A REVIEW OF

Henry Phillips'

'Economic Analysis of Broadleaf Afforestation'

Irish Forestry Certification Initiative, October 2005

&

'Future Species Scenarios and Impacts on Coillte Teoranta'

The Irish Farmer's Association National Farm Forestry Conference, November 2005

'Much of the land going under forestry is not suitable for hardwoods. Perversely, good agricultural land is necessary to grow hardwoods properly. Much of the land we have will not grow hardwoods. As Mr. McCarthy said, our objective is to get to 10% broadleaves because that is as much land as we have that is suitable for growing hardwoods. Hardwoods are not commercial, do not produce a return and require good agricultural land. If hardwoods are to be planted they should not be regarded as a commercial proposition.'

Michael Lowery, Chief Executive Officer, Coillte Teo.
Oireachtas Joint Committee On Agriculture And Food, 23 June, 2004.

Caroline Lewis
Friends of the Irish Environment
February 2006

Acknowledgements

The author would like to acknowledge the support of The Irish Natural Forestry Foundation [INFF] and the Forest Network Newsletter [FNN] in which part of this Review originally appeared.

The full text of the Henry Phillips' work is available in the library of the Friends of the Irish Environment at http://www.friendsoftheirishenvironment.net/main/download.php?op=getit&lid=22

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INTRODUCTION

Until November of 2005, those opposed to Irish national forestry policy had never been given access to the calculations that underpinned the basic tenet that conifers are economically profitable and broadleaf/native species are not.

While Ireland's ENGOs supported the Heritage Council's call for a 50% broadleaf planting in 1999, as the author of the Report under review wrote in his Executive Summary, 'This type of scenario has never been subject to any form of economic or indeed technical evaluation.'

The debate is critical because Coillte Teo., the State Forestry Board that operates as a limited company in the marketplace, has as its principle object 'to carry on the business of forestry and related activities on a commercial basis'. In the late 1980s the state's forestry assets were transferred to a quasi-private company, two Ministers holding the only 'golden' shares. Coillte Teo. was formed of 440,000 hectares, approximately 330,000 of which are considered the 'forest estate'.

The commercial basis of the conifer forestry policy, set in 1996 and designed to capitalise on the generous afforestation grants established by the European Commission in 1993, required only 10% broadleaves on sites 'which could support them', *ie.* on sites which could produce an economic return from these broadleaves. Externalities are not factored into those calculations or into the work under review.

The Plan set a target of 25,000 hectares in the first four years and 20,000 hectares of conifers a year thereafter until 2035 – a land use change that would have seen agro-forestry plantations covering 17% of the country. While targets have consistently been missed – see the chart at the end of this review - the Plan has never been subject to the five year review originally envisaged, although it has been considered by Peter Bacon, the economist, first for the Irish Farmer's Association and then, in an expanded form, as a Report to the Minister in 2004. This Report did not consider the impact of a change of species as the economic value of broadleaves was given at nil. The current Coillte Teo. rate of broadleaf planting is 8% on reafforestation sites, and their CEO told an Oireachtas Committee that 'If hardwoods are planted they should not be regarded as a commercial proposition.'

Species selection is only one element of sustainable forestry, but the agreement on exclusion of all broadleaves as non-commercial has been central to the continued support for a forestry policy on which the Heritage Council's '*Review of Ireland's CAP Rural Development Plan 2000-2006*' commented:

> "Ironically for a measure emanating from an 'integrated' plan, the forestry measure would seem to be the greatest real threat to Ireland's farmland biodiversity and represents the greatest challenge facing the development of a sustainable rural development policy in Ireland."

In July of 2005 after repeated requests Coillte Teo. agreed to provide the Irish Forestry Certification Initiative Steering Committee with an economic justification for their policy. What was requested was a detailed breakdown of the costs and benefits of a range of scenarios with various percentages of broadleaves. The environmental chamber of the Steering Committee anticipated a clear concise document that looked at various species scenarios in a realistic and objective manner.

However the work presented and reviewed here is unclear, inconsistent and full of anomalies, including a flawed economic concept. It is both biased and opinionated. Insufficient details are given and where they are given they do not stand up to careful scrutiny. While Mr. Phillips characterised his document as 'a basis for discussion and debate', the findings and figures were presented with Ted Horgan at the Irish Farmer's Association Annual Farm Forestry Conference in November 2005. Farmer's decisions about species choice being taken now are based on Mr. Phillips' work.

So many concerns were raised by the emerging results of this review that advice was sought from two senior forestry professionals from outside of Ireland. Their comments, attached as an Appendix, were deeply disturbing.

Not only did the reviewers castigate the author for sloppiness and bias, but they suggested that the author 'appears to be neither independent nor expert in the subject under discussion.'

It is vitally important that the economic arguments that inflate the value of conifers and misrepresent the value of broadleaves demonstrated in Mr. Philips work be addressed.

I. Economics & Discounted Cash Flow Analysis

The methodology used in Mr Phillips' economic analysis is inappropriate for a number of reasons including:

- The spreadsheet model used gives incorrect results;
- The economic analysis is unrealistic due to the use of questionable rotation lengths, yield class and species selection;
- The use of a 5% discount rate is normally considered inappropriate for forestry due to its long term/ permanent nature;
- Underlying variables can lead to reduced reliability of projections over a longer time period than 20 years.
- It appears that the data used in the economic analysis were 'based on discussions with Mr A Pfeifer, Coillte Teo.' rather than a comprehensive independent objective analysis.

Mr. Phillips based the economic analysis on the principles of discounted cash flow (DCF). This method enables a comparison to be made between a range of different scenarios. It determines the present sum when the future one and the rate of interest are known and is termed discounting. This method allows for the time value of money.

The discount rate is the equivalent of the annual rate of interest at which the present value would have to grow to attain the required value of the known future sum. It is a rate used in current value calculations to convert your company's future cash flows into current cash values based upon the preferred percent Return on Investment (ROI).

The present value (PV) is what you have to invest now to have a defined sum in the future at a certain % annual return or interest.

5% DISCOUNT RATE

The discount rate is the equivalent of the annual rate of interest at which the present value would have to grow to attaint the required value of the known future sum. This method allows for the time value of money.

The discount rate used in this Report is one used for long term investment projects - in this case industrial plantation forestry. The author informs us that discount rates used in forestry evaluation in the E.U are from 0 – 3.5 %. In the UK 3.0% is used and in Austria 0 – 1.2 %.
The choice of 5% as the hurdle discount rate is referenced only to the author's own 1999 study 'Approaches to forestry investment in Ireland'.

