

The socio-economic contribution of forestry in Ireland

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© COFORD 2006

First published in 2006 by COFORD, National Council for Forest Research and Development, Dublin, Ireland.

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ISBN 1 902696 49 2

Title: The socio-economic contribution of forestry in Ireland.

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Citation: Ní Dhubháin, Á., Flécharde, M-C., Moloney, R., O'Connor, D. and Crowley, T. 2006. The socio-economic contribution of forestry in Ireland. COFORD, Dublin.

The views and opinions expressed in this publication belong to the authors alone and do not necessarily reflect those of COFORD.

Foreword

Economic appraisal of the Irish forestry sector has, to date, focussed largely on the return from state and EU investment in the afforestation programme. Given that the main plank of forest policy has, for over a century, been the afforestation programme, this is not surprising.

Until COFORD's 1999 publication - *Economics of Irish Forestry* - by J. Peter Clinch, economic analysis was based, in the main, on discounting expected timber revenues and costs, to arrive at net present values and rates of return. Clinch's work broke new ground and included externalities – 'costs and benefits to members of society other than the forest owner', as well as land and labour costs and timber revenues. Using a cost benefit analysis framework, he estimated the return on the 1996 strategic plan for forestry to be 4%.

Further analytical work on the 1996 strategic plan has followed, most notably two reports by Peter Bacon and Associates in 2003 and 2004. Again a cost benefit approach was used, the 2004 report - *A Review and Appraisal of Ireland's Forestry Development Strategy* showing a net benefit of the afforestation programme of €571 million.

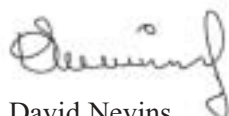
Following on Clinch's work COFORD took the view that work was needed to capture the full economic contribution of the forestry sector, beyond the forest gate, where most cost benefit analysis stops. Our view was based on the fact that forest product harvesting, transport and processing all generate considerable economic activity, and benefits to rural communities and the wider economy, and that these factors need to be considered in any appraisal of state investment in forestry.

As a result the ECONTRIB project came into being as a collaborative project involving Coillte, UCD and UCC. As well as the main objective of evaluating the direct economic contribution of forestry to the Irish economy the work had another very important task – to examine the social contribution of forestry to the rural economy and sustainable development in Ireland.

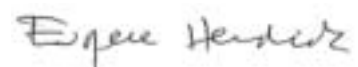
Work in the project was greatly facilitated by bringing together a multidisciplinary team of foresters, economists and sociologists. Their combined skills and interactions have resulted in this report which for the first time captures the full economic contribution of the forestry sector – estimated for 2003 as €472.4 million, with the wood products sector, largely based on home grown timber contributing €1.65 billion, about 1.5% of GNP, again in 2003.

As an economic activity forestry has now come of age, and is now a significant generator of wealth and prosperity for the nation; it is one of the few remaining productive and profitable land uses. These facts needs to be taken into account when national policy decisions are being taken, whether they be in the afforestation programme, industrial development, or in research, education and training.

Peoples' perception of forestry is important in a country where the national policy is to almost double the forest estate. What ECONTRIB has shown is that these perceptions vary according to the level of processing activity and employment that forestry generates within local areas. The work has also shown that Coillte's consultation process with community groups on harvesting and other activities is an effective way of gaining a wider acceptance and appreciation of forestry among community groups.



David Nevins
Chairman



Eugene Hendrick
Director

Brollach

Go dtí seo bhí meastóireacht eacnamaíoch Earnáil na Foraoiseachta in Éirinn dírithe go príomha ar an ioncam a fuarthas ar ais ó infheistíocht an stáit agus an AE sa chlár coilltíthe. Ní nach ionadh, nuair a chuirtear san áireamh gurb é an clár coilltíthe an chuid is tábhachtaí de pholasaí foraoiseachta sa tír le níos mó ná céad bliain anuas.

