

Ireland

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Summary

Just over 50% of the productive forest estate in Ireland is less than 25 years of age. The private component of this estate is even younger. Substantial Government and EU grant-aid has been the primary driver to the establishment of private forests. The major factor affecting the competitiveness of the forest – wood / non-wood / services – consumer chain in Ireland therefore is the limited current supply of raw material and the uncertainty about the future supply of roundwood from private forests. Most of these forests are less than 10 hectares in size and are located in inaccessible areas. There are concerns that, due to the lack of economies of scale, harvesting will not take place. The lack of silvicultural skills combined with the absence of an organisational structure among the majority of forest owners makes the economic harvesting and marketing of the timber output from the forests more unlikely.

Species distributions of state and private forests are dominated by *Picea sitchensis*. While the species is suitable for a range of end-uses the opportunities to add value are limited. This is a barrier to the development of value-added enterprises. The development of enterprises using species other than *Picea sitchensis* is difficult due to the limited and irregular supply. The range of non-wood products and services that can be produced within *Picea sitchensis* forests is limited.

The main problem and research question for enterprise development in the forest sector is to identify the appropriate organisational structure that will facilitate the economic harvesting and marketing of the timber output from small-scale forests. If this structure is in place a key barrier to enterprise development in the forestry sector will be removed. Research and development into value-added applications of Irish grown timber, in particular *Picea sitchensis* timber, is required to expand the market for that timber. Markets for a range of non-wood products and services need to be investigated further.

1. Consumption

1.1 State of the art and historical development

The Irish sawnwood market experienced rapid growth in the 1990s with demand growing from 580,000 m³ in 1992 to 1.24 million m³ in 2000 (TIDG 2002). This increase in demand was linked to the high level of house building that was undertaken during the period, which saw the number of house completions increase from 21,391 in 1993 to 49,812 in 2000. Current projections for 2004 suggest that 80,000 new homes will be completed this year. Compared to other EU countries the housing stock in Ireland is very low relative to the population. The rapid rise in the number of young adults, strong employment growth, prevailing low interest rates and tax incentives for residential property were key factors in fuelling this increase in house building (AIB Capital Markets and Merrill Lynch 2000).

The furniture market in Ireland has also grown. In 2003 it was estimated to be worth 570 million euro (at manufacturing prices). Of this, 123 million euro was exported.

1.2 Forest products and services consumption

The population of Ireland has increased steadily since 1946. The population at that time was 2,955,107. The population in April 2004 was 4.04 million, the highest figure since 1871 (CSO 2004). The age distribution of the population has also changed during that period with the percentage of the population aged less than 25 years falling from almost 44% in 1946 to 37% in 2002, while the percentage aged between 25 and 44 years (i.e. at house purchasing age) grew from 26% to 30%.

The distribution of the population between urban (where urban is defined as towns with 1,500 or more persons) and rural has undergone a major transformation in the period since the foundation of the State in 1926. At that time less than one-third of the population lived in urban areas. The urban share has increased at each successive census and currently 60% of the population lives in urban areas.

The GDP per capita in 2002 was 33,021 euro. The most recent data on household expenditure patterns show that 27.9% of average weekly household expenditure was on food, drink and tobacco in 2000. The percentage of expenditure on housing was 9.6% with a further 2.5% and 4.6% spent on household non-durables and durables respectively (CSO 2001).

1.3 Market demand for forest related products and services by urban population

There are insufficient data available in Ireland to quantify the urban population's demand for forest related products and services. Thus this section deals with the total demand for these products and services. The market for sawnwood in Ireland comprises construction, pallet, fencing, joinery and furniture. In the year 2000, the Irish sawn timber market (including Northern Ireland) was estimated at 1.48 million m³ (Table 1) with a value of 266 million. Although the volume of Irish timber sold on the Irish market has grown, market share fell from 60% in 1990 to 42% in 2000. This share varied between the different market segments with a share of 83% in pallets, 71% in fencing, but only 29% in construction (TIDG 2002). The majority of imports of sawn timber are from Sweden and Finland. It is important to note that Irish grown timber has size and strength characteristics that make it unsuitable for certain construction uses, e.g. roof trusses. As a consequence it is estimated that only 694,000

m³ of the Irish construction market is actually “available” to the processors of Irish-grown timber (TIDG 2002: 46).

The market for sawnwood is expected to continue to rise reflecting the anticipated requirement of 55,000 new houses per annum over the next 10 years (Bacon and Associates 2003). This strong demand is expected to be underpinned, in the short to medium term, by GNP growth and low interest rates (AIB Capital Markets and Merrill Lynch 2000).

Irish panel board producers export in the region of 75% of their output, mainly to Britain. The total demand for these products has not grown significantly in the past 10 years. It is however expected that demand for medium density fibreboard and oriented strand board will increase by 10% in the short-term (TIDG 2002).

Table 1. Consumption of main wood products in 2000 in Ireland (includes Northern Ireland) ('000 m³)

Product category	Domestic production	Imports	Exports	Apparent consumption
Sawn market				
Construction	348	818	20	1146
Fencing	151	28	82	97
Pallet	356	41	154	243
Other	33	0	33	0
Sub-total	888	887	289	1486
<i>Wood-based panels</i>	745	284	581	448

The most important non-wood forest products are Christmas trees and foliage. Demand for Christmas trees has grown in Ireland over the past number of years. In 2002 an estimated 400,000 trees were sold in Ireland. Demand for forest foliage has increased in Ireland and in larger flower markets in Britain and Continental Europe. The Irish foliage industry started in 1993 and has grown steadily to cover 150 hectares in 2003.

Forests are the most important recreational facility in Ireland. This is due to the fact that unlike most European countries Ireland has no “right to roam” legislation and no designated recreation rights of way such as those that exist in England and Wales. Recreation is generally limited to Coillte Teoranta (The Irish Forestry Board) owned forests (formerly state forests), as private forests in general are not used for recreation. The demand for the use of forests has increased substantially since state forests were opened to the public in 1970. The most recent estimates indicate that the total number of annual visits to Irish forests is 8.5 million (Clinch 1999). The range of activities being undertaken in these forests has expanded. For example, the demand to use forests for cycling, mountain-biking, horse-riding, camping etc has increased especially in forests near large urban centres.

1.4 Main problems and research questions in consumption for enterprise development

Consumption for forest products in Ireland is largely related to the housing boom and related projects (DIY, house extensions). However, industrial development has driven demand for pallets and packaging and infrastructural development has driven demand

for fencing and acoustic barriers. Current trends in each of these areas suggest that further growth can be expected over the next 10 years. Product demand is not seen as a problem/barrier to enterprise development in the forestry/wood products sector.

The greatest barrier to enterprise development relates to limited supply and consequently the difficulty of achieving scale at a level similar to competing, overseas companies. The lack of scale limits the amount of retained income that can be spent on new product development and marketing. Consequently, Irish companies may struggle to keep pace with overseas companies. A barrier to enterprise development in non-wood services is the low population density in Ireland.

Annex to Part A: Organisations studying forest products consumption and main publications and information sources

No organisation studies forest products' consumption in any great detail. Responsibility for reporting on consumption rests with the Forest Service of the Department of Agriculture and Food. COFORD, the Council for Forest Research and Development, cooperates with the Forest Service in meeting national reporting requirements. There are no current research projects dealing with forest products consumption. However, COFORD is about to undertake a major project looking at the market potential of engineered wood products in Ireland.

2. Small-scale forestry practises

2.1 State of the art and historical development

The total area of private forest in Ireland, i.e. 282,970 hectares, can be considered to be small-scale private forestry. This is because there is no tradition of forest ownership by municipalities, churches, or industry. Thus for the purposes of this section private forestry is considered to be synonymous with small-scale forestry.