A Hurdle Rate is a rate based on a preferred Return on Investment (ROI) that is determined by the investor to compensate for the risks related to the particular investment.

As Coillte Teo. regard forestry as having a primarily economic remit the discount rate used is one used for long term investment projects. Mr Phillips tells us discount rates used in forestry evaluation in the E.U are from 0 – 3.5 %. In the UK 3.0% is used and in Austria 0 – 1.2 %. The choice of 5% as the hurdle discount rate must therefore be challenged.

However, discount rate aside when the DCF method used by Mr Phillips is scrutinised it would appear that his method is fundamentally flawed.

DCF looks at the overall cash flow inwards and/or outwards in each year and multiplies this by the appropriate discount factor that takes account of the year in which the flow occurs and the rate of return required. Discount factors are obtained by calculating the present value of €1 in each year for a given rate of return:

Discount factor = 1/(1 + X/100)^t

Where x is substituted with the discount rate and t is the length of rotation in years

The present value (PV) is derived by multiplying the future value or values (FV) by the appropriate discount factor.

In forestry you pay out money (costs) for establishment, maintenance and, insurance etc. Forestry will also have revenue (income) for sale of timber, grants & premiums, non-wood services & products hunting licenses etc.

The DCF looks at the cash flow for each year and multiplies the flow by the appropriate discount rate.

In relation to the DCF Mr Philips presents us with the following headings:

- rotation length
- discounted cost
- discounted revenue
- net present value (NPV)

Under these headings the total discounted cost, discounted revenue and the resulting NPV are given.

A project is viable at the discount rate used (the discount rate is given as 5%) if the NPV is greater than 0 as this means that the return reaches the rate required i.e. 5%. Note that DCF looks at costs(expenditure) and revenue (income).

Even if the revenue (income) were only €1.00 the discounted revenue would be positive. At the very least it can be 0. **There can not be a negative discounted revenue in economics**. Expenditure belongs with the costs and revenue can only be income.

Mr. Phillips has given negative discounted revenues in all 6 of the tables on which he basis his conclusions. There is no reference to a new method of discounted cash flow analysis and this begs the question how has Mr. Phillips derived these negative discounted revenues?

If we look at the information given in Table 6 of his report we can see that using Coillte Teo.'s data Mr. Phillips has given ash YC 8 rotation 65 years a negative discounted revenue of -€2069. Does this means that at the end of the 60 year rotation he gives for this species, the grower would be required to pay to have the timber carted away? But how can this be if revenue is income and this is a cost? Any such cost should be discounted as a cost.

Other species are also given negative discounted revenues as follows:

- **Beech; 120 year rotation; negative discounted revenue of -€69**
- **Beech; 140 year rotation; negative discounted revenue of -€56**
- **Birch; 65 year rotation; negative discounted revenue of -€244**
- **Oak; 120 year rotation; negative discounted revenue of -€30**
- **Oak; 140 year rotation; negative discounted revenue of -€57**

Negative discounted revenues appear in Tables 6, 7, 8, 9 and 10.

For example in Table 6 of the report for Ash YC 8 the following values are presented:

- **discounted cost = €3053**
- **discounted revenue = - €2069**
- **NPV = - €2069.**

The net present value (NPV) is the discounted revenue minus the discounted costs which for this example is:

-€2069 - €3053 = - €5122

From this simple calculation it is evident that the NPV for ash of **-€2069** given in Mr. Phillips' report is incorrect. This could be a typographical error - but if these results are derived from running a spreadsheet model then it is difficult to see how such a mistake can be made ***unless results automatically generated by the spreadsheet model were altered manually.***

That would, of course, raise questions about the integrity of the data contained in these tables.

There also appears to be an anomaly with internal rate of return (IRR). The IRR is the rate of return in which the present value (PV) of the costs is equal to the PV of the benefits:

It is used as a n alternative to least cost and benefit/cost analysis when ranking a range of alternative proposals.

As both the discounted costs and discounted revenues must be positive it follows that the internal rate of return must also be positive. Mr Phillips' Report gives a negative internal rate of return (IRR) for birch of -.0.27% in Tables 7, 8, and 9. How can these be when, even in Mr. Phillips' analysis, birch has a positive discounted revenue and a positive discounted cost?

It is not only the representation of the DCF method of investment appraisal that is incorrect. The inputs to the model used, such as YC, rotation length and price, are neither independent nor consistent.

In order to more accurately evaluate Mr Phillips' analysis a DCF model was run using an Excel spreadsheet. A range of scenarios were used and figures from the Irish Timber Growers Association Year book were used for Sitka Spruce. It was assumed these costs would be incurred by any plantation. A rotation length of 40 years was assumed and a discount rate of 5% used. The following results were derived:

- **Sitka Spruce at YC 18: NPV = €262**
- **Sitka Spruce at YC 10:NPV = - €1073 (the maximum achieved on approximately 40 000 ha. of Coillte Teo.'s 'productive' estate)**
- **Birch including establishment costs at YC 6: NPV = €1060**
- **Birch natural regeneration at YC 6: NPV = €1895**

II. PROPORTION OF COILLTE TEO. ESTATE THAT WILL SUPPORT BROADLEAVES

Mr Phillips states that the proportion of the 390,000 hectares ceded to Coillte Teo. in 1988 that will support broadleaves is not known. This basic information is not made available as it is 'outside the remit of the report' and Coillte Teo. does not provide this basic information.

The Report states that

'An analysis of Coillte Teo.'s estate by soil type and elevation class (Figures 1 and 2) show that a significant proportion of future reforestation sites are unlikely to support broadleaves. An estimate of the % area that will support broadleaves is outside the remit of this report. However prior to any change in the current species requirement it would be prudent to undertake such an analysis, indeed it is worrying that such analysis has not been undertaken by the proponents of increased species diversity and broadleaf planting'.

It is not the remit of the 'proponents of increased species diversity and broadleaf planting' to undertake such an analysis. This must be the responsibility of the forestry company or land owner– in this case Coillte Teo. In other European countries the analysis of the soils type to ensure that the right tree is planted in the right place is taken seriously and carried out thoroughly as a matter of course.

