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Trends and spatial patterns in private afforestation in the Republic of Ireland

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Abstract

Against a background of minimal activity, the huge growth in private afforestation in the Republic of Ireland has been dramatic. This trend is defined and set in the context of European Union policy and related national forestry incentives, but other influences are also involved. There are distinct spatial patterns in the amount and characteristics of private planting. These are mapped on a county basis and discussed with reference to: the extent of afforestation and its role in land use change; comparisons with the public sector; the ownership of private afforestation; and the type and size of tracts being planted. Differences between east and west are evident. These include a greater volume of private planting activity in the west, together with the greater use of enclosed land and the development of larger tracts of forestry. The patterns are the outcome of many complex influences, but land type is of primary importance. In the major expansion of private afforestation which is projected, greater attention should be given to the spatial dimension.

Key words: Private afforestation, Republic of Ireland, Irish forestry

Introduction

Reference has often been made to Ireland as being the least forested country in Europe, apart from Iceland. Less frequently realised internationally is the fact that in the afforestation which has taken place to address this situation, private planting has traditionally played a miniscule role, so that the level of private ownership of Irish forests has been uniquely low among European countries. The extent to which this has been reversed in the Republic of Ireland since the 1980s has been dramatic, not only in forestry terms, but also in the context of national land use. The upsurge in private afforestation must rank among the most abrupt changes to have occurred in the history of the use of Irish land and it is notable even on an international comparative basis. It is the purpose of this paper to illustrate this remarkable development through graphic representation of trends and cartographic portrayal of spatial patterns, together with comment on the features concerned. The data used are based principally on those compiled by the Forest Service, Department of the Marine and Natural Resources.

The changed environment for private afforestation

The abruptness and magnitude of the escalation in private planting in the Republic of Ireland are demonstrated clearly in Figure 1. Private activity accounted for only 3% of all planting between independence and 1980, but contributed 79% of the expanded afforestation in 1996. The area planted annually increased from 134 ha in 1979 to 617 ha in 1985, and then sharply to 9,147 ha in 1990 and a peak of 17,343 ha in 1995. The area afforested in 1995 was 90 times the mean annual planting of 193 ha over the period 1930-79. The pri-

vate afforestation of 101,528 ha over the decade 1987-96 was more than 10 times the total area planted over the five decades 1930-79. This decade of private afforestation accounted for 17.2% of the total forest in the state at the end of 1996. It constitutes the most abrupt change in Irish forest history and represents a change in the use and cover on 1.5% of the country's total land.

The extremely low level of private afforestation prior to the 1980s suggests the existence of strong barriers inimical to private planting. These may be summarised as including: the lack of forest consciousness and knowledge; the tendency to associate forestry solely with the former landlord class and later, with the state; the small size of farm holdings and the competition with agriculture for the scarce land resource; the state subsidies and other incentives offered to agriculture; the costs and risks involved in planting combined with the long time scales of returns on investment; the long term commitment inherent in the conversion of land from agriculture to the very different use of forestry; the fear of detracting from entitlements to social welfare and other benefits; and uncertainty with regard to future marketing prospects for timber (Gillmor, 1992). As Neeson (1991) has emphasised, however, explanation for the predominance of state over

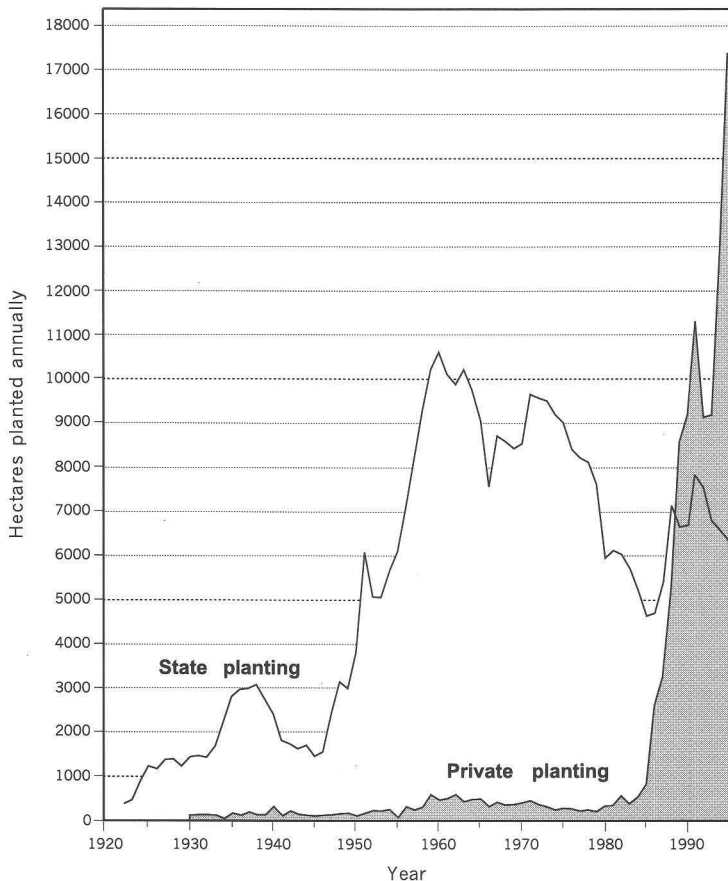


Figure 1. Annual afforestation in the Republic of Ireland, 1920-96.

private afforestation must be sought not only in the attitudes of land owners, but also in official policy. While the principle of providing state grants towards private planting costs was adopted as early as 1928, such afforestation was seen in practice as being very much secondary to direct state involvement and potentially a competitor with it for land. While some individual foresters and politicians were keen to promote private afforestation, there was little evidence of a general strong commitment and no clear policy was formulated.

