and deals with addressing the first research objective – namely exploring farmers’ goals and values with regard to land-use in general and afforestation in particular. The chapter begins by outlining the background to farm forestry in Ireland and gives an overview of the wider political context for supporting farm afforestation. Next, the literature on farm afforestation research is reviewed with a focus on factors influencing farmers' afforestation decisions. This is followed by a section discussing theories on farmer decision-making and includes the development of an associated conceptual model. The research design section explains why a qualitative approach in the form of in-depth interviews was chosen, how and where the data were collected and describes the chosen coding strategy. The results section first presents farmers’ values with regard to farming in general and goes on to explore farmers’ reasons for not planting or planting as well as analysing the underlying values influencing such reasoning. Finally, the results are discussed in terms of their academic and practical implications.

3.2 Farm forestry in Ireland
Ireland has one of the most favourable climates for tree growth in Europe, with a mean annual increment almost double the European average (Kearney and O’Connor, 1993; Ni Dhubháin and Kavanagh, 2003). Under natural conditions, the whole island would be covered with trees (Neeson, 1991). However, due to continued resource exploitation and the expansion of agriculturally used land, forest cover decreased throughout the centuries and reached an all-time low in the 1890s, with only 1% of the land under forest. Due to a number of afforestation programmes, forests currently cover approximately 12% of the total land surface – considerably less than the European average of about 40% (EUROSTAT, 2010).
Up until the 1980s, afforestation was primarily undertaken by the State. The first increase in private sector planting followed the introduction of the EEC-funded Western Package Scheme in 1980. Farmers afforesting part of their holding could obtain up to 85% of their establishment costs (Ní Dhubháin and Wall, 1999). In 1989, a countrywide afforestation scheme was introduced, which pays farmers an additional subsidy in the form of an annual premium to provide an income from the time of planting until the time the first timber harvest was due (Behan and McQuinn, 2005). The value of the premiums increased significantly (Figure 1) after the scheme was transformed into an Accompanying Measure according to EC Regulation 2080/92 (Behan and McQuinn, 2005; Frawley, 1998; Ní Dhubháin et al., 2009).

As a consequence, private planting rates peaked in 1995 with 17,000 hectares of farm land being afforested (Forest Service, 2009). Encouraged by these figures, the national forestry strategy ‘Growing for the Future’, published in 1996, set ambitious planting targets of 25,000 hectares per annum until the year 2000, and 20,000 hectares per annum from 2000 until 2030 (DAFF, 1996). This level of afforestation was predicted to lead to a level of timber output necessary to facilitate the establishment of a viable wood-processing sector, leading to additional employment opportunities (DAFF, 1996, 2010; Irish Government, 2002). It was acknowledged that the ‘afforestation of agricultural land would displace existing agricultural employment insofar as it displaces agricultural output’ (DAFF, 1996, p. 3). However, it was considered that ‘in contrast to agricultural employment, forestry would create reasonably well paid permanent full time jobs’ (DAFF, 1996, p. 3).

Nevertheless, interest in planting dropped significantly after the Strategy was launched. In the period from 1996 to 2009, only 48% of the targeted area of farmland was planted with trees (Forest Service, 2009), even though the value of the premium was increased in 1995, 1999, and 2007 (Figure 1). This decline in planting has been attributed in part to the availability of additional agri-environmental subsidies paid under the Rural Environment Protection Scheme (REPS), introduced in the reform of the Common Agricultural Policy in 1993. These subsidies offered farmers a competitive
alternative to forestry that did not require a change in land use (Bacon, 2003), i.e. REPS provided farmers with an additional subsidy to continue farming albeit in a more environmentally friendly fashion. The costs of complying with the scheme were minimal for those operating cattle and sheep farms, which traditionally had been the farming type most likely to be converted to forestry. A further attraction of REPS for farmers was that the land enrolled could be withdrawn after the period of five years, whereas the decision to afforest was irreversible under current legislation (McCarthy et al., 2003). The general decline in planting from 2002 was linked to the increasing value of land in Ireland; afforestation was considered to devalue the land asset as it was permanent change in land use (Malone, 2008). To make the afforestation scheme even more attractive, the Irish Government introduced the stacking of the Single Farm Payment in 2005, allowing a farmer who afforested land to continue to receive direct payments on that land.¹ Nevertheless planting rates did not meet the targets and the Department of Agriculture, Fisheries and Food states in its Rural Development Programme for the period from 2007 to 2013 that ‘the major difficulty with the [afforestation] programme at the moment is the low rate of take-up’ (DAFF, 2010, p. 60).

¹ Due to Ireland’s critical economic situation, forestry premiums in 2009 were cut – surprisingly little – by 8%. In the Government’s budget 2012 target planting levels were adjusted to 7,000 ha. However the overall strategy of increasing the forest cover to 17% until 2030 is still in place.
3.3 Farm forestry and agricultural change in Ireland

According to the Irish forestry strategy, 70% of the planting target was to be carried out by private landowners – more specifically by farmers (DAFF, 1996). The rationale for the continued support of farm afforestation is closely linked to a paradigm shift in the EU agricultural policy from a ‘productivist’ to a ‘post-productivist’ agricultural regime. According to Lowe et al. (1993), productivism can be conceptualised as the commitment to an intensified, industrially driven agriculture driven primarily by increased output and productivity. In defining the post-productivist agricultural regime, Ilbery and Bowler (1998) characterise it as a shift in agricultural policy from intensification to extensification, from concentration of agricultural resources to the dispersion of resources and from agricultural specialisation to diversification. While such categorisations are widely deployed in explaining the fundamental shift that has taken place in post-war agriculture, the dualistic nature of the productivist/post-productivist discourse has been criticised as potentially misleading, leading to a forced
categorisation in which underlying processes of change often remain unspecified (Evans et al., 2002; Wilson, 2001). At a policy level, responses to the problems associated with ‘industrialised agriculture’ were apparent in the rural development measures introduced in some EU member states as early as in the 1960s (O’Connor and Dunne, 2009). From the early 1980s, the Common Agricultural Policy (CAP) was continuously reformed. First implemented were quotas, set-aside and extensification regulations. Later on, with the MacSharry reforms in 1992, agri-environmental measures and the general support of the afforestation of agricultural land followed. As the focus of these policies is on support decoupled from agricultural output, the new rural development paradigm is often referred to in the ‘contentious’ post-productivist terms outlined above (O’Connor et al., 2006b; Potter and Burney, 2002; van der Ploeg et al., 2000). Part of this post-productivist rural development paradigm today is the notion of multifunctionality, which became a defining feature of the European model of agriculture (Potter and Burney, 2002). Many definitions and interpretations of the term multifunctionality are discussed in the literature. The most commonly used concept is that of multifunctionality being the ‘joint production of commodities and non-commodity outputs (public goods and externalities)’ (O’Connor and Dunne, 2009, p. 334). It needs to be pointed out however, that the notion of multifunctionality is also not an uncontested one. For the advocates of further trade liberalisation within the WTO, multifunctionality is regarded as disguised protectionism (Dibden et al., 2009; O’Connor and Dunne, 2009).

Marsden and Sonnino (2008) classify an agricultural activity as being multifunctional if it adds income to agriculture, reconfigures rural resources in ways that lead to wider rural development and contributes to the needs of the wider society. Based on this definition, farm afforestation can be regarded as part of the concept of multifunctional agriculture, as farm forestry – according to European and Irish policies – is expected to meet precisely these targets. First, farm forests are expected to create an alternative source of income for farmers (DAFF, 2010). This can either be provided through non-food resources like timber or bark; or through food-resources such as game, honey, berries and mushrooms (Glueck, 1998). Second, it is assumed that forestry and related
services or industries contribute to the development of rural economies (DAFF, 1996). This is because locally owned and managed farm forests are regarded as being more beneficial for rural development than large-scale State or privately owned plantations, on the basis that profits are more likely to remain in the communities (Frawley, 1998; Schirmer, 2007). Furthermore, rural communities are likely to exhibit less negative attitudes towards locally owned and managed farm forests than towards large-scale (State) afforestation. In the past, large-scale planting had caused controversy and concern amongst the local population both in Ireland and in other countries such as Spain, Finland and Australia because it was linked to depopulation of rural areas and a depersonalised, factory-like productive use of land (Carvalho Oliveira and Monteiro Alves, 1993; Marey-Perez and Rodriguez-Vicente, 2009; Schirmer, 2007; Selby and Petäjistö, 1995). Third, with regard to the needs of the wider society, the established forests are also expected to meet environmental objectives, e.g. by sequestering carbon and providing an alternative energy source, as well as by improving the biodiversity situation (DAFF, 2010). While the social role of forests, for example, for recreation is acknowledged in the general Irish forestry strategy, this function is provided by the State owned forests rather than by privately owned farm forests, as there is no public access granted onto private land like it is for example in Scandinavian countries, Austria or parts of Germany through the ‘freedom to roam’.

According to McDonagh et al. (2010), the discourse on productivist versus post-productivist agriculture outlined above mirrors a parallel discourse about the changing role for forestry, moving from a modernisation perspective that focused on the production of timber as a primary resource to one that recognises it a multi-use (e.g. carbon sinks, biodiversity, wood production) and multi-benefit (e.g. tourism, recreation, quality of life) resource.

### 3.4 Research on farm afforestation

Other countries in Europe experienced a pattern of farm afforestation uptake similar to Ireland. After an initial period of intense interest, planting rates also dropped in France and Finland (Mather, 1998; Selby and Petäjistö, 1995). In England and Northern
In Ireland, participation in afforestation schemes did not meet expectations from the outset (Burton, 1998; Edwards and Guyer, 1992; Ilbery and Kidd, 1992). In Ireland, most attempts to explain the drop in farm afforestation focused on the socio-economic factors and the material resources of the farm. Economic analyses, for example, compared the returns from forestry and farming enterprises in Ireland over a typical forest rotation. They showed that using Net Present Value (NPV) analysis, forestry returns under current market conditions would exceed those from farming on poor quality land, namely beef and sheep enterprises (Collier et al., 2002; Duesberg, 2008; Behan 2002 cited in Wiemers and Behan, 2004). More recently, Breen et al. (2010) showed that the NPV of various forestry scenarios are higher even compared to farming enterprises typically carried out on medium-quality land. The first income from timber harvesting is typically realised in a conifer plantation after 20 years. The aim of the forestry premium is to bridge this income gap and economic comparisons of family farm income with forestry premiums have also confirmed that the value of the latter exceed the former, where beef and sheep enterprises are being operated (Collier et al., 2002). On the basis of these results, agricultural land should have been planted with forestry at a larger scale than has been observed.

Other Irish studies have looked at how factors such as farm size and the farming population’s demographic characteristics (e.g. age, occupation and successor situation) have influenced farmers’ decisions with respect to afforestation (Collier et al., 2002; Connolly et al., 2005; Farrelly, 2006b; Frawley and Leavy, 2001; Hannan and Commins, 1993; Ní Dhubháin and Gardiner, 1994). However, the outcomes of these studies have been partially contradictory. In addition, a longitudinal study on on-farm diversification in Scotland showed that neither household type or size nor farmers’ age had had an impact (Shucksmith, 1993). The only variable showing a consistent influence on farm afforestation in Ireland, as well as in the UK, was farm size. Farmers with larger than average farms have been shown to be more likely to plant (Frawley, 1998; Frawley and Leavy, 2001; Ilbery and Kidd, 1992; Mather, 1998; Ní Dhubháin and Gardiner, 1994).
An early survey on farmers’ attitudes towards planting in Ireland revealed that most farmers would only plant land that was ‘good for nothing else’ (Ní Dhubháin and Gardiner, 1994). Other Irish studies confirmed that the land planted or considered for planting was mainly marginal agricultural land yielding little or no agricultural return (Collier et al., 2002; Frawley, 1998; Frawley and Leavy, 2001; Hannan and Commins, 1993; Kearney, 2001; McCarthy et al., 2003; Ní Dhubháin and Kavanagh, 2003). In 2006, a supplementary survey on farm afforestation was conducted as part of the Irish National Farm Survey. When asked about the barriers to afforestation, farmers stated that the main reason for not planting was that they needed all their land for agriculture (McDonagh et al., 2010). Similar findings were made in England, Spain, Finland, Scotland and Northern Ireland, where farmers were also more willing to afforest marginal land such as fallows, unimproved bog or rough grazing ground (Clark and Johnson, 1993; Edwards and Guyer, 1992; Marey-Perez and Rodriguez-Vicente, 2009; Selby and Petäjistö, 1995; Watkins et al., 1996). In Ireland, less than one quarter of farmers indicated they would have no objections to planting good farmland (Frawley, 1998). Kassioumis et al. (2004) found similar results in Greece, where only one quarter of farmers in an area dominated by agricultural production believed that fertile agricultural land should be planted. Ní Dhubháin and Gardiner (1994) asked Irish farmers what would encourage them to afforest land. Interestingly, 67% could not think of any factor, which would positively influence such a decision. Similarly, Potter and Gasson (1988) asked farmers in England how high premiums would need to be to transfer agriculturally used land into forestry and 61% did not want to join at any rate.

Frawley (1998) concluded that farmers follow an economic rationale when planting marginal land. However, when it comes to displacing conventional agricultural enterprises, deeply held values about the appropriate use of good farmland can be a barrier to afforestation (ibid). Bishop (1990) and Watkins et al. (1996) came to the conclusion that negative attitudes towards forestry on farmland were deeply rooted amongst farmers and that farmers’ attitudes and beliefs about farm afforestation are among the main obstacles to planting.
Very little work has been done so far to explore these deep-rooted attitudinal barriers to afforestation of farmland amongst farmers. Burton (1998) studied the influence of farmers’ self-identity on the participation in a community woodland scheme in England. He found that farmers gain little satisfaction from the management of woodland and thus are disinclined to establish one on the farm. In Ireland to date, no study has explored in-depth the factors underlying the decision-making of farmers with regard to the practice of farm afforestation. However, this is crucial to be able to identify and address potential barriers.

3.5 Farmer decision-making theories

The Irish afforestation scheme offers farmers external motivation in the form of financial incentives to plant their land with trees. Thus it assumes that farmers make this decision based on profit maximisation values (Schneider and Ingram, 1990). This assumption is true to a certain extent, as almost no farm afforestation took place prior to the introduction of the premium scheme, while studies conducted since that time have shown that the vast majority of farmers would not plant if grants were not available (Carroll et al., 2011; Maguire, 2008). On the other hand, there has been a significant shortfall in planting rates despite the higher profitability of forestry compared to dominant farm enterprises in Ireland. Thus, it seems that elements of the farming community make their decisions with regard to afforestation based on goals and values other than profit maximisation. The general literature on farmers’ decision-making confirms this assumption. There is abundant evidence that farm management (especially on owner-occupied family farms) is not only motivated by economic goals (Austin et al., 2001; Battershill and Gilg, 1997; Burton, 1998; Gasson, 1973; Morris and Potter, 1995; Potter and Gasson, 1988; Shucksmith and Herrmann, 2002; Willock et al., 1999a).

Gasson (1973) described several different types of goals and values observed amongst British farmers. Goals, according to Gasson (1973), are defined as ends or states in which the individual desires to be. They are satisfiable and achievable. The decision to pursue one goal or another is influenced by values (Figure 2, p. 51). Values serve as a
guideline to categorise situations, objects or events into being good or bad, right or wrong. Based on the literature and her own empirical research, she classified the following value groups prevalent amongst farmers:

- **Instrumental**: i.e. making the maximum income, making a satisfying income.
- **Intrinsic**: i.e. enjoyment of work tasks, preference for a farming life-style, purposeful activity, control over land.
- **Social**: i.e. farming for the sake of interpersonal relationships, continuing the family tradition.
- **Expressive**: i.e. farming as a way of self-expression, meeting a challenge, exercising special abilities or aptitudes, pride of ownership.

Gasson (1973; p. 525) furthermore described values as being organised in systems and that ‘people desire to achieve all valued ends, but in situations where these are mutually exclusive, it is the relative ordering of values which determines how they decide to act.’ It is this ordering of values we need to know, in order to understand the course of actions taken in specific decision-making situations such as farm afforestation.

Researchers in the field of behavioural studies have developed much more complex and sophisticated models of farmers’ decision-making. The most comprehensive study undertaken in this area was probably the Edinburgh Study of Decision-Making of Farmers (ESDMF) (Austin et al., 2001; Willock et al., 1999a; Willock et al., 1999b). An interdisciplinary group of researchers consisting of psychologists, agricultural scientists, business management specialists and mathematicians incorporated personality, cognitive ability and external farm variables to model farmers’ general behaviour. They have shown that both personality and intelligence factors significantly contribute to farmers’ behaviour (Figure 2, p. 51) (Austin et al., 2001; Willock et al., 1999a).
Battershill and Gilg (1997), too, distinguish between different factors influencing farmer behaviour and decision-making, identifying ‘structural factors’ such as Government policy, financial pressures and family structure, and ‘attitudinal’ factors such as farmers’ values, dispositions and personalities. This conceptualisation is in line with a ‘structurationist’ approach, which gives equal weight to farm circumstances and farmer circumstances in terms of influencing decision-making and behaviour. Going a step further, Clark and Lowe (1992) have highlighted the prevalence of ‘farmer-free’ theories, which neglect the important role of farmers’ own ideas and intentions in explaining their decisions. According to Battershill and Gilg (1997), this dimension of the ‘farmer focus’ remains overlooked in most agricultural research.

All the above-mentioned aspects are important to draw an all-encompassing model of farmers’ behaviour. However, the authors of the ESDMF study themselves pointed out that ‘whilst this observation might be interesting from an academic viewpoint, the policy relevance of such results is less apparent.’ (Willock et al., 1999a, p. 300). They furthermore contend that there are problems with integrating structural and attitudinal variables in models in terms of practicability, as large data sets would be required. Instead they recommend that in order to gain a deeper understanding of the factors influencing farmers’ decision-making processes, farmers’ behaviour in specific domains such as animal welfare and farm conservation should be explored (Willock et al., 1999a). Against this backdrop, exploring the decision-making of farmers with specific regard to afforestation will thus not only lead to practical policy recommendations, but also to deepen the understanding of farmers’ decision-making processes.

The approach taken in this study is to draw on Gasson’s (1973) basic decision-making model and the work of Willock et al. (1999b) (Figure 2). This approach provides the researcher with sufficient guidance through the theoretical structure while at the same time allowing sufficient freedom for data collection.
3.6 Research design

To date, quantitative approaches have dominated the studies undertaken on Irish farmers’ decision-making with regard to afforestation. This means that farmers were confronted with predefined questions and possibilities of answers rather than being given the opportunity to articulate their own views. To let them talk about their personal reasoning behind the decisions of land-use in general, and afforestation in particular, is crucial to gaining a deeper understanding of the decision-making process and the goals and values influencing it. Thus a qualitative approach in the form of semi-structured interviews (in-depth interviews with open-ended questions) was chosen as such an approach permits one ‘to understand the world as seen by the respondents’ (Quinn Patton, 2002). The interviews were shaped by a topic guide covering the broad discussion topics and structuring the conversation, but also allowing for the exploration of issues brought up during the interview. The guidance note (Appendix 8.1, p. 143) covered general questions regarding the farm enterprise and size, the farm family, future expectations for farming, agricultural markets and policy as well as general goals for the farm. It also included discussion areas such as the information situation about the afforestation scheme, the value of incentives paid

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Figure 2: Factors impacting on farmer decision-making
Derived from Gasson (1973) and Willock et al. (1999b)
and farmers’ values with regard to planting forestry on farmland. Each interview was recorded and transcribed. The interviews times ranged from 15 minutes to two hours, lasting on average 45 minutes. All interviews were coded using Nvivo©-software to identify farmers’ values and goals towards farming in general and the values underlying their decision-making on afforesting marginal and agriculturally used land.