Go dtí gur fhoilsigh COFORD –*Economics of Irish Forestry* le J. Peter Clinch i 1999, bhí anailís eacnamaíoch bunaithe go príomha ar ioncam adhmaid agus costais ionchais a lascainiú, le teacht ar ghlanluacha agus rátaí sochair reatha. Chlúdaigh obair Clinch ábhar nár clúdaíodh riamh roimhe agus chuir sé rudaí seachtracha san áireamh – ‘costais agus tairbhe do bhaill na sochaí seachas úinéir na foraoise’, chomh maith le costais an talaimh agus saothair agus ioncam ó adhmaid. Ag úsáid creatlaí d’anailís chostais/sochair, mheas sé an sochar ón phlean straitéiseach don fhoraoiseacht do 1996 mar 4%.

Lean obair anailíseach eile ar phlean straitéiseach 1996. Is í an chuid is sonraithí den obair seo ná dhá thuirisc le Peter Bacon agus Comhlaigh i 2003 agus 2004. Arís eile, úsáideadh cur chuige costais/sochair, agus léirigh tuairisc 2004 – *A Review and Appraisal of Ireland’s Forestry Development Strategy* – glansochar de €571 milliún don chlár coilltíthe.

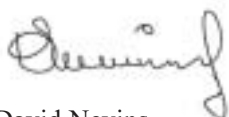
Ag leanúint ar aghaidh ó obair Clinch chonacthas do bhaill COFORD go raibh obair de dhíth leis an mhéid iomlán a dhéanann earnáil na foraoiseachta don gheilleagar a thuiscint, taobh amuigh de limistéar na foraoise féin, an áit a stopann an chuid is mó de na hanailísí costais/sochair. Bunaíodh an dearcadh seo ar an fhíoras go ngineann fómhaireacht, iompar agus próiseáil táirgí foraoiseachta a lán gníomhaíochta eacnamaíche agus a lán sochar do phobail faoin tuath agus don gheilleagar go ginearálta, agus nach mór na fachtóirí seo a chur san áireamh in aon mheastóireacht ar infheistíocht an stáit san fhoraoiseacht.

Dá thoradh sin tháinig tionscadal ECONTRIB ar an saol mar thionscadal comhoibríoch a raibh Coillte, UCD agus UCC páirteach ann. Chomh maith leis an phríomhchuspóir – an dóigh a bhfónann an fhoraoiseacht go díreach don gheilleagar Éireannach a mheas, bhí tasc an-tábhachtach eile ag an obair – ionchur sóisialta na foraoiseachta don gheilleagar tuaithe agus don fhorbairt inmharthanach in Éirinn.

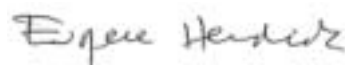
Tugadh foireann ildisciplíneach d’fhoraoiseoirí, eacnamaíthe agus socheolaithe le chéile, rud a rinne obair an tionscadail i bhfad níos éasca. A scileanna agus idirghníomhú le chéile a chruthaigh an tuairisc seo, tuairisc a thugann léargas don chéad uair ar ionchur iomlán eacnamaíoch earnáil na foraoiseachta – a measadh do 2003 mar €472.4 milliún, le hearnáil na dtáirgí adhmaid, bunaithe go príomha ar adhmaid fásta sa tír ag soláthar €1.65 billiún, tuairim is 1.5% den Olltáirgeacht Náisiúnta, arís i 2003.

Tá an fhoraoiseacht ag teacht in aois mar ghníomhaíocht eacnamaíoch anois, agus is gineadóir suntasach í de mhaoín agus rathúnas don náisiún; tá sí ar cheann den bheagán úsáidí talún atá fós táirgeach agus brabúsach. Ní mór na fíorais seo a thabhairt san áireamh agus cinntí náisiúnta polasaí á ndéanamh, bíodh sin sa chlár coilltíthe, san fhorbairt thionsclaíoch, sa taighde, san oideachas nó sa traenáil.