While these influences seem to account for most of the lack of interest in planting trees among Irish landowners during much of the twentieth century, surveys of farmers shed some light on this reluctance in recent times. The perceptions of a sample of farmers who had planted in northern counties as to the main reasons why farmers in general were slow to avail of government financial incentives for forestry were: the long term nature of return on forestry combined with the absence of an annual income (42%); the lack of a forestry tradition (36%); and the prohibitively high initial costs involved (15%) (Kelleher, 1986). The reasons why they themselves had not planted given by farmers in 12 western counties were: the lack of suitable land (35%); a limited land resource (15%); a combination of the long time period associated with the returns from forestry and other financial reasons (15%); a dislike of trees (4%); and other reasons for not planting (12%), while 19% of respondents stated that they had never considered planting trees (Ní Dhubháin and Gardiner, 1994). With regard to the lack of suitable land, farmers felt that their land would be better used for agriculture, and that it was 'too good' for forestry. Some attitudes among farmers which are inimical towards forestry persist and hinder the promotion of planting (Ní Dhubháin *et al.*, 1994).

As the barriers to private planting were so effective, it is evident that a major change in the environment for private afforestation must have occurred in order for there to be such a sudden and huge growth in activity. This transformation related essentially to the incentives resulting from the change in the context for forestry relative to agriculture within the European Union, and the concurrence of Irish policy with this shift. It was facilitated by the increasing realisation of the suitability of the Irish biophysical environment for tree growth, the establishment of advisory, demonstration and training services, the greater media and public profile of forestry and the promotion of private enterprise.

The first measure in addition to the pre-existing state grants was the EU Agricultural Development Programme for the West of Ireland, known as the 'Western Package', which included forestry among several measures to promote development in the 12 western counties for a 10-year period from 1981. One-half of the generous grant funding for planting was provided by the EU, rising later to 70%. With take-up falling very far behind the target of 2,500 ha/year, a vigorous campaign to increase awareness of the Western Package forestry measures was undertaken in 1985. As emphasised by Bulfin (1993, 1994), what was to prove of greatest importance, however, was the fact that the disincentive to farmer afforestation resulting from the lack of short term income was tackled first in 1986/87. From then, farmers entitled to livestock headage grants in disadvantaged areas who converted to forestry continued to receive compensatory payments for 15 years, though they had to reduce stock levels to qualify. This vital incentive of annual payments was greatly extended 3 years later through the broader and much more beneficial Forest Premium Scheme. The National Farm Forestry Forum (1996) concluded that the most significant factor influencing the rate of farm afforestation is the level of premium payment, but that this is set within the context of the alternative returns in agriculture.

The shift in EU policy towards the promotion of afforestation was heralded in 1986 by the Community Strategy and Action Programme for the Forestry Sector. It favoured the

expansion of forestry as a means of reducing agricultural surpluses by affording an alternative use for land, lessening the EU's heavy reliance on timber imports, providing employment and economic development in rural areas, affording environmental and recreational benefits, and compensating for the destruction of the European forest resource by atmospheric pollution and fire (CEC, 1986). This emphasis was based especially on the striking contrast which developed between the market prospects for agricultural produce and for timber. Forestry was identified in *The Future of Rural Society* as having a potentially important role in integrated rural development (CEC, 1988). With this European commitment and the consequent prospect of financial assistance towards its achievement, Irish policy was to concur wholeheartedly. In 1987, the government identified forestry as one of the main areas for development in its Programme for National Recovery. This included a firm action programme to realise the potential of forestry for job creation, import substitution, export revenue, and regional and social development. Record total planting targets were set and particular encouragement was to be given to farmers to avail of the incentives and to expand into forestry.

The outcome of the concordance between Irish government and EU interests was the approval in July 1990 by the Community of the Forestry Operational Programme 1989-93 (Government of Ireland, 1991; Gillespie, 1994). The high level of financial support was made possible by the availability of Structural Funds under Ireland's Priority 1 status to compensate for the move towards the Single Market. The effect of the Operational Programme and other forestry measures was to increase and extend from the west to all of the state, the capital grant support for private planting and the annual payments. These incentives were additional to the favourable taxation regime for forestry (Grayson, 1993). Continuation and extension of EU financial support for Irish forestry since 1994 has been provided for by a Common Agricultural Policy (CAP) Reform Accompanying Measure. Afforestation of agricultural land was one of three accompanying aid measures agreed by the EU in 1992 as part of CAP reform, the others concerning agri-environmental policy and the early retirement of farmers. These measures are financed 75% from the EU FEOGA Guarantee Budget and 25% from national exchequers. The forestry incentives were increased in value, scope and duration. The influence of incentive levels was reflected in the decline in private planting in 1992-93 (Figure 1). During this period, uncertainty existed regarding the process of CAP reform, and some landholders delayed planting in expectation of enhanced forestry benefits under the new measure. Depressed timber prices may also have played a role in this decline. Similar expectations of even greater incentives seem to have affected planting in 1996-97. The relative attractiveness of agricultural incentives and prospects must also be considered but the impact of these under CAP reform has not to date had the depressant effect on forest planting projected by Kearney (1994). Nonetheless, the recent downturn must to some extent reflect the success of the Rural Environment Protection Scheme (REPS), which has been adopted by over 30,000 farmers and under which, afforestation is barred on environmental grounds.

The very close correspondence between the trends in private planting and the EU and state measures to promote afforestation suggests the extent to which the development is incentive-led. It must be acknowledged, however, that simple questioning of farmers concerning their motives for planting illicitly responses which do not prove the total dominance of grant aid alone. In Kelleher's (1986) study, the predominant reason given for respondents' planting intention (84%) was to use land that was waste or of no good for anything else, with only 6% specifying investment reasons. Ní Dhubháin and Gardiner (1994) found that the reasons given by farmers were shelter provision (45%), financial rea-

sons (23%), use of wasteland (15%) and aesthetic reasons (8%), but only 38% of these respondents had received grant aid. The ranking of motives for future planting was rather different. This was: to use up poor ground (58%); financial reasons (16%); landscape and conservation reasons (12%); and shelter provision (8%). Although the main reason given overall was to use land of little value for other purposes, obviously the land of poor quality was there and remained unplanted until the introduction of the afforestation incentives. In answering such questions, many farmers tend to take the availability of grant assistance as given and not requiring mention, so that they concentrate on other influences (Cawley *et al.*, 1995). Additionally, there may be some deliberate downplaying of the role of grant dependence by farmers.