In the absence of the percentage of the area on Coillte Teo.'s estate that will support broadleaves it is difficult to give scientific credence to the author's assertions about the unsuitability or otherwise of any part of Coillte Teo.'s estate to support broadleaves. The only figures made available to date show simply the percentage breakdown of the various soil types and elevations within Coillte Teo. holdings. They do not even indicate which soil types are at which elevations. It is even unclear if this is a breakdown of the productive estate or the entire estate.

If this statement – 'a significant proportion of Coillte Teo.'s estate is unlikely to support broadleaves'- is taken as referring to commercial broadleaves [>YC 4 for oak], then it is difficult not to conclude that *ipso facto* the remainder of the estate – less this 'significant proportion' - is in fact able to support commercial broadleaves.

Neither does the simplistic 'significant proportion' argument take into account the move onto better land through the ongoing farm partnership sites which are, in general, capable of growing a commercial broadleaf crop but are typically planted with >65% Sitka spruce and only 10% broadleaves. The latter are not considered to have any future commercial value and are left unmanaged.

In fact, it is evident from available information that a 'significant proportion' of the Coillte Teo. estate is unable to support a 'commercial crop' of conifers [>YC14 for SS], let alone broadleaves. The yield class for Sitka spruce on the most unsuitable sites fall as low as YC 4. [COFORD 2003].

III. ROTATION LENGTH, YIELD CLASS & WOOD SUPPLY

Key to any economic assessment of the cost or benefit of increasing the broadleaf component of the forest estate is the yield of not just broadleaves, but of the existing conifers.

An average of yield class 18 is used for Sitka spruce on the Coillte Teo. estate in the calculations in this Report. This is a significant increase from the estimated average yield class of 16 given in 1999 in 'Sitka Spruce in Ireland' [COFORD 1999]. The 'Report to the Minister on the Corporate Development of Coillte Teo. Teo.' [Merrill Lynch 2000] gives 16.7; even the more recent 'A Guide to Forest Tree Species Selection and Silviculture in Ireland' [COFORD 2003] gives only an average yield class of 17.

The opposite approach was taken for broadleaves and the yield class for all broadleaved species are below averages cited elsewhere.

Further, standard intermediate thinning was chosen as the basic silvicultural regime for both conifers and broadleaves. This is not normal practice for broadleaves which usually have a longer thinning cycle with increased thinning volume. The failure to include this difference in the analysis skews it in favour of conifers. In fact broadleaves' longer thinning cycle and increase in thinning volume will bring a corresponding increase in income.

Mr. Phillips states:

'An MS Excel model was used to predict future wood supply scenarios. The model was calibrated against Coillte Teo.'s current long term forecast and run for a 200 year period assuming that the estate was clearfelled over a forty year period. In simplistic terms the impact can be assessed by comparing the average volume production per hectare in the baseline with that of the 50% broadleaf scenario. Under the baseline the average volume production per hectare over the 200 year period is 9.26 m^3. This is equivalent to an average annual production of 3.28 million m^3. Under the 50% broadleaf scenario, Mr. Phillips writes that the average production falls to 5.7 m^3 per hectare per annum. This is equivalent to 2.02 million m^3 per annum over the 200 year period. Thus there is an overall reduction of 3.56 m^3 per hectare per annum which is equivalent to a drop in timber production of 1.26 million m^3 per annum.'

What does this say? The definition of yield class is the average growth in m^3 per hectare per annum. We are told that for the base line scenario this is just over 9 m^3. We are also told that within Coillte Teo.'s estate Sitka Spruce averages YC 18.

The overall productive estate is given as 354,451 hectares. Annual reforestation is 8,620 hectares over a 40 year rotation. (The authors model operated on a 40 year rotation even though in Mr. Philips DCF analysis for Sitka Spruce the rotation is given as 42 years – the shortest rotation length of all species).

On this principle using the baseline scenario of 9.26 m^3 per hectare and we assume per year Mr. Phillips has multiplied 9.26 m^3 by the productive area of 354,451 hectares. This gives the average annual production as 3,282,216 m^3 (3.28 million m^3).

However there appears to be an anomaly. On page 8 of the report Mr. Philips gives us details in relation to species groups. Here we are told that Sitka Spruce YC 18 was chosen

as being representative of the primary species category which makes up 65% of the reforestation obligations. Other conifers with yield classes from between 8 to 10 were chosen as representative of diverse species (Table 4, Breakdown of Species) and these make up the 20% of the reforested area. Broadleaves are given YC of between 4 and 10 and consist of 10% of the reforested area.

In order to analyse Mr. Phillips' report a simple model was developed using Excel and a range of species and yield class scenarios were evaluated.

The initial alternative scenario was derived by calculating 65% of the forest estate. We are told Sitka Spruce has an average yield class of 18. **Even when the remaining forest estate is given a yield class of zero the average production is almost 900 000 cubic metres more than Mr. Phillips' baseline figure. This brings into question the yield class Mr Phillips has used for Sitka Spruce and the average yield class must be significantly less than 18.**

When a more realistic average of YC 8 for broadleaves and YC14 for conifers is used there is NO reduction. In fact there is **an increase of over 616,000 m3 per year in timber production over Mr. Phillips' baseline scenario**.

Species breakdown scenarios	Average YC (m3 ha-1 yr -1)	Average Production (m3 yr)	Difference from baseline production (m3)
Phillips Report Scenarios			
Baseline	9.26	3,282,216	0
50% Broadleaves	5.7	2,020,371	-1,261,845
Alternative scenarios			
SS YC 18@ 65% Others YC 0	11.7	4,147,077	864,861
SS YC 18 @ 65% Others YC2	12.4	4,395,192	1,112,976
SS YC 18@ 65% Others YC4	13.1	4,643,308	1,361,092
SS YC 18@ 65% Others YC6	13.8	4,891,424	1,609,208
SS YC 18@ 65% Others YC8	14.5	5,139,540	1,857,323
50% conifers YC 12 50% broadleaves YC6	9	3,190,059	-92,157
50% conifers YC 8 & 50% broadleaves YC 4	6	2,126,706	-1,155,510
50% conifers YC 14 & 50% broadleaves YC 8	11	3,898,961	616,745

This either completely negates Mr. Phillip's estimations of reductions in productivity, or challenges the accuracy of the average YC given, particularly for Sitka spruce.

This suggests invalid results in the author's economic assessment. It also negates Mr. Phillips' statement that with a change to 50% broadleaves 'What is more dramatic is the rapidity of the fall in production which initially drops to below 1.5 million m3 per annum or less than half of current volume production figures'

The rotation lengths Mr Phillips has used appear to differ significantly from other published sources. If we compare the rotation lengths given in Table 5 of the report to those recommended in COFORD publications it is evident that there are quite astonishing discrepancies. These re presented below for ease of reference/comparison. By using the longest rotation lengths (or in some cases rotations longer than the recommended time frame) the economical appraisal will be heavily biased in favour of conifers.