3.7 Coding strategy

In order to establish farmers’ goals with regard to afforesting land, the interviews were first coded by farmers’ reasons for not planting trees and their reasons for planting trees. In a second step, the coding strategy investigated further the values farmers held about farming in general and how they influenced the farmers’ decision-making process with regard to afforestation. The analysis followed Layder’s (1998) ‘adaptive theory’. It attempts to combine an emphasis on prior theoretical ideas and models, which feed into and guide research, while at the same time adding to the generation of theory from the on-going analysis of data. The coding was conducted based on Gasson’s (1973) farming values: instrumental, intrinsic, social, and expressive values as outlined in the theoretical discussion above. During the coding process, for each value, several sub-values were identified, based on the data collected and put into sub-value groups according to Gasson’s (1973) theory. Wherever this was not possible, new sub-value groups were created which were grounded in the data collected. Instrumental values were divided into two mutually exclusive sub-values: making the maximum profit and making a satisfying profit. Intrinsic values were divided into four sub-values. Three of those sub-values – enjoyment of work tasks, priority for food production (‘purposeful activity’) and keeping control – were also described by Gasson (1973). The fourth sub-value ‘habit’ was created to represent farmers’ views where they exhibited a certain passivity towards the course of action taken on the farm. Coded under social values were quotes expressing farming values such as ‘to keep the family tradition going’, ‘to leave a good asset for successors’ and also quotes about farming relating to social contact or the value that farming has for society as a whole. The latter aspect was not described by Gasson (1973) but expressed by many farmers in this study. Coded as expressive sub-values were quotes expressing pride of ownership, exercising
special abilities, but also quotes showing that farmers exhibited entrepreneurial characteristics, didn’t mind taking risks and/or had business ideas. Also coded as an expressive sub-value were farmers’ quotes expressing nature conservation values.

3.8 Study area

Cattle and sheep farms have for many years been the least profitable agricultural enterprises in Ireland. Market returns in these systems have not covered the costs of production for many years and parts of the support payments are used to make up the shortfall (Connolly et al., 2009). As discussed earlier, calculations and comparisons of Net Present Values (NPV) have shown that forestry returns would exceed those from beef and sheep enterprises (Breen et al., 2010; Collier et al., 2002; Duesberg, 2008; Behan 2002 cited in Wiemers and Behan, 2004). Thus they have been identified as the farm types where forestry is an attractive financial option (Leavy, 2001). The region chosen for study was the Mid-West/North-West of Ireland as farming in this part of the country is characterised by small cattle and sheep farms on poor soils. Depopulation is also a feature of the region, with the population declining by 19% and employment by 24% between 1971 and 1996 (Bacon, 2003; Kearney and O'Connor, 1993). Creating alternative income options for farmers in these areas could help to stop further marginalisation. The three study counties chosen were Roscommon, Sligo and Westmeath as their forest cover is also below the Irish average (Figure 3). Thus, the potential in these counties for afforestation was assumed to be high.
3.9 Study participants

The target population was farmers operating their farms in the three chosen counties. The names and addresses of farmers in Ireland are not publicly available. Hence, the Irish Department of Agriculture, Food and the Marine was requested to facilitate the survey by inviting a random sample of 800 farmers to participate, of which 62 agreed to do so. Due to restrictions associated with the Freedom of Information Act (1997), it was not possible to obtain any details on non-respondents in order to investigate non-response bias. However, an overview of the demographic and socio-economic characteristics of the study participants given in Table 1 shows that the average farm size in the sample was above the national average, which might be due to eight unusually big estates in the sample, each of which comprised more than 100 hectares.
of land. When these were excluded, the average farm size of the sample was exactly that of the national average. Of the 62 participants, 14 had planted forestry on their land. Again the average size of these forests was larger than the national average farm forests. However, when the large estates were excluded, the average farm forest size dropped below the national average (Table 1).

Table 1: Overview of the survey participants’ characteristics

<table>
<thead>
<tr>
<th></th>
<th>Roscommon</th>
<th>Sligo</th>
<th>Westmeath</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of participants by counties</td>
<td>31%</td>
<td>32%</td>
<td>37%</td>
</tr>
<tr>
<td>Percentage of participants by farming enterprises</td>
<td>Cattle</td>
<td>Mixed cattle</td>
<td>Sheep</td>
</tr>
<tr>
<td>Percentage of participants by occupation</td>
<td>Full-time farming</td>
<td>Part-time farming</td>
<td>Retired</td>
</tr>
<tr>
<td>Average farm size</td>
<td>Sample 53 ha</td>
<td>Adjusted sample 37 ha</td>
<td>National 37 ha</td>
</tr>
<tr>
<td>Average forest size</td>
<td>Sample 12 ha</td>
<td>Adjusted sample 7 ha</td>
<td>National 9 ha</td>
</tr>
<tr>
<td>Average age</td>
<td>Sample 55 years</td>
<td>National 55 years (2007 figures)</td>
<td></td>
</tr>
<tr>
<td>Average direct payments in €</td>
<td>Sample 18,200</td>
<td>National 17,300 (2010 figures)</td>
<td></td>
</tr>
</tbody>
</table>

1 Excluding farms larger than 100 ha

Results are presented in the following order: First, farmers’ goals and values towards farming in general are described. Second, farmers’ reasons for not planting and third, reasons for planting are presented. Finally, results are explored in the context of Gasson’s (1973) theory and policy implications of the results are discussed.
3.10 Results

The results section first presents farmers’ values with regard to farming in general and goes on with exploring farmers’ reasons for not planting and planting including the underlying values influencing such reasoning.

3.10.1 General farming values

Regarding instrumental values, most of the participants exhibited one of the two instrumental sub-values described by Gasson (1973). The two sub-values described and observed were either making a ‘maximum income’ or making a ‘satisfying income’. They were mutually exclusive meaning that farmers held either one or the other sub-value. The majority were looking to make a satisfying income rather than the maximum one (Table 2).

<table>
<thead>
<tr>
<th>Farming value</th>
<th>Sub-value</th>
<th>No. of interviewees</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental</td>
<td>Total</td>
<td>62</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Satisfying income</td>
<td>40</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>Maximum income</td>
<td>13</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>Indifferent to profit</td>
<td>9</td>
<td>14%</td>
</tr>
<tr>
<td>Intrinsic</td>
<td>Total</td>
<td>51</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Enjoyment of work tasks and lifestyle</td>
<td>29</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>Habit</td>
<td>17</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Priority of food production</td>
<td>15</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>Control over land</td>
<td>15</td>
<td>24%</td>
</tr>
<tr>
<td>Social</td>
<td>Total</td>
<td>18</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Family tradition</td>
<td>16</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>Good for society</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Social contacts</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Expressive</td>
<td>Total</td>
<td>15</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>Meeting a challenge</td>
<td>9</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>Knowledge, abilities and aptitudes</td>
<td>7</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Nature conservation</td>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Pride of ownership</td>
<td>2</td>
<td>3%</td>
</tr>
</tbody>
</table>

Only instrumental sub-values were mutually exclusive
This bigger group typically said that farming financially ‘only breaks even’, but in most years they would keep all or most of the Single Farm Payment as their profit. This seems to be a satisfactory enough income, as most of the interviewed farmers were not interested in increasing their income further.

‘You are lucky if you break even. The better farmers are holding their single farm payment and a small bit along with it. But most farmers would be losing some of their single farm payment.’

Most farmers looking for the maximum income didn’t state this openly and if so, they qualified their intention to make as much money as possible with an additional remark such as ‘you will never become a millionaire farming!’. Another farmer complained that pursuing the maximum income puts him and his animals under ‘too much stress’. Farmers who exhibited profit maximisation as their target for farming were more inclined towards exploring and deploying alternative market opportunities such as mushrooms, organic farming, wind farms, selling spring water from the farm, producing good quality food but also forestry.

‘I have a great well on my land it’s thousands, millions of gallons of water leaving it probably every day. If I could ever get the money to set up a water bottling plant at it... because it’s the finest of spring water, it’s perfect.’

But also adapting quickly to the changing market situation was one of their strategies.

‘I’m going to get into more cows, that’s what I’m planning anyway, sell more weanlings. Well so far it’s the quickest way to make money.’

The profit maximisers were also very interested in and well informed about the current and future development of agricultural policies, especially those affecting support payments. In general it can be said that they showed a more active, entrepreneurial approach towards managing their farm.
A small group of farmers did not have instrumental values at all and were indifferent to profit from farming. They were either retired, had full-time off-farm jobs, or were successfully self-employed. Farming for them was more like a hobby and sometimes they would use the income of the off-farm job to subsidise the farm business.

The majority of farmers with instrumental values additionally held one or more of the other values – intrinsic, social or expressive – described by Gasson (1973). With regard to the whole sample, the most frequently mentioned of these additional values were intrinsic values (Table 2, p. 56).

Within the intrinsic value group, four sub-values were identified during the research process. Three of those – ‘Enjoyment of work tasks and lifestyle’, ‘Priority for food production’ (as purposeful activity)’ and ‘Control over land’ – were also described by Gasson (1973). For many farmers intrinsic values seem to compensate them for low financial returns from farm work:

‘I never liked farming in my younger days, but I’m just glad to have it now. It’s not really for farming; it’s just the pleasure of it. (...) A place to have a nice walk. It is peaceful. It certainly is not the income, I know over the last number of years, the income off it has been little or nothing or negative.’

A fourth sub-value was identified and termed ‘habit’. As noted earlier, it was created to represent farmers who stayed in farming simply because it is what they were used to doing all their life. Those farmers typically expressed a negative attitude towards change in general. They either felt too old for change or didn’t like change because of the ‘hassle’ involved and therefore preferred to keep doing what they were used to.

‘I know people change, but a lot of people won’t, because they are at it so long, they are not going to change. I suppose I won’t say it’s like a religion or something like that. It’s just in them to produce cattle or produce sheep or whatever.’
After ‘enjoyment of work tasks’, ‘habit’ was the next most frequently mentioned sub-value, closely followed by ‘priority of food production’ and ‘control over land’.

The other additional values – **social** as well as **expressive** – were less dominant in the discussions about running the farm in general. Gasson (1973) similarly found that farmers’ most frequently cited sources of work satisfaction were those related to intrinsic and instrumental values, while those related to expressive and social values were mentioned less often. Ilbery (1983) also found intrinsic values to be most important among the goals and values of hop farmers, followed by expressive values, with social values having the lowest priority. In this study, the most frequently cited social sub-value was continuing the ‘family tradition’ (Table 2, p. 56).

‘I do it, I guess maybe for the kids if they have an interest.’

Other less frequently mentioned social values were the enjoyment of the social contact made possible through the farming lifestyle and the idea that farming is beneficial for society as a whole.

Expressive sub-values as described by Gasson (1973) and exhibited by the interviewees were ‘meeting a challenge’, exercising special ‘abilities and aptitudes’ and ‘pride of ownership’ (Table 2, p. 56). Also coded as expressive sub-values were quotes by farmers whose farm management was influenced by ‘nature conservation’ values – which arguably could also have been coded as a social value. As Gasson (1973) noted, grouping of sub-values is by no means clear-cut and the meanings of value groups often overlap. It was decided to code the ‘nature conservation’ sub-value to the group of expressive values, on the basis that the interest in wildlife and the creation of suitable habitats for them was closely related to the sub-value of exercising special abilities.

The expressive sub-value ‘meeting a challenge’ was linked to entrepreneurial thinking in terms of actively looking for new business as a challenge.
‘I’m in the process of developing this new project; I’m a project person! I’m putting up a cool chill room, for my organic lambs. (…). Well of course there’s other projects you can do as well, once you have these sheds fixed up (…) you could actually take in turkeys or geese or other things. You can use the sheds in the summer then for other options.’

To exercise special abilities or to make use of special knowledge was often expressed through an interest in breeding high-quality stock or through managing the land in order to make it look good.

In contrast to the instrumental values, intrinsic, social and expressive values were not mutually exclusive. They were held in parallel creating a complex value system with regard to farming in general. One farmer, for example, had sold some wetland to a forestry company. He managed the remaining part of the farm with the goal of profit maximisation and entrepreneurial thinking in terms of enjoying new challenges (see quote above). However, at the same time, the farm work also provided great source of joy to him:

‘With the sheep I work very hard. But it’s enjoyment as well, you may go through a lot of punishment for two months in the lambing, because it’s all hours, but at least when they are all up and running and out, and they are all looking well, you forget all that, it’s gone, looking forward to the next thing then!’

3.10.2 Reasons for not planting

When presented with the option to afforest some land, the most commonly expressed reason for not planting trees was that the farm afforestation scheme wasn’t attractive enough financially. However, only a very small group of farmers knew the financial details of the scheme and had compared them with their farming returns. Although they had heard about the existence of the scheme, most respondents were not actually informed about the details. After informing them of the financial benefits of the scheme, many farmers admitted that it would pay better than staying in farming.
‘Each year? For the twenty years? That would include fencing and planting? ...Jesus you have me thinking now! And I thought you said you weren’t promoting forestry!’

However, even after being presented with the financial benefits, no farmer became seriously interested in planting. The most frequently cited reason for not planting was that the land on the farm wasn’t suitable for forestry, i.e. not ‘bad’ enough or that the farm was too small for planting.

‘Well that’s out with me, I have all very good fertile land and I would not plant it, I wouldn’t destroy it, there is no way, no matter how attractive it was, it’s one of the last things I would do, I would feel I would be destroying my land, by planting trees on it. I only agree to planting poor quality land for forestry, but good land, I don’t like the idea of it.’

At this point of the interview, farmers were asked why they would not plant agriculturally used land, despite forestry returning higher profits. Interviewees’ answers generally centred around three reasons, which were in most cases influenced by intrinsic farming values: they either said that farming was the more attractive option, because it produced food (31); or because it had the advantage of a fairly quickly adaptable land-use cycle and they wanted to ‘keep control’ over the land (45); or because it was linked to a specific enjoyable type of work and lifestyle (17). Reasons were not exclusive and most farmers mentioned two or all three of them. A typical statement for farming being linked to the preference of food production was:

‘You tend to hold onto land, you don’t tend to plant land, you tend to hold onto it, as growing crops, beef or cattle anyway.’

For farmers, the second attribute making farming more attractive than forestry was, as mentioned above, linked to a flexible land-use system, which can potentially be changed from one year to another. This very often was expressed in the notion of forestry being too much of a long-term enterprise.
‘Forestry as you know, you are in there for twenty years, you can’t change, whereas I get out of sheep or get out of cattle I could get back in two years later or three years later.’

The third attribute characterising farming as the preferred land-use is linked to a strong affinity for the activities and lifestyle related to farming:

‘But the spring time is a lovely time of the year when you are farming, when calves are being born and I don’t think it’s really what you make out of it, it’s the fact that you get the animals and you get them to stay alive and you get them thriving, that’s basically it, it’s the job satisfaction. There is not much job satisfaction in forestry.’

A quite large group of interviewees (18) indicated that Irish farmers would have a general resentment towards forestry, which is deeply rooted in the nation’s history of oppression, tenant farming and famine.

‘In Ireland there is a huge tie to the land. The fact that you have land is worth more than the land itself. It’s historically, going back to the famine times and going back to different times. (…) To put your land in forestry is a sin and I would have been told that, when I planted my land.’

‘Irish people and land, there’s a sort of a bond there all the time and the forestry is sort of foreign. (…) A lot of it is coming from history, the fact that you had the English landlords here.’

Another substantial group of farmers (17) had concerns about the impact forestry would have on the landscape and environment. Typically, farmers were afraid of forestry blocking the view, destroying the landscape or impacting on water quality.

‘Once you plant your green field, you don’t see your green field anymore, because the trees start to grow on it. It’s nice to look out that window and you see a green field.’
A small group of farmers (5) stated that they would not plant because of social value reasons, i.e. that they hoped the next generation would take over the farm soon and they would rather leave the decision about what to do with the land to them.

### 3.10.3 Reasons for planting

Most of the interviewed farmers who already had planted some forestry had a similar view on planting as the majority of farmers without forest; farmers with forest mostly planted because they had land that was difficult to farm or bad land that they could not improve (e.g. drain) to make it fit for grazing. In many cases, the planted parcels were separate plots, typically far away from the farmhouse and the farming facilities. Those farmers who had planted typically had more than one reason leading to this decision. Similar findings were made by (Frawley and Leavy, 2001) and (Ní Dhubháin and Kavanagh, 2003).

‘We inherited the land and we planted it two years after inheriting it. It was such a burden having it, because it was far away from the house, it put extra pressure on you going to see cattle on it. (...) This land it was bog, it was mountain, it would have been dangerous for cattle, because it wasn’t drained properly, there were dykes in it, so it wasn’t used.’

Asked if they would plant more – and also better quality land – most of them expressed the same view as farmers who had not planted, which was ‘I would never plant good land’. Only two farmers had no major objections towards planting land that was agriculturally used. They had planted because forestry in their case was the most attractive option financially. But even these farmers had additional reasons driving them towards planting trees on agricultural land, e.g. not having time to farm the land themselves; having a big farm by comparison – hence leaving enough land for farming; or having a plot of land far away from the farmhouse or plot that was difficult to farm.

‘The farm is in about twenty plots and we have one farm, I think it’s thirty-five minutes away from the home house and we used to keep all our cattle there we’ll say. And we
just found it wasn’t viable anymore to keep. But the main reason why we did move was because the main Dublin-Galway road would split the land in two. So it was harder to farm as well.’

3.11 Discussion and conclusion

Most of the farmers interviewed appeared to exhibit multiple values in parallel about farming in general, confirming Gasson’s (1973) view that farmers have complex value systems. In terms of instrumental values, the results showed that the two sub-groups – making ‘the maximum income’ and making a ‘satisfying income’ – are mutually exclusive. Although Gasson (1973) groups the two instrumental sub-values under one heading, they lead to two very different decision-making processes. Farmers who look to make the ‘maximum income’ generally showed a more active approach in running the farm enterprise and improving their income and thus their profit. Farmers looking for a ‘satisfying income’ seem to look for an alternative source only when their income falls below a certain threshold over a longer period of time. Amongst the interviewees, the dominant instrumental value was to make a satisfactory income rather than the maximum one, confirming similar results of Battershill and Gilg (1997). Farmers themselves were aware of the fact that their income from farming is quite low and pointed this out in the interviews. This is also supported by statistical data showing that the average family farm income is only half of that of the average earnings of industrial employees in Ireland (CSO, 2011; Hennessy et al., 2010). However, intrinsic, social and expressive values with regard to farming in general seem to compensate farmers for this low income. At the same time, direct payments provide a certain income security to many farmers and thus there is no necessity or immediate pressure to identify alternative income options for farmers looking for a ‘satisfying income’. This might explain why few farmers knew about the details of the afforestation scheme.

