

General paper

An overview of twentieth century Irish forestry and forest products literature

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Summary

The development of Coillte's bibliography of twentieth century Irish forestry and forest products literature is briefly outlined. An overview of Irish forestry literature, briefly describing its development during the time covered by the bibliography, is provided. A survey of the literature recorded notes the volume of work produced on each of the major subject areas, and compares the extent to which a number of topics are covered in this literature. The report concludes with a brief account of recent developments in the area of electronic publishing and forestry related literature.

Introduction

In March 1997, Coillte completed a bibliography of Irish forestry and forest products literature covering the period 1900-96. The bibliography was published in the form of a bibliographic database on CD-ROM under the title FIR CD. Material selected for inclusion in the database was obtained from journals, technical reports, theses, conference proceedings and number of other sources, published and unpublished, contained in various libraries and research centres throughout Ireland (Table 1). The variety of sources used enabled the compilers of the bibliography to assess a large amount of previously uncatalogued material, and to include much valuable unpublished work, so-called 'grey literature', and information contained in less well-known publications. There are approximately 1,500 records on the database, each containing an abstract, publishing details on the item referred to, the location of the document and, where possible, the address of the principal author. The database also has a key word index, containing several descriptors for each record.

Table 1. *List of locations of material selected for inclusion in the bibliography.*

Coillte library	Forestry Section, UCD
Forbairt library	Royal Dublin Society library
UCD library	Trinity College library
Forest Products Dept., Enterprise Ireland	RIA library
Dept. of Agriculture library, Dublin	Teagasc library
Forest Service, Dublin	Teagasc Research Centre, Kinsealy
N. Ireland Forest Service	Dept. of Botany, UCD
COFORD	Dept. of Botany, Trinity
ESB library	School of Pharmacy, Trinity College
ESB Information Centre	Dept. of Zoology, UCD
Dept. of Agriculture for N. Ireland library	School of the Built Environment, University of Ulster
Dept. of Agricultural and Food Engineering, UCD	Dept. of Environmental Resource Management, UCD
University of Limerick library	National Botanic Gardens library
College of Technology library, Bolton Street	

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Methodology

This survey examined the records in the bibliography in order to determine the extent to which various subjects have been covered in forestry related literature. The data for the survey were obtained by recording the frequency with which each of the subject areas examined are used as key words or key terms in the index of the database. The first part of the survey compares the following main subject areas covered by the literature: afforestation; silviculture; environment; forestry history; timber processing; forest policy; and forest protection. A comparison is also made of the volume of literature of each of these subject areas produced during four separate time periods, and this is represented by Figure 1. The second part of the survey uses the data to compare the amount of work produced on topics associated with the following general subject areas: (i) forest management and research; (ii) business and forestry; (iii) environment and ecology; (iv) timber processing; and (v) tree species. Finally, the output of a number of research institutes are compared.

Irish forestry literature

The earliest item recorded in the bibliography is a note in the journal of the Department of Agriculture and Technical Instruction for Ireland (March, 1902) on the appointment, by the Board of Agriculture, of a Departmental Committee to enquire into the state of woodlands and the prospects for forestry in Great Britain. The final report of the Committee, published in 1908, makes a number of recommendations regarding the preservation of existing woodlands and the correct approach to the establishment of a state forestry industry. The perilous state of Irish woodlands following the passing of the Land Purchase Acts, and the consequences of postponing the preparation of a coherent forest policy, are vividly described in a number of journal articles, pamphlets and books during the intervening period. Articles on woodland history and the economic benefits of afforestation were regularly published in the journals of the Royal Irish Academy, the Royal Dublin Society and the Statistical and Social Inquiry Society of Ireland during the first decade of the century. The early stages of the reforestation programme undertaken by the Department of Agriculture and Technical Instruction, beginning with the state's acquisition of the Avondale Estate in 1903, are described in articles in the Department's journal, along with advice and instructions on various aspects of silviculture and forest management. The progress of the programme, and the various administrative and legislative changes associated with it, can be traced in the pages of this journal, in the regular General Reports produced by the Department of Agriculture and Technical Instruction up to 1928, and also in the journal of the Department of Agriculture and Lands from 1923.