Species	Rotation Lengths (Phillips report)	Rotation Lengths (COFORD)	Yield Class (Phillips report)	Yield Class (COFORD)	Notes
BROADLEAVES					
Alder	65	30 - 50	6 - 8	6 - 16	Current demand for top quality logs greatly exceeding supply [COFORD].
Ash	60 - 65	60 - 80	6 - 8	6 - 16	There is a constant demand for good quality ash, which usually exceeds supply thus maintaining a strong price for growers [COFORD 2003]. £350 m^3 for hurley ash [COFORD 2003].
Beech	120 - 140	100 - 120	4 - 6	4 - 8	
Birch	65	35 - 60	6	4 - 8	
Wild Cherry	65	50 - 80	Not given	5 - 10	Wild cherry is the most valuable timber species in Europe for the manufacture of high class furniture, with the demand for top quality cherry timber greatly exceeding supply.[COFORD 2003] Good quality stems fetch in excess of €400/m^3.
Spanish Chestnut	65	50 - 70	Not given	4 - 12	Valuable timber
Oak	120 - 140	120 - 175	4 - 6	2 - 9	Highest value timber - 20% by volume of best oak stands can be high quality veneer – usually sessile
Sycamore	65	50 - 90	6	4 - 12	Can be left to 120 years or more with no deterioration in timber quality. Wavy grain fetched £1,700 /m^3 in Denmark in 1996
CONIFERS					
Douglas Fir	45	50 - 65	16	4 - 24	
European Larch	46 - 52	50 - 60	8 - 10	4 - 12	
Lodgepole pine N Coastal	Not specified	55 to 75	Not specified	4 - 14	
Lodgepole pine S Coastal	Not specified	45 to 70	Not specified	4 - 18	
Scots Pine	54 - 56	60 - 90	10 - 12	4 - 14	
Norway Spruce	49	60 - 80	16	4 - 22 (Average 16)	
Sitka Spruce	42	45 - 70	18	4 - 30 (Average 17)	

COFORD Yield Class Values from *A Guide to Forest Tree Species Selection and Silviculture in Ireland* © COFORD 2003
Growing Broadleaves. Padraig M. Joyce © COFORD 1998

IV. QUALITY ISSUES IN SITKA SPRUCE

The reliance on Sitka spruce was established in the 1996 Strategic Plan because 'a growth rate of over 3 times the EU average has been recorded for Sitka spruce.'

What was not addressed in that Plan was that this rapid biological growth rate of Sitka results in a timber that is of particularly low grades when compared to the main competitors such as Eastern Europe, Sweden and Canada.

Irish timber suppliers now refuse almost without exception to provide or even quote prices for Irish grown Sitka spruce on grounds of its poor quality (also expressed as a 'high proportion of juvenile wood') including Coillte Teo.'s own sawmill in Dundrum, Co. Tipperary.

In fact recent reports to the industry from the Timber Industry Development Group (TIDG) and from economist Peter Bacon confirm Clinch's conclusion that the entire international softwood market is oversubscribed, particularly in the low value commodity end of the market. As early as 2000 the processors had no demand for a supply of pallet and fencing grade sawlog.

According to the TIDG 2004 report to Mary Harney, TD, then Minister for Industry, Trade, and Employment, this situation continued into 2001 and this supply continues to go unprocessed. Liam McElligott, Chairman of the Group, called the realities facing the industry 'harsh', citing 'strong international competition' against 'entrenched international competitors'.

Bacon notes that the price of pine in particular has declined in the last 10 years by up to 30%. The resultant fall in the price of pine has eroded the economic advantage of spruce as the two are now close in price while pine species are preferred to Sitka spruce as they are suitable for high value uses.

Coillte Teo. itself, in its 2004 Annual Report, stated that not only had it experienced a drop of 5% in the margin on timber sales, but that 'a decision by a number of customers to source some of their log requirements abroad reduced the demand for Coillte Teo. material.' Given the overall strength of the Irish construction market and the apparent monopoly of Coillte Teo., falling sales can only be explained by market forces. In fact, the Irish sawmill market grew by 60% 1994 – 2000 while indigenous timber sales fell from 55% to 42% [Merill Lynch] in a trend unchecked to date.

It is not timber that is driving Coillte Teo.'s business now, but its land sales, subsidiaries, consultancies, and partnerships.

V. WIND-THROW

The site with predominantly SS YC 16 suffered average overall weighted losses of £1649 per hectare. On sites with a higher YC 20 average overall weighted losses were in the order of £3668 per hectare.

Mr. Phillips' analysis does not address the cost of wind-throw on the economic viability of conifer plantations. Spruce plantations offer little resistance to wind because of the simple structure of the forest stand. Mixed species plantations with more storeys, rich in species, with diverse ages and horizontal structure all increase wind resistance.

A recent case study ['Financial impact evaluation of catastrophic storm damage in Irish forestry: a case study'; Maarten Neiuwenhuis, Edmund O Connor, Institute of Chartered Foresters , 2001] clearly shows the significant losses that are suffered. One conclusion states that 'Wind-thrown material has on average stumpage values 10.5 per cent less than those obtained for normal or premature felled timber'.

In this case study wind-throw losses were looked at in two sites.

The site with predominantly SS YC 16 suffered average overall weighted losses of £1649 per hectare. On sites with a higher YC 20 average overall weighted losses were in the order of £3668 per hectare.

Where wind throw occurs well before the target rotation lengths the total wind-throw loss can exceed the average annual stumpage value. Following the storm in 1997 in the Southern region 29% of the total volume of timber harvested in 1998 was from wind-thrown plantation resulting in a loss of almost £460000.