Distribution of private forestry

The distribution by county of private planting over the decade 1987-96 is shown in Figure 2, in terms of total planting (represented by the proportionate circles) and also in the context of total land use (represented by the choropleth shading). Both dimensions reflect a western emphasis. The counties with the largest areas afforested were Mayo, Kerry, Donegal, Clare and Cork, each with about 9,000 ha or more. In terms of the proportion of the land involved, this exceeded 2% over the decade in Clare, Leitrim, Kerry and Sligo. This western orientation reflects the extent of hill and bog land and the poorer quality of western farmland. Related in part to this is the fact that the intensity of agricultural use there, as indicated by stocking densities, is lower, as are farm incomes and land prices. Also, more land becomes available through retirement, due to the older age structure of the western farm population. The activities of forestry contracting companies and cooperative effort have influenced the pattern of afforestation locally, as has South Western Forestry Services in Kerry and the Western Forestry Cooperative in the northwest. The highest levels of planting in the eastern half of the country were in Laois-Offaly, where the Slieve Bloom Mountains and substantial tracts of peatland are situated, and in Wicklow, with its large area of upland and longer tradition of forestry. The lowest levels were in the northeast, where the proportion of non-agricultural land is least.

There has been some spatial shift in the pattern of private afforestation. Prior to 1988, grant aid was given only to the 12 western counties (Cavan, Clare, Cork, Donegal, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Roscommon and Sligo), and to Limerick from 1986. While the response to the availability of grant aid was at first slow in other counties, extension of incentives to all of the state was followed by a decline in the western region's share of planting. This had lessened to 77% by 1990, and was 68% in 1992 and 1996. Within the west, there has been some change, with afforestation being highest in Donegal and Kerry in the period 1992-96. Most notable was the expansion of planting in Donegal, where it had been slow to develop in the 1980s. The share of planting in Leinster increased to 15% in 1990, 24% in 1992 and 27% by 1996. This eastward shift in recent years seems to be partly a response to coming under the CAP Accompanying Measure, whereby higher premiums are being paid in the non-disadvantaged areas to encourage afforestation of agricultural land. Also, the introduction of higher grants followed by a greater differential for broadleaf planting have encouraged the planting of better land. This is reinforced by the setting of a minimum yield class of the equivalent of 14 for Sitka spruce and, to a lesser extent, environmental concern regarding the afforestation of blanket bog. The encouragement of planting better land and broadleaf species seems likely to promote further shift in the distribution of afforestation. Another influence

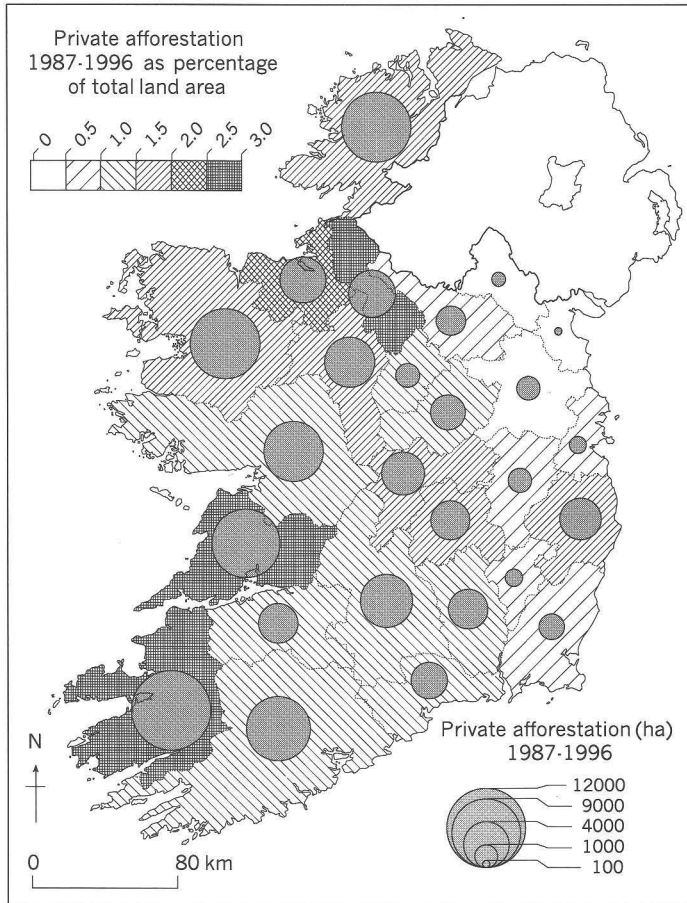


Figure 2. Distribution of private afforestation, 1987-96, and its role in land use.

which may become of significance is the pattern of REPS adoption by farmers, which is now higher in the west and northwest of the country.

The spatial pattern of private afforestation shown in this paper differs markedly from that portrayed in the map by Hannan and Commins (1993), and their finding that forestry grant applications were most common in the larger farm areas of good land and intensive agriculture. They acknowledged that these findings were contrary to their hypothesis. The difference may be explained at least in part by the fact that the pattern shown here is based on the area and proportion of land afforested, whereas Hannan and Commins used the proportion of holdings with applications for forestry grants. Thus, it may be that in the areas of large farms and good farming, a higher proportion of farmers apply for forestry grants, but go on to plant only very small parts of their holdings.

The spatial patterns portrayed at the county level are the outcome of the decisions made by a multiplicity of individual landowners. As has been conceptualised for farm diversification as a whole (Cawley *et al.*, 1995), these decisions may be seen as the result of

interaction between the internal environment of the farm itself and the external environment of institutional and other macro influences. While the latter are the factors which are most likely to be evident in the consideration of general trends and patterns, this is not to deny the importance of socio-economic, personal and other influences at the level of the individual landowner and holding. Among the complex range of such variables are: the individual's age, marital status and life cycle situation; the extent and nature of social welfare, health benefits and other income support receipts; the farm layout and farming system; the individual's involvement in various agricultural and other schemes; and his or her familiarity with and attitudes towards planting incentives. The process of adoption and diffusion of innovations affects the pattern of afforestation at the local level. As concern about the environmental impacts of forestry has increased, this and the designation of conservation areas affect local distributions (Hickey, 1990; RDS, 1991). Research concerning the many influences affecting decisions to plant or not to plant is needed urgently in order to provide a better understanding of the afforestation process.

