Factors influencing Irish farmers' afforestation intention

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ABSTRACT

The natural conditions in Ireland have a positive influence on tree growth as the mean annual increment is twice as high as that in mainland Europe. However, due to centuries of resource exploitation and the expansion of agricultural land the island has the second lowest forest cover in the EU. An increased forest cover would encourage the establishment of a range of processing industries and thus support necessary economic development in rural areas. Furthermore through farm afforestation farmers are given the opportunity to diversify their businesses, as market output of the majority of cattle and sheep farms in Ireland often does not cover the production cost. To increase forest cover, the Government in 1989 introduced a scheme supporting farm afforestation, which is encouraged through premium payments that are high enough to make forestry more profitable than the majority of drystock farming. Afforestation targets, however, have not been met and previous studies have failed to offer a consistent explanation for the shortfall in planting rates. Thus, the objective of this work was to identify the factors influencing farmers' afforestation decision. More specifically the study aimed at identifying the combined effect of structural, socio-demographic and attitudinal factors on the probability to plant. Based on previous findings from in-depth interviews with Irish farmers' about their goals and values regarding farming and afforestation, a postal survey was conducted in Spring 2012 including question on farm structure and socio-demographic variables as well as questions on reasons for planting/not planting. The data was analysed using logistic regression. 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.

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1. Introduction

1.1. 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 than 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 ha per annum to the year 2000, and 20,000 ha per annum from 2000 to 2030, have been set in the Government's Forestry Strategy 'Growing for the future' (DAFF, 1996). 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 (see Fig. 1 for premium and planting rates).

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 two-fold: 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 the 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 ha planted in 1995 (Forest Service, 2009) (Fig. 1). However, since this time planting rates have been consistently and significantly below the target. In the period from 1996 to 2009, only 48% of the targeted area of farmland was planted with trees (Forest Service, 2009). Despite continuous improvements in funding, planting rates have remained below the target. Thus, the Department of Agriculture, Fisheries and Food stated in its Rural Development Programme for the period from 2007 to 2013 that '*the*
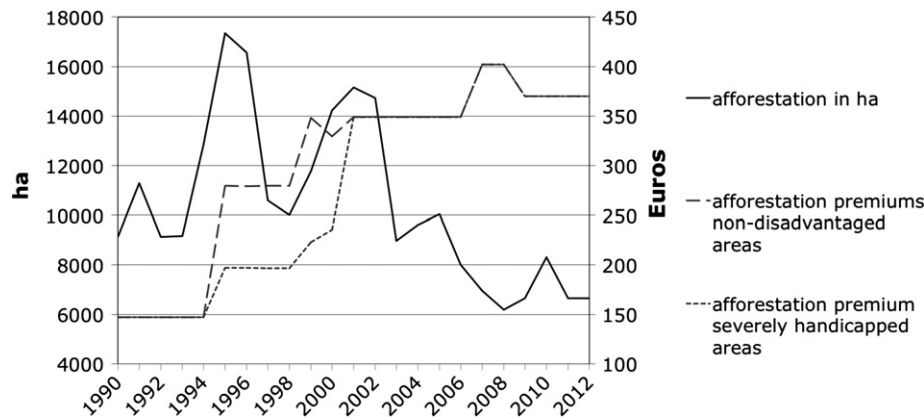
Fig. 1. Private afforestation rates (ha/year) and rate of annually paid farm afforestation premiums (Euros/ha) in Ireland 1990–2012.
Source: N.N. (1990); Irish Farmers Association (1991–1996); Irish Timber Growers Association (1997–2010); (Forest Service, 2010, 2012).

major difficulty with the [afforestation] programme at the moment is the low rate of take-up' (DAFF, 2010).

The first objective of the study was to quantify the importance of the previously identified factors influencing 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. The second objective was to establish for what proportion of farmers a lack of detailed 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 we present the results in form of the two logit models developed 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 detailed information on the scheme. Finally the results are discussed and conclusion is drawn with regard to policy recommendations.

1.2. 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 et al. (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 ha in 2005 to 6000 ha 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, 2006; 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 de-population to their areas. This might be due to a lack of integration of these plantations into the existing landscape, as Nijnik and Mather (2008) and Nijnik et al. (2008) found in studies on the public preferences regarding woodland development in Scotland that woodlands are to play an important role in the integration of aesthetic, ecological and socio-economic components in landscape management. Nijnik and Mather (2008) furthermore found that the public in Scotland holds a diversity of views with regard to preferences and normative expectations as to the tree-planting in Scotland. 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 (Duesberg et al., 2013). Similarly McDonagh et al. (2010) discovered that the main barriers to planting for Irish farmers were 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, 2006). Similar findings were made in England, Spain, Finland, Scotland and Northern Ireland, where farmers were also more willing to afforest marginal land such