Several of these articles were contributed by Augustine Henry, Professor of Forestry in the Royal College of Science for Ireland from 1913 and co-author of *Trees of Great Britain and Ireland* (7 vols.), the first two volumes of which appeared in 1906. A consistent theme in Henry's writings was that a successful afforestation programme in Ireland would be heavily dependent on the planting of species from areas of the world with a mild and damp climate similar to that of Ireland. A.C. Forbes, who played a central role in the establishment of state forestry in Ireland, was another prolific author whose work on a range of silvicultural, economic and historical themes appeared regularly in the journals of the relevant Government Departments and scientific and agricultural societies. He was also one of the contributors to the first journal of the newly-formed Society of Irish Foresters. The first volume of *Irish Forestry* appeared in November 1943, giving Irish researchers, administrators and academics the opportunity to publish work in a journal

specifically devoted to the subject of forestry in Ireland. The hundreds of papers that have been published in *Irish Forestry* provide a comprehensive record of the growth and development of forestry, forest policy and forestry thought in Ireland over the past 55 years.

During its first 10 years, *Irish Forestry* carried extensive commentary on a number of important official statements on forestry policy during this period. The most significant of these documents were the Report of the Minister for Lands covering the period 1938-42, the 1946 Forestry Act, and the Report of the FAO Forestry Mission to Ireland which appeared in February 1951. This period of policy development resulted in the establishment of a stable and achievable annual planting target and the initiation of an integrated forest research programme. The results of much of the work undertaken as part of this programme are described in a series of internal reports produced by, successively, the Forestry Division of the Department of Lands, the Forest and Wildlife Service, and Coillte. The frequency with which these reports were published increased significantly with the establishment of the Forest and Wildlife Service in 1969. The number of post-graduate dissertations in forestry also increased significantly in the same period. The number of theses completed in the period 1970-73 far exceeded the number for the years preceding 1970, and more than 30 doctoral theses are recorded as having been completed since 1973. There has also been a steady increase in recent years in the amount of post-graduate research in other disciplines, such as economics, rural development and statistics, which deals with forestry related subjects.

With the establishment of a coherent forest policy and the consistent attainment of planting targets by the end of the 1950s, more attention began to be paid to issues related to timber processing and the replacement of imported timber by home-grown softwood. In 1966, a major study of the utilisation of Irish grown wood for pulp, paper and composite wood products was published by the Industrial Development Authority. Most of the research on forest products has been produced by staff at the Forest Products Department of the Institute for Industrial Research and Standards, and its successors, EOLAS, Forbairt and Enterprise Ireland. The Forest Products Department has also developed strong links with wood science faculties in a number of third level colleges, and an increasing amount of published work and postgraduate theses are being produced as a result of this collaboration.

The first significant official statement of forest policy in Northern Ireland, following the assumption of responsibility for forestry development by the Northern Ireland Ministry of Agriculture in April 1922, was the *Report on Afforestation in Northern Ireland*, undertaken by the Commission on the Natural and Industrial Resources of Northern Ireland and published in 1923. Following extensive afforestation during the period 1946-69, confined mainly to blanket bog and poor marginal hill land, a white paper was published setting out the future objectives of forest policy. Responsibility for the implementation of this policy has remained with the Department of Agriculture for Northern Ireland, and Northern Ireland Forest Service reports are published by the Department.

Survey of literature

A survey of the contents of the bibliography reveals the extent to which certain themes dominate forestry research and analytical comment on the Irish forestry industry. The large number of reports and publications which deal with silviculture, forest management and timber processing reflects the prolific output of research material from the state bodies responsible for research in forestry and wood science. The rapid development of

forestry in Ireland since the 1950s has had a significant impact on the Irish landscape and rural economy, and this is reflected in the volume of literature produced on political, social and economic consequences of the state's forestry programme. There are over 150 items which cover issues related to land use, in particular, the transfer of land from agricultural use to forestry and the afforestation of marginal lands. A similar number examine various issues associated with afforestation, including the social and economic effects of this process.