At the beginning of the 20th century just over 1% of the land area of Ireland was afforested. The forests which had covered the country 10,000 years previously had been cleared for agriculture, to provide wood for houses, and for shipbuilding. By the early decades of the 18th century, Ireland was a timber-importing country. Irish farmers, who were tenants on land owned in the most case by absentee landlords, were subsisting on small pieces of land. They could not afforest the land because they did not own it but afforestation was not desirable anyway because they needed the land for agriculture. The landlords did however afforest. Those rearing a family on a few hectares of poor land looked enviously at woodlands on the estates of the aristocracy, which were maintained primarily for hunting and sport. With the passing of the Land Acts in the late 19th century ownership of the estates was transferred to the tenant farmers. Landlords cleared most of the forests before the transfer of ownership. The new owners then cleared the trees that remained so as to remove the symbol of landlordism while also maximising the area available for agriculture. Interest in planting trees fell and remained low until the 1980s despite the availability of state afforestation grants after 1930. The limited amount of private planting that was undertaken was by the small number of landlords that remained in the country and who had a tradition of tree planting. The net result was that prior to 1980 the vast majority of landowners in Ireland had no interest or tradition in forestry.

In 1981 the first round of EU funding for afforestation was made available in Ireland as part of the Western Package Scheme of EU-grants (EC Reg. 1820/80). Funding under this scheme provided for up to 85% of the costs of forest establishment. Only farmers living in the western, more disadvantaged parts of the country were eligible to apply for these grants. Despite the availability of the grant, farmers were not only slow to adopt forestry as a farm enterprise but were extremely antagonistic towards it especially in western counties. There were a number of reasons for this attitude. First, there were historical reasons, i.e. the association of forestry with landlordism; second, forestry was perceived to be only suitable for useless land on mountain tops thus it was perceived as an insult to suggest that a farmer's land was only fit for forestry. Third, large non-resident farms in poor country areas which were earmarked for subdivision by the Land Commission were being bought up by developers on behalf of pension funds, banks and insurance companies. As a result farmers saw their last hope of consolidating their fragmented farms disappearing. Emotions exaggerated the extent of this problem. The introduction of 100% establishment grants, and a scheme in 1987 to compensate those afforesting for income foregone, removed a major barrier to afforestation. The latter scheme was replaced by the Forest Premium Scheme in 1990. Under the conditions of this scheme farmers were paid a premium for the first 20 years of the rotation to compensate them for loss of income from land removed from agricultural production. The net result was a substantial increase in private planting rising from a mere 300 hectares in 1982 to a peak of more than 17,000 hectares in 1995 (75% of total afforestation) (see Figure 1). In 2003, private planting

rates fell to 8,969 hectares as a direct result of cutbacks in funding for forestry. It is not clear how the introduction of the Single Payment Scheme in January 2005 will influence afforestation levels. However, the concession for forestry which allows farmers to continue to receive their full single payment as well as the full forestry premium (under certain conditions) should encourage increased afforestation by farmers.

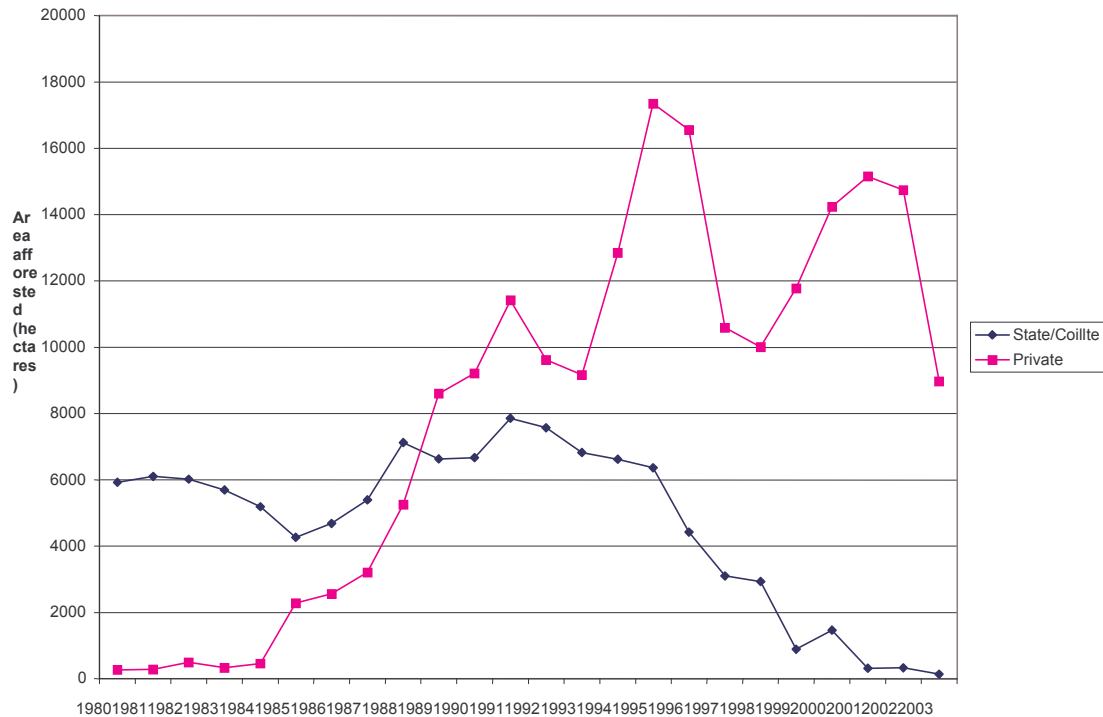


Figure 1. Afforestation rates (State and private) in Ireland 1980-2003.

2.2 Small-scale forest holdings

Small-scale forest holdings are a relatively new phenomenon in Ireland. In 1973, there were only 81,963 hectares of private woodland of which 33,102 hectares were scrub (Purcell 1979). However, since that time, 196,415 hectares have been afforested. It is estimated that there are in the region of 17,000 small-scale forest holdings with an average holding size of 10.6 hectares. However, many holdings are less than 10 hectares (Table 2).

Table 2. Distribution of private holdings established between 1990 and 2002 in Ireland

Area (hectares)	Number of holdings
≤2	2,075
>2 ≤4	3,088
>4 ≤6	2,265
>6 ≤10	3,189
>10 ≤20	3,269
>20 ≤50	1,504
>50 ≤100	209
>100	39
Total	15,638

Most of the owners of small-scale forests are farmers. Approximately, 61% of the forest area planted post 1990 was by full-time farmers; 17% by non-farmers and the remainder by part-time farmers. Among the non-farmers the most common group were professionals or business owners (Wall and Ní Dhubháin 1998). Survey data can be used to indicate the age of those afforesting, with fifty-two percent of owners surveyed by Wall and Ní Dhubháin (*ibid*) aged between 31 and 50 years with only 4% less than 30 years. The vast majority of owners are married (79%) and male.

As mentioned previously, almost all private plantations in Ireland are less than 20 years old. Reflecting the fact that the earlier afforestation grant schemes were only available on lands afforested in 12 western counties, the older private plantation (i.e. greater than 15 years) are found in the west of the country. As a consequence of the age structure of private plantations the volume of wood harvested to date is limited but expected to rise. In the year 2003, of the total timber sales of 3,270,000 m³, only 5%, or 162,000 m³ were sourced from private plantations. As the private forests mature output is expected to increase to over 1 million m³ annually by 2015. Private forests are not open to the public and their use for recreation, hunting and other non-wood activities by persons other than the owners and their families is negligible.