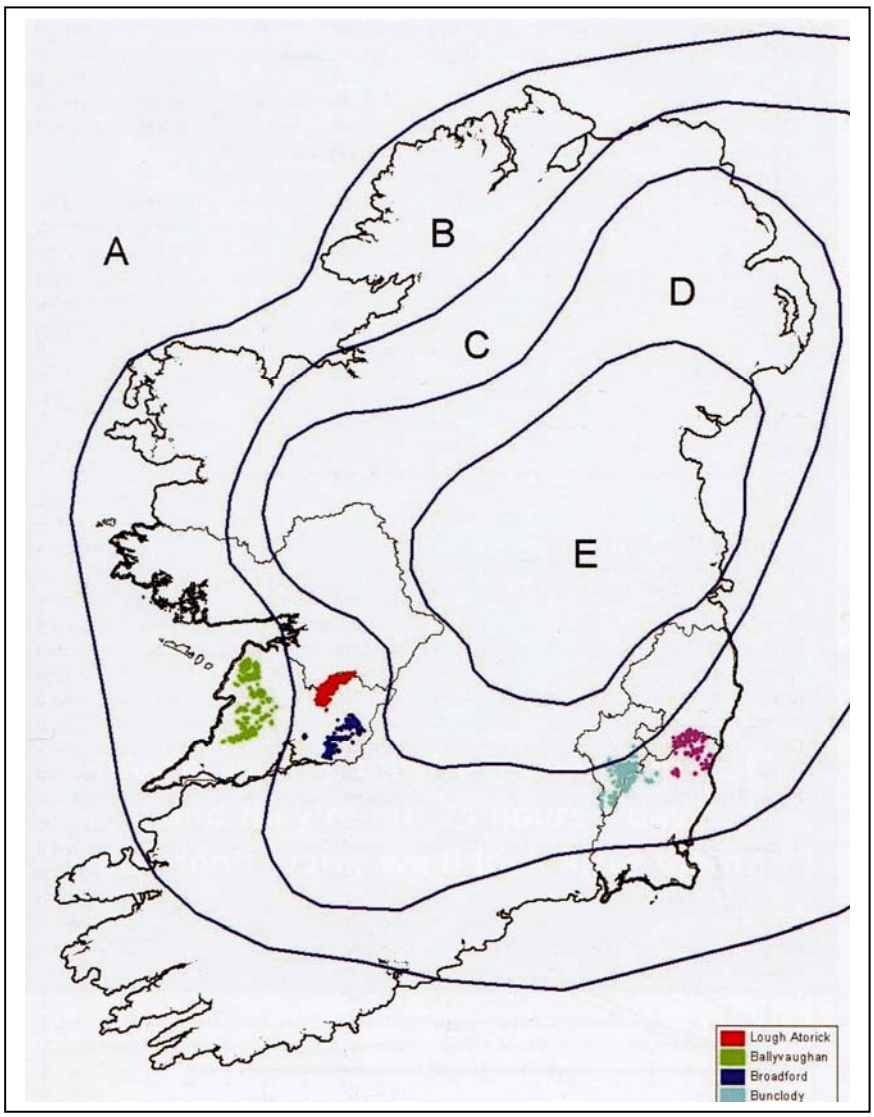
This case study recommends the use of broadleaves to increase crop stability. This recommendation is supported in COFORD's own 'A Guide to Forest tree Species Selection and Silviculture in Ireland', again entirely ignored in policy considerations. To quote: 'There is much observational evidence that some coniferous species are more stable when grown in a mixture with deep rooting broadleaf species such as oak'.

In fact, the predominant podsol soils in Ireland are quite poor, having been man made by deforestation and grazing. The decomposition and levels of organic material are reduced in softwood forests compared to hardwood forests. Broadleaves help to improve and deepen soils. Therefore in Central Europe conifer forests on this soil type are often being converted to broadleaves. Further, erosion can be high on such soils, suggesting plantation forestry requiring clearfell is ecologically inappropriate.

Yet despite this information being readily available and researched monocultures of conifers are still being grant aided in vulnerable areas and Coillte Teo. continues to afforest and reforest with 90% conifers, even in areas defined as high risk for wind throw.

It must also be noted that storms are expected to increase in frequency and severity in the future due to the influence of climate change on weather patterns.

This map shows the five wind zones of Ireland. The strongest winds are in zone A, the weakest in zone E. Zones B and C are heavily forested. Sitka spruce is a shallow rooting conifer, and the windthrow threat discourages thinning and shortens rotation length. Both the quality and the quantity are adversely affected. The sites marked were part of a COFORD study which included this map. From 'The Initial Development of a windthrow risk model for Sitka spruce in Ireland', published in the *Irish Timber Growers Association Forestry Yearbook 2002*.



VI. ESTABLISHMENT / REFORESTATION COSTS

In the Report we are told that

> 'Coillte Teo. maintains a work track recording system which provides cost information on all forest operations, including reforestation, under a series of pre-defined Operation Codes. While the system distinguishes between broadleaf and conifer establishment costs, it does not provide the costs on a species basis as required in this analysis. For this reason and also to provide more objective cost information, the Forest Service catalogue of operation costs was used to determine establishment costs by species and / or species group.'

In fact, reforestation costs are available from Coillte Teo. Further, there is ample evidence of vigorous natural regeneration from species such as ash, sycamore and birch. No mention is made of natural regeneration which readily occurs in natural forest ecosystems and is free. A Millennium Forest assessment for Birch clearly shows how successful natural regeneration can be even under difficult circumstances. And yet despite this the author writes:

> 'Based on an average of the low and high values in the Forest Service Catalogue of operation costs, a number of species specific establishment cost models were determined. These were in all instances less than the maximum allowable costs under the current afforestation grant scheme.'

The Report goes on to assure us that:

> 'of all the potential impacts, establishment costs are the easiest to estimate and amount to €542.29 per ha'. This equates to an annual cost of €4,674,469 based on an average reforestation programme of 8620 ha. The present value of this future stream of costs is **€93.5 million**.'

It goes on to assure the reader that the loss to Coillte Teo. to even achieve 10% broadleaves would therefore be €43.2 million, comprised of €13.3 million in establishment costs and €29.9 million in profitability.

Current forest practices are such that during forest operations natural regeneration is cut out, whatever the species, allowing only the planted crop to become fully established. This would not be the case if the forests were being managed sustainably.

VII. SOFTWOOD AND HARDWOOD PRICES

Neither the inflated softwood prices used for coniferous timber and the deflated value placed on hardwoods stand up to scrutiny.