The public and private sectors

There are interrelationships between trends in public and private afforestation. With the huge expansion of state planting in the period after the second world war, afforestation reached a peak of 10,500 ha in 1960 (Gillmor, 1993). As may be seen in Figure 1, annual planting subsequently declined, particularly over the period 1972-85 during which it fell from 9,600 ha to 4,600 ha. This resulted primarily from the increasing cost and difficulty of procuring land, particularly in the 1970s after accession to the EC had led to greater prosperity in agriculture. Another restriction in the 1980s was the curtailment of state expenditure due to national budgetary difficulties. A further consideration has been the need to allocate an increasing share of state resources towards reforestation with the maturing of the national forest. Reforestation has increased from 691 ha and 10% of total state planting in 1980, to 6,003 ha and 57% of planting in 1996.

The shortfall in reaching even reduced state national planting targets prompted government to turn more towards the private sector, reinforced by the tendency to lessen direct state participation in the economy as a whole. Thus, the decline in state involvement was a contributory factor in the expansion of private afforestation. Greater encouragement had begun in 1978, even before European funding for forestry became available, with a substantial increase in the level of grants under the Private Forestry Scheme. The subsequent growth in private planting began to compensate for the decline in state afforestation. This inverse relationship ceased in the period 1986-91, however, when an upturn in state afforestation occurred at the same time as the huge expansion of private planting. This correspondence is accounted for by the provision of substantial EU funding for public as well as private afforestation under the Forestry Operational Programme. Nonetheless, as private activity and the related price of forestry land increased, it became progressively more difficult to acquire land for state afforestation, accounting for the downturn in planting in the 1990s. This difficulty contributed to the introduction in 1992 of the Coillte Partnership Scheme, whereby Coillte undertakes planting, management and marketing while the farmer retains ownership of the land and receives an annual income based on the value of the grants, premium payments and revenue from the sale of the timber. In 1996, 814 ha were planted under this scheme, contributing 18% of Coillte afforestation. The Coillte Partnership Scheme has resulted in a blurring of the boundary between public and private afforestation.

Over the decade 1987-96, 62% of the afforestation in the Republic of Ireland was by private planting, but the relative contributions of the private and public sectors varied by county (Figure 3). While private activity figured prominently in this recent afforestation in the west, some of the highest shares were in some eastern counties. This reflects some private planting in the context of a general lack of afforestation by either state or private interests on good agricultural land and in particular, the lack of acquisition by the state of this land, due to its high cost. The private contribution was greatest, at 96%, in Meath, but the total afforestation in this county over the decade was only 1,100 ha. It seems likely that this was accounted for by some large farmers planting small parts of their holdings combined with a few substantial plantings. Among the counties with major forestry activity, Kerry was exceptionally high with 82% private sector involvement, second only to Meath. The private contribution was also high in the northwest, exceeding 70% in Sligo, Leitrim and Roscommon. It was lowest in Waterford, by a significant margin at 40%, where there was substantial state planting in upland areas but limited private interest on good agricultural land.

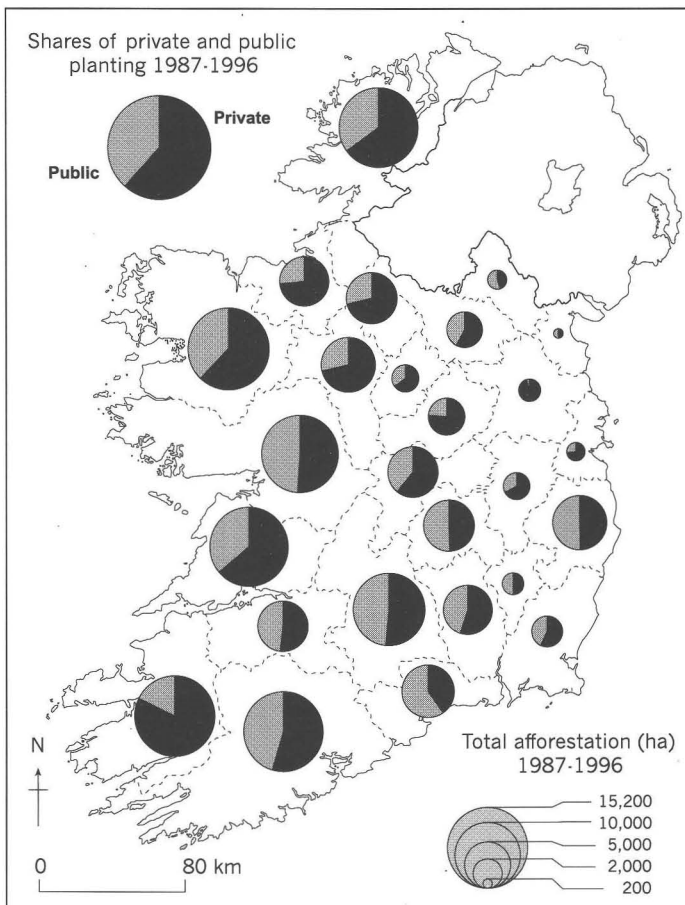


Figure 3. Distribution of private and state afforestation, 1987-96.

The contribution of private planting over the decade 1987-96 to the total forest landscape at the end of 1996 is shown by county in Figure 4. With the type of land used for private planting tending to be somewhat similar to that of the state sector which dominates the total forest area, general uniformity in the contribution might be expected. Spatial variation existed, however, and this reflected especially the temporal differences in the respective planting efforts and in particular, the recent nature of the major private contribution. This may be seen by comparing the older forested county of Wicklow, where the recent private contribution was only 9%, with western counties, where it generally exceeded 20%. The contribution was greatest, at 33%, in Kerry, with its high level of recent private planting activity having a major impact on the forest landscape of the county.