From the results of this study, we can conclude that multiple, sometimes contradictory, farming values co-exist unchallenged under stable circumstances. Burton and Wilson (2006) provide an overview of empirical evidence on farmers with ‘multiple farming identities’ or ‘farming styles’ which confirms this conclusion.
However, when it comes to a concrete decision between two alternatives – such as the option to afforest land versus the decision to stay in farming, the situation is different. In a concrete decision-making situation, the various co-existing values can contradict each other as discussed by Gasson (1973). In such a situation, one value or group of values takes precedence over the others as a main guiding value in the decision-making process. For example, the majority of farmers with general profit maximisation values would never plant agriculturally used land, even if it would produce more profit under forestry. Only two farmers in this group had no major objections to planting agricultural utilised land (and actually had planted such land). The majority, however, would never plant ‘good land’. This is underpinned by the fact that private forests in Ireland are mainly growing on land considered marginal for agriculture such as peat (30%), poorly drained gley soils (30%) or podzols (10%) (Farrelly, 2006a). It should be pointed out that ‘good land’ from a farmer’s point of view is not a standardised characterisation according to soil quality parameters. What constitutes ‘good land’ to somebody in the West of Ireland could be marginal land worth planting to somebody in the midlands. In a survey of Irish farmers who afforested as part of the Coillte farm partnership, those participants with farms in the West of Ireland – where wet soils prevail – planted predominantly wet mineral soils, whereas farmers in other parts of the country planted mostly dry mineral soils (Ní Dhubháin and Kavanagh, 2003). It seems that ‘good land’ from a farmer’s point of view is defined as land that is used for food production in a typical way under the given conditions. While farmers in regions where the soil quality is lower frequently use quite wet land for farming, farmers in other regions with land of similar quality could think of it as suitable for planting. Regardless of the objective quality of the land in question, there seems to exist a common view amongst the farming community that the ‘good land’ should not be planted, even if it would return a higher income. However, most farmers would plant ‘bad’ land without hesitation. This decision is based on profit maximisation values, given that, after planting, the land at least produces some income.
When farmers were asked why they would prefer farming to planting – despite the lower income earned – intrinsic farming values were the most frequently cited reasons. Sometimes, one single intrinsic value dominated, but most often farmers mentioned more than one value as being a barrier to planting. This means that if only ‘good land’ is available, values other than instrumental ones are guiding the decision-making process. Similar findings were made by Battershill and Gilg (1997) in a study on the influence of farmers’ dispositions on environmentally friendly farm management practices, in which farmers ranked the enjoyment of farming and the countryside higher than the achievement of profit maximisation targets. The importance of values other than instrumental ones in guiding the decision-making process on afforestation of agriculturally used land also explains why farmers didn’t change their mind in favour of planting, following the provision of more detailed information about the scheme and the realisation of the profitability of forestry. It can be concluded that simply addressing the lack of information will not be sufficient to encourage more farmers to plant. The reason why forestry is not an option to these farmers simply is because it is not farming. Similarly, Selby and Petäjistö (1995) found that Finnish farmers clearly favoured solutions that maintain productive farming over various other means for reducing overproduction. Elands et al. (2004) in their multinational research in eight EU countries found that in Atlantic countries – and especially those with a short forestry history such as Ireland – the view that ‘forests are harmful’ (i.e. because they are a threat to other land use activities such as farming or because they diminish the beauty of the landscape) is more widespread than in central European countries with a long forestry history such as Germany. This gives rise to the conclusion that the Irish farmers’ value systems with regard to farm forests exhibit both universally valid and regionally specific value system characteristics.

This study demonstrated, that Irish farmers’ value systems with regard to farming and afforestation can be a barrier to engage in this alternative land use. This finding is highly significant for future policy design in the area of farm afforestation support in Ireland. As the majority of the farmers interviewed were not guided by profit maximisation values when it comes to afforestation, it is questionable if the farm
afforestation scheme in its current form alone will be sufficient to increase the planting rates as envisaged in the Irish policy strategy. The results suggest that an additional policy tool is needed to overcome the barriers rooted in Irish farmers’ value system about farming. Identifying which tool might be appropriate was part of the second major objective of this study. To recapitulate, the second research objective aimed to quantify the identified afforestation barriers, recognizing their importance for the wider farming community in Ireland and assessing their relevance for the design of more effective policy tools. The quantitative study was conducted in the form of a survey, the results of which were presented in a second research article (which at the time of the thesis’ submission was under review for the Journal Land Use Policy). This article is presented in the following chapter 4.
4 Assessing policy tools for encouraging farm afforestation in Ireland

4.1 Overview

This chapter is concerned with the second overall objective of the study, which attempts to quantify identified afforestation barriers in Ireland while assessing their relevance in terms of the design of more effective policy tools. The results of this part of the study have been submitted as a research article, which is under review at the time of the thesis’ submission. The chapter is constituted as follows: The background to farm afforestation in Ireland in terms of rural development, agriculture and forestry is discussed briefly in section 4.2. The next section outlines the theories and literature on farmer decision-making. This is followed by a description of the theory of behavioural assumptions underlying policy tools. Based on this theory, potential alternative tools to further encourage farm afforestation in Ireland were identified. The ‘Material and Methods’ section then explains the design of the questionnaire developed for the purpose of addressing the objectives; in particular it describes how the findings of the previous qualitative studies were integrated. The results indicate that the majority of those surveyed do not make their decision to afforest based on profit maximisation goals. Offering only an incentive tool – such as the current premium scheme – will not be sufficient to encourage those farmers to plant trees. Additionally capacity tools such as group plantings of neighbouring fields and information campaigns as well as symbolic tools such as a PR- or image-building campaign should be deployed to further encourage afforestation by farmers.

4.2 Introduction

More than one third of all Irish farms are classified as economically vulnerable and another third is viable only due to farm household members engaging in pluriactivity (Hennessy et al., 2011). Job opportunities outside farming however have been decreasing in Ireland since the economic crisis of 2008 and did so, in particular, in rural areas (Meredith, 2011). In addition, the education levels of Irish farmers (holders) are low with about 70% of all farmers having only lower secondary education (Behan et al., 2007). Furthermore, between 1995 and 2009, average farm incomes declined by 43%
when adjusted for inflation (Connolly et al., 2010). The overall decline in farm incomes led to a fall in the number of jobs available in agriculture further reducing job opportunities in particular for male workers with little or no training (Meredith, 2011). Additional employment options could be offered by a growing sustainable forestry and wood-processing sector, as the natural conditions in Ireland are very favourable to tree growth (DAFF, 1996, 2010). The mean annual increment is approximately twice as high as that in mainland Europe (Kearney and O'Connor, 1993; Ni Dhubháin and Kavanagh, 2003). Forests, however, cover only approximately 12% of Ireland’s land surface, far less than the European average of 40% (EUROSTAT, 2011).

A national forestry strategy was launched in 1996, which sets out ambitious afforestation targets (DAFF, 1996). They were to plant 25,000 hectares per annum until the year 2000, and 20,000 hectares per annum from 2000 until 2030 (ibid). It had been calculated that such a level of afforestation would lead to a critical mass of timber output necessary ‘to support a range of processing industries’ (DAFF, 1996, p. 2). The forestry strategy further specified that 70% of the planting was to be carried out by private landowners, in particular farmers. As noted earlier, planting is encouraged through a farm afforestation scheme, which fully covers establishment and maintenance cost of the first four years after planting and pays farmers an annual tax-free premium for the duration of 20 years. Despite the availability of these incentives between 1996 and 2009, only 48% of the targeted area was planted with trees (Forest Service, 2009) (Figure 1, p. 43). In other countries, the participation in similar farm afforestation schemes was also not as high as expected. In Finland and France, after an initial high level of interest, planting rates also dropped (Mather, 1998; Selby and Petäjistö, 1995). In England and Northern Ireland, participation in afforestation schemes did not meet expectations from the outset (Burton, 1998; Edwards and Guyer, 1992; Ilbery and Kidd, 1992; van Gossum et al., 2008). In the Belgian region of Flanders, despite the implementation of afforestation incentives and restriction on deforestation, forest cover declined before slightly increasing again (van Gossum et al., 2008). Thus, despite the availability of financial incentives for farm afforestation, farmers have not planted to the extent envisaged and planting rates
have been volatile in many countries (Edwards and Guyer, 1992; Mather, 1998). The Irish Government took a number of actions to increase the attractiveness of the scheme. For example, premiums rose in 1995, 1999, and 2007 with the minimum premium currently standing at 369 Euros/ha per year (Figure 1, p. 43). Nevertheless, planting rates continued to stay below target.

4.3 Farmer decision-making

According to Anthony Giddens’ theory of structuration, social practices such as land-use and land-use change are influenced by structure as well as by individual agents’ actions (Giddens, 1984). Giddens’ theory of structuration attempts to overcome the dichotomy of sociological research focusing either on actors and structure, on the macro or micro-level. He argues that the social sciences should focus their analysis more on social practices rather than on individual experience or social structure. Giddens defines structure as the ‘rules’ and ‘resources’ related to a structuration process, but also being the outcome of agents’ actions (‘duality of structure’). The process of structuration combines both agency and structure, which interact with each other to ‘structure’ a society or social system (Burton and Wilson, 2006; Giddens, 1984). In the more specific research area of farmer decision-making this theory is paralleled by Battershill and Gilg’s (1997) concept of farmer behaviour with regard to land-use. They divided the different factors influencing farmer behaviour and decision-making into structural factors and individual farmer factors. Influential structural factors were identified as Government policy, financial pressures and farm characteristics. Values, goals, attitudes and socio-demographic factors were identified as influential individual farmer factors (ibid). Such an approach takes farm and farmer circumstances equally into account when trying to describe farmers’ decision-making and behaviour.

In Ireland, most attempts to explain the low take-up rates of farm afforestation have focused on the structural context (e.g. economic factors and material resources of the farm). The results of economic modelling exercises have been mixed. Wiemers and Behan (2004) found that Irish farmers in the past made economically optimal decisions
with regard to not planting. However, Collier et al. (2002), Behan (2002 cited in Wiemers and Behan 2004), Duesberg (2008) and more recently Breen (2010) have shown that forestry returns would exceed those from drystock beef and sheep farming. Empirical studies looked at the relationship between Irish farmers’ afforestation intentions and farm structure as well as socio-demographic variables such as farm size, enterprise type, off-farm employment, education level, age, marital status, successor situation and region (Collier et al., 2002; Farrelly, 2006c; Frawley and Leavy, 2001; Hannan and Commins, 1993; Ní Dhubháin and Gardiner, 1994). The only variable that consistently emerged as having an influence on farm afforestation in Ireland was farm size: farmers with larger than average farms were more likely to plant. Studies conducted on farm afforestation in the UK found similar results (Ilbery, 1992; Mather, 1998; Watkins et al., 1996).

Research into Irish farmers attitudes toward afforestation has revealed that farmers have only considered afforesting land that was good for nothing else (Collier et al., 2002; Frawley, 1998; Frawley and Leavy, 2001; Hannan and Commins, 1993; Kearney, 2001; McCarthy et al., 2003; Ní Dhubháin and Gardiner, 1994; Ní Dhubháin and Kavanagh, 2003). Furthermore, the majority of the land planted to date by farmers had previously been used for rough or summer grazing. Hence, planting it did not have a major impact on farm management (Frawley and Leavy 2001). McDonagh et al. (2010) discovered that the main barriers to planting for Irish farmers was the inflexibility resulting from afforestation and the belief that farmers needed all their land for agriculture. Nevertheless, among the Irish studies looking at farmers attitudinal barriers there is a lack of qualitative approaches in-depth exploring the reasons underlying the rationale to only plant the bad land from the farmer’s perspective.

4.4 Policy tools matching farmer decision-making

In order to design successful policies to further encourage farm afforestation, it is necessary to understand farmers’ views on the issue. This is particularly important for policies that rely on the voluntary uptake by a large number of people in different situations, such as the Irish farm afforestation scheme (Burton et al., 2008; Morris and
Potter, 1995; Wilson, 1997; Wilson and Hart, 2000). As McDonagh et al. (2010) point out, the decision to afforest is difficult and, for every farmer, depends on different factors. According to Schneider and Ingram (1990), individuals can have different reasons for compliance or non-compliance with a policy. In their theory on policy tools, they contend that policies generally are designed to match various decision-making behaviours to the desired policy outcome. Accordingly, individuals of a target population will only co-operate if the employed policy tool matches their decision-making behaviour with regard to the policy’s objective. Schneider and Ingram (1990) classified five different types of policy tools according to the type of behaviour they address (Table 3).

Table 3: Policy tools and the behaviour they address
(Based on Schneider and Ingram, 1990)

<table>
<thead>
<tr>
<th>Policy Tool</th>
<th>Behaviour</th>
<th>Example of Policy Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentive tool</td>
<td>Positive response to incentives; utility maximisation</td>
<td>Positive or negative incentives such as inducements, charges, sanctions and force</td>
</tr>
<tr>
<td>Symbolic tool</td>
<td>Non-co-operation due to disagreement with the values implicit in a policy</td>
<td>Public relations or Image-building campaigns associating a policy’s objectives with positive values</td>
</tr>
<tr>
<td>Capacity tool</td>
<td>Non-co-operation due to a lack of capacity such as information, resources (e.g. land) or skills</td>
<td>Information campaigns about the cost and benefits of a policy</td>
</tr>
<tr>
<td>Authority tool</td>
<td>Co-operation without tangible payoffs in order to obey an authority or law</td>
<td>Guidelines for Government agents and officials</td>
</tr>
<tr>
<td>Learning tool</td>
<td>The situation involves such high levels of uncertainty that the nature of the problem and the solution to it has yet to be specified</td>
<td>Mediation, evaluations, hearings, etc. that facilitate interaction of Government agents and target population</td>
</tr>
</tbody>
</table>
The Irish farm afforestation scheme according to this theory is a typical incentive tool offering external motivation in the form of premium payments. Incentive tools are designed based on the assumption that the target population will make their decision based on utility maximisation. As the incentives of the Irish farm afforestation scheme are of a monetary nature, utility maximisation translates into profit maximisation. The assumption that farmers make the decision to join the afforestation scheme and plant trees based on profit maximisation goals is true for those farmers who availed of the scheme in the past and planted, even though they might have had additional reasons to plant. If this assumption were also true for those farmers who did not plant, the explanation for the low uptake of the scheme would be that premiums are not attractive enough. However, economic studies have shown that forestry returns would exceed those from farming on poor quality land, namely beef and sheep enterprises (Breen et al., 2010; Collier et al., 2002; Duesberg, 2008). There certainly are profitable cattle and sheep farms that return higher margins when compared to forestry. Nevertheless on the majority of drystock farms market outputs do not cover production costs (Hennessy et al., 2011). Thus, if those farmers behaved as profit maximisers, agricultural land should have been planted with forestry on a larger scale. However, as Schneider and Ingram (1990, p. 514) point out ‘not all decisions or behaviour are driven by objective or tangible payoffs’. The general literature on farmers’ decision-making confirms these findings. There is abundant evidence that farmers’ farm management (especially on owner-occupied family farms) is not motivated solely by economic goals (Austin et al., 2001; Barnes et al., 2011; Battershill and Gilg, 1997; Bieling, 2004; Burton, 1998; Davies and Hodge, 2006; Duesberg et al., 2013; Gasson, 1973; Gorton et al., 2008; Maybery et al., 2005; McDonagh et al., 2010; Morris and Potter, 1995; Niska et al., 2012; Potter and Gasson, 1988; Shucksmith and Herrmann, 2002; Soini et al., 2012; Valbuena et al., 2008; Willock et al., 1999a). Thus, another explanation for the afforestation scheme’s failure to reach its targets could be that a proportion of farmers do not behave as profit maximisers. From previous research conducted, we know that farmers hold different financial goals such as making a ‘Maximum Profit’, or a ‘Satisfying Profit’ or having ‘No Interest in Profit (Hobby Farmers)’ (Duesberg et al. 2013). However, farmers can adjust these goals to
various decision-making situations. For example Gasson (1973; p. 525) assumed that ‘people desire to achieve all valued ends, but in situations where these are mutually exclusive, it is the relative ordering of values which determines how they decide to act.’ This would mean that while a farmer might overall pursue profit maximisation goals, this might change when it comes to the decision to afforest. If Irish farmers do not act as profit maximisers when it comes to the afforestation decision, different policy tools will be needed to accompany the current incentive tool to encourage more farmers to plant trees on their land.

Two of the tools presented in Table 3 could be considered as potential options to accompany the current incentive tool, namely capacity tools and symbolic tools. The incentive tool should continue to be available as almost no farm afforestation took place prior to the introduction of the premium scheme and studies conducted since that time have shown that the vast majority of farmers would not plant if no grants were available (Carroll et al., 2011; Maguire, 2008). Authority tools would not be an option in Ireland as they would direct or command farmers to plant without offering any positive or negative incentive. Furthermore, applying such a tool would not be sensible as one objective of the afforestation scheme is to provide farmers with alternative income streams (DAFF, 1996). Learning tools are also regarded as unsuitable in this instance as they are typically employed where the nature of the problem and the solution to it have yet to be established. In this case, the Irish forestry strategy has identified the problem as being too low a level of forest cover, the main solution to which is to encourage the private afforestation through farmers (ibid). While both of these assertions can be questioned, the purpose of this study is not to assess the targets of the strategy itself.

The objective of this work is to determine whether it would be necessary to improve the current incentive tool and to determine if additional symbolic and capacity tools need to be employed to encourage more Irish farmers to plant trees on their land. For this purpose, it was first established whether Irish farmers in general behaved as profit maximisers. Second, it was examined whether they behaved as profit maximisers with
regard to the actual afforestation decision situation or if their decision to afforest is instead based on symbolic values. Third, it was determined whether capacity deficiencies need to be addressed in order to encourage afforestation. Lastly, the implications of the findings in terms of designing more effective policies are discussed.

4.5 Research design

A survey was sent out to a sample of farmers all over Ireland to find out which policy tools – incentive, symbolic or capacity – need to be employed to encourage more farmers to afforest (see section 4.6, p. 79 for sampling and study participants). A further objective was to establish the behaviour that underlies a farmer’s decision to afforest and to determine if capacity deficiencies are a barrier to planting. The survey included 19 questions and was based on our previous research related to the goals and values of Irish farmers with regard to afforestation (Duesberg et al. 2013). For that research, 62 in-depth interviews to explore the afforestation decision from a farmer’s point of view were conducted. The results from that study provided us with the range of potential afforestation behaviours and capacity deficiencies, which are examined in this survey. The survey questionnaire comprised five sections dealing with the following issues:

A) Profit goals for the farm in general;
B) Reasons for not planting;
C) Reasons for planting;
D) Knowledge about afforestation scheme;
E) Socio-demographic and farm structure variables.

The objective of section A was to establish which profit goals farmers pursue for their farm in general. Presented were three statements representing the profit goals (maximum/satisfying/no profit) identified in our previous work (ibid). Participants were asked to choose the one statement they most agreed with. The selection and phrasing of the three statements was grounded in the data collected for the previous qualitative research. The options presented in the survey were:
'I look at farming totally from a financial point of view. I reckon the land is there to make as much money as possible.' (Maximum profit)

'You would want to make a satisfactory income with farming, all right. But the last penny of profit wouldn’t necessarily be what I’m after.' (Satisfying profit)

'The farm is just a hobby really. I’m farming despite the fact that at best it would break even only.' (Hobby farmer)

The objectives of sections B and C of the survey were to establish the types of behaviour that underlie a farmer’s decision to afforest, i.e. whether a lack of incentives or symbolic reasons were the main reasons for not planting or planting. In section B, five statements expressing incentive or symbolic reasons for not planting were presented. The selection and phrasing of these statements, too, was grounded in the data collected during the previously conducted in-depth interviews. The options presented in the survey were:

I will not plant because:

'When I do the figures on it, I’m still better off using the land for farming or renting it. I would be losing money if I planted.' (Represents profit maximisation behaviour – Incentives too low)

'I prefer producing food on my land rather than growing trees – even if it is making less profit.' (Represents symbolic barrier – prefers to produce food)

'Forestry is too long-term, you can’t change from one year to another like in farming.' (Represents symbolic barrier – prefers land-use flexibility)

2 Incentive barriers would need to be addressed by incentive tools and symbolic reasons by a symbolic tool.
'What would I do if I planted trees? I do not think it’s really how much money you make out of farming; it’s the job satisfaction. There is not much job satisfaction in forestry.' (Represents symbolic barrier – prefers farming lifestyle)

'Earlier generations put a lot of work into felling trees and making this farmland. I’m not going to plant it now.' (Represents symbolic barrier – family tradition, social values)

In section C, similar questions were put to those who were interested in afforestation to determine whether their decision to plant was because they believe forestry to be a more profitable option than farming, or whether there were symbolic reasons guiding this decision. Four statements were presented in the questionnaire and respondents were asked to indicate which they agree most with. Those statements were also drawn from the in-depth interviews conducted for the previous work on goals and values for farm afforestation. The presented statements were:

I will plant, because:

‘With forestry I will earn more money than with farming the land.’ (Represents financial reason – profit maximisation)

‘I have really bad land that’s good for nothing else and is not producing anything.’ (Represents symbolic reason – prefers to produce food on good land)

‘I think a forest will be a good asset to have for my successors.’ (Represents symbolic reason – family tradition, social values)

‘Creating a forest will contribute to nature conservation and provide habitats for wildlife.’ (Represents symbolic reason – social values)
Sections D and E examined whether capacity deficiencies were barriers to planting. In our own previous research, three capacity deficiencies had been identified as being potentially relevant (Duesberg et al. 2013). These were as follows: a lack of knowledge about the scheme; insufficient land and a lack of decision-making skills in terms of accounting and comparing returns from different land-uses. To establish the extent to which a lack of knowledge about the scheme was the main barrier to planting, participants were first asked in section D if they were interested in planting, they were then given detailed information about the afforestation scheme and were then asked if that information had changed their mind in favour of planting. The detailed information provided described all of the financial benefits available more specifically and asked the participants about their level of knowledge/awareness of these different benefits.