Table 2. *Comparison of major subject areas in the bibliography.*

<i>Subject</i>	<i>No. of records</i>	<i>% of total records</i>
Afforestation	149	10.0
Silviculture	291	19.6
Environment	149	10.0
Forestry history	90	6.0
Timber processing	294	19.8
Forest policy	214	14.4
Forest protection	150	10.1

Unlike the other major subject areas, work on forest policy appears regularly in each period covered by the bibliography. By contrast, there was very little work carried out on environmental issues before 1970, but it has been one of the most significant subject areas in the period since then. Similarly, although timber processing is the most frequently cited key term in the database, the volume of research in this area before 1970 was not significant. The promotion of home-grown timber has resulted in a significant increase in the

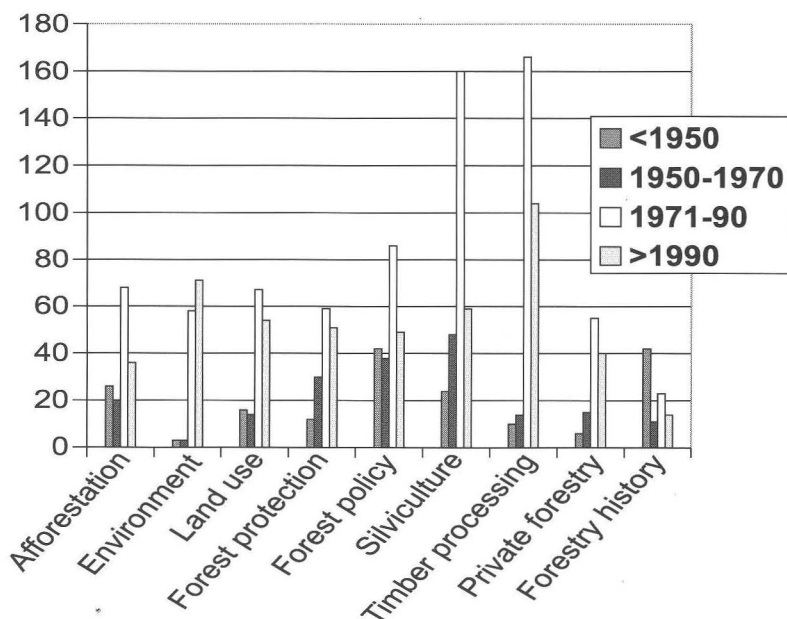


Figure 1. *Number of records referring to topics over certain time periods.*

amount of research on forest products and a corresponding increase in published material and limited circulation reports dealing with this area. While most of this increase is a result of the research carried out by the Forest Products Department of Enterprise Ireland, a considerable amount of work has been carried out by the wood technology and engineering departments of a number of third level institutions, either independently or in collaboration with Enterprise Ireland. Unlike the other major subject areas, a very high proportion of items in the bibliography which examine the history of forestry were completed in the first half of the period covered. Much of this work can be attributed to a small number of individuals, such as A.C. Forbes, who published a great deal of research findings and commentary during the early days of Ireland's afforestation programme.

Comparison of key words

Forest management and research

There is a fairly even distribution in the literature on the various practical aspects of afforestation and forest management. The volume of material concerned with matters related to the pre-establishment phases of forestry, such as site preparation and nursery work, is however, somewhat lower than that which looks at planting, establishment and maintenance. The production of articles and reports on harvesting has been fairly evenly spread throughout the period of the bibliography, but the work in this category which examines the development and performance of forest machinery has been carried out in the last 4 years. Although the earliest item recorded which examines the subject of genetics and breeding was written by Augustine Henry in 1914, most of the work on this subject has been completed since 1980. Since that time, it has become as significant a research area, in terms of the number of articles or reports published on the topic, as harvesting, cultivation, establishment or nurseries. A comparison of the frequency with which certain key words appear in this section shows how significant the issue of peatland forestry has been in Irish forestry literature. The extent to which the afforestation programme has been dependent on poor peat and gley soils is apparent from the volume which is concerned with the establishment and maintenance of forests on this land. More than 40% of the records which cite fertilisation as a key word refer to work dealing with low nutrient peat and gley soils.