The reasons for the excessive stumpage prices paid for coniferous timber in Ireland are summarised perfectly in Peter Clinches work 'Economics of Irish Forestry'. The reason not to use Irish prices in an economic evaluation are particularly well described in Chapter 5 which concludes with the following summary:

> 'There has been no secular tendency for real timber prices to increase over time in Ireland and the UK. Improvements and increased acceptance by the public of non-wood substitutes and reconstituted wood products are likely to limit the potential for increases in timber prices. The predominant species in Ireland is Sitka Spruce. It has been predicted that there are unlikely to be real increases in global prices for the products made from this type of tree. Competition from British producers will intensify in the UK market while global prices of high quality hardwood sawlogs are forecast to rise, most Irish standing timber is coniferous. With this evidence it would seem unwise to predict a rise in the real price of Irish standing coniferous timber in the long term and it is a distinct possibility that there may be downward pressure of prices.
> The potential does exist for Coillte Teo. to act as a monopoly supplier and thereby inflate prices. However the evidence is unclear as to whether Coillte Teo. exploits this potential. Given that price distortion may occur, price series provided by Coillte Teo. are not reliable as indicators as the social value of Irish timber.'

Yet the primary and diverse conifer prices used in Mr. Phillips' review were based on the average prices achieved by Coillte Teo. for both harvested and standing sales over the time period 1990 - 2004.

Conversely, Mr Phillip's report uses an unrealistically low price for hardwoods. The hardwood timber prices were obtained from restoring old woodland sites – not even from a properly managed stand comparable to conifers. To quote:

> 'Due to the relatively small volumes of broadleaved timber sold annually in Ireland and to the wide variation in both quality and species, there is as yet no wholly reliable database from which to develop PSCs for Irish broadleaves. To overcome this contact was made with the Woodland Trust, UK who supplied the hardwood price size data used in the analysis of restoring plantations on ancient woodland sites (Pryor and Jackson 2000).'

Surely in the absence of a reliable database from which to develop price size curves the price the timber is achieving in the marketplace would be a good indicator of the value of hardwoods?

The two set of figures cannot be compared. How can you compare broadleaved timber prices from the restoration of plantations on ancient unmanaged woodland sites with a conifer plantation grown with a solely commercial remit? No information is even given as to the composition or condition of the old woodland sites.

Why is a negative or zero value given to small hardwood thinning and yet any sized conifer has a positive value? In fact many conifer plantations, if they are thinned at all, are thinned to waste particularly if they are not within an economically viable distance from a manufactured board plant. This will become even more critical as fuel price rises work their way into the statistics - and continue to increase.

Additionally figures are not reflective of prices in the international market place. There are consistent complaints about the inflated prices Irish sawmills are being asked to pay for timber from Coillte Teo. In 1995 the Irish Timber Council showed that timber prices charged by Coillte Teo. were £9 million higher than UK prices for the same product in 1995. The UK figures given below clearly show that the average price paid for Sitka spruce in Ireland is almost four times that paid for coniferous timber in the UK.

UK average prices 1/10/2003 - 30/09/2004. from UK sales contracts for standing coniferous timber.

Average volume per tree in m3	Average price £/m^3	Average price €/m^3
up to 0.074	2.08	3.04
0.075-0.124	3.29	4.80
0.125-0.174	3.71	5.41
0.175-0.224	5.04	7.36
0.225-0.274	5.95	8.68
0.275-0.424	5.58	8.14
0.425-0.499	6.82	9.95
0.500-0.599	7.23	10.55
0.600-0.699	8.27	12.07
0.700-0.799	10.02	14.62
0.800-0.899	9.77	14.26
0.900-0.999	11.72	17.10
1.000 and over	14.14	20.64
Average	**6.18**	**9.02**

[Source: UK Forestry Commission]

Due to the scarcity of information in relation to hardwood prices it is worth looking at the price of coniferous construction/joinery grade timber and hardwood timber in the market place. The average prices are given in the two tables below.

Softwoods prices - construction grade		
	€/m3	comments
West Cork Sawmill	227.50	don't stock Irish grown - too weak
Tipperary sawmill	221.20	Irish grown Sitka Spruce

Hardwood prices	€/m3
Oak	1266.54
Beech	1168.55
Ash	1022.99
Alder	1037.82
Birch*	1200.20
sycamore	974.28
Average	1111.73

'Pippy' oak, an effect produced through epicormic branching, sells for €1825.42 m3 – 30% more than unblemished wood. This flies in the face of the general claim that epicormic branching reduces the value of the timber

Additionally there is a significant and increasing demand for native-grown hardwood timber. Unlike the coniferous and manufactured timber product side of the market, demand outstrips supply.

The situation is likely to remain so in both the national and international timber market. It is the high quality sector that commands and demands the better price, an opportunity which is denied to Irish growers who are guided by Mr. Phillips' Report.

VIII. CASE STUDY – BIRCH

Mr. Phillips has told us that under the 50% broadleaf scenario birch will form a significant part of Coillte Teo.'s broadleaf estate preferred choice consisting of almost 10 % of the reforestation.

Mr. Phillips gives Birch a Yield Class of 6 and a 65 year rotation. Taking a discount rate of 5% the discounted costs are 3,053 and discounted revenues of 11 resulting in a Net present value of -3,042.

The timber is valued as less than half of that paid for firewood at €8 m3. This low price gives a net cash balance of - €621 and an annual cost of €10.

If we take this at face value this analysis begs two questions –

1. If birch will result in such a financial burden then why is it proposed to plant so much of it?

2. Why is the value of birch so much less than that paid for firewood? If we look further into the value of birch some interesting facts materialise.

In an analysis done for the Millennium Forests (owned and managed by Coillte Teo.) a management plan for birch prepared for the Woodlands of Ireland Silvicultural Sub-group was prepared by a qualified Forester and Ecologist.

In this management plan we are told that the birch "…should yield 100m^3 of commercial logs @ €65/m^3 and 100m^3 of boxwood/fuel wood @ €15/m^3 [per hectare over a 37 year rotation and being ¾ of the total stems". This gives us an income of €8000 - equivalent to €216 a year. Even allowing for management costs of a quarter of this it still gives an income of €162 per annum - a far cry from Mr. Phillips' annual loss of - €10.

In the site used for the Millennium Forest analysis the birch grew from natural regeneration on heavily polluted land which proved unable to support even Sitka spruce and is regenerating freely along with ash and sycamore. There are NO establishment costs.

Finally the retail prices paid for birch in the Irish market do not accord with Mr. Phillip's figures.

In Ireland at a Coillte Teo. owned sawmill the price realised by birch timber is €1200 m^3 – a price only exceeded by oak. (Conifer construction timber retails from sawmills at about €220 m^3.)

An appraisal of the value of the other broadleaf species yields similar results to this case study of birch.