Section E established the extent to which a lack of land or farmers’ decision-making skills were barriers to planting. For this purpose, questions relating to the size of farm and the educational level of the farmers were included in the questionnaire. In terms of the size of the farm, farmers were asked about the size of the land farmed as well as for the size of the land owned to establish the number of hectares to which the participant has property rights in terms of making a long-term land-use-change decision.

Additional general questions relating to the farm enterprise, its location, occupation, gender, marital status and family stage were also included.

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3 See section 4.2 for more information on the afforestation scheme’s benefits.
4.6 Data collection and analysis

The questionnaire for the survey was distributed in spring 2012 to a random sample of 4,000 farmers all over Ireland with the support of the Department of Agriculture, Food and the Marine (DAFM), which administered the mailing. The sample was drawn from a list of 136,000 recipients of Direct Payments (Single Payment Scheme and other schemes), which represented 97% of the farming population. Table 4 and Table 5 give an overview over the respondents’ characteristics.

Table 4: Overview of participants’ characteristics: enterprises

<table>
<thead>
<tr>
<th>Enterprise Type</th>
<th>Survey participants</th>
<th>National average¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle (specialist beef)</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>Mixed cattle and sheep</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Sheep</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>Dairy</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Mixed tillage and grazing livestock</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Tillage</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Mixed field crops²</td>
<td></td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

¹ Census of Agriculture 2010 (CSO, 2012)
² This category was only surveyed in the Census of Agriculture

The survey had a relatively high response rate of 38%. Other postal surveys sent out to farmers typically achieve response rates between 10 and 25% (Garforth and Rehman, 2005; Jongeneel et al., 2008; Kassioumis et al., 2004). The high response rate is even more notable as the questionnaire was sent out in spring, which usually is a busy time of the year for all farmers. An explanation could be the fact that the mailing was recognisably sent out by the Department of Agriculture. Also the relative compactness of the questionnaire, which comprised only four pages, might have been to our 

⁴ According to the most recent Census of Agriculture conducted in 2010 there are almost 140,000 farms in Ireland. No information is available about those farms not receiving direct payments.
advantage. Additionally it could have been interesting for the participants to read the sections that contained farmers’ typical statements about farming values and reasons for planting and not planting.

Table 5: Overview of participants’ characteristics: farm size, forest size, and age

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>National average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average size of land farmed</strong></td>
<td>48 ha</td>
<td>40 ha(^1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(UAA)</td>
</tr>
<tr>
<td><strong>Average size of land owned</strong></td>
<td>39 ha</td>
<td>35 ha(^1)</td>
</tr>
<tr>
<td><strong>Forest ownership</strong></td>
<td>14%</td>
<td>App. 12%(^2)</td>
</tr>
<tr>
<td><strong>Average size of forest</strong></td>
<td>14 ha</td>
<td>10 ha(^3)</td>
</tr>
<tr>
<td><strong>Average age</strong></td>
<td>54 years</td>
<td>55 years(^4)</td>
</tr>
</tbody>
</table>

\(^1\) National Farm Survey 2011 (Hennessy et al., 2011), the difference between the sample’s average size of land farmed and the national average is most likely due to differences in the way this figure is defined by farmers and by the National Farm Survey

\(^2\) CSO 2010

\(^3\) CSO 2012

\(^4\) National Farm Survey 2007 (Connolly et al., 2007)

For data administration and analysis, SPSS software was used. The aim of this paper is to explore whether it is necessary to improve the current incentive tool that forms the basis of the afforestation scheme in Ireland and to determine if additional symbolic and capacity tools are needed to encourage more Irish farmers to plant trees on their land. To do this, the reasons respondents gave for their decision were linked to their values, goals and capacity in an effort to identify what tools are appropriate. This was done in the form of a number of frequency tables (with associated chi-square test) to help better understand whether the reasons for not planting were associated with the values and some socio-economic characteristics. A one-way ANOVA test was employed to determine whether the average farm size was differed significantly according to the reasons given for not planting.
4.7 Results
The results that are presented below identify, which of the three optional policy tools – incentive, symbolic or capacity – are appropriate to encourage more Irish farmers to plant trees on their land. First, it is explored if the current incentive tool is generally appropriate and if premiums need to be increased to encourage more farmers to afforest. For this purpose farmers’ financial goals for the farm are analysed. Second, the role that financial goals and symbolic values play in the afforestation decision is examined. Third, capacity deficiencies in terms of a lack of knowledge about the scheme, insufficient land, and a lack of decision-making skills are explored. The discussion section explores the implications of the findings for policy making.

4.7.1 General financial goals
The majority of participants (51%) were looking only for a ‘satisfying profit’ rather than for the maximum profit (Table 4). Almost one quarter of farmers (23%) indicated that farming was only a hobby (‘I’m farming despite the fact that at best it would break even only.’). Similarly, Meredith and McCarthy (2012) found that the majority of Irish farmers regard farming as a way of life rather than as a business enterprise. Another quarter (26%) indicated that they were looking for the maximum profit with their farm.

4.7.2 The role of incentives and symbolic reasons in the afforestation decision
Of the survey participants, only 10% currently considered availing of the afforestation scheme to plant trees on their land. About one third (36%) of those had already planted forests in the past. When asked for the reasons for their lack of interest in planting, only a minority (13%) expressed the view that it was because of a lack of incentives (Table 6). For the majority of respondents, the barrier to joining the afforestation scheme was of a non-monetary, symbolic nature. More than one third stated they would prefer to produce food, ‘even if it was making less profit’ – as it was phrased in the questionnaire. One quarter did not want to give up the flexibility of land-use choice. The rest either wanted to continue farming for social or lifestyle reasons (Table 6).
Table 6: Farmers’ reasons for not planting

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefers to produce food (symbolic)</td>
<td>35%</td>
</tr>
<tr>
<td>Prefers land-use flexibility (symbolic)</td>
<td>24%</td>
</tr>
<tr>
<td>Family tradition (symbolic)</td>
<td>16%</td>
</tr>
<tr>
<td>Lack of incentives (financial)</td>
<td>13%</td>
</tr>
<tr>
<td>Prefers lifestyle (symbolic)</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Interestingly a number of farmers exhibited different decision-making behaviours for the farm in general and for the specific afforestation decision. While 26% of participants indicated the pursuit of maximum profit as a general financial goal for the farm, only 13% of participants would base their decision to afforest on profit maximisation goals. This appears to confirm Gasson’s (1973) assumption that the ordering of values can change in differing decision-making situations.

Linking the reasons for not planting with the general profit goals showed that profit maximisers were more likely not to plant because of a lack of incentives (Table 7). Nevertheless almost three quarters of profit maximisers would not plant because of non-monetary reasons. Hobby farmers on the other hand were less likely not to plant because of a lack of incentives (Table 7). The majority of them either preferred to produce food or the flexibility of traditional farming as opposed to forestry (Table 7).
Table 7: Instrumental farming values and reasons for not planting

<table>
<thead>
<tr>
<th>Reason</th>
<th>Maximum profit</th>
<th>Satisfying profit</th>
<th>Hobby farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefers to produce food (symbolic)</td>
<td>27%</td>
<td>38%</td>
<td>33%</td>
<td>34%</td>
</tr>
<tr>
<td>Prefers land-use flexibility (symbolic)</td>
<td>26%</td>
<td>23%</td>
<td>28%</td>
<td>25%</td>
</tr>
<tr>
<td>Lack of incentives (financial)</td>
<td>24%</td>
<td>11%</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>Family tradition (symbolic)</td>
<td>12%</td>
<td>16%</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>Prefers lifestyle (symbolic)</td>
<td>11%</td>
<td>12%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Chi-square = 61.35; P < 0.0001

Furthermore, it was analysed if enterprise type, socio-demographic variables and farm size are related to the reasons for not planting as such relationships could have an impact on designing alternative policy tools (Tables 8 and 9). Tillage and dairy farmers were more likely not to plant because of the incentives being too low (Table 8). Drystock farmers (cattle, sheep, mixed cattle and sheep) were more likely not to plant because of lifestyle and tradition (Table 8). Mixed tillage and grazing farmers were more likely not to plant because of incentives than drystock farmers, but also more likely not to plant because of tradition compared to tillage and dairy farmers.

In terms of occupation, full-time farmers were more likely not to plant because of lack of incentives (Table 8). Farmers with part-time off-farm jobs were more likely not to plant for lifestyle reasons. With regard to education levels, those with vocational agricultural training were more likely not to plant because of low incentives (Table 8). There was a higher percentage of those with trade-based qualifications who did not plant because of the lifestyle related to farming. There was no significant association between the reasons for not planting and other socio-demographic variables.
### Table 8: Reasons for not planting by enterprise, occupation and education

<table>
<thead>
<tr>
<th>Enterprises¹</th>
<th>Lack of incentives</th>
<th>Prefers to produce food (symbolic)</th>
<th>Prefers land-use flexibility (symbolic)</th>
<th>Prefers lifestyle (symbolic)</th>
<th>Family tradition (symbolic)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tillage</td>
<td>31%</td>
<td>33%</td>
<td>26%</td>
<td>2%</td>
<td>8%</td>
<td>100%</td>
</tr>
<tr>
<td>Dairy</td>
<td>26%</td>
<td>33%</td>
<td>22%</td>
<td>8%</td>
<td>11%</td>
<td>100%</td>
</tr>
<tr>
<td>Mixed tillage and grazing livestock</td>
<td>13%</td>
<td>38%</td>
<td>24%</td>
<td>3%</td>
<td>22%</td>
<td>100%</td>
</tr>
<tr>
<td>Cattle</td>
<td>10%</td>
<td>32%</td>
<td>25%</td>
<td>14%</td>
<td>19%</td>
<td>100%</td>
</tr>
<tr>
<td>Sheep</td>
<td>9%</td>
<td>36%</td>
<td>26%</td>
<td>13%</td>
<td>16%</td>
<td>100%</td>
</tr>
<tr>
<td>Mixed cattle and sheep</td>
<td>6%</td>
<td>35%</td>
<td>28%</td>
<td>15%</td>
<td>16%</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13%</td>
<td>34%</td>
<td>25%</td>
<td>12%</td>
<td>16%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation²</th>
<th>Lack of incentives</th>
<th>Prefers to produce food (symbolic)</th>
<th>Prefers land-use flexibility (symbolic)</th>
<th>Prefers lifestyle (symbolic)</th>
<th>Family tradition (symbolic)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time farming</td>
<td>17%</td>
<td>36%</td>
<td>22%</td>
<td>10%</td>
<td>15%</td>
<td>100%</td>
</tr>
<tr>
<td>Full-time off-farm job</td>
<td>10%</td>
<td>31%</td>
<td>29%</td>
<td>13%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Part-time off-farm job</td>
<td>7%</td>
<td>33%</td>
<td>26%</td>
<td>17%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Retired</td>
<td>7%</td>
<td>31%</td>
<td>30%</td>
<td>17%</td>
<td>15%</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13%</td>
<td>34%</td>
<td>25%</td>
<td>12%</td>
<td>16%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education³</th>
<th>Lack of incentives</th>
<th>Prefers to produce food (symbolic)</th>
<th>Prefers land-use flexibility (symbolic)</th>
<th>Prefers lifestyle (symbolic)</th>
<th>Family tradition (symbolic)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural training</td>
<td>20%</td>
<td>34%</td>
<td>23%</td>
<td>11%</td>
<td>12%</td>
<td>100%</td>
</tr>
<tr>
<td>Third level or above</td>
<td>14%</td>
<td>36%</td>
<td>27%</td>
<td>9%</td>
<td>14%</td>
<td>100%</td>
</tr>
<tr>
<td>Primary</td>
<td>11%</td>
<td>33%</td>
<td>20%</td>
<td>17%</td>
<td>19%</td>
<td>100%</td>
</tr>
<tr>
<td>Secondary</td>
<td>11%</td>
<td>35%</td>
<td>27%</td>
<td>10%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Other trade based qualif.</td>
<td>11%</td>
<td>34%</td>
<td>20%</td>
<td>18%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Third level+</td>
<td>14%</td>
<td>36%</td>
<td>27%</td>
<td>9%</td>
<td>14%</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13%</td>
<td>34%</td>
<td>25%</td>
<td>12%</td>
<td>16%</td>
<td>100%</td>
</tr>
</tbody>
</table>

¹ Chi-square = 68.01; P < 0.0001
² Chi-square = 34.63; P < 0.01
³ Chi square = 34.31; P < 0.01
Those who said they would not plant because the incentives were too low owned or farmed more land than those who gave other reasons (Table 9). This is probably related to the fact that the farmers most likely not to plant due to low incentives were dairy and tillage farmers (Table 8). The area of dairy and tillage farms in general is greater than the overall average farm size (CSO, 2012).

Table 9: Reasons for not planting and size of land farmed and owned
(One-way ANOVA)

<table>
<thead>
<tr>
<th>Reason for not planting</th>
<th>Size of land owned</th>
<th>Size of land farmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of incentives (financial)</td>
<td>44 ha (^a)</td>
<td>57 ha (^a)</td>
</tr>
<tr>
<td>Prefers to produce food (symbolic)</td>
<td>35 ha (^b)</td>
<td>45 ha (^b)</td>
</tr>
<tr>
<td>Prefers land-use flexibility (symbolic)</td>
<td>38 ha (^b)</td>
<td>47 ha (^b)</td>
</tr>
<tr>
<td>Prefers lifestyle (symbolic)</td>
<td>34 ha (^b)</td>
<td>40 ha (^b)</td>
</tr>
<tr>
<td>Family tradition (symbolic)</td>
<td>36 ha (^b)</td>
<td>42 ha (^b)</td>
</tr>
<tr>
<td>Overall</td>
<td>37 ha (^b)</td>
<td>46 ha</td>
</tr>
</tbody>
</table>

Different superscript letters \(^{a,b}\) denote significant differences between means at a 5% level.

Reasons for planting

In the questionnaire, those farmers who were interested in afforesting land (10% of the sample) were asked about their reasons for being so inclined. The least frequently given reason for planting (13%) was because it was more profitable than agricultural land-use. The majority would plant because ‘bad land’ was available (32%), which usually is land that cannot be used for the actual farming enterprise. The second most-often mentioned reason for planting was that a forest would be a good asset for the family in the future (29%). Almost one quarter (23%) would plant because of a forest’s contribution to nature conservation and habitat provision for wildlife. No significant associations between the reasons for not planting and farm and socio-demographic variables were found.
4.7.3 Lack of capacity

Lack of knowledge about the scheme
Most of the survey participants (87%) were aware that the farm afforestation scheme was in operation in Ireland. Initially, only 10% currently considered planting. However, when given details of the scheme the percentage considering planting rose from 10% to 26%. Interestingly, many of those (93%) who changed their minds having been given details of the scheme had previously indicated that they were aware of the scheme, indicating that the scheme in general is well enough known.

Lack of Land
The minimum area to be planted under the scheme is 0.25 ha. Only 4% of participants owned less than that. Thus, formally a lack of land is only for a few respondents a barrier to planting. However, in the long-term, and from a forestry perspective, ‘postage-stamp’-sized forests are not commercially viable. Farrelly (2007) found that the average size of an Irish farm forest – which is about nine hectares – is too small to be of economic interest for forestry companies and sawmills when it comes to thinning and harvesting, especially in remote areas. From previous discussions with farmers, it is known that some forestry companies do not recommend planting plots below 20 ha. The latest Census of Agriculture showed that about one quarter of Irish farms are below 20 hectares of size (CSO, 2012).

Lack of decision-making skills
Forestry has been shown to be the more profitable option compared to drystock farming such as non-dairy cattle and sheep enterprises (Breen et al., 2010; Collier et al., 2002; Duesberg, 2008). About 76% of all farms in Ireland belong to one of these categories (CSO, 2012). In the previously conducted qualitative interviews, a number of drystock farmers had claimed not to plant because of the lower profitability of forestry. This raises the question, whether those farmers based their conclusion on wrongly calculated farm return figures and whether a lack of farm accountancy skills is a barrier to planting. In the survey, however, only 10% of drystock farmers indicated that they would not plant because farming was more profitable than forestry. Thus, a
lack of decision-skills would potentially only be an issue for these 10%. Assuming that at least a proportion of these farms are indeed more profitable than the average drystock farm reduces even further the percentage of farmers for whom a lack of decision-making skills is a barrier to planting. When looking at education levels, there is a difference between drystock and dairy or tillage farmers. Fewer drystock farmers have availed of agricultural training in the past when compared to dairy and tillage farmers (Table 10). While this indicates that potentially there could be a lack of decision-making skills, this would only be a barrier to further farm afforestation for a small proportion of the farming community.

Table 10: Education levels by enterprise

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>Primary</th>
<th>Second.</th>
<th>Voc. agr. training</th>
<th>Trade based qualif.</th>
<th>Third level</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>13%</td>
<td>32%</td>
<td>45%</td>
<td>3%</td>
<td>12%</td>
<td>100%</td>
</tr>
<tr>
<td>Tillage and mixed tillage</td>
<td>14%</td>
<td>33%</td>
<td>27%</td>
<td>3%</td>
<td>23%</td>
<td>100%</td>
</tr>
<tr>
<td>Drystock (cattle, sheep, mixed)</td>
<td>23%</td>
<td>37%</td>
<td>14%</td>
<td>10%</td>
<td>16%</td>
<td>100%</td>
</tr>
<tr>
<td>Overall</td>
<td>20%</td>
<td>36%</td>
<td>20%</td>
<td>8%</td>
<td>16%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Chi-square=100.26; P<0.001

4.8 Discussion and conclusions

Only a minority of respondents indicated that they made their farming decisions based on profit maximisation. This fact could explain why the planting rates for the Irish farm afforestation scheme have not been as high as expected. Although the majority of farmers are not incentivised by the premiums, the payments will have to stay, as without them it is unlikely that any planting would take place (Carroll et al., 2011; Maguire, 2008). Furthermore, one objective of the farm afforestation scheme is to offer farmers alternative income options, which for the first 20 years are provided in the form of the premiums. Thus to encourage more farmers to plant, alternative policy tools need to be employed in addition to the current incentive tool.
To identify which additional tool or mix of tools will be needed, identifying farmers’ most prevalent reasons for not planting is important. The most often mentioned non-monetary reason for not planting was the preference for producing food, ‘even if it is making less profit than forestry’. These respondents value food more highly than timber. Correspondingly, most farmers who would plant would do so because they had bad land ‘that is good for nothing else’. Bad land typically is land that cannot be used for the main enterprises that the rest of the farm is used for (Duesberg et al., 2013). McDonagh et al. (2010) point out the strong agricultural heritage that is connected to traditional animal or crop production and that forestry is typically associated with marginal and less productive lands. Furthermore, they contend that the historical legacy of clearing trees to create ‘productive’ lands is still prominent among Irish farmers (ibid). Similar findings were made in countries such as England, Spain, Finland, Scotland, Northern Ireland and USA, where farmers, too, were reluctant to afforest good agricultural land (Clark and Johnson, 1993; Edwards and Guyer, 1992; Marey-Perez and Rodriguez-Vicente, 2009; Raedeke et al., 2003; Selby and Petäjistö, 1995; Watkins et al., 1996). For these farmers replacing food with trees is not in line with their values with regard to land-use. The problem with planting poor quality land is that the timber produced typically also is of poor quality. To encourage farmers who would only utilise ‘bad land’ to also consider planting better quality land, a symbolic tool associating forestry with positive values should be employed (Schneider and Ingram 1990). Such a tool could be a public relations or image-building campaign demonstrating the various potential uses of different timber and non-timber goods and pointing out social benefits that would result from an increased forest cover (e.g. for rural development or the environment). Also, the results of this survey show that nature conservation and wildlife concerns are, for many farmers, an important reason to plant. Thus, the potential positive effects of an increased forest cover on nature conservation and wildlife should be utilised in an image campaign.