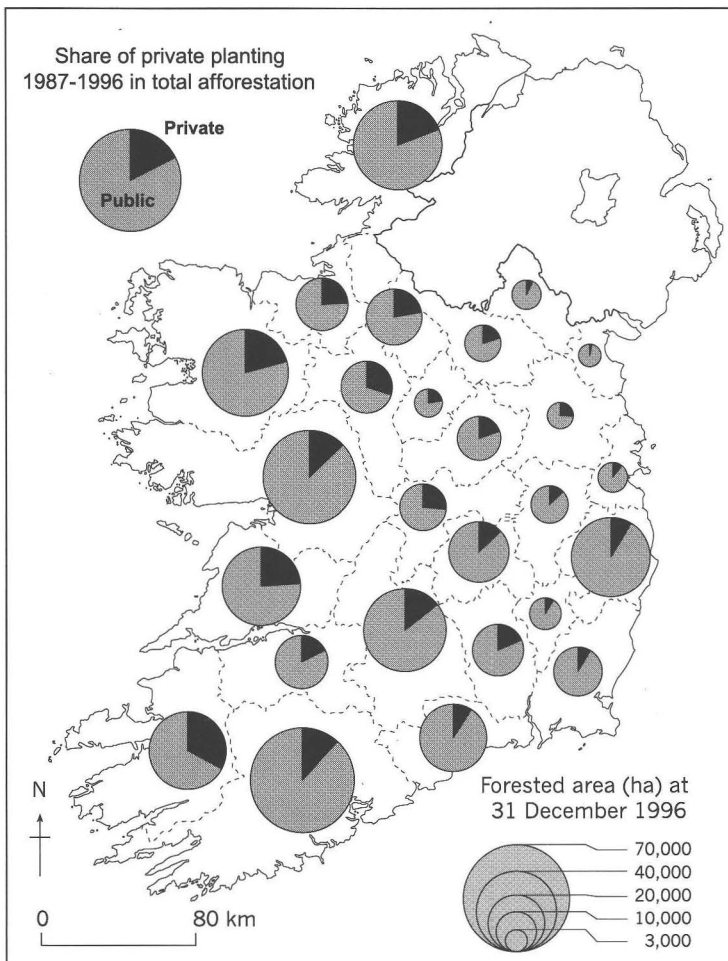


Figure 4. The contribution of private planting, 1987-96, to total afforestation.

The private planters

Financial institutions were quicker than farmers to avail of the opportunities to invest in the rapid expansion of forestry in the 1980s, to the extent that farmers accounted for only one-fifth of private planting in 1986. Corporate participation did in itself influence farmer interest in forestry, by contributing to confidence in the future of the industry, but it was the addition of annual payments to the pre-existing generous grants which provided the major stimulus to the huge expansion of planting by farmers. This was reinforced by the development of support from the farmers' organisations, advisory services and cooperative societies. The share of ownership by farmers in the greatly expanded private planting had increased to 45% by 1990.

Data on three categories of private planters (non-farmers, part-time farmers and farmers) are available from 1992, with non-farmers comprising both corporate forestry and planting by individuals in occupations other than farming (Figure 5). The share of non-farmers diminished over this 5-year period in both relative and absolute terms, from 4,017 ha and 44% of private planting in 1992, to 1,529 ha and 9% in 1996. This reflects in particular the progressive rise in the price of forestry land and the effect of this on projected rates of return on investment in forestry (O'Connor and Kearney, 1992/93; O'Connor and Conlon, 1993). Also, there is difficulty in acquiring the size of tracts which are of interest to companies, combined with the fact that pension funds devote only a small part of their portfolios to forestry, due to its illiquidity. The decline in the share of planting has occurred despite the feeling among farming interests that circumstances are weighted in favour of those who are not farmers (Divilly *et al.*, 1995). The increased participation by part-time farmers, from 922 ha and 10% of planting in 1992 to 3,614 ha and 22% in 1996, followed from the broadening of the income eligibility status for the forestry incentives and greater realisation of the benefits of forestry to people in that situation, with perhaps an increase in the extent of part-time farming.

There were variations by county in the ownership of private afforestation in 1992-96 which reflected differing participations over time but also spatial variation in any one year (Figure 6). Apart from the tiny area of planting in Louth, farmers and part-time farmers combined had a majority share everywhere. The role of

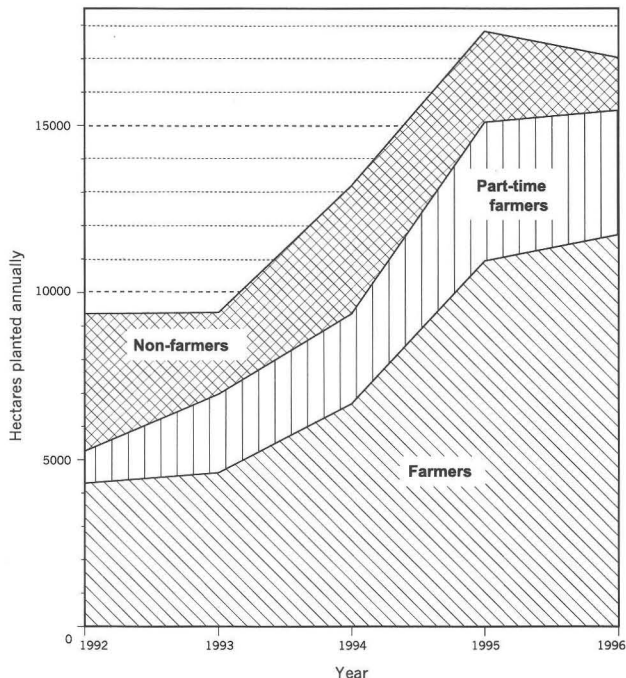


Figure 5. The ownership of private afforestation, 1992-96.