IX. CONCLUSION

Mr. Phillips' 'Future Species Scenarios and Impacts on Coillte Teoranta' has been circulated and accepted without any adverse reaction. It has been presented to the IFA Farm Forestry Conference without a single question being asked. This is a cause of concern in itself.

Of greater concern is that Coillte Teo. is basing its economic evaluation of conifers not only on these flawed data and analysis, but without the social and environmental credits and debits.

As Richard Ramsauer writes in the Appendix:

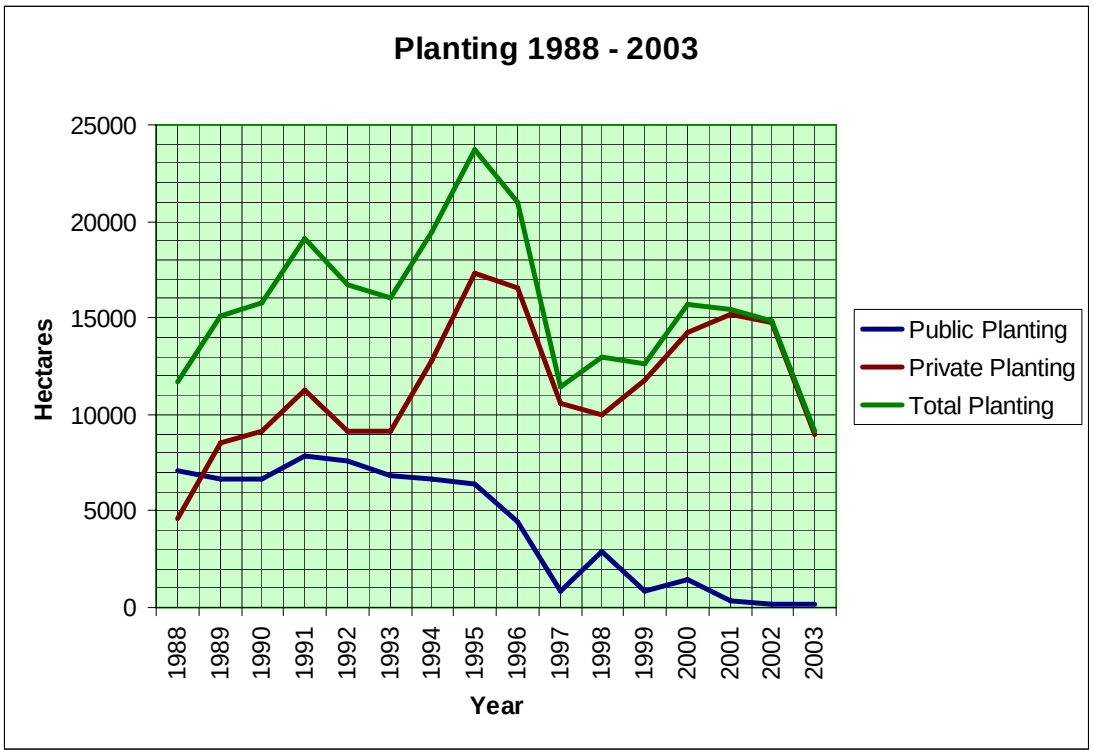
> 'All other benefits from sustainable multifunctional forestry are being ignored. All forest-functions are not calculated - except for wood production'.

The costs of forestry to the environment are measurable, just as are the benefits.

Mr Philips says himself that

> '…the case for broadleaves has never been subjected to any economic evaluation.'

This is not good enough.



'With the exception of the Native Woodland Scheme, which encourages the planting of native species, forestry on farmed land has been identified as having an almost completely negative impact on natural heritage.' (Gwyn *et al.*, 2003).'

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APPENDIX I

Peer Group Reviews

Part 1
Steven Harrington

I was asked to review the Initial Economic Analysis of Future Species Scenarios and Impacts. Based on my experience working with managers of broadleaf (hardwood) forest resources in North America, some of whom have been managing such forests for over 50 years, as well as my experience working on FSC certification, I offer the following opinion:

To be meaningful, this sort of analysis should be independent. Analysis should be conducted by experts with appropriate understanding of non-plantation forest management, particularly with hardwood/broadleaf species, and with processing/marketing of broadleaf species. The writers of this report do not appear to be either independent or expert in the subject under discussion.

The tone of this report and a number of instances of sloppiness in it indicate that it is more of an opinion piece cast as an objective analysis. The purpose of this report, and its timing, raise questions. In a number of instances the authors are editorializing, particularly in relation to proponents of various alternatives – this seems inappropriate to objective analysis, and reflects bias(es) that compromise the integrity and credibility of the report's findings.

Comparing volumes between conifers and hardwoods is inadequate for analysis – you have to compare value. Because hardwood timber is valued differently than softwood timber (e.g. grading) one cannot simply make volume/value to volume/value comparisons. Hardwood species also provide a large and growing range of value-added possibilities due to their wide range of interesting wood characteristics, with which softwoods generally cannot compare. Finally, the hardwood stands in question, established from scratch, presumably would be subjected to thorough management over time, thus ensuring optimal qualities and maximum potential value of trees in a stand through time. They would avoid the costs of timber stand improvement harvests required to modify quality and species mix in maturing/mature stands that only come under management after past impacts.

Moreover, in discussing the value of timber and markets, volume targets and customer expectations, there seems to be a questionable assumption of static conditions into the next two centuries. If anything, history teaches that change in some form or other can be expected. Some of this change will be outside the control of any forest decision-makers in Ireland; some of it can be generated by them. The development of supply, quality, product diversity and markets for broadleaf timber is within the capacity of the Irish forestry and forest products sectors. To make assumptions of future value based on the current woefully underdeveloped broadleaf sector is simply inappropriate.

The report writers express surprise at the lack of analysis carried out by groups or individuals proposing alternatives. Yet, analyses of economic optimization should have been carried out by Coillte itself well before the present. Is it surprising that Coillte has dedicated virtually the entire forest estate to exotic monoculture without doing an economic analysis of broadleaves or ecological analysis? Is there an ecological evaluation of conifer plantations?

In the discussion of soil/elevation types – the writers say that land can't support broadleaves, then say they can't say how much land can support broadleaves, then they say someone else should have studied this – yet this is THEIR JOB!

Rotations make no sense when discussing forest stands that should be managed under a continuous cover scenario. Continuous cover regimes allow forest owners to take advantage of transient price increases for timber and avoid being caught by transient price shortfalls. Also, if you have continuous cover and rely on natural regeneration after first planting, those costs should not repeat – you do have to repeat them for conifer plantation systems.