The second most commonly cited reason for not planting was that ‘forestry is too long-term, you can’t change from one year to another like in farming.’ One could argue that keeping land-use flexible is a strategy to maximise profit over the years and thus
farmers who chose this option act as profit maximisers. It has to be noted, however, that respondents who chose land-use flexibility as a reason for not planting dismissed the option of not planting because it would mean a loss in money. From the qualitative interviews it is known that many farmers expect returns for agricultural goods to increase in the coming years. Thus, preferring to keep land-use flexible could be based on these expectations. To encourage those farmers to plant, an information campaign about future opportunities from forest products could be employed (e.g. the increasing need for renewable energy). Also, for those farmers who did plant in the past, the idea that a forest will be a ‘good future asset for the successor’ was the most often mentioned reason. For them, the long-term nature of a forest is an advantage, rather than something negative. Turning the disadvantage of inflexibility into the advantage of a long-term investment could also be part of an information and image campaign to associate forestry with positive values. The decision not to plant because forestry is inflexible, however, could also be lifestyle related, capturing the fact that farmers enjoy the management work related to adjusting the farm’s inputs and outputs to current market situations from year to year. To encourage those and the other respondents who directly stated that ‘there’s not much job satisfaction in forestry’ a symbolic tool would again need to be applied. For example, an image campaign could demonstrate how a farmer can get actively involved in establishing and managing his or her own forest and point out interesting work tasks and management activities occurring in forestry. This would also benefit the quality of the timber produced as, currently, due to a lack of forest management knowledge among farmers, the timber produced is at risk of being of poor quality (Farrelly, 2007; Ní Dhubháin et al., 2010).

The social reason for not planting was the third most often mentioned reason. Values such as tradition and family predominate in this decision to refrain from afforesting land. For this group, forestry would need to be associated with positive social values. For example a symbolic tool in the form of an image campaign could highlight a forest’s benefits as a family asset as well as for the local community and the wider society. As Slee et al. (2004) point out, forestry can deliver social values and help give places identity, as well as giving people association with those places.
While only 13% of farmers stated that a lack of incentives would keep them from planting, increasing premiums might actually activate a higher percentage than that. However, as symbolic values play a pivotal role in the afforestation decision, higher premiums alone might not be sufficient to encourage a large number of farmers to plant. A lack of incentives was more likely to be a barrier to full-time dairy and tillage farmers with agricultural training. Those enterprises are more profitable when compared to afforestation (Collier et al., 2002). However, dairy and tillage farms are typically of above average size and could avail of the land capacity to plant (CSO, 2012). This group is more likely to be encouraged to afforest by increasing the premiums than other farmers – yet if such increases applied to all entrants to the scheme, they would be expensive in the long run. Additionally, it is questionable from the viewpoint of rural development and food security if viable commercial farms such as dairy and tillage farms need to be offered income support, especially for land-use change.

As well as a lack of incentives and symbolic reasons, the following three capacity deficiencies were explored as further potential barriers to a greater uptake of the afforestation scheme: a lack of knowledge about the scheme, a lack of land and a lack of decision-making skills. The data analysis showed that 16% of respondents are likely to get interested in the afforestation scheme if a lack of information was addressed. As it was the provision of detailed information that increased the number of those interested in planting, an information campaign providing these details rather than a general awareness-raising campaign, could activate a ‘passive pool’ of potential planters. Teagasc, the State’s body for research, knowledge transfer and education, is currently providing advice and training with regard to farm afforestation and farm forest management. Further research would be needed to assess whether this information reaches the correct cohort of farmers.

At first, a lack of land does not seem to be a major barrier to planting, as the minimum area to be planted under the scheme is only 0.25 ha. One of the farm afforestation scheme’s objective is to give farmers the opportunity to diversify their businesses
It is in particular small farms below the average size of 33 hectares that are in need of diversification and income support. More smallholder farmers could be encouraged to plant small plots of land, which would increase their income at least for the 20 years of premium payments. However, after the end of the premium payments, those ‘postage-stamp’-sized forests are rarely commercially viable. Encouraging more farmers to plant small plots of land with forestry thus is not advisable from a long-term rural development and forestry perspective. Thus, on further consideration, a lack of land could in fact be a constraint in particular for small farms, that would benefit most from such diversification. To overcome such a barrier, and at the same time to address the shortcomings of small plantations, a capacity tool facilitating group plantings of adjacent fields owned by smallholder farmers could be employed. This would create larger forests, which would be more beneficial to the individual landowners and to the development of a forestry sector in these areas. Larger forests would also have a higher value for wildlife, nature conservation and recreation. As the survey has shown, small farms were more likely to be run by hobby farmers. This group was more likely not to plant because of non-monetary reasons. Thus, they would need to be encouraged through the use of a symbolic tool in the form of an image-building campaign that associates forests with the positive values described above.

Another capacity deficiency that was assumed to be a barrier for further planting was a lack of decision-making skills. The vast majority of farmers who would potentially benefit from joining the afforestation scheme had symbolic reasons as to why they did not want to plant trees on their land. Thus decision-making skills such as accounting for, and comparing returns from different land-uses were not utilised in the afforestation decision and thus their presence was irrelevant. Furthermore, farmers claiming to make the afforestation decision based on profit maximisation were prepared to change their decision-making behaviour. During the previously conducted qualitative interviews, participants would first claim not to afforest because profits from forestry were too low. However, after being presented with detailed information

5 In the West of Ireland where farms would benefit even more from diversification the average farm size is only 26 hectares (CSO, 2012. Census of Agriculture 2010. Central Statistics Office, Dublin.
about the financial incentives, they agreed that forestry would be more profitable. Subsequently, they provided non-monetary reasons for not planting (Duesberg et al., 2013). Such a change in the decision-making process could still take place after farmers’ lack of decision-skills was addressed. To summarise, improving decision-making skills would most likely activate only a small percentage of farmers to plant. However, further research would be needed to specifically look at the role of decision-making skills with regard to land-use change.

As this study was conducted in Ireland and was based on Irish farmers’ views about afforestation, the question arises whether the results are transferable to other countries. Elands et al. (2004) in their multinational study covering eight EU countries, found that the view that ‘forests are harmful’ (i.e. because they are a threat to other land use activities such as farming or because they diminish the beauty of the landscape) is more prevalent in Atlantic countries – and especially in those with a short forestry history such as Ireland – than in central European or Scandinavian countries with a long forestry history. It has also been shown that farmers in countries such as England, Spain, Finland, Scotland, Northern Ireland and USA, are also reluctant to afforest good agricultural land (Clark and Johnson, 1993; Edwards and Guyer, 1992; Marey-Perez and Rodriguez-Vicente, 2009; Raedeke et al., 2003; Selby and Petäjistö, 1995; Watkins et al., 1996). Furthermore, as highlighted in chapter 2, a number of studies have shown the importance of farmers’ non-monetary goals with regard to farm management. Thus, matching policy tools to these goals and the underlying values is most likely to be of relevance beyond Ireland.

Summary of recommended policy tools
Summarising the policy recommendations necessary to encourage more farmers to plant, it can be said that merely increasing the premiums would be insufficient as a means of increasing the number of farmers joining the afforestation scheme. Furthermore, there would be a risk of encouraging more prosperous farmers who are not in need of income support. In terms of their decisions about afforestation, the majority is influenced by values other than profit maximisation. Symbolic policy tools need to be employed to overcome such non-monetary barriers. These would either
demonstrate that the outcome of the policy is consistent with an existent value scheme or would employ techniques, which associate farm forests with positive images. In the case of the Irish farm afforestation scheme, an image-building campaign could be combined with an information campaign about the monetary benefits of the scheme, which would activate the pool of potential planters. As well as providing information about the scheme’s less well-known details, such an information and image campaign would need to highlight the following positive aspects of forestry to farmers: the potential uses of various timber (e.g. fuel wood) and non-timber goods (marketable goods such as foliage and mushrooms as well as social benefits); the market outlook for forest products; the positive aspect of a long-term investment such as forestry for the family or successors; the benefits of an increased forest cover to the local and wider society (e.g. rural development, amenities, landscape, environmental benefits); and the interesting work tasks associated with forestry. Urquhart (2012b) and Howley (2013) found that farmers have multiple objectives for their forests including economic, lifestyle, nature conservation and recreational goals. Thus each of the topics highlighted above is likely to address more than one group of farmers, multiplying the potential effect of such a campaign. Finally, it is suggested that to overcome the issue of the insufficiency of land – which arises from the small average farm size in Ireland – a capacity tool should be designed to facilitate, encourage and support group plantings of neighbouring fields.

This chapter has explored the reasons given by respondents in relation to their afforestation decision and linked them to farmers’ values with regard to farming as well as to farm structure and socio-demographic characteristics. It furthermore explored the capacity constraints in an effort to identify what alternative policy tools would be appropriate to further encourage farm afforestation. The following chapter (chapter 5) focuses solely on the probability of a farmer deciding in favour or against afforestation. Logistic regression is employed to develop a model describing farmers’ afforestation decision depending on farmers’ values with regard to farming as well as on farm structure and socio-demographic characteristics.
5 Factors influencing Irish farmers’ probability to afforest

5.1 Overview

In this chapter, which represents the third research article, the key objective is to identify the combined effect of individual farmer factors, socio-demographic variables and farm structure variables on a farmers’ probability to plant. This involves developing a holistic model describing Irish farmers’ afforestation decisions based on the range of individual farmer factors as well as farm structure and socio-demographic variables hitherto identified. The developed logit model showed that while profit goals did not significantly influence the decision-making with regard to farm afforestation, structural as well as attitudinal factors played a vital role in this process. This was identified as one reason as to why the current incentive scheme failed to deliver the outlined afforestation targets. Other policy tools are needed in addition to the incentives to further encourage afforestation. Another model was developed describing the factors increasing farmers’ probability to change their mind in favour of planting after being given detail information about the afforestation scheme’s benefits. In that model, farmers’ values did not turn out to be significant.

5.2 Policy background

Due to its temperate north-Atlantic climate, the natural conditions for tree growth in Ireland are very favourable. The mean annual increment is almost double the European average (Kearney and O’Connor, 1993). Forest cover, however, is only about 12% and it is the Government’s target to increase it to at least 17% by the year 2030 (DAFF, 1996). To achieve this target, planting levels of 25,000 hectares per annum to the year 2000, and 20,000 hectares per annum from 2000 to 2030, have been set in the Government’s Forestry Strategy ‘Growing for the future’ (ibid). The majority of this afforestation is to be undertaken by private landowners, more specifically farmers. For this purpose, an afforestation scheme was launched in 1989 and continually improved over the years in order to encourage Irish farmers to afforest (Figure 1, p. 43).
Currently, the scheme covers all planting and establishment costs and pays an annual premium for the duration of 20 years to offset the loss of income from the time of planting until the first revenues from timber harvesting. The rationale behind this strategy is twofold: first, the achievement of the planting targets will lead to a critical mass of timber output that will facilitate the development of a range of processing industries. Second, by offering grants and premiums to farmers, they are encouraged to diversify their businesses and create alternative income streams. Such alternatives are necessary as most farms in Ireland are not economically viable without EU subsidies. In particular, the market returns from sheep and non-dairy cattle farming do not cover all production costs (Hennessy et al., 2011); these farm types make up 76% of all farms in Ireland (CSO, 2012). Carbon sequestration as another objective of the afforestation scheme has become increasingly important in recent years in order to meet the Government’s internationally agreed climate change targets.

Initially, the interest in afforestation by farmers was high with planting rates reaching a peak of 17,000 hectares planted in 1995 (Forest Service, 2009) (Figure 1, p. 43). However, since this time planting rates have been consistently and significantly below target. In the period from 1996 to 2009, only 48% of the targeted area of farmland was planted with trees (ibid). Despite continuous improvements in funding, planting rates have remained below target. Thus, the Department of Agriculture, Fisheries and Food stated in its Rural Development Programme for the period from 2007 to 2013 that ‘the major difficulty with the [afforestation] programme at the moment is the low rate of take-up’ (DAFF, 2010, p. 60).

The objective of the study was to quantify the importance of the in a previous study identified influential factors on Irish farmers’ afforestation decision-making for the wider farming community in Ireland and to develop a model that would describe the likelihood that a farmer will afforest based on these factors. A second objective was to establish for what proportion of farmers a lack of detail information about the afforestation scheme’s benefits is a barrier to planting and to identify which group of farmers should be addressed with such information in order to address that potential
barrier. Finally, the results will be discussed as to their implications for policy-making to further encourage afforestation.

The paper will first review the literature looking at factors influencing farmers’ afforestation decision. Second, data collection and the analytical tools are explained. Third, the results in form of the two logit models developed are presented describing A) the probability of a farmer to afforest and B) the factors influencing a farmer to change mind in favour of planting after being given detail information on the scheme. Finally, the results are discussed and conclusion drawn with regard to policy recommendations.

5.3 Factors influencing farmers’ afforestation decisions

A number of studies have been conducted to explain the shortfall in planting rates, mainly looking at the influence of economic and socio-demographic factors. Few studies included attitudinal factors such as farmers’ values and their attitudes towards forestry.

The majority of studies tried to explain the shortfall in planting rates by comparing the economic returns of afforested land to those of the displaced agricultural use. They were based on the assumption that farmers’ decisions to afforest are influenced by profit maximisation goals. The results of these studies were mixed. For example, Wiemers and Behan (2004) employed a real options model to calculate forestry returns that would trigger afforestation on various land-use types. According to that study, Irish farmers in the past made economically optimal decisions with regard to afforestation. However Collier et al. (2002), Behan (2002 cited in Wiemers and Behan 2004), Duesberg (2008) and more recently Breen (2010) showed that forestry returns would exceed those from drystock beef and sheep farming and that afforestation should have taken place to a greater extent if all farmers were acting as profit maximisers. In 2005, farm afforestation was made even more financially attractive given that farmers who planted continued to receive agricultural direct payments on the afforested land. According to calculations done by Wiemers and Behan (2004) and
Bacon (2004), this reform should have had a positive effect on farm afforestation. In reality however, planting declined from around 10,000 hectares in 2005 to 6,000 hectares in 2008.

Other studies looked at the relationship between farmers’ afforestation intentions and farm structure as well as socio-demographic variables such as farm size, enterprise type, off-farm employment, education level, age, marital status, successor situation and region (Collier et al., 2002; Farrelly, 2006c; Frawley and Leavy, 2001; Hannan and Commins, 1993; Ní Dhubháin and Gardiner, 1994). The only variable that consistently emerged as having an influence on farm afforestation in Ireland as well as in the UK was farm size: farmers with larger than average farms were more likely to plant (Frawley, 1998; Frawley and Leavy, 2001; Ilbery, 1992; Mather, 1998; Ní Dhubháin and Gardiner, 1994; Watkins et al., 1996).

Another research focus to explain Irish farmers’ decision-making with regard to afforestation has been attitudinal factors or the goals and values of farmers. Collier et al. (2002) and similarly Frawley and Leavy (2001) found that farmers in general recognize the need for a greater forest cover in Ireland. However, they do not want forests on their own land or in close proximity. As Fléchard et al. (2006) observed, some rural dwellers associated forestry with bringing isolation and depopulation to their areas. In the authors’ previous work on farm afforestation decision-making, farmers’ most important reasons for not planting or planting were influenced by non-monetary reasons rather than by profit goals (Duesberg et al., 2013). For that previous research, 62 in-depth interviews with farmers were conducted. In these interviews, the importance of producing food, land-use flexibility and the enjoyment of the work tasks related to farming were identified as the most prominent reasons for not planting (ibid). Similarly McDonagh et al. (2010) discovered that the main barriers to planting for Irish farmers was the inflexibility resulting from afforestation and their assertion that they needed all their land for agriculture. A number of earlier studies similarly found that the majority of farmers only considered afforesting land that could not be used agriculturally or that was ‘good for nothing else’ (Collier et al., 2002; Frawley, 1998; Frawley and Leavy, 2001; Hannan and Commins, 1993; Kearney, 2001; McCarthy
et al., 2003; Ní Dhubháin and Gardiner, 1994; Ní Dhubháin and Kavanagh, 2003). This finding is underpinned by the fact that private forests in Ireland are mainly growing on land considered marginal for agriculture such as peat (30%), poorly drained gley soils (30%) or podzols (10%) (Farrelly, 2006a). Similar findings were made in England, Spain, Finland, Scotland and Northern Ireland, where farmers were also more willing to afforest marginal land such as fallows, unimproved bog or rough grazing ground (Clark and Johnson, 1993; Edwards and Guyer, 1992; Marey-Perez and Rodriguez-Vicente, 2009; Selby and Petäjistö, 1995; Watkins et al., 1996).

Few studies have been conducted to explore farmers’ attitudinal barriers to afforestation of farmland. Burton (1998) studied the influence of farmers’ self-identity on their participation in a community woodland scheme in England. He found that farmers gain little satisfaction from the management of woodland and thus are disinclined to establish one. In the previous research mentioned above, the values and goals underlying a farmer’s afforestation decision were explored, which lead to the conclusion that the majority of farmers make this decision based on intrinsic, expressive and social values about farming rather than on profit maximisation (Duesberg et al., 2013). According to Ní Dhubháin and Wall (1999), the negative attitude of Irish farmers towards forests arises, in part, from the historical association of trees with land-owning gentry. Additionally, the extensive area of bogs that are found in many parts of the country resulted in peat being used as the primary fuel source rather than wood. This further contributed to the lack of interest in establishing trees and the development of a farm forestry tradition (ibid).

In the context of understanding the decision-making process with respect to Irish farm afforestation, structural, socio-demographic and attitudinal factors were examined. However, to date, no attempt has been made to combine explanatory factors from different areas to develop a holistic model explaining farmers’ afforestation decisions. One sociological theory that attempts to overcome the dichotomy of sociological research focusing either on actors or structure, on the macro- or micro-level is Anthony Giddens’ theory of structuration. He argues that the social sciences should focus their analysis more on social practices rather than on individual experience or
social structure only. According to Giddens’ theory of structuration social practices such as land-use and land-use change are influenced by structure as well as by individual agents’ actions (Giddens, 1984). He defines structure as the ‘rules’ (e.g. agricultural policy) and ‘resources’ (e.g. farm structure) being a condition to social practices, but also being the outcome of agents’ actions (‘duality of structure’). Agent factors that influence social practices for example are socio-demographics and attitudes. As social practices such as land-use change are influenced by both structure and agency factors there is scope to develop a model describing the combined effect of such factors on land-use change or more specifically on farmers’ decision-making to change land-use, e.g. to forestry.

Looking at the more specific literature on the decision-making of farmers, Giddens’ theory is paralleled by concepts of Battershill and Gilg (1997), Edwards-Jones (2006) and Burton (2006). These authors conceptualize farmers’ behaviour and decision-making with regard to land-use change as being influenced by structural (Government policies, financial situation, physical geography), socio-demographic (age, family structure, education), and individual farmer (agent) factors such as attitudes, goals and values.