2.3 Small-scale forest practices

The objectives of small-scale forest owners, and the management and work undertaken in their forests, are primarily influenced by the fact that these owners are almost exclusively in receipt of either an afforestation grant or a combination of the grant and an annual premium. The afforestation scheme under which these subsidies are available has timber production as its main objective. Receipt of the subsidies is subject to the forest owner adhering to strict guidelines which reflect this objective. For example, if conifers are to be planted they must be planted at 2 metre square spacing. In the case of broadleaves the spacing is commonly 2 m by 0.75 m. The plantations must be fenced and a management plan produced. Given the overriding emphasis on timber production, it is not surprising that in a survey of over 100 private forest owners 90% gave the production of timber for sale as the main objective for their forest (Ní Dhubháin and Wall 1999). Forty-five percent had planned to use some of the timber output on their farm as fencing or fuelwood. The provision of recreation for the owners and their family was an objective for 42% of owners. Thus despite the emphasis on timber production in the grant schemes, there is evidence of multiple-use management objectives among small-scale forest owners.

Few forest owners undertake the work in and management of their woodland. Instead they employ management companies to do this. The afforestation grant covers all the costs incurred by the person establishing a forest including an overhead to reflect the cost of hiring a company to undertake the work. Almost 80% of small-scale forest owners surveyed in 1996 (*ibid*) utilised the services of a management company while the remainder did their own planning and execution of almost all operations. Many farmers only plant once in their lifetime and with no inherited tradition/experiences, coupled with the fact that there is a 100% grant available for establishment, many of them consider that there is no point learning new skills. Furthermore, they may consider that there would be a greater risk of them not receiving the grant (receipt is subject to successful establishment of the plantation) if they were to undertake the work themselves rather than employ a professional forest management company.

Most land that is afforested is marginal agricultural land and in upland areas conifers are planted while in lowland areas broadleaves are planted. The most common conifers planted include: *Picea sitchensis*, *Larix X eurolepis* and *Pseudotsuga menziesii* while in the case of broadleaves *Fraxinus excelsior*, *Acer pseudoplatanus*, *Quercus* spp. and *Fagus sylvatica* are most commonly planted. As the quality of land planted during the earliest EU-funded afforestation grant scheme was poor, the older of these plantations comprise pure conifers. Research work on a sample of these older plantations suggests that the growth rates will be quite high with an average yield class of 21 m³ha⁻¹an⁻¹ recorded (Redmond et al. 2003). As a consequence rotation lengths of between 40 and 50 years are expected. The thinning of these plantations is expected to start shortly. The limited amount of harvesting that has taken place to date has been undertaken by the sawmills to which the timber was sold.

The key role that the availability of grants and premiums played in attracting landowners into forestry, should not be underestimated. The afforestation grant covers all the cost of establishment and the majority of those planting already own the land so do not incur the additional cost of land purchase. In addition, many of those that afforest do so on marginal land thus the opportunity cost of converting land to forestry is negligible. In any case the annual premium, which is paid for the first 20 years of the rotation, ranges in value from 209 euro to 500 euro per hectare. Given that many Irish farmers earn annual family farm incomes less than 400 euro per hectare the attraction of the premium is clear. The tax-free status of all income from forestry is an additional incentive to afforest. Thus the owners' investments in small-scale forestry would be considered minimal.

Despite the representation of farmers in private forestry, there is very little integration between forestry and farming in individual farms. The forests are fenced for the whole of the rotation. Much of the work undertaken in the forest is done by contractors rather than the owner thus further reducing the level of interaction between the two activities.

A sizeable number of private forest owners are members of forestry co-operatives which evolved from dairy co-operatives. For example, the Western Forestry Co-operative and 20 farm-owner forest-producer co-operatives have now over 2,500 members owning 16,000 hectares of forestry in over 4,000 small plantations. A further co-operative grouping, which stemmed from the Western Forestry Co-

operative, is the Forestry Development Association in the Kilkenny/Waterford/Laois/Offaly region. This association has over 400 members.

Because many landowners plant small areas, to effect economies of scale, better visual layout, accessibility and marketing, the Western Forestry Co-operative tries to get land adjoining an existing plantation afforested to achieve a target minimum size of 20 hectares for a group. While this is developed as one unit each farmer retains full ownership of his/her plantation. It will be co-ordinated by the co-operative for selling as one unit in the interest of efficiency. A small number of the members of the Western Forestry Co-operative are involved in joint forestry developments.

2.4 Policy framework and production conditions

The primary piece of legislation that regulates forestry in Ireland is the 1946 Forestry Act. This legislation contains the provisions for the promotion of forestry, the development of afforestation, and the production and supply of timber. Its provisions also cover the compulsory acquisition of land, the extinguishment of easements, the creation of rights of way and the introduction of restrictions on cutting down and injuring trees. The Act also deals with the licensing of tree felling and reforestation obligations. The Forestry Act 1956 facilitates the acquisition of land for the purposes of the Forestry Act 1946. The Forestry Acts, 1946 and 1956 are currently being reviewed as they were enacted at a time when: the forest estate was smaller; timber shortages following the Second World War required strict control of felling; and the environment, amenity and multi-purpose forestry had not yet emerged as important issues. The National Forest Standard published by the Forest Service outlines criteria and indicators relating to the national implementation of Sustainable Forest Management.

As highlighted earlier almost all afforestation in Ireland is grant-aided. Receipt of this grant-aid is subject to the adherence to strict environmental protection controls. These include a set of eight environmental guidelines relating to interactions between forestry and: water; the landscape; archaeology; biodiversity; and aerial fertilisation. The remaining three guidelines relate to forest harvesting and the environment, forest protection, and forest recreation. The Code of Best Forest Practice describes for each forest operation the best operational practice and potential adverse impacts. Grant-aid is also available to the owners of private forests for woodland improvement, the high pruning of conifers, and the shaping of broadleaves. The building of roads within the forest is also financially supported. Recently incentives to establish woodland with native species only, or to improve existing native woodlands have become available under the Native Woodland Scheme.

Current Government policy is laid down in "Growing for the Future: A Strategic Plan for the Development of the Forestry Sector in Ireland" which was published in 1996. Among the policy aims included in this plan was an afforestation target of 25,000 hectares per annum to the year 2000 and 20,000 per annum in the period 2001-2030. The Minister for Agriculture and Food recently appointed consultants to carry out a review of forest policy in Ireland. The report produced by these consultants has recently been completed (Bacon and Associates 2004).

There is no research institution specifically dedicated to small-scale forestry in Ireland. However, research institutions such as COFORD have funded research into

small-scale forestry. The Dept. of Crop Science, Horticulture and Forestry has undertaken some of this research with COFORD funding. Teagasc (The Irish Agriculture and Food Development Authority) has also been engaged in research into small-scale forestry.

Formal education in forestry in Ireland at degree level (full-time four year degree course) is provided by one University – University College Dublin. Diploma courses in forestry are available at two institutes – the Waterford Institute of Technology and the Galway-Mayo Institute of Technology (three-year full-time courses). The Forest Service and Teagasc organise 20-hour training courses in forest operations. The courses are open to private landowners who are planning to afforest or have recently afforested part of their land. The agencies also organise a large number of field days at demonstration forest sites. Currently, training courses in thinning have been organised. Uptake of these courses is generally poor with over 78% of private forest owners surveyed by Ní Dhubháin and Wall (1999) indicating that they had not attended any of these courses and indeed had no formal education in forestry. Training for those wishing to work as forest workers is provided through the Teagasc College, Ballyhaise in Co. Cavan.

Teagasc employs 12 farm forestry advisors nationally who are responsible for forestry extension. They provide a range of technical services to farmers and organise field days and demonstrations for forest owners in conjunction with the Forest Service.

The national state Forest Service currently employs 25 foresters. However they no longer have a direct role in providing extension services. Instead their role is to promote forestry, to ensure plant health regulations are being observed and to audit existing grant-aided plantations to ensure all that all environmental guidelines and the Code of Best Forest Practice are being adhered to. The Forest Service does however provide extension services indirectly by providing funding to other agencies, e.g. Teagasc, to employ extension foresters and to provide training programmes for private forest owners.

2.5 Supporting and limiting factors for enterprise development in small-scale forestry and barriers to entrepreneurship

Supporting factors

Availability of incentives: The availability of incentives in the form of establishment grants and annual premiums makes it attractive for landowners to afforest land.