Economic analysis of pine forests in the southeastern United States has demonstrated that uneven aged regimes reliant on natural regeneration after the initial planting can dramatically outperform even-aged plantation regimes over time. The establishment costs discussed in the report for broadleaves appear to be quite high and should be subjected to outside review.

The websites www.daviesand.com/papers/Economics and www.pioneerforest.com discuss management approaches and economic considerations relevant for mixed broadleaf forests, and provide a good introduction to the performance potential of oak-dominated broadleaf forests over time, in a North American context.

There seems to be no consideration of the risks (both ecological and financial) involved in the promotion of a non-diverse forest base. The ramifications of pathogenic activity (e.g. insects/disease) within a forest system so dominated by a single species (Sitka spruce) are a cause for serious concern. What would be the relative efficacy of a 50% broadleaf scenario on replanted lands in the sudden event of widespread mortality in spruce plantations? What if markets for spruce pulp deteriorate?
Steven Harrington

[Steven Harrington has a master's degree in forestry from the Yale School of Forestry and Environmental Studies in New Haven, CT, USA. For the past 10 years he served as the coordinator of the Forest Stewards Guild, a North American organization of forestry professionals. He was the US Southwest Region Coordinator for the FSC and served on the FSC-US Board of Directors and Standards Committee.]

Part II
Richard Ramsauer

Coillte Teo. is the only State Forestry Board in the EU not to fulfil national forestry policy.

Coillte management and board are not competent to run a forestry company. There is no example in Europe or worldwide of a major forestry organisation run by business people, accountants etc. with nobody with complex forestry or environmental competence in the top level. No central European government would allow state forests to act against official policy and even support this behaviour with public funds. The FSC certification is a scandal. Certification rewards Coillte for failing to follow national policy.

Coillte compares plantations, which means growing trees in an agricultural way, with sustainable (which always means very long term, not only 40 years) multifunctional forestry and focuses on economical aims only. A "short term" comparison of economical aspects only is quite problematic.

All other benefits from sustainable multifunctional forestry are being ignored. All forest-functions are not calculated - except for wood production.

According to official company policy Coillte has no silviculture strategy. It has no development of broadleaf competence and no intention of real active involvement since the company’s foundation. This is evidenced by the fact that there are no significant trial plantations and no international activities of a scale that would enable Ireland to bring in European species of broadleaf trees.

There are many negative effects by such (spruce) monocultures.

Short rotation and clearcuts heavily interrupt the functioning of the ecosystem by reducing habitats for other organism of the ecosystem. The process exhausts the soil nutrients. The bare land of clearfells allows for the washing out of many of these nutrients and exposes the soil organisms to extremes of temperature and humidity.

Aside from soil degradation, the biological risks from bark beetle, fungi, etc. are negative impacts from spruce monocultures which all lead to loss of production in the long term.

Spruce plantations offer little resistance to wind because of the simple structure of the forest stand. The more diverse mixed plantations with more storeys, rich in species, ages and horizontal structure all increase wind resistance.

These negative impacts can be still seen in many forests in Central Europe. This is the reason why most governments in Central Europe and the UK are trying to shift forests away from monocultures wherever possible.

And yet these negative effects and the connected risks are not taken into consideration by this Report! Who is putting these factor into the calculations that support Sitka spruce?

When broadleaves are mixed with conifers all functions are fulfilled in an optimal way. The Report ignores the benefits of biodiversity, the improvement of soil through the build-up of very valuable multispecies forests.

The soil type "Podsol" is in fact quite a poor soil, mostly man-made by deforestation and grazing (which is the case in Ireland). The decomposition of organic material is less in softwood forests than in hardwood forests so broadleaves help to improve such stands not only through the improvement of nutrients availability, but through draining of soil and better root penetration.

Erosion can be high on such soils, therefore clear-cutting shouldn't occur as always happens in plantations. This is why conifer forests on this soil are often being converted to broadleaves in Central Europe!

A mixed forest ecosystem has more components and is more stable. Stable ecosystems require less effort to secure their functions. By returning nutrients to the soil, continuous regeneration of the forest takes place, avoiding clearfells. Without bare land there is less wash out of nutrients and less extreme stress on the soil from exposure to varying temperature and humidity.

Coillte compares its existing system (plantations of conifers as monoculture), but for planting 50% broadleaves they have to change their system (from plantations to a multifunctional forestry), which can't be compared only in economic terms. To change a "management" system from plantation to a long term sustainable mixed forests costs money (at the beginning), but this doesn't mean, that this forestry, implemented by all Central European countries, is not sustainable as is suggested by Coillte.

Establishment costs are not higher for broadleaves, except for its protection against animals (deer, rabbit). All Coillte's assumptions showing return on investment of hardwoods are intentionally negative with even the wrong figures. Coillte is in fact already successfully running a hardwood sawmill. Hardwoods even in Ireland are already in early stages of delivering energy from thinnings and even from sawlogs under Irish growth conditions.

The quality of wood from Sitka plantations is different to that from hardwood, which is e.g. denser. And, yes, business follows timber! Best prices per m3 are being achieved by Oak and Ash - the hardwood prices in this report seem too low: e.g. in Austria (and Czech rep.) pulpwood/beech is 26 - 31 Euro/m3.

This Report uses 5 ½% discount rates. This is far higher than the discount rate used in sustainable forestry (as opposed to plantations, which are closer to agriculture). The Report even states this on page 4: 0% - 1%; 2% in Austria, etc. In this report only three tree species exceed the hurdle rate of 5%, should therefore only 3 species be commercially used (in Europe, maybe worldwide)?

In Ireland only the Sitka program 'works'. But it 'works' with methods impossible elsewhere in central Europe - huge clearcuts, negative soil impact and degradation, ugly monocultures, the poorest biodiversity.

Everywhere in Europe these brutal methods would lead to similar short term financial results - but no other European government would allow this kind of financial exploitation of state assets at the cost of the environment.
Richard H. Ramsauer

[Richard Ramsauer is a 4th generation family forestry owner in the Austrian Alps. For 10 years he was Managing Director of the Prince of Liechtenstein's forest estates in Austria. From 1990 – 2000 he was Chief Executive Officer of the Austrian Federal Forests, one of the largest state-owned diversified forest estates in central Europe and the single biggest asset of the Republic of Austria. Since 2001, he has been an independent consultant for state-owned forests in Central and Eastern Europe as well as for the European commercial timber sector.]