5.4 Data collection and survey design

The study set out to identify the factors influencing a farmer’s afforestation decision. More specifically, it aimed to describe the combined effect of structural, socio-demographic and attitudinal factors on the probability to plant. For this purpose, a survey was distributed by mail in Spring 2012 to a random sample of 4,000 farmers in Ireland. The random sample was drawn from a list of 136,000 Irish farmers in receipt of direct payments, which represents approximately 97% of the Irish farming population. The mailing was administered with the support of the Department of Agriculture, Food and the Marine. Of the total number of survey forms administered, 1,529 forms were sent back resulting in a relatively high response rate of 38%. Having discarded forms with missing values, a sample of 1,077 responses was used for data analysis. The survey form consisted of four pages comprising questions about farm
structure and socio-demographic variables, as well as questions regarding issues such as profit goals and farming values. Including goals and values into the questionnaire facilitated the analysis of the importance of structural and socio-demographic as well as attitudinal factors in a farmer’s decision to afforest. The attitudinal questions were designed based on the previously conducted 62 in-depth interviews on the goals and values of farmers with regard to afforestation (Duesberg et al., 2013). As noted previously, in that study, three different profit goals were identified among Irish farmers – profit maximisation, satisfying profit, making no profit/hobby farmers – and a number of intrinsic, expressive and social values that play a role in farmers’ decision-making for farming in general and with regard to afforestation. The three profit goals, as well as the most important intrinsic, expressive and social values were included in the questionnaire. Participants were asked to choose from the three profit goals the one they would agree most with. Furthermore they were asked how strongly they would agree with statements representing the following intrinsic, expressive and social values using a Likert-type scale:

- Enjoyment of farming activities and lifestyle (LFST)
- Importance of food production (FOOD)
- Independence (INDI)
- Taking on new challenges (CHAL)
- Family tradition (TRAD)

The phrasing of the profit goal and the farming-value statements were based on typical representative quotes made by farmers during the previously conducted in-depth interviews.
Additionally, to establish whether a lack of detail information about the afforestation scheme is a barrier to further planting, the questionnaire provided participants who indicated that they would not plant with detail information about the benefits of the scheme. Having been presented with this information, participants were then asked again if they would be interested in planting to see whether receipt of the information had changed their choice.
5.5 Data analysis

The assumption is that farmer decision-making with regard to afforestation is a ‘social practice’ that is influenced by structural and individual agents’ factors. Thus, the study set out to examine which farm structure, socio-demographic and attitudinal variables influence the probability of Irish farmers considering afforestation under the State’s support scheme. In addition, the characteristics of those farmers who changed their mind about planting once they were provided with detail information concerning the afforestation scheme’s benefits were also explored. In both situations, the variable of interest takes a binary form, considering planting or not, hence logit models were used. Logit models have been widely used to describe farmers’ behaviour, first from the late 1950s in adoption-diffusion research and more recently in research on farmers’ uptake of multifunctional farming or agri-environmental measures (Crabtree et al., 1998; Finger and El Benni, 2013; Jongeneel et al., 2008; Mettepenningen et al., 2013; Poppenborg and Koellner, 2013; Rodriguez-Vicente and Marey-Père, 2009; Sheikh et al., 2003; Wauters et al., 2010; Yiridoe et al., 2010).

Under a logit specification the probability of a binary outcome is identified as:

\[ P_i = \frac{e^{x_i}}{1 + e^{x_i}} \]

where \( P_i \) is the probability of outcome \( i \), \( x_i \) represents the independent variables or characteristics related to outcome \( i \), including a constant, and \( \beta \) represents the model coefficients. The model can be estimated using maximum likelihood estimation. Given the nature of the model, the coefficients are not directly interpretable. Thus, in this study, marginal effects are also reported, which identify the change in the probability of choice at the sample means given a unit increase in the variable. For dummy variables, the reported marginal effects describe the change in probability due to the inclusion of the variable versus its omission. Results from the qualitative interviews and statements from the survey can be considered as reporting about cause-effect relations as perceived by the interviewees.
5.6 Results

Two logit models were created from the collected data. The first describes farmers’ probability to afforest depending on a number of structural and attitudinal variables. The second describes the characteristics of farmers who changed their mind in favour of planting on receipt of detail information about the afforestation scheme’s benefits. Table 11 gives an overview of respondents’ characteristics.

<table>
<thead>
<tr>
<th>Table 11: Overview of participants’ characteristics: enterprises</th>
<th>Survey participants</th>
<th>National average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cattle (specialist beef)</strong></td>
<td>55%</td>
<td>55%[^1]</td>
</tr>
<tr>
<td><strong>Mixed cattle and sheep</strong></td>
<td>11%</td>
<td>11%[^2]</td>
</tr>
<tr>
<td><strong>Sheep</strong></td>
<td>11%</td>
<td>10%[^3]</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td>11%</td>
<td>11%[^4]</td>
</tr>
<tr>
<td><strong>Mixed tillage and grazing livestock</strong></td>
<td>5%</td>
<td>2%[^5]</td>
</tr>
<tr>
<td><strong>Tillage</strong></td>
<td>4%</td>
<td>3%[^6]</td>
</tr>
<tr>
<td><strong>Mixed field crops[^2]</strong></td>
<td></td>
<td>7%[^7]</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>3%</td>
<td>1%[^8]</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>100%[^9]</td>
</tr>
<tr>
<td><strong>Average size of land owned</strong></td>
<td>39 ha</td>
<td>33 ha[^1][^3]</td>
</tr>
<tr>
<td><strong>Average size of land owned – farms with forest</strong></td>
<td>56 ha</td>
<td>---</td>
</tr>
<tr>
<td><strong>Forest ownership</strong></td>
<td>14%</td>
<td>12%[^1]</td>
</tr>
<tr>
<td><strong>Average size of forest</strong></td>
<td>14 ha</td>
<td>10 ha[^4]</td>
</tr>
<tr>
<td><strong>Average age</strong></td>
<td>54 years</td>
<td>55 years[^5]</td>
</tr>
</tbody>
</table>

[^1]: Census of Agriculture 2010 (CSO, 2012)
[^2]: This category was only surveyed in the Census of Agriculture
[^3]: The difference between the sample’s and the national average farm size is most likely due to differences in the way this figure is defined by farmers and the Census
[^4]: (Forest Service, 2010b)
[^5]: National Farm Survey 2007 (Connolly et al., 2007)

5.6.1 Probability to afforest

For each logit model, a number of independent variables were entered into the data analysis. Appendix 8.3 (p. 149) gives an overview of all variables surveyed. In the first model describing farmers’ probability to afforest, eight variables turned out to be significant (Table 13). Table 12 gives an overview of the dependent and independent
variables in the final logit model describing farmers’ probability to afforest. Of the eight significant independent variables in the model, five were of structural and three of an attitudinal nature (Table 12 and 13).

Table 12: Summary of variables in the logit model describing Irish farmers’ probability to afforest

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Unit</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considering</td>
<td>0.097</td>
<td>-</td>
<td>Dummy (1 if considering, 0 if not)</td>
<td>204</td>
</tr>
<tr>
<td>Past planting</td>
<td>0.142</td>
<td>-</td>
<td>Dummy (1 if previously planted forestry, 0 if not)</td>
<td>159</td>
</tr>
<tr>
<td>Area owned</td>
<td>39</td>
<td>31.838</td>
<td>Hectare</td>
<td>65</td>
</tr>
<tr>
<td>Full-time farmer</td>
<td>0.576</td>
<td>-</td>
<td>Dummy (1 if Full-time, 0 if Part-time, Retired, Other)</td>
<td>49</td>
</tr>
<tr>
<td>Dairy enterprise</td>
<td>0.114</td>
<td>-</td>
<td>Dummy (1 if Dairy farmer, 0 if Cattle, Sheep, Tillage, Mixed Enterprise, Other)</td>
<td>134</td>
</tr>
<tr>
<td>Forest cover of county</td>
<td>0.448</td>
<td>-</td>
<td>Dummy (1 if forest cover of county is greater than 11%, 0 if less)</td>
<td>0</td>
</tr>
<tr>
<td>LFST</td>
<td>4.114</td>
<td>0.739</td>
<td>Likert scale (1-5)</td>
<td>24</td>
</tr>
<tr>
<td>CHAL</td>
<td>3.824</td>
<td>0.889</td>
<td>Likert scale (1-5)</td>
<td>33</td>
</tr>
<tr>
<td>TRAD</td>
<td>4.345</td>
<td>0.729</td>
<td>Likert scale (1-5)</td>
<td>23</td>
</tr>
</tbody>
</table>

Structural variables

Past afforestation and farm size

The variable ‘Past planting’ was positively correlated with respondents’ intention to plant. Farmers who already had planted some forest in the past were 12% more likely to plant in the future than those who hadn’t (Table 13). Farm size was another significant structural variable in the logit model to explain farmers’ probability to afforest (Table 13). Farmers with larger farms were more likely to afforest. Additionally the average farm size of those who had planted in the past was with 56 hectares above the national average of 33 hectares (CSO, 2012). This confirms findings of previous studies that had already shown the dominance of relatively larger farms among those
where afforestation takes place (Frawley, 1998; Frawley and Leavy, 2001; Ilbery and Kidd, 1992; Mather, 1998; Ní Dhubháin and Gardiner, 1994).

Table 13: Logit model on factors influencing Irish farmers’ probability to consider afforestation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>S.E.</th>
<th>Sig.</th>
<th>P-value</th>
<th>Marginal effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past planting</td>
<td>1.210</td>
<td>0.245</td>
<td>***</td>
<td>0.000</td>
<td>0.119</td>
</tr>
<tr>
<td>CHAL</td>
<td>0.439</td>
<td>0.156</td>
<td>***</td>
<td>0.005</td>
<td>0.029</td>
</tr>
<tr>
<td>Area owned (ha)</td>
<td>0.008</td>
<td>0.003</td>
<td>**</td>
<td>0.014</td>
<td>0.001</td>
</tr>
<tr>
<td>TRAD</td>
<td>-0.383</td>
<td>0.159</td>
<td>**</td>
<td>0.016</td>
<td>-0.026</td>
</tr>
<tr>
<td>Full-time farmer</td>
<td>-0.554</td>
<td>0.239</td>
<td>**</td>
<td>0.021</td>
<td>-0.039</td>
</tr>
<tr>
<td>Dairy enterprise</td>
<td>-0.946</td>
<td>0.490</td>
<td>*</td>
<td>0.054</td>
<td>-0.048</td>
</tr>
<tr>
<td>County with above-average forest cover</td>
<td>0.413</td>
<td>0.221</td>
<td>*</td>
<td>0.061</td>
<td>0.029</td>
</tr>
<tr>
<td>LFST</td>
<td>-0.282</td>
<td>0.161</td>
<td>*</td>
<td>0.080</td>
<td>-0.019</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.602</td>
<td>0.749</td>
<td>**</td>
<td>0.032</td>
<td>-0.108</td>
</tr>
<tr>
<td>Number of observations</td>
<td>1077</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-299.987</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Significance level: * 10%, **5%, ***1%**

**Occupation and enterprises**

Of the occupation variables entered into the logit analysis, only full-time farming was shown to be correlated with the afforestation decision. Full-time farmers were less likely to decide in favour of afforestation (Table 13). Farming enterprises typically operated on a full-time basis are dairy and tillage or mixed tillage farms. From all the enterprise variables entered into the analysis, only dairy farming turned out to be a variable of significance in the model. Dairy farmers were less likely to join the afforestation scheme and plant trees (Table 13).
Average forest cover

Farmers living in counties with above-average forest cover were more likely to consider afforesting their land (Table 13). The average forest cover per county ranges from 22% in county Wicklow to 3% in county Meath. While county Wicklow is characterised by hilly terrain, which limits agricultural land-use, county Meath is a more or less flat midland county with fertile soils suitable for a wide range of agricultural land-uses. Forest cover is likely to reflect local soil types and climate and, consequently, the range and profitability of potential land-uses. Thus, the fact that farmers living in counties with above-average forest cover are more likely to plant is probably correlated to these geographic parameters.

Attitudinal variables

The survey included two questions concerning attitudinal variables, namely profit goals and general farming values. Respondents were asked to identify which of three profit goals (maximum/satisfying/none) they would agree most with. None of these profit goals was a variable of significance in the logit model – the likelihood of planting did not significantly increase or decrease depending on the profit goals. However, three of the five non-monetary farming value variables entered into the analysis turned out to have a significant influence on farmers’ afforestation decision (Table 13).

The non-monetary farming value variable with the highest significance was the one representing the expressive value of taking on new challenges (CHAL) (Table 13). In the questionnaire, this option was represented by the following statement: ‘I like taking on new challenges and I have a lot of ambition for my farm and many plans about how I want to manage it in the future’. Farmers who agreed with this statement were more likely to afforest. From the in-depth interviews discussed previously, it is known that farmers who are more inclined to taking on new challenges were also more willing to take risks and in general exhibited more business-oriented, entrepreneurial thinking (Duesberg et al., 2013).
The two other attitudinal variables, which were significant in the model, were the ‘Tradition’ (TRAD) and the ‘Lifestyle’ (LFST) variables. Both were negatively correlated to the intention to afforest. The ‘Tradition’ variable was represented in the questionnaire by the following statement: ‘I regard the farm as a family asset that I’m keeping in a good condition to pass on to my successors one day.’ Farmers who agreed with this statement were less likely to afforest. The ‘Lifestyle’ option was represented in the questionnaire by the following statement: ‘I enjoy the activities, work tasks and lifestyle related to farming’. Those farmers did not want to see the farm business replaced by a forest because it would deprive them of an important source of satisfaction in their life. We also know from other elements of study that for farmers who do not plant for lifestyle reasons, making a profit from farming in general was less important.

5.6.2 Intention to plant after provision of detail information

The second logit model developed from the data concerned farmers who changed their mind in favour of planting on receipt of more detail information about the afforestation scheme’s benefits. Over 87% of the respondents in general were aware of the availability of the scheme and this was not influenced by farmer characteristics. Respondents who had no intention of planting were provided with detail information concerning the benefits of the afforestation scheme and were then asked again whether they would consider planting. In total, the number of those interested in planting rose from 10% to 26%. Those who changed their mind in favour of planting were analysed again using a logit model. Table 14 gives an overview of the dependent and independent variables in that logit model.
Table 14: Summary of the variables in the logit model explaining farmers changing their mind in favour of planting

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Unit</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changed mind</td>
<td>0.158</td>
<td>-</td>
<td>Dummy (1 if considering, 0 if not)</td>
<td>133</td>
</tr>
<tr>
<td>Dairy enterprise</td>
<td>0.114</td>
<td>-</td>
<td>Dummy (1 if Dairy farmer, 0 if Cattle, Sheep. Tillage, Mixed Enterprise, Other)</td>
<td>134</td>
</tr>
<tr>
<td>Forest cover of county</td>
<td>0.448</td>
<td>-</td>
<td>Dummy (1 if forest cover of county is greater than 11%, 0 if less)</td>
<td>0</td>
</tr>
<tr>
<td>Knowledge of scheme</td>
<td>5.276</td>
<td>2.669</td>
<td>Score (0-8)</td>
<td>213</td>
</tr>
<tr>
<td>Married with children</td>
<td>0.64</td>
<td>-</td>
<td>Dummy (1 if Married with children, 0 if Married without children, Living with partner, Single, Widowed, Divorced/Separated)</td>
<td>95</td>
</tr>
<tr>
<td>Aged 45 to 64</td>
<td>0.523</td>
<td>-</td>
<td>Dummy (1 if aged between 45 and 64, 0 if less than 45 or more than 64)</td>
<td>42</td>
</tr>
<tr>
<td>Past planted</td>
<td>0.142</td>
<td>-</td>
<td>Dummy (1 if previously planted forestry, 0 if not)</td>
<td>159</td>
</tr>
</tbody>
</table>

The analysis showed that those who had planted in the past, were aged between 45 and 64 and were married with children were more likely to change their mind (Table 15). Dairy farmers and farmers living in counties with above-average forest cover were less likely to change their mind, having been given more information (Table 15). Also the more respondents already knew about the scheme the less likely they were to change their mind.
Table 15: Logit model on factors influencing Irish farmers changing their mind in favour of planting

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>S.E.</th>
<th>Sig.</th>
<th>P-value</th>
<th>Marginal effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past planting</td>
<td>1.238</td>
<td>0.231</td>
<td>***</td>
<td>0.000</td>
<td>0.227</td>
</tr>
<tr>
<td>Knowledge of scheme (0-8)</td>
<td>-0.108</td>
<td>0.038</td>
<td>***</td>
<td>0.004</td>
<td>-0.015</td>
</tr>
<tr>
<td>Aged 45-64 (Reference are aged&lt;45 and aged &gt;65)</td>
<td>0.466</td>
<td>0.184</td>
<td>**</td>
<td>0.011</td>
<td>0.064</td>
</tr>
<tr>
<td>Dairy enterprise</td>
<td>-0.711</td>
<td>0.313</td>
<td>**</td>
<td>0.023</td>
<td>-0.083</td>
</tr>
<tr>
<td>Married with children</td>
<td>0.430</td>
<td>0.197</td>
<td>**</td>
<td>0.029</td>
<td>0.057</td>
</tr>
<tr>
<td>County with above-average forest cover</td>
<td>-0.320</td>
<td>0.179</td>
<td>*</td>
<td>0.074</td>
<td>-0.044</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.434</td>
<td>0.269</td>
<td>***</td>
<td>0.000</td>
<td>-0.200</td>
</tr>
</tbody>
</table>

N=943
Log Likelihood                               -423.864
Significance level: * 10%, **5%, ***1%

5.7 Discussion and conclusions

The chapter set out to model the probability that a farmer will afforest based on structural, socio-demographic and attitudinal variables. The second objective was to establish whether addressing a lack of detailed information about the afforestation scheme’s benefits would get more farmers interested in planting and, if so, who those farmers were.

Farmers considering afforestation

As to the first objective, the data analysis showed that five structural and three attitudinal variables have a high probability of affecting farmers’ decision-making with regard to afforestation. This proves the importance of individual farmer factors, such as farming values, in this specific decision-making situation. Farmers who liked taking on new challenges were more likely to plant, while farmers for whom farming lifestyle and family tradition were important were less likely to consider afforestation. To encourage more farmers to plant, those values need to be taken into account in policy development. For example, to encourage those ‘lifestyle’ farmers who are interested in planting, there would need to be a highlighting of the interesting work tasks around
establishing and managing a forest. Addressing those farmers for whom family tradition is important could focus on the future value of a forest for their successors. From the results, we also know that profit goals did not have a significant influence on the decision to afforest, demonstrating that it is not primarily related to considerations about the comparative returns from farming and forestry.

There were five structural variables that turned out to play a significant role in the afforestation decision. Past planting, local forest cover and farm size had a positive effect, while dairying and fulltime farming had a negative effect on the probability to afforest. Similarly, Ilbery and Kidd (1992) and Crabtree et al. (1998), in studies conducted in the UK, concluded that farmers who have planted in the past were more likely to join an afforestation scheme. Farmers who had planted in the past not only were positively inclined to consider afforestation again, they were also more likely to change their mind in favour of planting (again) after receiving more detailed information about the scheme. This indicates that the experience from past afforestation has been positive. This group could be easily identified and addressed through a simple information campaign in order to increase afforestation rates. Another advantage of encouraging past planters to afforest more land would be that larger forests might be created when planting fields adjacent to the previously planted areas. Previous research had shown that farmers would only afforest ‘bad land’ (Collier et al., 2002; Frawley, 1998; Frawley and Leavy, 2001; Hannan and Commins, 1993; Kearney, 2001; McCarthy et al., 2003; Ní Dhubháin and Gardiner, 1994; Ní Dhubháin and Kavanagh, 2003). Further research could reveal whether past planters intend to afforest remaining patches of ‘bad land’ or, if due to a positive afforestation experience, they would consider planting even better quality land, which would indicate an improvement in the attitude towards forestry as a farm enterprise.