non-farmers was highest, at 49%, in Leitrim. It was there that the comparative advantage of forestry relative to agriculture was demonstrated first and to the greatest extent on its wet mineral soils (Foras Talúntais, 1973-78), attracting considerable corporate interest. Land acquisition in Leitrim has been facilitated by the fact that population decline has been greater than in any other county. Participation by non-farmers was next highest in the other adjacent and northwestern counties of Roscommon, Mayo, Cavan and Donegal. This conforms to some extent with the finding of Hannan and Commins (1993) that the small amount of land sold for forestry was more prevalent in the more remote and traditional areas of poorer farming conditions. In the east, participation by non-farmers was substantial in the established forestry county of Wicklow, and there was some planting near to Dublin by people in occupations other than farming. The share of planting by part-time farmers was as high as 28% in Donegal and Kerry, where it made a substantial contribution to the high level of very recent afforestation. It tended to be greater in general in the west, as small holdings are more likely to be operated on a part-time basis, but it was also relatively significant among the much lower forestry activity in north Leinster.

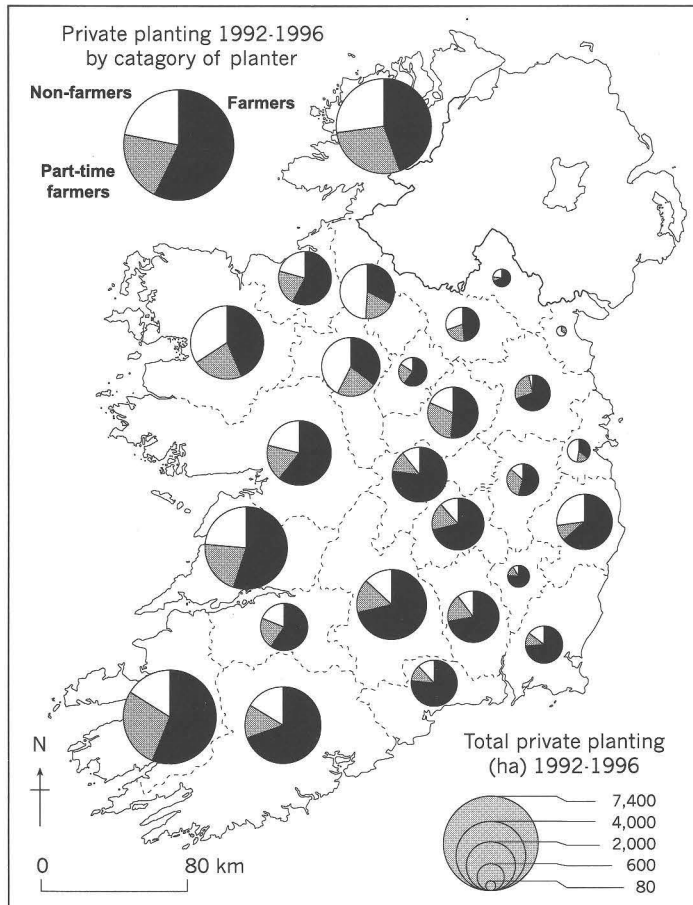


Figure 6. Distribution of private afforestation ownership, 1992-96.

Forested land: type and size of tracts

With regard to the nature of the land being afforested, the data enable a distinction to be made between enclosed and unenclosed land. There has been pronounced spatial variation in the relative proportions of these land types (Figure 7). Planting on unenclosed land correlated closely with the distribution of upland and bog, being markedly higher along the west coast and reaching its peak in Donegal and Kerry. This indicates the importance of private forestry on western hill land and peatland. Also, in areas where uplands exist, it is much more likely that adjacent lowland or enclosed land is of inferior quality for agriculture and therefore more likely to be planted. In the eastern half of the country, there is little unenclosed land available for planting and so values were very low. The exceptions were on the Wicklow and south Dublin uplands, on the Slieve Bloom Mountains and peatlands of Laois and Offaly, and in upland districts of Waterford and Tipperary. These considerations of unenclosed and adjacent land reinforce the primacy of land type as a factor in the spatial distribution of private afforestation.

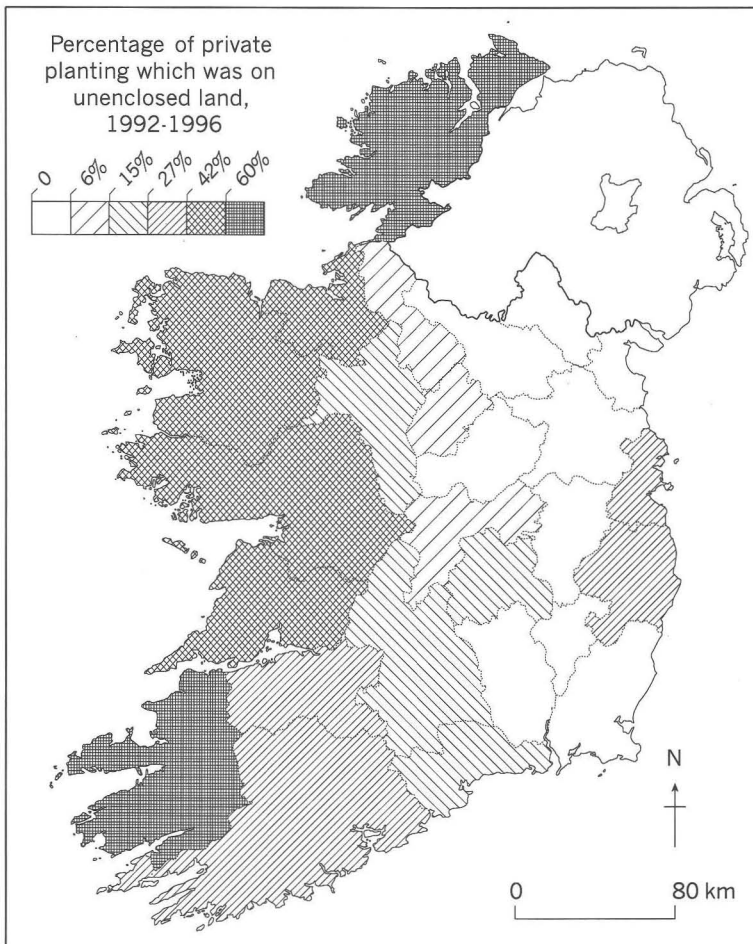


Figure 7. Private afforestation on unenclosed land, 1992-96.