Table 3. *Frequency of items related to forest management and research.*

<i>Subject</i>	<i>No. of records</i>	<i>% of total records</i>
Cultivation	40	2.7
Establishment	60	4.0
Fertilisation	80	5.4
Tree growth	68	4.6
Harvesting	77	5.2
Forest nurseries	48	3.2
Genetics/breeding	33	2.2
Peatlands	90	6.1

Business and forestry

In view of the importance of the subject of land use in Irish forestry, it is perhaps surprising that not a great deal of work has been carried out on the specific issue of land acquisition. Out of a total of 54 items dealing with the subject, almost 40 are annual reports produced by

the various state agencies responsible for forestry development. A recurrent theme in the research that has been completed on land acquisition is the pressure being placed on agricultural land in recent years due to changes in EU policy on price supports, and the attitude of farmers to the resultant increase in the afforestation of agricultural land. While the amount of research and commentary on the acquisition by the state of agricultural land for forestry purposes is limited, there is a significant amount of literature on farm forestry, i.e. the use of land owned by individual farmers for forestry purposes. Much of the work carried out in this area examines the question of incentives for farmers to become involved in forestry. More than half the items on farm forestry also cover the issue of grants and subsidies.

Table 4. *Frequency of items related to business and forestry.*

<i>Subject</i>	<i>No. of records</i>	<i>% of total records</i>
Investment	37	2.5
Land acquisition	54	3.6
Marketing	47	3.2
Grants	74	5.0
Private forestry	116	7.8
Farm forestry	60	4.0

Environment and ecology

Of all the topics covered in the bibliography, work on native or natural woodlands is the most evenly distributed throughout the period reviewed. Also, descriptions of existing or extinct woodlands are found in a great variety of sources, including archaeological, historical, ecological and natural history journals. Literature on forest ecosystems and ecology is contained in a similar range of sources, but nearly 80% of the work in this area has been completed since 1980. Almost all reports, articles and papers which examine pollution have been published since 1987, and nearly half of these relate to work carried out as part of EU sponsored research programmes such as the European Community Scheme for the Protection of the Community's Forests against Atmospheric Pollution. It is interesting to note that approximately one quarter of the records which have pollution as a descriptor in their key word fields refer to investigations on the pollutant effects of afforestation, with the main concern being the acidification of waterways. Afforestation has been described as the single most important agent of rural landscape change in Ireland in recent times, and much of the literature which examines environmental aspects of forestry, as well as economic and rural development issues, pays particular attention to this change. As public perception of the effects of forestry play an increasingly important part in the industry's decision-making process, landscape, and the related issue of urban forestry, will become an important area of research in the future.

Table 5. *Frequency of items related to environment and ecology.*

<i>Subject</i>	<i>No. of records</i>	<i>% of total records</i>
Forest ecosystems/ecology	45	3.0
Native/natural woodlands	38	2.6
Pollution	30	2.0
Landscape	37	2.5
Forest amenities	39	2.5

Timber processing

While issues associated with the processing and utilisation of home-grown timber have been covered in papers and official reports throughout the period reviewed, it was not until the late 1960s that a comprehensive forest products research programme was established. During the period 1966-70, the Forest Products Department of the Institute for Industrial Research and Standards published a series of reports on the timber properties of different species grown in Ireland. A report on the Irish home-grown softwood sawmilling industry in 1976 assessed the potential of this sector to compete with imported timber, and identified the need to develop a system of standards for timber quality. The establishment of new standards for Irish conditions, and the identification of the type of practice needed to attain these standards in the areas of drying, grading and preservation, were central to the research programme of the Forest Products Department in the following years. In recent years, a significant contribution to forest products research has been made by the School of the Built Environment at the University of Ulster. Staff at the department, and at the PROBE research group attached to it, are responsible for 14 of the articles, reports and conference papers recorded in the bibliography.

Table 6. *Frequency of items related to timber processing.*

<i>Subject</i>	<i>No. of records</i>	<i>% of total records</i>
Timber quality	49	3.3
Timber preservation	42	2.8
Timber drying	34	2.3
Timber grading	56	3.8
Sawmilling	47	3.2