Existence of forestry co-operatives and associations: A number of forestry co-operatives and associations have been operating in Ireland for a number of years.

Presence of forest management companies: A number of long-established management companies exist who offer forest owners a service, which includes the establishment and early management of their forests. An increasing number of these companies will now manage the forest for a period up to and including first thinning.

Limiting factors

Size and location of small-scale forests: The majority of small-scale forests are less than 10 hectares and located in inaccessible areas.

Lack of knowledge or experience of forest management: The owners of small-scale forests have no inherited tradition or knowledge of forest management.

Economies of scale: In light of points 1 and 2 above it is difficult to envisage how harvesting can be undertaken economically in small-scale forests. Few forest owners have the experience of harvesting timber and few would have the equipment to undertake this work. The lack of economies of scale would make harvesting within these stands an unattractive option for harvesting contractors especially as most harvesting is mechanised in Ireland.

For a landowner wishing to afforest land there are few barriers to his/her involvement in afforestation. As highlighted above there are indeed a number of factors supporting such a decision. On the other hand, for those wishing to purchase land for afforestation, the high land prices in Ireland are a barrier. For those wishing to develop an enterprise based on the products of small-scale forests there are a number of barriers. The forests are small and access is poor and harvesting the timber products in these forests presents logistical and economic challenges. Also little is known about the quantity or quality of wood and non-wood products in small-scale forests.

One of the key areas of research in the area of small-scale forestry is to identify the most economic means of harvesting in small-scale forests and to identify the appropriate marketing methods for the harvested products.

Annex to Part B: Organisations studying small-scale forestry and main publications and information sources

Organisations studying small-scale forestry in Ireland include:

Teagasc - which provides integrated research, advisory and training services for the agriculture (including forestry) and food sectors. It has also been involved in research on farm forestry.

Western Forestry Co-operative Society Ltd - which is based on the forestry co-operative movement in Denmark. It has a wide range of functions including undertaking research into farm forestry.

Dept. of Crop Science, Horticulture and Forestry. The Forestry Section of this department has been involved in research into small-scale forestry.

The primary publications and information sources on small-scale forestry are:

The Irish Timber Grower's Associations Forestry Yearbook. Published every year, the book includes statistics and information relating to private forestry.

Forest Service, Department of Agriculture and Food.
(<http://www.agriculture.gov.ie/index.jsp?file=forestry/pages/index.xml>).

3. Wood-processing industries

3.1 State of the art and historical development

The historical development of the wood processing industry in Ireland was linked to the availability of the raw material resource. The land area under forests has increased from 1% in the early decades of the last century to almost 10% in recent years. In the first half of the 20th century small privately owned sawmills processed a high percentage of hardwoods. State afforestation programmes undertaken by the Forest Service focused almost exclusively on planting coniferous species. In the second half of the century sawmills predominantly processed softwoods. Other than the Forest Service, which had two small sawmills, the vast majority of mills were privately owned. Currently there is no primary processing undertaken by the State. Privately owned sawmills are rurally based and dispersed around the country.

In parallel with the growth in raw material supply, a small number of privately owned sawmills made substantial capital investments in primary and secondary processing machinery. An Irish privately owned chipboard plant was established in 1959. This was subsequently acquired by Finsa in 1984, the large Spanish owned board manufacturer. Medite (now Weyerhaeuser) established a medium density fibreboard plant in 1983. This was followed by the establishment of an oriented strand board (OSB) plant by Louisiana Pacific and Coillte Teoranta in 1996. Coillte, which had a 35 per cent shareholding, has subsequently acquired outright ownership of the plant. Masonite, a US based company, established a door skin manufacturing plant in 1997.

In parallel with the increase in planting of coniferous softwood species, the Forest Service commissioned the Institute for Industrial Research and Standards (IIRS) in 1964 to undertake research and development on a range of softwood species to ascertain their physical and mechanical properties. This work led to the production of technical data to international norms for the material. In turn, the data were used to develop national standards and were subsequently fed into the development and production of European standards (ENs).

The introduction of National Standards for structural timber grading and certification in 1988 necessitated the development and implementation of grading and quality control systems in the plants. Training and certification courses were developed for the industry covering primary processing and manufacturing. Quality control systems for timber grading, marking and manufacturing operations were developed. The training and certification work was undertaken under the supervisory control of the Timber Quality Bureau of Ireland (TQBI), a representative body of state, semi-state and industry interest groups. Parallel quality control schemes were established for timber roadside fencing and the use of timber in local authority house building programmes. The training and certification work subsequently transferred to the National Standards Authority of Ireland (NSAI) in 2001.

Ireland participates fully at European level in CEN's work on the development of timber standards. A representative Timber Standards Consultative Committee works with NSAI on national and European standard development work. NSAI has also established an advisory board comprised of industry representatives to assist and review the ongoing range of timber training and certification work. The work ranges

across sawmilling, board manufacture, preservation, phytosanitary regulations, timber frame manufacture, roof truss manufacture, timber fencing, joinery, etc.

3.2 Wood-processing industries

There are three primary categories of wood processing in Ireland. They are:

Sawmilling;

Panel board manufacture;

Furniture/Joinery.

Sawmills

There are approximately 70 mills in total. Most are family owned businesses. Five large mills dominate the sector each with single shift annual saw log processing capacity in excess of 200,000 m³. A further four medium sized mills have processing capacity in the region of 100,000 m³. The processing capacity of the remaining mills is significantly smaller. The large and medium sized mills process approximately 90% of saw logs. These mills only process softwood logs. The primary species is *Picea sitchensis*.

Saw logs are categorised into two categories – large and small saw logs. The large saw logs have a top end over bark diameter of 20 + cm. The top end diameter of the small saw log is in the range 14 – 20 cm. Logs of 7 – 14 cm top diameter are categorised as pulpwood and are primarily used in panel board manufacture. The volume of saw logs processed annually is a little over 2 million cubic metres. Log harvesting is undertaken in the main by harvesting contractors. A further 1.3 million cubic metres of pulpwood is generated.

Sawn timber output from the mills in 2003 was in the region of 1.2 million cubic metres. This was processed into four primary categories:

Construction timber;

Pallet timber;

Fencing timber;

Decking, garden shed and garden furniture timber components.

The breakdown of sawn timber output is roughly 40% construction, 33% pallet and 22% fencing, and 5% other. Turnover for the sector was in the region of 270 million euro.

The domestic market is the primary market for Irish sawn timber. Approximately 30% of output is exported to Britain in the form of pallet, fencing, decking, garden shed and furniture components. Residues, in the form of clean chips, sawdust and bark, represent approximately 50% of output from logs. The clean chips are used as a raw material by the medium density fibreboard and hardboard door skin plants. Sawdust is used by the chipboard plant and as a boiler fuel while the bark is primarily used as a bark mulch.

In 2004 two of the large sawmills installed combined heat and power (CHP) plants utilising biomass from sawmill residues in the form of sawdust and bark. The first is fully commissioned utilising heat for drying kilns and the excess energy is being supplied as electricity into the national grid. The second plant which is due to be commissioned in December 2004, will utilise heat for drying kilns and the production

of pellets while the excess energy will be utilised to generate electricity for the national grid.

Over the past 4 to 5 years the large sawmills invested in excess of 100 million euro in primary and secondary processing facilities. Parallel research and development work was undertaken by larger sawmill companies. This was targeted at the automation of primary processes, increased volume throughput, improved added value and overall efficiency within the plants.

Panel Board Mills

The panel board mills are regionally based across the country. The Weyerhaeuser MDF plant with an output capacity of approximately 400,000 m³, utilises clean chips and pulpwood raw materials. The Coillte OSB plant has an output capacity of 350,000 m³ and utilises pulpwood raw material. The Finsa chipboard plant with a capacity of 125,000 m³ utilises pulpwood, sawdust, chips and recycled timber. The Masonite door facings plant has an output capacity of 120,000 m³ and utilises clean chips as its raw material.