The availability of the substantial tracts of unenclosed land contributed to the larger average size of plantings in some of the western counties (Figure 8). Also, some whole farms were afforested in these areas, although the general practice was to plant only part of the holding. While tracts were biggest in Donegal, at 13.7 ha over the period 1992-96, there were high mean values in Counties Westmeath, Dublin and Meath. This belt in north Leinster seems anomalous, especially when compared with the counties of lowest value to the north and south of it. Perhaps it may be explained by the distortion of average values by a small number of large plantings among the generally low level of afforestation activity there. The low mean size of plantings in the other counties of larger farms suggest that only small parts of these holdings have been afforested. These explanations are supported by the findings of Hannan and Commins (1993) concerning grant applications. The spatial pattern of planting size tends to be the reverse of that of farm size, with the largest afforested tracts being in the western counties of small holdings. Variability was greatest among the counties with small areas of afforestation, and elsewhere there was relative uniformity in the mean size of forested tracts.

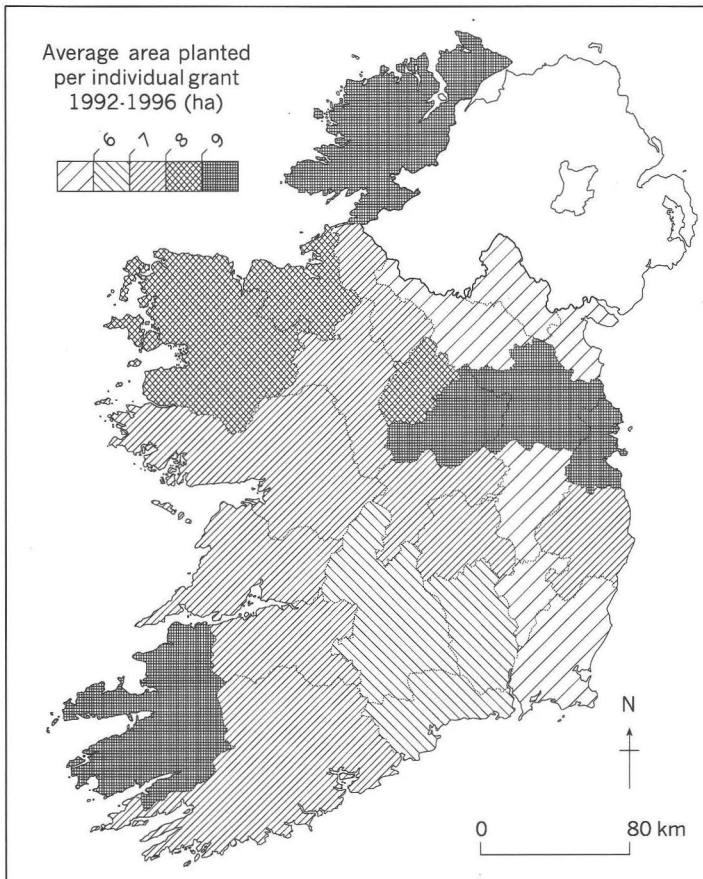


Figure 8. *Size of private plantings, 1992-96.*

The mean area to which grants over the period 1990-95 applied was 9.9 ha, but the size structure varied somewhat from year to year. The range was from 7.5 ha in 1993 to 11.2 ha in 1994, and this contrast may have resulted in part from some large plantings being delayed in order to avail of the increased incentives in 1994. The structure of plantings in the 1990s was skewed towards small size, with tracts of less than 10 ha representing 72% of the total in number but accounting for only 31% of the total area of land involved (Table 1). Obviously the small sizes and scattered distribution of private planting in the Republic of Ireland present difficulties for forest management and harvesting, though these can be lessened through cooperative effort on the part of farmers and through the development of management practices appropriate to small scale production.

Table 1. *Size structure of private planting, 1990-95.*

<i>Size of planting (ha)</i>	<i>Number (%)</i>	<i>Total area (%)</i>
100+	0.5	6.8
50.0-99.9	1.7	11.7
20.0-49.9	9.0	26.8
10.0-19.9	16.9	24.1
6.0-9.9	17.4	14.0
4.0-5.9	14.6	7.4
2.0-3.9	23.1	7.1
<2.0	16.8	2.1

An analysis of a random sample of 10% of grant-aided plantings in the year 1991/92 provided interesting information on the nature and size of private afforestation tracts (Convery and Clinch, 1994). The favourable environmental context was indicated by the fact that on almost 40% of sites, the yield class was 20 or higher for Sitka spruce, the species which accounted for 90% of planting. The facts that only 19% of sites were severely exposed, 82% of the total area was below 200 m and over half of the plantings were on mineral or mixed soils, were taken to indicate that forestry was 'coming down the hill'. The vegetation of the sites was: grass/rush (49%); heather/furze (41%); grass (5%); and scrub (5%). Of the land planted, 79% had been used for grazing and 65% enclosed and improved prior to afforestation. With regard to size, 33% of the lots and 9% of the area planted were below what was considered to be the commercial threshold of 4 ha. The average number of hectares planted per grant were: corporate sector (17.4 ha); full-time farmers (8.7 ha); part-time farmers (6.4 ha); and individuals in other occupations (5.9 ha). Thus, the pattern of ownership has an influence on the distribution of tract size (Figures 6 and 8).

Conclusion

The rapid growth of private afforestation in the Republic of Ireland has been a remarkable development. This is so within Irish forestry in that it represents both a shift from state to private afforestation and a major expansion in the level of total afforestation. In the broader terms of national land use, private afforestation is a major new element in the scene. As has been demonstrated in this paper, there are distinctive trends and spatial pat-

terns involved. Given the significance of this development, it is surprising that it has not attracted more general attention, debate and policy formulation.