The positive experience from planting could have been passed on by word of mouth to neighbouring farmers, which might explain why farmers living in counties with above-average forest cover were more likely to afforest. Another reason for this phenomenon could be that farmers living in counties with high forest cover in general have a more positive attitude towards forestry (Frawley and Leavy, 2001).
From a rural development perspective, one of the afforestation scheme’s objective, is to offer income support to those farmers who struggle to make a living from farming, which typically are small-scale drystock farmers (Hennessy et al., 2011). The study showed that drystock farmers are neither significantly inclined nor disinclined to planting. However, targeting small farms could be difficult, as the results showed that larger farms were more likely to be planted. A scheme initiating and supporting group plantings of small neighbouring fields could enable small-scale (or below average farm size) farmers to plant. This would also have the advantage of increasing the average farm forest’s size, improving their value for forestry, nature conservation and recreation as well as the bargaining power of the forest owners once it comes to thinning and harvesting operations. In the Netherlands, environmental co-operatives have proved successful in motivating farmers to join agri-environmental and rural development activities (Renting and Van Der Ploeg, 2001).

Past studies in Ireland and the UK had already shown the dominance of relatively larger farms among those where afforestation takes place (Frawley, 1998; Frawley and Leavy, 2001; Ilbery and Kidd, 1992; Mather, 1998; Ní Dhubháin and Gardiner, 1994). There is, however, an interesting difference between Irish and UK farmers as to the farm size they consider big enough for planting. While Irish farmers in this study on average planted forests if their farm size was at least 56 hectares, farmers in a study undertaken in West-Nottinghamshire considered planting from a farm size of at least 100 hectares (Watkins et al., 1996). The overall average farm size in that area, however, was with 197 hectares much bigger when compared to the overall Irish average farm size of 33 hectares (CSO, 2012; Watkins et al., 1996). It seems that the farm sizes deemed big enough for planting are regionally flexible. An average farm size could be assessed as ‘big enough’ for planting if it is above the local average. As there is considerable difference in farm sizes within Ireland, a farm size ‘big enough’ for planting could vary between counties. The fact that there is regional flexibility in the farm sizes deemed big enough for planting raises the question of whether there also is

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6 The average farms size in Ireland ranges from 22 hectares in County Mayo to 44 hectares in County Kildare
a temporal and sectoral flexibility. Average farm sizes have continually increased in the past. In Ireland average farm size grew from 22 hectares in the 1980s (the decade where the first afforestation programmes were launched) to 33 hectares in 2010. Thus the average farm size reckoned to be big enough for planting could have risen over the years, too. Also, farm sizes differ between enterprises with tillage farms averaging 56 hectares and specialist beef farms averaging 28 hectares (CSO, 2012). Thus farm sizes big enough for planting could also be varying between enterprise types. As farm size plays a pivotal role in the decision-making with regard to farm afforestation, the regional, temporal and sectoral flexibilities in average farm sizes might have to be considered when developing strategies to encourage more farmers to plant. Further research would be needed to confirm these conclusions.

Another result of the work presented in this chapter was that full-time and dairy farmers were less inclined towards planting. The latter is noteworthy as the average farm size of Irish dairy farms is, at 55 hectares, above the overall average of 33 hectares (CSO, 2012) and farm size had a significantly positive influence on the probability to afforest. One reason for this effect could be the comparatively high profitability of dairy farms. Dairy farming in the past has been the most profitable farm enterprise in Ireland (Hennessy et al., 2011). It is a highly specialised business that needs a high level of investment in machinery and technical equipment, which is typically financed by loans (ibid). Such sunk costs determine the course of the farm business for many years into the future, also termed as ‘path dependency’ by economists. Another explanation for dairy farmers being less likely to join the afforestation scheme could be that they typically operate on fertile or ‘good’ agricultural land (see above). As other studies have shown, farmers in general are reluctant to plant such land. While dairy farmers might be less likely to plant, it is questionable whether such a group should be targeted when designing policy tools to encourage farm afforestation and whether it makes sense from a rural development perspective to offer alternative income streams to viable farm business such as dairy farms.
On the other hand, tillage farmers were not significantly disinclined to plant, despite them also typically being viable businesses and operating on fertile land (CSO, 2012; Hennessy et al., 2011). One reason might be that fewer tillage farms run their businesses with loans compared to dairy farming (Hennessy et al., 2011). Also profit margins on tillage farms have been decreasing in the past due to the continuous increase in fertilizer and fuel prices. Another possible explanation could be a number of unusually wet summers and cold winters in Ireland. From personal communication with foresters in Ireland, we know that the interest in planting by tillage farmers rises after extreme weather situations. This is confirmed by findings of Sutherland et al. (2012) who reported that farmers are more likely to make major changes in farm management after trigger events. While other farm enterprises, too, suffer from bad weather, the effect can be more devastating to tillage farmers, as crops can be irreplaceably destroyed by a single extreme weather event. Another reason for tillage farmers being less opposed to forestry might be that growing trees is closer to their understanding of an agricultural product than is the case for dairy farmers. As the average size of a tillage farm is 56 ha, which is significantly greater than the national average of 33 hectares (CSO, 2012), and larger farms are more likely to be planted, targeting tillage farmers with afforestation campaigns could prove successful, especially after trigger events. Tillage farms typically operate on fertile soils, which would make them particularly interesting as sites for establishing forests of high nature value. Ireland offers a specific support scheme to create such forests. This scheme should be promoted when encouraging tillage farmers to afforest. As concluded above, however, the farm size big enough for planting could be flexible between enterprises. Thus a tillage farmer could consider 56 hectares as being not big enough for planting.

**Farmers changing their mind**
The second objective of the research reported in this chapter was to establish whether a lack of detail information about the afforestation scheme’s benefits was a barrier to more planting, and if so, to whom specifically. In total, 16% of farmers changed their mind in favour of planting, following the provision of such information as part of the survey. Encouraging 16% of farmers to join the afforestation scheme and plant could
significantly increase the number of hectares planted in Ireland. Furthermore, such an encouragement could be achieved with comparatively simple tools such as mailings. Again, past planters were more likely to change their mind, which was somewhat surprising as one might assume that past planters already knew about the scheme’s details. However, new benefits have been added to the scheme over the years and past planting might have been undertaken some time ago. This again leads to the conclusion that past planters might be easily convinced to plant some more forestry through a simple information campaign specifically addressed to them. Employing such information campaigns after trigger events negatively affecting the course of the farm business could improve their effectiveness (Sutherland et al., 2012).

In addition, married farmers aged between 45 and 64 with children were more likely to change their mind, which was interesting, as in the first logit model regarding intention to plant, no socio-demographic variable emerged as significant. From research results presented in earlier chapters, we know that the most important reason for planting, among past planters, was generating an asset for their successors. Providing information about the benefits of the afforestation scheme may have demonstrated to farmers with children, the value of a forest to them and their successors. Dairy farmers were less likely to change their mind in favour of planting, confirming the first logit model’s results, which showed that they in general are less likely to plant. Farmers living in counties with above-average forest cover were less likely to change their mind, which is different from the first logit model in which they were more inclined to plant. One explanation could be that information about afforestation might be more easily accessible in those counties – for example through neighbours who have planted. Also, having seen neighbours planting, farmers might have seriously considered afforesting their own land and have already explored the conditions. Thus, farmers in counties with above-average forest cover might have rejected the afforestation option based on an informed decision. The detail information presented was not new to them and thus did not change their mind. The same explanation might apply to the finding that the more farmers knew about the scheme the less likely they were to plant.
In order to recommend more specific policy actions based on this chapter’s findings, (e.g. who exactly to address and how) would require the afforestation policy to specify more detailed goals. The Irish State’s afforestation policy neither indicates regional focuses for further afforestation nor does it outline which farmers specifically should be encouraged to plant. From a rural development, but also from a forestry perspective, it would be necessary to outline regions and farm enterprises that future afforestation policies should focus on. Such planning could ensure that resources are concentrated on areas where the natural conditions would be most suitable for forestry and where local economies would benefit most from a strong forest sector.
6 Discussion & Conclusion

6.1 Overview

The study set out to address three research objectives which were first to understand and explore the range of potential barriers to farm afforestation from an individual farmer’s point of view; the second objective comprised to quantify the identified afforestation barriers, to recognize their importance for the wider farming community in Ireland and to assess the relevance of the findings as to the design of more effective policy tools. The third objective was to identify the combined effect of individual farmer factors, socio-demographic and farm structure variables on a farmers’ probability to plant. This chapter will summarize the findings with regard to the three objectives and provide an overview of the overall results. It will also discuss the implications of the overall findings made with regard to policy-making and ask whether, based on these findings and the criticisms of the current afforestation scheme, alternative strategies to afforestation in Ireland would be an option. Finally, further potential research topics in the area of farmer decision-making are discussed.

6.2 Summary of results relating to exploring farmers’ goals and values

To summarise the results made with regard to research objective one it can be stated that farmers exhibited complex value systems in which the ordering of values is flexible and can adapt to various decision-making situations. These findings are in line with Ruth Gasson’s (1973) assumption that individuals can hold multiple values (or attitudes), resulting in a variety of behavioural options depending on situational factors. Similar findings about the complexity and situational adaptability of farmers’ attitudes and behaviours were made by Burton and Wilson (2006) and Wilson and Hart (2001). This study led to an expansion of Gasson’s farming values categorisation in that it revealed the existence of two types of instrumental values – maximum profit and satisfying profit – each of which leads to different approaches of farm management.

The analysis of the goals and values of farmers with regard to farming in general and afforestation in particular, showed that while the decision to afforest ‘bad land’ is
based on profit maximisation goals, the majority of Irish farmers’ is guided by non-monetary values when it comes to afforesting agriculturally used land. Similar findings were made by Battershill and Gilg (1997) in a study on farmer participation in agri-environmental schemes. According to the view expressed by Irish farmers in this study, ‘good land’ should be kept for producing food, which confirms findings by Burton and Wilson (2006) about productivist mind-sets prevailing despite a change towards a post-productivist paradigm at policy level. Also, it can be concluded that the priority ascribed to food production is a powerful social norm among farmers from all farming backgrounds and regions in Ireland. As the pool of ‘bad’ land available for planting has been diminishing over the lifetime of the afforestation programme, the intrinsic value of giving food production a priority has become a significant barrier to further planting. Additional important non-monetary planting barriers identified were keeping up the family tradition, the work tasks and lifestyle related to farming, and the flexibility of land-use.

6.3 Summary of the results relating to identifying alternative policy tools
The findings of this element of the study showed that while financial incentives are necessary, they are not sufficient to encourage more afforestation. Although the majority of drystock farmers indicated to make their decisions with regard to afforestation based on other values than profit-maximisation the afforestation premiums would need to stay active as before their introduction no farm afforestation took place (see chapter 4.8). Furthermore, it is one of the principles of the farm afforestation scheme to provide struggling farmers income support (see chapter 1.4). However, as the majority of drystock farmers are guided by other than profit maximisation values it is unlikely that they are encouraged to significant further planting by only increasing the premiums. Rather a change in farmers’ value system that with regard to agriculturally used land would be needed to alleviate a significant barrier to further planting. Another option would be to introduce the support of different types of forests that are better integrated with the current use of the farmland, such as linear plantings along hedges, streams and walls.
Dairy and tillage farmers’ on the other hand were shown to be more likely to make their decisions based on profit maximisation values and thus are more likely to respond to financial incentives. However, they typically outperform the average income and would have to be incentivised by much higher premiums (see also section 4.8). From the view of rural development and food security, however, incentivising prosperous farmers to designate productive farmland into forestry is debatable. Recommended additional policy tools based on the findings of the study can be summarised as follows:

**Symbolic tools**

To overcome the non-monetary barriers to afforestation that were identified within this study, additional policy tools are required to complement the incentive tool which currently underpins the forest strategy, as farmers are more likely to join voluntary schemes if they are convinced of the utility of the measure (Schneider and Ingram, 1990; Vanslembrouck et al., 2002). Such an approach could use symbolic tools that attach positive images and values to forests and forestry. Such an image or PR-campaign would aim to change farmers’ values with regard to forestry or to demonstrate that forestry is in line with their existing value system about land-use. In the Irish situation the messages that are conveyed should include:

- The positive aspect of forestry as long-term investment for the family or successors;
- The benefits of an increased forest cover for the local and wider society (e.g. rural development, amenities, landscape, environmental benefits);
- Interesting work tasks for land-owners in forestry;
- The multiple uses of various timber and non-timber goods that farmers can capitalise on;
- The positive market outlook for forest products.

As dairy farmers and full-time farmers were shown to be less likely to plant, and also because their farm businesses are profitable and least likely to need income support, such an image campaign should be geared towards drystock farmers for whom farming
lifestyle and family tradition is important.

**Capacity tool to address a lack of detail information**

A significant number of farmers (16%) could be encouraged to plant by means of an information campaign conveying detailed information about the scheme. This finding is supported by Öhlmer et al. (1998) who found that during a decision-making process, farmers had more difficulties in finding the relevant information, rather than in processing it. However, as the amount of time needed for finding information cannot be increased the efficiency in the search for information could be improved by making information more visible and accessible (ibid).

Furthermore, an information campaign should specifically address married farmers with children and farmers who have planted in the past, as those were more likely to change their mind regarding planting. As farmers are more likely to make major changes in farm management after trigger events, these information campaigns could prove more successful after such events (Sutherland et al., 2012). A study on Finnish forest-owners indicates that for relevant extension services to be successful, individual preferences as to the various channels of information need to be taken into account (Hujala et al., 2009).

Weiss and Tschirhart (1994) point out that information campaigns are more successful if they capture the attention of the right audience; deliver an understandable and credible message; deliver a message that influences the beliefs or understanding of the audience; and create social contexts that lead toward desired outcomes. Research on a wide variety of campaigns suggests that campaign failures occur at each step (ibid). Such an information campaign could be delivered through Teagasc, the State’s body for research, knowledge transfer and education for the agricultural sector.

**Capacity tool for setting-up co-operatives**

Previous research, as well as the results from this study, has shown that farm size plays a pivotal role in farm afforestation in Ireland and elsewhere. Smaller farms are less
likely to be planted. In Ireland, however, it is specifically smallholder farmers who, from a rural development point of view, require income support and would benefit from joining the afforestation scheme. To overcome the problem of small farm sizes and to encourage more smallholders to plant without the risk of creating ‘postage-stamp’-sized forests, a capacity tool needs to be employed to encourage group plantings of adjacent fields. Such a capacity tool could be a Government-led project actively approaching farmers in a specific area that would especially benefit from afforestation in terms of rural development, landscape ecology or recreation. Madsen (2002) points out that such spatial considerations have become increasingly important since societies expect forests to provide multiple monetary and non-monetary functions. For the purpose of establishing and supporting afforestation in specific areas, farmer organisations could be set up. In other countries, landowner organisations provide a number of advantages to small-scale owners in countries with fragmented forests (Cubbage et al., 2007). The only Irish woodland owner cooperative was set up in Donegal as a wood fuel supply cooperative. It supports its members with harvesting and marketing their timber but also with distributing knowledge about establishing and managing forests. In the Netherlands environmental co-operatives proved successful in motivating farmers to join agri-environmental and rural development activities (Renting and Van Der Ploeg, 2001). Furthermore, the European Commission, Parliament and Council agreed that with the next CAP reform, the setting-up of producer groups and organisations will be supported through the rural development pillar, providing the opportunity to set up such a tool with EU funding. To further increase the interest in afforestation, projects could be set up that are geared towards increasing the demand for timber resources. Relevant examples include the Irish LEADER-funded Clare Wood Energy project or the above-mentioned Donegal Woodland Owners, which also promotes timber marketing and sustainable forest management.

Another option to increase the forest cover would be to set up a company managing the afforestation process in a specific area. In the UK, such a company was set up to manage the process of increasing the forest area in a specific region in the Midlands to create a ‘National Forest’. The company, through various incentive schemes, image
campaigns and extension services, successfully increased the forest cover from 6% in 1995 to 19.5% in 2012, compared to a 12% forest cover in all of UK (N.N., 2013; van Gossum et al., 2009).

6.4 Summary of the results relating to the factors influencing a farmer’s probability to plant

In terms of the third overall research objective of identifying the combined effect of individual farmer factors, socio-demographic and farm structure variables on a farmers’ probability to plant, the findings showed that besides the individual farmer factors, a small number of structural variables were shown to have an influence on the decision-making with regard to farm afforestation. Farm size, the extent of forest cover in the county and previous planting had a positive effect, while being a dairy farmer or a full-time farmer had a negative impact on the afforestation decision. Of the individual farmer factors, none of the three profit goals (maximum/satisfying/none) were significantly related to the probability to afforest. However, three of the five non-monetary farming value variables turned out to be significantly related to the farmers’ afforestation decision. While an enjoyment in taking on new challenges was positively related, factors related to tradition and lifestyle were negatively related to the probability to afforest. The fact that factors from both positive and negative factors turned out to be significant in this process endorses the view expressed by Battershill and Gilg (1997), Edwards-Jones (2006) and Burton (2006) that both have to be taken into account when trying to understand and explain farmer behaviour and decision-making.

6.5 Reflection on the chosen methodologies

Regarding research objective one the chosen methodology was Ruth Gasson’s theory of goals and values of farmers (Gasson, 1973). Although Gasson’s categorisation of farmers’ values has been developed a couple of decades ago it proved useful for addressing the first research objective in this study. It can be argued to have anticipated and incorporated aspects – although in a much simpler manner – elements of a couple of other, later developed theories on behaviour in general or farmer
decision-making in particular. For example Gasson’s definitions of values and goals are very close to Fishbein and Ajzen (2010) behavioural model, as its values incorporate aspects of behavioural, normative and control beliefs and goals are closely related to intentions. Farmers’ individual values and goals as described by Gasson can be argued to lead to distinct farming styles as developed by van der Ploeg (2010). They furthermore are likely to instil a farming ‘habitus’ in the sense that values lead to the reproduction of structures and are a barrier to change. At the same time Gasson’s goals and values-theory avoids some of the shortcomings that the above-mentioned theories would have had as underpinning methodologies for this study on farm afforestation. For example Gasson’s theory allows relating farmers’ goals and values to important structural or socio-demographic variables. It furthermore allows to research behaviour in specific decision-making situations rather than researching the overall style of how individual farms are run. It also allows including the idea of multiple value orders, changing depending on the specific decision-making situation. Additionally Gasson’s theory on values and goals allowed for including new values or sub-values and it was this relative adaptability and openness that predestines it as a theory for a research that is explorative and qualitative in nature. Such qualitative research will develop this theory further by describing the respective values and sub-values important in other, specific decision-making situations.

With regard to the second and third research objective Schneider and Ingram’s theory of behavioural assumptions underlying policy tools was chosen (Schneider and Ingram 1990). These behavioural assumptions tied in with Gasson’s theory of values influencing farmer’s decision-making or behaviour. It thus proved useful in combining the two sets of data collected of this multi-method research and allowed for the results to develop and build upon another. Another advantage of Schneider and Ingram’s theory is that it allowed for describing alternative, better-suited tools to stimulate change based on the gained insights into farmer decision-making. The theory could be further developed by more explicitly describing the behaviour underlying the different policy tools availed of in specific policy areas such as agriculture.
6.6 A critical appraisal of the farm afforestation scheme

The policy recommendations given so far were based on the assumption that encouraging farm afforestation is the appropriate approach to achieve the objectives of the Irish afforestation strategy. As outlined earlier, the Irish farm afforestation strategy pursues a number of economic and social objectives. In terms of economic targets, it aims to increase timber output, stimulate rural economies and provide farmers with alternative income streams. With regard to public goods for society, it is expected to create environmental benefits by increasing the variety of wildlife habitats as well as recreational and leisure services. Based on the literature and on the findings made in this study, the current incentive scheme has to be scrutinised as to whether it is the appropriate tool to achieve the above targets.

In terms of the economic aspects, the farm forests created through the afforestation scheme are often too small to be of economic interest to felling companies and sawmills (Farrelly, 2006b). Furthermore, due to a lack of forest management knowledge, the timber produced is at risk of being of poor quality (Farrelly, 2007; Ní Dhubháin et al., 2010). Such small isolated and remote plots of poorly managed forests will rarely result in a significant economic return after the termination of the premium payments. Above all, the overall afforestation rate is lagging significantly behind the Government’s targets that were calculated based on the objective of supporting a range of processing industries.