A high percentage of the output from the panel board mills is exported to the UK, mainland Europe and beyond. Exports account for 80% to 90% of OSB and MDF production while for door facings they account for in excess of 90%. Approximately 50% of chipboard production is exported.

There are five panel board mills operating within the Island of Ireland. They include an MDF plant, an OSB plant, two chipboard plants and a door facings plant. All are part of a larger group employing in excess of 250 people. They are therefore not classified within the SME category. With the exception of the OSB plant which is part of Coillte Teoranta, the rest of the panel board mills are owned by multinational timber companies. Employment within the sector is approximately 1000 (TIDG 2002). Turnover is in the region of 265 million euro per annum.

Panel board mills are stand-alone operations in Ireland. They are not integrated as mills are elsewhere in Europe. Over 300 million euro was invested in manufacturing facilities in a ten year period (TIDG 2002). The companies undertake research and development work and have established a successful track record of innovative product and process development combined with efficient plant utilisation.

The cost of freight and transport is an issue for Irish board mills relative to their European counterparts with better market proximity. Transport represents approximately 12% of the costs of the Irish board mills (TIDG 2002). Energy costs represent approximately 7% of overall costs. Unlike board mills elsewhere in Europe with biomass-based power plants feeding into the national grids thus significantly reducing the cost of power, Irish panel board mills have not as yet established power plants on their sites.

Furniture Manufacture

There are 409 companies in the furniture sector employing 6,615 people. The output from the sector in 2003 was 570 million euro (at manufacturing prices). Of this, 123 million euro was exported. The market size at retail level was 1.3 billion euro of which 800 million euro was domestic furniture. The balance was contract furniture. Irish manufacturing market share was 30% in domestic furniture and 50% in contract furniture.

The key furniture sub-sectors are as follows:

Living/dining/bedroom;

Kitchen/bathroom;

Bedding;

Upholstery.

Changing market requirements demand high levels of innovation from furniture manufacturers. Larger companies undertake ongoing research and development work on new furniture ranges in response to changing fashion trends and lifestyle needs.

3.3. Wood processing industries practices

In sawmilling there has been a transformation in processing capacity and efficiency over the past 4-5 years. High levels of investment in automated primary and secondary processing have created sawmilling facilities on par with some of the best mills in Europe. The emphasis is on volume throughput, log yield and market value optimisation. As shown earlier, the primary categories of sawn timber produced are construction, pallet, fencing and garden timber components. Sawn timber products compete with imported timber from Scandinavia, the Baltics, Russia, Germany and South America in both the Irish and British markets. Imported timber is generally purchased through Irish or British based timber agents acting on behalf of overseas producers on a small commission basis.

The value added machined timber end of the market used in areas such as flooring, joinery and furniture manufacture is dominated by imported timber. Fast grown *Picea sitchensis* is unsuitable for use in these areas. However, some minor softwood and hardwood species such as *Pseudotsuga menziesii*, *Pinus sylvestris*, *Larix* spp., *Fagus sylvatica*, *Acer pseudoplatanus*, *Quercus* spp, etc are used. The volumes are low and log supply is fragmented. Some of the small sawmills specialise in processing the minor species. Coillte Teoranta, the Irish Forestry Board, coordinates the limited supply of sawn timber from some of the mills. It kiln dries and machine finishes the timber. Employment within the mills is in the range of 2-10 people. These small family-owned mills are spread across the country. In relative terms, the volume output from these mills is very low. The sawn products produced are generally used to service niche speciality market needs within areas such as furniture, joinery, flooring, wood crafts, etc.

Sawmilling capacity currently exceeds sawlog supply. Approximately five per cent of sawlog raw material is imported from Scotland. Coillte Teoranta supplies approximately seventy per cent of sawmiller's needs. The balance is supplied from The Northern Ireland Forest Service and private growers.

High levels of investments were made in large and medium sized sawmills in automated processing and optimisation machinery and equipment over the past five year period. Further investment is now being made with the installation of combined heat and power (CHP) plants in some mills. Research and development on innovative process and product development in both sawmills and board mills is ongoing.

Market prices are dictated by a number of factors. Sawn structural timber is to a large extent dictated by the Scandinavian timber price in the market. Irish timber is generally about three per cent below the Scandinavian price. Pallet and fencing timber prices are driven by competition between Irish, Baltic and Brazilian suppliers and competitive pressures amongst manufacturers. In the board manufacturing sector, prices are determined by supply/demand in British, European and global markets.

3.4 Policy framework and production conditions

In 1996 a strategic plan for the development of the forestry sector in Ireland was published (*Growing for the Future: A Strategic Plan for the Development of the Forestry Sector in Ireland*). It recommended the establishment of a Timber Industry Development Group (TIDG) to report on the downstream side of the industry. The TIDG was established in 2000 with terms of reference to make recommendations for the optimum development of the industry sectors which process and market Irish wood and non-wood forest products, and to identify economic, marketing, technical and infrastructure issues that impact on the ability of the sector to improve competitiveness and to capitalise on opportunities presented by The National Development Plan for forestry.

The TIDG report was published in 2002. The report reviewed the forestry and processing sectors together with markets for Irish timber. It identified challenges and opportunities and made recommendations for the way forward into the future. The optimum utilisation of the available wood resource over the coming decades in a manner that builds an internationally competitive, profitable and sustainable industry was a primary strategic objective. It recommended that scale be built across the industry through a combination of capacity utilisation, consolidation, strategic alliances, joint ventures, acquisitions, international expansion and co-operative initiatives in areas such as R & D, marketing etc. A common R & D policy focussed on competitiveness, market development and customer satisfaction was recommended.

A TIDG steering group was established to direct and oversee the broad research and development work involved in the production of the TIDG report. A working group was also established to undertake the initial research and analysis necessary to facilitate the TIDG steering group in its deliberations. The Steering Group membership included representatives from Government Departments of Enterprise Trade and Employment, and Marine and Natural Resources, Coillte Teoranta, Enterprise Ireland, COFORD, Irish Timber Council, Irish Timber Growers Association, Irish Timber Trade Association, National Furniture Manufacturers Association, SFADCO, Udaras Na Gaeltachta and a panel board manufacturer.

The above Government Departments, state agencies and timber trade representative bodies together with third level universities and colleges are the primary institutions that influence policy and direction in wood processing. National and international

standards, market requirements and conditions are important considerations in formulating sectoral and sub-sectoral policies and strategies.

Development assistance is provided to companies through semi-state development agencies such as Enterprise Ireland, SFADCO, Udaras Na Gaeltachta, Local Enterprise Boards and COFORD. Financial support is provided for research and development, human resource (HR) development, training, management development, mentor programmes, feasibility studies, etc. The National Standards Authority of Ireland (NSAI) implement product certification schemes for structural timber grading, timber preservation, roof truss manufacture, timber frame manufacture, phytosanitary plant health compliance for timber pallets and packaging, etc. The NSAI also provides Irish Agreement certification for products and components that satisfy stringent test and analysis to determine their end use suitability. An NSAI Timber Standards Consultative Committee with representatives from the timber sectors, trade associations, state and semi-state bodies work together on the development of Irish standards and European norms. A similar representative advisory body works with NSAI on the timber training, certification and quality control programmes.

3.5 Supporting and limiting factors for enterprise development in wood processing industries and barriers to entrepreneurship

Some of the primary supporting factors are as follows:

Business Environment: There is a good business environment and there are good business supports within the country.

Integrated Industry: The industry is integrated from log supply to sawmilling, HP, board manufacture, pallet, fencing, etc.

Domestic Market: There is a strong domestic market with record levels of house completions.

Export Markets: Large volumes of sawn timber are exported to Britain. A one-day delivery service is provided on a roll on/roll off basis. Board products are exported to European and world markets.