Based on assumptions concerning a critical mass for the forest industry, official policy envisages a continuation of a high level of afforestation, with annual targets for total planting of 25,000 ha to the year 2000, and thereafter 20,000 ha to the year 2030 (Department of Agriculture, Food and Forestry, 1996). This would extend the forest area from 8% to 18% of the land in the Republic of Ireland. It is envisaged that private planting will predominate over public afforestation in the approximate ratio of 70:30, with an emphasis on farmer participation. This level of private planting would involve private afforestation of 490,000 ha or 7.1% of the total land of the state, in addition to that existing at the end of 1996.

There is no reference in the strategic plan to the spatial dimensions of this high level of private afforestation, though it does contain a proposal to establish a national Forest Inventory and Planning System. The Forest Service is also funding work on an indicative forestry strategy. The remote sensing and geographical information systems technologies currently available provide the basis for some of the information needed in spatial planning. The forestry adoption process and the role of forestry in rural development are essential inputs to the planning system, and more research into these factors is required. A useful start in relation to the rural development dimension has been made through the work of Kearney and O'Connor (1993) and Ní Dhubháin (1995). The National Economic and Social Forum (1997), expressing reservations about the continuation of forestry policy formulation within a top-down framework, recommended that future policy should be determined in consultation and cooperation with local communities. This should be done within the broader context of integrated sustainable rural development. In association with this, the planning of spatial trends and patterns would ideally be within the framework of an indicative strategy and national land use policy, something for which geographers have been calling for decades.

REFERENCES

- Bulfin, M. 1993. Private forestry in Ireland: progress and problems. *In: Afforestation of Agricultural Land*. Edited by Volz, K.R. and Weber, N. Commission of the European Communities, Luxembourg. pp. 59-76.
- Bulfin, M. 1994. Ireland – changes in agricultural policy and their impact on private forestry. *Irish Forestry* 51:69-79.
- Cawley, M., Gillmor, D.A., Leavy, A. and McDonagh, P. 1995. *Farm Diversification: Studies Relating to the West of Ireland*. Teagasc, Dublin.
- CEC. 1986. *Community Action in the Forestry Sector*. Commission of the European Communities, Luxembourg.
- CEC. 1988. *The Future of Rural Society*. Commission of the European Communities, Luxembourg.
- Convery, F.J. and Clinch, J.P. 1994. Forestry as a land use in Ireland. *In: Rural Land Use on the Atlantic Periphery of Europe: Scotland and Ireland*. Edited by Fenton, A. and Gillmor, D.A. Royal Irish Academy, Dublin. pp. 131-142.
- Department of Agriculture, Food and Forestry. 1996. *Growing for the Future: A Strategic Plan for the Development of the Forestry Sector in Ireland*. Stationery Office, Dublin. 98 pp.
- Divilly, P., Carey, M. and O'Reilly, G. 1995. *Forestry or Farmland: A Dilemma for Land Use and Management in Ireland*. LLAS Working Paper 16. Department of Geography, University College Dublin.
- Foras Talúntais. 1973-78. *County Leitrim Resource Survey*. Dublin.

- Gillespie, J. 1994. Forestry in Ireland. *In: What Price CAP? Issues and Challenges Facing Agricultural and Rural Policy in the European Union*. Edited by Kearney, B. Institute of European Affairs, Dublin. pp. 51-57.
- Gillmor, D.A. 1992. The upsurge in private afforestation in the Republic of Ireland. *Irish Geography* 25:89-97.
- Gillmor, D.A. 1993. Afforestation in the Republic of Ireland. *In: Afforestation: Policies, Planning and Progress*. Edited by Mather, A. Belhaven, London. pp. 34-48.
- Government of Ireland. 1991. Forestry Operational Programme 1989-1993. Stationery Office, Dublin.
- Grayson, A.J. 1993. Private Forestry Policy in Western Europe. CAB International, Wallingford. pp. 75-85.
- Hannan, D.F. and Commins, P. 1993. Factors Affecting Land Availability for Afforestation. Economic and Social Research Institute, Dublin.
- Hickey, D. 1990. Forestry in Ireland: Policy and Practice. An Taisce, Dublin.
- Kearney, B. 1994. Changes in CAP and GATT - implications for Irish farming and land use. *Irish Forestry* 51:36-44.
- Kearney, B. and O'Connor, R. 1993. The Impact of Forestry on Rural Communities. Economic and Social Research Institute, Dublin.
- Kelleher, C. 1986. Forestry for farmers. *In: The Changing CAP and its Implications*. An Foras Talúntais, Dublin. pp. 188-213.
- National Economic and Social Forum. 1997. Rural Renewal - Combating Social Exclusion. Forum Report 12. Dublin.
- National Farm Forestry Forum. 1996. Report of the National Farm Forestry Forum. Department of Agriculture, Food and Forestry, Dublin.
- Neeson, E. 1991. A History of Irish Forestry. Lilliput, Dublin. 388 pp.
- Ní Dhubháin, Á. 1995. The impact of forestry on rural communities. *Irish Forestry* 52:31-40.
- Ní Dhubháin, Á. and Gardiner, J.J. 1994. Farmers' attitudes to forestry. *Irish Forestry* 51:18-26.
- Ní Dhubháin, Á., Gardiner, J.J. and O'Reilly, G. 1994. Farmers' Attitudes Towards Forestry: Cross Cultural Differences. LLAS Working Paper 8. Department of Geography, University College Dublin.
- O'Connor, R. and Kearney, B. 1992/93. Economic issues in Irish forestry. *Journal of the Statistical and Social Inquiry Society of Ireland* 26(5):179-209.
- O'Connor, R. and Conlon, F. 1993. Agricultural and Forestry Land Prices in Ireland. Economic and Social Research Institute, Dublin.
- RDS. 1991. The Right Trees in the Right Places. Proceedings of a Conference on Forestry and the Environment. Edited by Mollan, C. and Maloney, M. Royal Dublin Society, Dublin. 143 pp.