Tree species

The importance of Sitka spruce to the Irish forest industry is immediately obvious from the frequency with which it occurs as a key term in studies on silviculture, botany and forest protection. It has also been by far the most important species in research on forest products. For example, more than one third of the literature produced by Enterprise Ireland's Forest Products Department recorded in the bibliography deals with issues arising specifically from the processing of Sitka spruce timber. Due to its high growth potential on poor soils and its usefulness as both a pioneer and nursing species, lodgepole pine has been widely planted in Ireland since the 1950s. As a result of the increasing availability of mature lodgepole pine during the 1980s, and the difficulties involved in processing a timber of lesser quality than that provided by other species, the amount of research into its potential end uses increased significantly. The amount of literature which deals specifically with the processing of other species, such as Norway spruce and Douglas fir, is considerably lower. There are over 100 separate items dealing with broadleaves in general or individual broadleaf species. A high proportion of these are botanical or ecological studies of woodlands, or assessments of the benefits from species diversification in Irish forests. While the amount of literature investigating the utilisation, marketing or processing of hardwood timber is quite small, research into the use of both broadleaf and conifer species as biomass for energy production has increased significantly in recent years.

Table 7. *Frequency of items on various tree species.*

<i>Subject</i>	<i>No. of records</i>	<i>% of total records</i>
Sitka spruce	245	16.5
Lodgepole pine	82	5.5
Norway spruce	33	2.2
Larch	33	2.2
Scots pine	31	2.1
Douglas fir	21	1.4
Ash	21	1.4

Research institutions

Not surprisingly, the institutions which have produced the largest amount of forestry related material have been those associated with the state forest sector, Coillte and the former Forest and Wildlife Service. Approximately 230 items recorded in the bibliography have been completed by one of these organisations or by members of their staff, just over 100 of which are reports by the Research Branch. Apart from annual reports and summaries of research work, the remainder, approximately 90 items, comprises articles, conference papers and contributions to published collections, including IUFRO reports and books on broad topics such as the environment or economic development. The staff of the Forest Products Department of Enterprise Ireland, and its predecessors Forbairt, EOLAS and the Institute for Industrial Research and Standards, account for 152 records, the majority of which are either internal reports or material produced by the Department under contract with the Forest Service or other organisations. Approximately 35% of the total have been included in publications, some of which are collections published by the Forest Products Department. The bulk of this organisation's output has been completed since 1979, with only 15 items recorded before that year. Literature produced by Coillte/Forest and Wildlife Service staff is more evenly distributed over the time period under review, with approximately 80% of the total dated 1979 or later.

The research work carried out by Coillte/Forest and Wildlife Service finds practical application in support of the organisation's primary task of tree production. Therefore, as most of the literature produced is intended for internal use, only a small proportion of research findings are published. University departments emphasise the importance of publishing research findings and it is therefore not surprising that a far higher proportion of their research results are presented in journals and other publications. For example, 85% of the literature attributed in the bibliography to the Forestry Section of the Department of Crop Science, Horticulture and Forestry, UCD, has been published. The corresponding figure for the Department of Environmental Resource Management is approximately 85%.

Electronic publishing and forestry research

Recent technological advances have enabled publishers to vastly increase the volume of information available in electronic format. An important part of this development is the use of the CD-ROM to carry information and the retrieval tools required to make it easily accessible. While the range of subject areas covered by published CD-ROMs is steadily increasing, there is a great deal of information contained in unpublished reports and less well-known publications which are unlikely to be documented by commercial publishers. Research institutions and similar information producing organisations therefore have an

Table 8. *Material produced by the main research institutions.*

<i>Research institutions</i>	<i>No. of records</i>	<i>% of total records</i>
An Foras Taluntais/Teagasc	51	3.4
Coillte/Forest and Wildlife Service	206	13.9
(Internal reports)	(121)	
(External publications)	(85)	
Enterprise Ireland	152	10.0
(Internal reports)	(116)	
(External publications)	(36)	
Forest Service	20	1.4
N. Ireland Forest Service	44	3.0
Dept. of Environmental		
Resource Management, UCD	36	2.4
Forestry Section, UCD	48	3.2

opportunity to become involved in the creation of innovative information products. The involvement of Coillte's research section and library in the compilation of a bibliographic database of Irish forestry and forest products literature is an example of this development in the field of forestry and timber technology. Other recent examples include the establishment of a comprehensive database of American wood products research by the Mississippi Forest Products Laboratory, and the compilation of a series of bibliographic databases by the University of Minnesota Forestry Library. These new products complement the information on forestry available on CD-ROMs compiled by commercial publishers such as the Commonwealth Agricultural Bureau and the National Agricultural Library (USA), and provide a valuable additional information resource in this field.

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