Capital Expenditure: High levels of capital expenditure have generated processing efficiencies on par with international norms.

Some of the primary barriers to entrepreneurship are as follows:

Capital Intensive: Primary sawmilling, board manufacture and secondary processing are highly capital intensive.

Raw Material Supply/Cost: The volume of raw material is relatively low compared to other European countries. The cost of the material is an issue between processors and suppliers. The volume of sawlogs projected for 2004 is 3.1 million m³ and pulpwood 0.8 million m³ (TIDG 2002).

Sawmilling Capacity: Large investments in primary processing created some over capacity within the sector. This created increased competition for raw material supplies.

Cost Base: The cost of labour, insurance, energy, services, etc. are relatively high.

Environmental Regulations: Compliance with environmental regulations can add significantly to the establishment and on-going costs.

High Penetration of Timber Imports: There is a high level of sawn and machined timber imports into Ireland from suppliers in Scandinavia, the Baltic countries,

Russia, Germany, France, US etc. Importers seek competitive advantage on price, quality and continuity of supply.

Irish Raw Material: The dominant species in Ireland is *Picea sitchensis*. It represents more than 80% of the volume output from Irish forests. It is a good sawlog for the production of structural, pallet and fencing timbers. It is also a good species for use in the production of panel board products. However, due to the characteristics of the timber it is not suitable for machine finishing products such as timber flooring, architrave, skirting, panelling, door framing, joinery, interior furniture, etc. The supply of minor species such as *Larix X eurolepis*, *Pseudotsuga menziesii*, *Pinus sylvestris*, *Quercus* spp., *Fraxinus excelsior*, *Fagus sylvatica* etc is fragmented and not of a scale to support large scale manufacturing operations in the above areas. Supplies of Irish grown minor species are sufficient to satisfy the needs of smaller scale manufacturing enterprises.

Annex C: Organisations studying wood processing industries and main publications and information sources

The primary research institutions undertaking research work for the timber sector include University College Dublin, University College Galway, University of Limerick, Dublin Institute of Technology and Regional Technical Colleges around the country.

Education and training is provided by the colleges listed above. Dedicated education and training is also provided by FAS, The Industrial Training Authority, The Institute of Wood Science through distance learning programmes and by the National Standards Authority of Ireland (NSAI). In-house company training is provided by a range of specialist consultants.

NSAI provides certification and monitoring services across a range of activities including timber grading, roof truss manufacture, timber frame manufacture, roadside and farm fencing and timber in Local Authority housing. It also provides a wood pallet and packaging phytosanitary monitoring scheme to the requirements of the FAO of United Nations (ISPM) No. 15.

4. Non-wood forest products and services

4.1 State of the art and historical development

Since the expansion of forest cover in Ireland from a low of just over 1% of the land area at the beginning of the 20th century to a current 9.7% (2002) of the land area, the emphasis in state forest policy has been on timber production. There has been little emphasis on the development of the non-wood products and services that forests can supply. The private forest estate in Ireland is very young, as highlighted elsewhere in this report, and the primary objective of forest management in private forests is timber production. As a result there is little, if any, non-wood products and services being produced in private forests. At the same time there is no tradition in Ireland of using non-wood products. For example, berry picking and mushroom picking in forests are not routinely carried out by the general public. Similarly, there is no tradition of deer hunting in Ireland. Thus non-wood forest products and services are limited in Ireland to forest recreation, Christmas tree production (see case study 1) and forest foliage (see case study 2).

The common law in Ireland is that one cannot enter onto anyone else's land without consent. If one does it is considered trespass. Thus unlike many other European countries there is no "right to roam". If forest owners opt to allow access to their forests, they could be liable for injuries incurred by visitors to the forest either for recreation purposes or to pick berries etc. Some protection is provided to landowners without insurance under the Occupiers Liability Acts 1995 and 1997.

Statistical information on non-wood products and services in Ireland is very limited. The following however are some useful websites:

Christmas trees:

www.real-irish-christmas-trees.com

www.kildarechristmastrees.com

www.coillte.ie

www.emeraldgroup.ie

Recreation:

www.coillte.ie

www.teagasc.ie

Foliage:

www.coford.ie

Only a small number of organisations are involved in the study of non-wood forest products and services. Teagasc has been involved in research on the foliage industry in Ireland. Some research on recreation has been undertaken by COFORD estimating the value of recreation as well as visitor numbers to forests in Ireland. COFORD has also funded research on Christmas trees. A project, also funded by COFORD, reviewing the markets for non-wood forest products has recently been completed (Collier et al. 2004).

4.2 Case studies of successful marketing strategies

Case study 1: Christmas tree production

The Christmas tree industry has grown dramatically over the past 20 years. The suitability of the Irish climate for growing conifers gave rise to the development of a commercial Christmas tree sector in the 1970s and 1980s. The sector expanded in the 1980s when farmers and other businessmen started to grow Christmas trees for investment purposes. The older Christmas tree farms tend to be located in hilly, mountainous areas where land quality is poor. However, those established since 1990 are located on better quality land. The intention was to produce good quality trees for export on these farms (Bord Glas 2003). In 2002, there were an estimated 600 commercial Christmas tree growers of which five grew Christmas trees on a large scale. Coillte Teoranta is one of the top growers. In total there were 4000 hectares under Christmas trees and the total farmgate value of trees harvested was estimated to be 7.5 million euro (Bord Glas 2003). The most common species grown are *Abies procera* (60% of sales), *Abies nordmannia* and *Pinus contorta* (30% of sales).

The market for the Irish Christmas tree industry can be divided into two categories. The first of these involves trees of moderate quality grown on small-scale sites as a subsidiary enterprise (Ryle 2000). These trees are suitable for the Irish market, which amounts to 400,000 trees annually. The second category involves high quality trees grown on a large scale by about five landowners. These enterprises exported trees worth approximately 4 million euro in 2002 to the UK, Germany, France, Belgium, Netherlands, Switzerland and Italy. However, the Irish market is currently saturated and this has led to a downward pressure on prices. The tendency is for increased demand for high quality trees and it is becoming increasingly difficult to sell low-grade trees.

There is no regulation *per se* in the industry which is one reason why good statistics on the industry are limited. Furthermore, there is no central body responsible for the industry. While the Irish Christmas Tree Grower's Association was founded in 1991, only 80 Christmas tree growers are members.

Christmas tree growing is treated like any other forestry enterprise in Ireland in that the profits accruing from forestry are exempt from income tax. However, unlike afforestation for timber production, no grant-aid (incentives) is available for the production of Christmas trees.

In most Christmas tree farms, the owner and his/her employees are responsible for all the planting, harvesting and marketing of the trees. There is no evidence of joint ventures or networking within the industry (with the exception of the exchange of information that occurs as part of being a member of The Irish Christmas Tree Grower's Association).

Case study 2: Foliage production

The Irish foliage industry commenced in 1993 and has grown steadily to over 150 hectares in 2003. The value of production in 2003 was 3.0 million euro of which 80% was exported. Industry estimates that this figure could rise to 300 hectares by 2006. The main cultivated foliage species include *Eucalyptus*, *Pittosporum* and *Viburnum*. A significant proportion of the foliage exported is wild or woodland foliage. The main woodland species are *Abies procera*, *Pinus* spp. and *Betula* spp. with *Rhododendron* being the main wild species.

There are an estimated three companies involved in forest foliage, all based in the south of the country. The enterprises are owner/family owned and all would be considered SMEs. The largest accounts for over 70% of the total value and employs 50 persons. All foliage is harvested by hand with workers paid on a piece level arrangement.

The area involved in cultivated foliage production is privately owned and there is no general access to the public. Wild and forest foliage is harvested from private and state owned properties. In the case of the latter, one must obtain a licence to harvest and the harvested foliage is certified.