There also has been criticism in the past regarding the negative environmental impact of farm afforestation (Tomlinson and Fennessy, 2009). Some of the issues have been addressed, as forest owners must adhere to a range of guidelines regarding species selection, plantation layout and management. For example, in order to increase the value of farm forests for wildlife, each plantation must include at least 10% broadleaf trees and 20% of a diverse conifer tree. However, this planting rule does not specify how the various species are to be mixed, resulting in single-specied blocks or strips planted next to each other rather than in a more natural mixed species planting. Such a separation of tree species does not fully serve the purpose of creating valuable habitats.
The created forests are often isolated plots of conifer plantations masked by a rim of broadleaf trees, which are scattered into the landscape like foreign objects. This, together with the prevailing clear-felling culture, explains the negative attitude of some rural dwellers towards forestry reported by Fléchard et al. (2006) and Carroll et al. (2009). Furthermore, the value of these kind of forests for recreation and leisure activities remains low (Moons and Rousseau, 2007) despite a recently-introduced regulation obliging farmers to give access to the public on forest roads. The latter issue remains a highly controversial matter, as the public in Ireland in general does not have the right to roam on farmland, as is the case in some mainland European countries.

Furthermore, some of the framework conditions for farm afforestation can be argued to have adverse effects on the uptake of the afforestation scheme. For example, despite the changes made to agriculture payment amounts and conditions farmers can rely on the continued support through EU subsidies. In comparison, forestry premiums are a relatively new payment, which are at risk of being significantly reduced or even phased out at some point. The fact that farm forestry advice is incorporated into the farming research and training body could be of advantage, as it usually is a trusted source for farmers. However, this bears also the risk that farm afforestation advice is merely treated as a matter of low importance. The increasing debate on food security further disincentivises a growing interest in farm afforestation (Buttoud et al., 2011).

At a more general level one has to question the design of the farm afforestation scheme in that it shifts the responsibility of land and forest management away from the farmer onto outside institutions such as forestry companies. Schneider and Ingram (1997) point out that policy designs point at the role of citizens addressed by it. Policy design influences whether citizens learn lessons of mobilization and involvement or lessons of alienation and withdrawal. In Ireland despite the farm afforestation scheme being in place since more than two decades very little change of forest culture has taken place among Irish farmers. One reason could be that the afforestation scheme does not encourage involvement of farmers in the establishment and management of their forests. Transforming the current scheme, where the emphasis is on support
payments, to one where farmers are involved in the planning, management and marketing of their forest and forest produce could thus promote a change in forest culture among farmers.

To summarize, the current scheme has deficiencies in creating long-term sustainable income streams for farm households; producing the envisaged timber output as well as in increasing forest’s values for wildlife, landscape and recreation; and developing a forest culture among farmers.

6.7 Alternatives to the current afforestation strategy

In the light of these criticisms, it needs to be pointed out that the majority of farmers in this study were not primarily interested in afforesting because of the economic returns. The majority of farmers who planted did so because of the forest’s future value to successors and nature conservation objectives. Furthermore, there is a negative attitude towards the make-up of productivist forestry as conifer plantations are regarded as foreign and blocking the view (Carroll et al., 2009; Carroll et al., 2011). Also, the majority of farmers would prefer to plant broadleaf trees rather than conifers (Carroll et al., 2009; Collier et al., 2002). These attitudes, together with the above outlined criticisms, point towards a reconsideration of the current afforestation strategy. Pannell (2008) maintains that the choice of policy mechanisms should be guided by the levels of private or public net benefit generated by a land-use change. To be able to choose mechanisms or instruments based on this categorisation, it would be necessary to separate forests into those with a priority on private or public benefit. For example, it needs to be considered whether the task of increasing the forest cover and timber output could be more effectively carried out when transferred to the semi-state forestry company Coillte or private forestry companies.7 While the focus of these forests would be on timber output, social and environmental goals would nevertheless be incorporated into their management to be in line with the notion of multifunctional

7 As the mobility of agricultural land in Ireland is very low this could prove difficult or might need some form of support. Also agricultural subsidies are capitalised into the land price increasing the cost of land to those interested in afforestation.
forests. A report on the potential uses of timber in the EU showed that demand in Ireland is likely to exceed the supply due to the low forest cover, and thus there is scope to further increase production (Mantau et al., 2010). The focus for farm forests, on the other hand, could move on to providing public goods while at the same time allowing for the production of timber, albeit at a lower level when compared to institutionally owned forests. This approach is supported by findings made by Urquhart et al. (2012a) who discovered that various groups of private woodland owners in the UK are well-disposed towards providing diverse public forest goods. In Ireland, this could be achieved for example by supporting farmers to set up and manage close-to-nature woodlands. Close-to-nature woodlands or forests are managed in a way that combines nature conservation with economic goals (Bieling, 2004). Such close-to-nature woodlands could be small in scale, suiting the low average farm sizes in Ireland, and would enhance the biodiversity and amenity of the farming landscape by creating a valuable mosaic of woodland habitats. Such forests would also be more in line with farmers’ goals and values about farming, forestry and land-use than timber production-oriented forests. Close-to-nature woodlands, however, need to be managed properly to create economically valuable logs worth harvesting in the future. Yet this would give farmers the opportunity to get involved in managing the woodland (e.g. managing natural regeneration, pruning, maintenance of habitats). Harvesting in small-scale close-to-nature woodlands is usually carried out by taking out relatively few mature trees rather than by clear-felling sites. This would provide farmers with a small annual cash flow rather than with lump sum payments at the end of the cycle, which is more in line with what farmers are used to from farming returns. If such close-to-nature small-scale woodlands were carefully integrated into the traditional landscape, they could also contribute to improving farmers’ and rural dwellers’ attitudes towards forestry in general. In an earlier study, Spinelli (1998) suggested another, similar alternative for farm afforestation to overcome farmers’ reluctance to plant agricultural land and address landscape issues. Instead of planting compact blocks, road banks and boundaries could be afforested in a linear way or trees could be interspersed with agricultural crops and pastures. In order to guarantee the continued provision of public goods through these woodlands, a temporally unlimited financial support would be justified. Carbon benefits would be another tool to support such
continuous cover farm forests, as they remunerate landowners for the services forests provide in terms of CO₂ storage.

There also is scope to increase the country’s rate of bio-energy created from wood resources. Although the use of bio-energy has increased in the past years, the sector is still small and costs are high due to scale or technologies needing development (Lewis, 2012). There especially is a need to develop supply chains and markets that give investors security (ibid). Scenarios of bio-energy development in Ireland estimate that the main role of timber will be in generating thermal energy for heating in domestic, service and industrial sectors (ibid). According to the EU’s Renewable Energy Directive Ireland’s target for heat from renewable energy is a 12% share until 2020. The share in heat from renewable energy, however, has grown slowly in the past from 2.4% in 2000 to 5.2% in 2012 and it is unlikely that Ireland will meet its 2020 target (Magner, 2014). One option to increase this share would be to support the establishment of short-rotation coppice with crops such as willow or miscanthus. Short-rotation coppice (SRC) could be more appealing to farmers than afforestation due to the flexibility of land-use (Strong and Jacobson, 2005). For SRC, however, fertile, well-drained soils are needed. As agriculture and food production continue to expand, and food production is valued highly by farmers it is debatable if there is enough land for SRC. There is, on the other hand, a great pool of land, that is deemed marginal for agriculture and would be suitable for high yielding forests (Magner, 2014). Austria, which has a high share of energy generated from wood, achieved this rate with the establishment a network of small and medium sized biomass district heating units and combined heat and power plants (Buttoud et al., 2011). In Ireland there are currently two schemes supporting the use and installation of renewable energy technologies (among others the installation of wood pellet and chip burners) in the domestic and service sector. This support already lead to an increase in the use of renewable energy use for heat production and is one example for an appropriate tool to create reliable markets for biomass producers (Dennehy et al., 2012).
6.8 Summary of recommendations for expanding the Irish forestry area

To support the further expansion of a sustainable forestry sector in Ireland, first, a forestry strategy would need to be generated that outlines in detail the economic, social and environmental targets envisaged to be achieved by Irish forests in the medium and long term. Second, as a range of different forests will be needed to achieve the various targets, potential types of forests should be defined that are best suited to reach the objectives; additionally geographical areas should be specified, as to where the individual types would be best located. Third, the appropriate social actors (farmers, state bodies, private industry) to create, manage and sustain the outlined forest types would need to be identified. Finally, support schemes need to be developed that would specifically target the establishment of the outlined forest types in the specified areas as well as help to create the necessary supply chains and markets. The results of this study can help to successfully deliver support schemes addressed at farmers and other landowners.

6.9 Recommendations for further research

The study has shown that the system of values and goals influencing the decision-making of farmers is complex and the ordering of values and goals can change according to the specific decision situation. As those values and goals have an important influence on the decision-making, it could be useful to identify how they are developed and maintained. Possible influences in this process could be the family, the wider social network (friends, neighbours), education (especially agricultural training) and agricultural media. Further knowledge about the development of farming goals and values would not only enhance the general understanding of farmer decision-making but would also be useful for initiating land-use change. Furthermore, such insights could help explain why the productivist ethos remains prevalent despite the general shift of agricultural policies towards a post-productivist paradigm (Burton, 2004b; Burton and Wilson, 2006; Walford, 2003; Ward, 1993).

Furthermore, some of the results generated in this research suggested that decision-making is not only influenced by internal (attitudes, goals, values) and external factors,
but also by the personality of farmers. Willock et al. (1999) have shown the influence of personality traits of farmers on their objectives and behaviours. Gaining knowledge on how different personalities react to various policy instruments could be useful in further optimising policy choice to specific target populations. Furthermore, policy tools could capitalise on specific personality traits of certain farmers. For example, some farmers interviewed in the course of this research exhibited a more active approach to managing the farm and were more open to new business ideas and trying them out. Wilson (1997) came to the conclusion that some farmers are viewed by their neighbours as leaders or innovators and their decisions are closely followed. Managed land-use change projects could employ the influence of such local innovators by actively engaging them in interacting with other farmers.

One of the tools recommended in this study to further encourage farm afforestation was to undertake an information campaign. In fact, Teagasc, the Irish State’s body providing research, knowledge transfer and education services to the agricultural sector are currently also responsible for delivering these services with regard to farm forestry. Further research would be needed to assess whether these research, knowledge transfer and education services are working effectively in the area of farm afforestation. This could be combined with research on the preferred information channels of farmers with regard to afforestation – as choosing the right channel is pivotal for the success of information campaigns (Hujala et al., 2009).

Furthermore, the study results suggest that there are regional and sectoral flexibilities in terms of the average farm sizes deemed to be ‘big enough’ for planting. In other words, there seem to be different understandings regarding the amount of agricultural utilisable land necessary in order to stay active in farming. Knowing how much land a farmer presumes to need to continue farming could be crucial in terms of encouraging further afforestation, especially when establishing group-planting processes. Further research would be needed to confirm and further explore these conclusions.

As a next step to further encourage afforestation in Ireland, it would be appropriate to conduct an action research project initiating group-planting of adjacent fields in a
specific area, combined with the setting up of an associated farmer organisation. During such a research project, valuable data could be collected that allows for a deeper understanding of the processes at work in such an initiative, but it would also be useful in informing the set-up of similar projects in other parts of the country if successful.
7 References


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8 Appendices

8.1 Guidance note for interviews

Module A) General questions regarding the farm
Ownership
Farm enterprises
Size of farm
Quality of land
Successor

Module B) Questions regarding economic factors of farming and the farm (is there a economic pressure for diversification in general and afforestation in specific?)
Economic situation of farming and the farm
Discussion about the targets for the farm
Economic outlook and expectations
Agricultural support payments (SFP, REPS etc.)
Debts, investments in past years
Pension
Diversification in the past
Plans to diversify in the near future
Reasons for diversification
Forestry as diversification option

Module C) Questions regarding resources like knowledge, skills, land
Knowledge/awareness about diversification schemes, forestry scheme, FEPS, stacking of SFP
Questions regarding the land resources available, e.g. size of the farm and the quality of the land with regard to afforestation
Questions regarding information resources: which ones and how often are they used? Is there a lack of time to get informed?
Module D) Questions regarding values and beliefs with regard to farming and forestry
Discussion about the value and meaning of farming and farm work
Discussion about land quality

E) Discussion about reasons for planting/not planting
Discussion about forestry premiums
Discussion about farm size and afforesting
Discussion about afforestation and personal situation (e.g. off-farm jobs, retirement, children...)
Discussion about farming values vs. forestry values
Discussion about afforestation and the environment
Discussion about farmers’ outlook for forestry and timber markets
Questions about the influence of family members, neighbours, other farmers, advisors, etc. on land-use decisions

Module F) Personal information
Name
Age
Gender
Family stage
8.2 Questionnaire for survey

1) What is your occupation? (Please tick as appropriate)
   1. Full-time farming
   2. Full-time off-farm job
   3. Part-time off-farm job
   4. Retired
   5. Other: ____________________

2) What is the highest level of education or training (full- or part-time) you completed to date? (Please tick as appropriate)
   1. Primary
   2. Secondary
   3. Vocational agricultural training
   4. Trade based qualification
   5. Third level or above

3) Which of the following is your principle farming activity? (Please tick one as appropriate)
   1. Dairying
   2. Dairying + other
   3. Cattle rearing (suckler cows)
   4. Cattle other
   5. Sheep
   6. Mixed cattle and sheep
   7. Tillage
   8. Mixed tillage + grazing livestock
   9. Other, please specify: ____________________

4) Which county is your farm (home address) located in?

________________________________________________________________________

5) How many hectares of land do you farm (including land rented from others)?

________________________________________________________________________ Hectares

6) How many hectares of land do you own?

________________________________________________________________________ Hectares
7) Which of the following three statements do you agree MOST with?

Please tick only ONE statement!
A) ‘I look at farming totally from a financial point of view. I reckon the land is there to make as much money as possible.’

B) ‘You would want to make a satisfactory income with farming, all right. But the last penny of profit wouldn’t necessarily be what I’m after.’

C) ‘The farm is just a hobby for me really. I’m farming despite the fact that at best it would break even only.’

8) How much do you agree or disagree with the following statements?

Please tick according to your rank of agreement

A) ‘I enjoy the activities, work tasks and lifestyle related to farming.’

B) ‘I like being a farmer because I believe producing food is a very important job.’

C) ‘I like the fact that I am independent and my own boss.’

D) ‘I like taking on new challenges and I have a lot of ambition for my farm and many plans about how I want to manage it in the future.’

E) ‘I regard the farm as a family asset that I’m keeping in a good condition to pass on to my successors one day.’
9) **Do you know that there is a state scheme financially supporting farmers who want to plant forest on their land?**

1. Yes  
2. No

If your answer is YES please proceed to question 10, otherwise proceed to question 12.

10) **Have you planted trees on your land as part of the state’s farm afforestation scheme?**

1. Yes If yes, How many hectares?  
2. No

11) **Are you currently considering afforesting (more) land as part of the state’s farm afforestation scheme?**

1. Yes  
2. No  
3. I would like to plant some (more) land but cannot get planting approval because of environmental/ planning restrictions

If your answer is YES, please proceed to question 14, otherwise proceed to question 12

12) **Are you aware of the following details of the state’s farm afforestation scheme? (Please tick as appropriate)**

<table>
<thead>
<tr>
<th>Option</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>It covers 100% of planting costs.</td>
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<tr>
<td>It pays an annual premium for planting.</td>
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<tr>
<td>It pays this annual premium for the duration of 20 years.</td>
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<tr>
<td>It pays annual premiums that start from 149 Euros for planting one acre of enclosed land.</td>
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<tr>
<td>It pays premiums that are tax-free.</td>
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<tr>
<td>It allows farmers to keep the Single Farm Payment on the area planted.</td>
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<tr>
<td>It offers compensatory payments under the Forest Environment Protection Scheme (FEPS) of up to 200 Euros for farmers in REPS.</td>
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<tr>
<td>It leaves the ownership of land with the farmer.</td>
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</table>

13) **Knowing all the details of the state’s farm afforestation scheme, would you reconsider planting trees on your land?**

1. Yes, I will consider it  
2. No

If your answer is NO: please proceed to question 15.
14) **Which of the following four statements do you agree MOST with?**

I WILL plant, because (please tick only ONE statement!)
A) ‘With forestry I will earn more money than with farming the land.’
B) ‘I have really bad land that’s good for nothing else and is not producing anything.’
C) ‘I think a forest will be a good future asset to have for my successors.’
D) ‘Creating a forest will contribute to nature conservation and provide habitats for wildlife.’

15) **Which of the following five statements do you agree MOST with?**

I WILL NOT plant because (please tick only ONE statement!):
A) ‘When I do the figures on it, I’m still better off using the land for farming or renting it rather than planting – I would be losing money if I planted.’
B) ‘I prefer producing food on my land rather than growing trees. Even if it is making less profit.’
C) ‘Forestry is too long-term, you can’t change from one year to another like in farming.’
D) ‘What would I do if I planted trees? I do not think it’s really how much money you make out of farming; it’s the job satisfaction. There is not much job satisfaction in forestry.’
E) ‘Earlier generations put a lot of work into felling trees and making this farmland. I’m not going to plant it now.’

16) **Gender – (Please tick as appropriate)**  
1. Male  
2. Female  

17) **What age are you?**  
____________________

18) **What is your marital status?**  
(Please tick as appropriate)
1. Married
2. Living with partner
3. Single
4. Widow/widower
5. Divorced/separated

19) **How many children do you have?**  
(Please fill in appropriate number)
1. Younger than 18 years
2. 18 years or older
3. No children

THANK YOU FOR YOUR CO-OPERATION!  
For questions please contact afforestation.survey@ucd.ie or tel. 01-716 77 55
## 8.3 Overview of all variables entered into the logit modelling process

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of farm</strong></td>
<td></td>
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<tr>
<td>Dairy</td>
<td></td>
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<tr>
<td>Dry stock (beef cattle and sheep)</td>
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<tr>
<td>Tillage and mixed tillage and dry stock</td>
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<tr>
<td>Other</td>
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<tr>
<td><strong>Farm size</strong></td>
<td>Hectares</td>
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<tr>
<td><strong>Forest size (if applicable)</strong></td>
<td>Hectares</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
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<td>Full-time farmers</td>
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<td>Part-time farmers (part-time off-farm job)</td>
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<tr>
<td>Full-time off-farm job</td>
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<td>Retired</td>
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<td>Other</td>
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<td><strong>Education</strong></td>
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<td>Primary</td>
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<td>Secondary</td>
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<td>Agricultural training</td>
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<td>Third level or above</td>
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<td><strong>Awareness about scheme</strong></td>
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<td>Yes</td>
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<td>No</td>
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<tr>
<td><strong>Detailed information about scheme</strong></td>
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<td>Did you know (y/n) that the scheme...</td>
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<td>Covers all planting cost?</td>
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<tr>
<td>Pays an annual premium?</td>
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<tr>
<td>The annual premium is paid for 20 years?</td>
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<tr>
<td>The minimum annual premium is 369 Euros?</td>
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<td>Pays premiums that are tax-free?</td>
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<tr>
<td>Allow farmers to keep the Single Farm payment on the land planted?</td>
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<tr>
<td>Offers additional compensatory payments to REPS farmers of 200 Euros per hectare?</td>
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<tr>
<td>Farmers retain ownership of the land after planting?</td>
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<td><strong>Age groups</strong></td>
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<td>&lt;44 years</td>
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<td>45-64 years</td>
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<td>&gt;65 years</td>
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<td><strong>Gender</strong></td>
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<td><strong>Marital status</strong></td>
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<td>Divorced/Separated</td>
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<td>Children &gt; 18 years</td>
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