Tá an dearcadh atá ag daoine ar an fhoraoiseacht tábhachtach in Éirinn, tír ina bhfuil polasaí náisiúnta ann chun eastát na foraoise a mhéadú beagnach faoi dhó. Is é a léirigh ECONTRIB ná go bhfuil an dearcadh seo ag brath ar leibhéal na gníomhaíochta próiseála agus na fostaíochta a chruthaíonn an fhoraoiseacht taobh istigh de cheantair áitiúla. Léirigh an obair fosta gur dóigh éifeachtach é próiseas comhairliúcháin Coillte le grúpaí pobail faoi fhómhaireacht agus gníomhaíochtaí eile chun glacadh agus tuiscint níos leithne faoin fhoraoiseacht a chothú i measc grúpaí pobail.



David Nevins
Cathaoirleach



Eugene Hendrick
Stiúrthóir

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Acknowledgements

The authors wish to thank those who participated in this project. In particular, they would like to thank all those in Coillte, in other forestry companies and in the wood processing sector who spent time completing the questionnaires. The enthusiasm and frankness of the stakeholders interviewed in the three case study areas is also acknowledged.

Executive summary

This study had the following objectives:

1. To evaluate the direct and indirect economic contribution of the forestry sector to the national and local economies;
2. To evaluate the direct and indirect economic contribution of the wood products sector to the national economy;
3. To quantify the short-term economic consequences of alternative afforestation scenarios;
4. To evaluate the social contribution of forestry to local economies.

The technique used to assess the economic impacts of forestry (i.e. growing sector) and the wood products sectors (i.e. processing sector) was input-output analysis. This allowed the linkages between these sectors and other sectors in the economy to be determined. With reference to the forestry sector, only economic activity associated with timber production is considered. The social impacts were determined using a combination of qualitative and quantitative techniques in three case study areas. Each case study was defined as the area within a 20-mile radius of the centre of the case study area. Shillelagh, Co Wicklow, Arigna, Co Roscommon and Newmarket, Co Cork, were the geographic centres of the three case study areas.

Key findings

- ▶ In 2003, direct output in the forestry sector was €255.4 million. Of this €134.5 million represented gross value-added (GVA) which was 0.12% of Gross National Product (GNP).
- ▶ Output and employment multipliers for forestry were derived. The type 2 output multiplier was shown to be 1.85, thus for every one million euro in expenditure in the forestry sector a further €850,000 in expenditure is generated in the rest of the economy. The type 2 employment multiplier was 1.90, thus for every 100 jobs in the forestry sector an extra 90 full-time equivalent jobs are provided in other sectors of the economy.
- ▶ When the indirect and induced effects are taken into account using the multipliers, the overall value of forestry to the Irish economy was €472.4 million in 2003.
- ▶ Direct employment in forestry was 3,780. Accounting for the induced and indirect effects, the total employment supported by the forestry sector was estimated to be 7,182.
- ▶ Direct output in the wood products sectors (i.e. panelboard mills, sawmills and other wood products excluding furniture) was €975.0 million. Of this €312.3 million was gross value-added (GVA) representing 0.27% of GNP.
- ▶ Output and employment multipliers for the wood products sectors were somewhat lower than for the forestry sector. The output multipliers for the panelboard mills, sawmills and other wood products (excluding furniture) sectors were 1.61, 1.71 and 1.72 respectively while the employment multipliers were 1.68, 1.74 and 1.81 respectively.
- ▶ The multipliers were used to determine the indirect and induced impact of the three wood products sectors. The total value to the economy of the three sectors was €1.65 billion, nearly 3.5 times the forestry sector figure of €472.4 million.