No formal links exist between the various companies but an interagency co-ordination group was formed in 2002, Foliage Ireland. It comprises representatives from Bord Bia, Teagasc, Enterprise Ireland, County Enterprise Boards and industry representatives. This group oversees the orderly and professional development of the industry. Contractual arrangements are in place with harvesting companies and landowners.

4.3 Conclusions: Supporting and limiting factors for enterprise development in non-wood forest products and services production and barriers to entrepreneurship

The supporting and limiting factors for enterprise development in NWFP and the barriers to entrepreneurship vary from product to product. These factors are therefore outlined separately for the three primary NWFP in Ireland, namely recreation, Christmas trees and forest foliage.

Recreation

A recent report (Collier et al. 2004) on the NWFP industry in Ireland identified the following factors as hindering development in the forest recreation sector:

- The lack of data on the current level of participation in and demand for forest-based recreational activities;
- The cost of public liability insurance for forest owners;
- The free access to state forests enjoyed by the general public which limits the development of commercial amenity activities in these and private forests.

The low population density in Ireland is also a limiting factor to enterprise development in forest recreation.

Christmas trees

Many Irish landowners got involved in Christmas tree production in the late 1980s and 1990s on very small areas of land. Maintaining a regular supply of trees from such small farms is difficult but is a vital requirement if markets are to be maintained. Some of these owners did not have the expertise themselves, or available to them, to produce the quality tree that is required for the market. Consequently many of these trees will not be harvested. For those wishing to enter the business of Christmas tree growing technical advice or extension services are not available. The lack of silvicultural skills among Christmas tree farm owners and the limited availability of extension services are the key limiting factors for enterprise development. A further limiting factor is that the main tree species used in Ireland for Christmas trees, *Abies procera*, is site type specific. There are few areas in Ireland with the exception of the Leinster where it is possible to grow high quality *Abies procera*.

Forest foliage

Foliage production and processing is a viable enterprise if carried out on a large scale – a minimum size unit of 10 ha is necessary. There is enormous competition for the commodity product in the market which is impacting seriously on price and subsequently returns. Important factors include access to market and up to date market information. Investment in foliage is made for a market 3 to 5 years away. Therefore market intelligence including future trends is vital. An important factor affecting the competitiveness of foliage production is the need to stay ahead of competition in terms of volume supply as ‘new’ species and in turn ‘new’ floral products are regularly introduced. The market for foliage is very buoyant and responds immediately to the supply of innovative, quality produce grown in a sustainable and environmentally conscious manner. This must be maintained and underpinned by a comprehensive research programme with sensible production and marketing strategies.

The key barrier to entrepreneurship in foliage production is the high capital investment required for cut foliage establishment and the long run-in period before any real income is realised. This can vary from 3 to 5 years depending on species and is particularly the case with cultivated ornamental species. The lack of solid data on management of forests for foliage production is limiting the development of the business. Certification and licensing can also impact.

Research requirements

There is a variety of research questions relating to NWFP that need to be addressed. For example, more information needs to be collected on those who currently use forests for recreation purposes. The market demand for new recreational facilities also needs to be investigated. Research is seen to play a key role in developing the foliage industry. Teagasc and the foliage industry are involved in number of research projects (see www.teagasc.ie). However, those in the industry would acknowledge that further technical research in the areas of foliage production and processing is critical for the future. There are threats from new pests and diseases e.g. *Phytophthora ramorum*, *Psyllid* insect pest on *Pittosporum* to name but two. Environmental pressures are forcing the industry to examine alternative methods of weed control and adopt biological methods of pest control. Collaborative research with countries with a vested interest in foliage production on topics such as the biological control of *Psyllid* on *Pittosporum* is required.

New forest and associated ornamental species need to be identified to satisfy a hungry and competitive market. Already, market research shows a demand exists for foliage from a range of forest species and other non-wood products including mosses, lichens etc but there is limited solid scientific information available on the impact of harvesting foliage from a number of these potentially suitable forest species and products. In respect of mosses, there are environmental concerns on the sustainability of harvesting in the woodlands in the long term. Furthermore, there needs to be a management protocol for foliage production developed for individual species and this can only occur if research is carried out.

Continuous market intelligence is critical to ensure that the development of the foliage industry progresses in an orderly and professional manner. The market for foliage is continuously changing as new products such as bouquets and gifts continue to be developed and this impacts dramatically at the primary level where specifications on products can vary from one season to the next. This change can only be dealt with effectively if there is good research and development taking place.

COFORD has been involved in research on some of the key elements of Christmas tree production (Hendrick 2002). These include a study of noble fir provenances, a study of serious diseases in noble fir, as well as a study of field methods to reduce the severity of current season needle necrosis (CSNN). Further research needs to be undertaken on species/site type interactions; provenance selection in *Abies procera* and nutrition requirements of Christmas trees.

5. Forests and ownership

5.1 State of the art and historical development

Ireland was once covered by forests, which developed after the last Ice Age. However, the clearance of these forests for agriculture and to supply fuel and raw material for industry left just over 1% of the land area under forest at the beginning of the 20th century. In the aftermath of the First World War the strategic importance of having an ample domestic supply of timber was highlighted, emphasising the need for an afforestation programme. However, in an effort to ensure that land fit for agriculture was not afforested, the Department of Agriculture placed a ceiling on the price that could be paid for land for forestry. This policy restricted not only land acquisition rates, and consequently afforestation rates for the following fifty years, it also influenced the type of land afforested. The majority of the forests established by the State between 1920 and 1980 were located in upland areas or in bogland, on land marginal for agriculture.

While state grants were available for private forestry from 1930, planting by the private sector was negligible until EU grant-aid for afforestation was introduced in 1981. The introduction of compensatory payments in 1987 for landowners who afforested and the Forest Premium Scheme in 1990 accelerated private planting rates (Figure 1). In 1989 afforestation by the private sector exceeded state afforestation for the first time and this trend has continued to the present day. Overall afforestation rates peaked in 1995 (Figure 1). The fall in private planting rates since that time has been attributed primarily to agri-environmental subsidies available to farmers under schemes such as the Rural Environment Protection Scheme. These subsidies have encouraged farmers to keep land in agricultural use rather than forestry.

In 1989 Coillte Teoranta, a semi-state company, was established and it took over the ownership and management of state forests. Afforestation by Coillte Teoranta has however been limited especially since 1996. This is due to a decision of the European Commission that Coillte Teoranta is a public entity and as such could not claim the forest premium. As a result much of the afforestation by the company in the past eight years has been in the form of joint ventures with farmers.

The total growing stock in Irish forests is estimated to be 50,859,000 m³ overbark. The average growing stock is low at 74 m³ha⁻¹, as a result of the age-class structure of the forests. Just over 50% of the productive forest estate is less than 25 years of age.

Timber production from Irish forests has reflected the trends in planting rates. As a consequence of the afforestation programmes of the 20th century timber harvesting from state forests has increased from 300,000 m³ in 1970 to over 3 million m³ in 2001. Reflecting the relatively recent emergence of a private forest sector, timber harvesting in private forests is almost non-existent at present, but is expected to rise to over 1 million m³ annually by 2015.

Direct employment in forestry peaked in the 1950s when over 5,000 people were employed in state forests. Despite the high afforestation rates over the past 15 years, employment in forest establishment, management and harvesting has fallen to 3,780 (Phillips 2003) as a result of increases in labour productivity and increased mechanisation of forest operations.

5.2 Forest Resources

Fifty-eight percent of the forest area is owned and managed by Coillte Teoranta. A detailed inventory of these forests is available. The remaining 42% of the forest area is privately owned and the last complete inventory of the private forest estate was undertaken in 1973. The Forest Service is currently developing a national forest inventory using a systematic sampling system based on a 2 km by 2 km grid of the country. It aims to complete the inventory by 2007. Notwithstanding the absence of a detailed national forest inventory, Coillte Teoranta publishes forest statistics and the Forest Service publishes summary national forest statistics on an annual basis. The latest national forest statistics indicate that there is a total of 639,330 hectares under forest with a further 41,000 hectares of other wooded land (Table 3). In the past five years an annual average of 0.32% of total agricultural land has been afforested.

Table 3. National Forest Statistics - Ireland

<i>Overall</i>	1900	1920	1950	1970	1980	1990	2002
Total land under forest and other wooded land	100,000	70,000	132,935	302,665	390,383	481,215	680,330
Predominately Coniferous	3,000	3,200	52,935	216,665	290,383	373,815	528,008
Predominately Broadleaved	65,500	34,300	37,000	39,000	45,000	50,400	82,972
Mixed Forest	1,500	1,500	5,000	7,500	15,000	17,000	28,350
Other Wooded Land	30,000	31,000	38,000	39,500	40,000	40,000	41,000
<i>Public</i>	1900	1920	1950	1970	1980	1990	2002
Total land under forest and other wooded land	300	2,100	53,565	213,979	294,983	346,446	397,360
Predominately Coniferous	0	300	41,265	198,479	274,983	324,646	370,907
Predominately Broadleaved	300	1,800	4,300	6,000	6,500	7,000	9,053
Mixed Forest	0	0	2,500	4,000	8,000	9,000	10,800
Other Wooded Land	0	0	5,500	5,500	5,500	5,800	6,600
<i>Private</i>	1900	1920	1950	1970	1980	1990	2002
Total land under forest and other wooded land	99,700	67,900	79,370	85,500	95,400	134,769	282,970
Predominately Coniferous	3,000	2,900	11,670	15,000	15,400	49,169	157,100
Predominately Broadleaved	65,200	32,500	32,700	33,000	38,500	43,400	73,920
Mixed Forest	1,500	1,500	2,500	3,500	7,000	8,000	17,550
Other Wooded Land	30,000	31,000	32,500	34,000	34,200	34,200	34,400

Forests where broadleaves are the dominant species account for 12% of the total forest area. However, broadleaf forests comprise only 2.2% of Coillte Teoranta's estate, while the percentage of broadleaves within private forests is much higher (i.e. 26%). The low representation of broadleaves within Coillte Teoranta's estate is partly explained by the relatively poor quality land that the company inherited, which was not suitable for the production of quality hardwood. On the other hand, the better quality land afforested by the private sector in recent years and the availability of higher annual subsidies for broadleaf planting help explain the higher rate of broadleaf planting by this sector. The Government broadleaf planting target has been set at 30% of total annual afforestation by the end of 2006. The Forest Service is currently examining the actions necessary to reach this target.

The dominant species in Irish forests is *Picea sitchensis* accounting for 66% of Coillte Teoranta's estate. The species also dominates in the private sector although the exact proportion will not be known until the national forest inventory is completed although it continues to account for almost 60% of afforestation. The dominance of this species can be attributed to the relatively poor land that was available for afforestation. *Picea sitchensis* was, and continues to be, particularly suited to the moist Irish climate and thrived on the wet mineral soils, achieving average growth rates of $16 \text{ m}^3\text{ha}^{-1}\text{an}^{-1}$. The average yield class of *Picea sitchensis* has increased to $18 \text{ m}^3\text{ha}^{-1}\text{an}^{-1}$ in recent years. This rate of growth, which is the highest in Europe, does have implications for wood quality and results in trees with a high proportion of juvenile wood. This limits the ultimate applications for the timber. However, *Picea sitchensis* is an extremely versatile timber and is suited for a wide variety of end-uses such as structural timber, fencing, and pallet wood. As a consequence of the fast growth rates the typical rotation for *Picea sitchensis* is 44 years. Almost all forests in Ireland can be classed as high forests and the majority is managed for timber production using the clear cutting system.

Resource based factors supporting or limiting enterprise development in the forest sector in Ireland

Supporting factors

Increase in the forest estate: Current government plans are that the area under forest should rise from a current 9.7% of the land area to 17% by the year 2030. While it is unlikely that this target will be reached, the area under forest will certainly increase substantially.

Increase in the supply of roundwood: As Coillte Teoranta's estate matures, harvesting levels will increase. Similarly, output from private forests is expected to rise. Recent forecasts indicate that timber production will increase to almost 5 million m^3 by the year 2015, assuming that harvesting is undertaken in private forests.

Limiting factors

Species distribution: Species distributions in both the public and private forest estates are dominated by *Picea sitchensis*. This imbalance is not expected to change in the short-term although there has been, and will continue to be, an increase in broadleaf planting and a slight decline in the planting of *Picea sitchensis*. However, for the foreseeable future, the output from Irish forests will comprise primarily *Picea sitchensis*. This over-reliance on one species, particularly one where the end-use options are not as broad as other species, and where opportunities for adding value are limited, is a concern. It also makes the development of enterprises using species other than *Picea sitchensis* difficult due to the limited and irregular supply. The species distribution and the type of silvicultural management also restrict the potential non-wood forest products that can be produced in Irish woodlands.

Lack of national forest inventory: The current lack of a national forest inventory is another barrier to enterprise development. However, with the anticipated publication of such an inventory in 2007, this barrier will be removed although only national statistics will be produced.

3. Wood quality in private forests: Private forest owners have effectively been responsible for all broadleaf planting in recent years. However, these owners have no knowledge or experience of forest management. In most instances they have contracted management companies to undertake the establishment of their forests. The management of broadleaf species requires much more intensive management than that of conifers especially if wood of high quality is to be produced. There are very strong concerns about the quality of management in these woodlands and about the resulting wood quality.

5.3 Forest ownership

The 282,970 hectares of private forest can be classified as non-industrial private forests or small-scale forests. The majority of the area (95,400 hectares) planted prior to 1980 is in the hands of large estate owners who had a tradition of tree planting. Post 1980 (and post the availability of EU grant-aid), the private forests planted (i.e. 187,570 hectares) are most commonly owned by farmers. The average size of private holding is estimated to be 10.61 hectares (based on available data from 1990 to 2002). Coillte Teoranta's estate is currently divided into 36 management units giving an average management unit size of 10,732 hectares.

There is no tradition in Ireland of forest ownership by municipalities, churches, industry etc. Forest ownership is therefore limited to the State (i.e. Coillte Teoranta) and private landowners. A very small area of state forest (2,820 hectares) is managed by the Department of Environment, Heritage and Local Government. Most of this forest is in National Parks and harvesting is restricted in these areas.

There is no tradition of collecting non-wood forest products in Ireland. Thus, while Coillte Teoranta-owned forests are open to the public, the use of the forests by the general public is limited to recreation and licensed deer hunting. "Everyman's right" does not apply in Ireland and thus the general public do not have access to private forests. Ownership based factors supporting or limiting enterprise development in the forest sector in Ireland

Limiting factors

Lack of organisational structures in private forestry: The private forest estate is owned by an estimated 17,000 private forest owners. While some of these are members of co-operatives or associations, the vast majority are not. This lack of organisational structure in private forestry makes it difficult for a potential entrepreneur to source suppliers of roundwood.

Monopoly in supply of roundwood: As a consequence of the skewed age-class structure of private forests, the major supplier of roundwood is, and will continue to be for some time, Coillte Teoranta. Thus entrepreneurs who would require roundwood would be restricted in their ability to negotiate price levels.

5.4 Main problems and research questions in forest resources and ownership for enterprise development in the forest sector

Irish grown *Picea sitchensis* timber has size and strength characteristics that make it unsuitable for certain construction uses. At the same time, the species dominates the Irish forest estate. Research and development into other applications, such as engineered products, could increase the scope of the market that is available to Irish sawn timber.

Many private forest owners have planted broadleaves. Research needs to be undertaken into the silviculture of broadleaves. The results of this research should be made available to private forest owners.

The development of an appropriate organisational structure for private forest owners is imperative. The various organisational structures that exist in other countries need to be investigated and their suitability for use in Ireland assessed.

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