- ▶ Direct employment in the wood products sectors was 6,870. When the indirect and induced employment impacts are derived using the employment multipliers, the wood products sectors supported a total of 12,246 jobs. This is 70% more than the total employment attributable to the forestry sector alone.
- ▶ The regional multipliers for forestry were lower than the national figures. The output multiplier for the South-West Region was 1.43, for the West Region 1.36, while for the Mid-East Region it was 1.56. These lower multipliers reflect the leakage of economic activity that arises due to the expenditure on inputs from outside the regions as well as the spending of wages and salaries from forestry outside the region.
- ▶ The gross value of an afforestation programme amounting to 15,000 hectares for a five-year period was estimated to be €474.78 million. Assuming that afforestation takes place on farm land, the net value of the afforestation programme for the five-year period is shown to be €171.98 million if the land was previously used for cattle rearing or €157.43 million if the previous land use was sheep farming. If stacking of direct payments is possible on all 15,000 hectares, the net value of the afforestation programme for the five year-period is higher, amounting to €340.27 million where forestry replaces cattle rearing and €328.47 million where forestry replaces sheep farming.
- ▶ The social impacts of forestry were assessed in the three case study areas. In these areas the extent of forest cover and the species composition were similar but the maturity of the forest cover varied as did the historical rate of afforestation. In the area where the forests were the youngest and where afforestation had occurred at the fastest rate (i.e. Newmarket), forestry was perceived to have contributed little in terms of employment and amenity while impacting negatively on the environment. In Arigna, attitudes were more positive, which can be attributed in part to the availability and use of consultation mechanisms in that area. Nevertheless, in both areas concerns were expressed about the dominance of conifers in the afforestation programme. There was clearly a demand for a different type of forest; one where timber production is not the primary objective and where the amenity and landscape functions are emphasized. In Shillelagh the social impacts of forestry were more positive, reflecting the long history of forestry in the area. The amenity and recreational functions of the forests in the Shillelagh area were acknowledged.

Achoimre fheidhmeannach

Bhí na cuspóirí seo a leanas ag an staidéar:

1. An méid a dhéanann earnáil na foraoiseachta, go díreach agus hindíreach, do na gheilleagair náisiúnta agus áitiúla a mheas;
2. An méid a dhéanann earnáil na dtáirgí adhmaid, go díreach agus go hindíreach, don gheilleagar náisiúnta a mheas;
3. Na torthaí gearrthéarmacha eacnamaíocha a bheadh ag cásanna malartacha coilltíthe a mheas;
4. Ionchur sóisialta na foraoiseachta don gheilleagar áitiúil a mheas.

Ba í an teicníc a úsáideadh le tionchar eacnamaíoch na foraoiseachta (i. earnáil an fháis) agus earnáil na dtáirgí adhmaid (i. earnáil na próiseála) a mheas ná anailís ionchuir/aschuir, rud a d'fhág go rabhthas ábalta na naisc idir na hearnálacha seo agus earnálacha eile sa gheilleagar a chinntiú. Maidir le hearnáil na foraoiseachta, ní chuirtear san áireamh ach gníomhaíocht eacnamaíoch atá bainteach le táirgeadh an adhmaid. Fuarthas amach an tionchar sóisialta ag úsáid meascáin de theicnící cáilíochtúla agus cainníochtúla i gcás staidéir a lonnainníodh i dtrí cheantar ar leith. Sainmhíníodh na ceantair do na cás-staidéir mar an limistéar taobh istigh de raon 20 míle amach ó lár an cheantair. Ba iad Síol Éalaigh, i gCo. Chill Mhantáin, An Airnigh, Co. Ros Comáin agus an Margadh Nua, Co. Chorcaí, láir gheografaíocha na dtrí cheantar do na cás-staidéir.

Príomhthorthaí

- ▶ I 2003, ba é €255.4 milliún an t-aschur díreach in earnáil na foraoiseachta. As an mhéid seo, ba Oll-Bhreisluch (GVA) é €134.5 milliún, nó 0.12% den Olltáirgeacht Náisiúnta (GNP).
- ▶ Fuarthas aschur agus iolraitheoirí fostaíochta don fhoraoiseacht. Léiríodh gurb é iolraitheoir aschuir cineál 2 ná 1.85. Mar sin de, as gach aon mhilliún euro a caitheadh in earnáil na foraoiseachta gintear €850,000 sa bhreis sa chuid eile den gheilleagar. Ba é iolraitheoir fostaíochta cineál 2 ná 1.90. Mar sin de, as gach 100 post in earnáil na foraoiseachta cuirtear 90 post coibhéiseach lánaimseartha ar fáil in earnálacha eile den gheilleagar.
- ▶ Nuair a chuirtear na héifeachtaí indíreacha agus aslaithe san áireamh ag úsáid na n-iolraitheoirí, ba é luach iomlán na foraoiseachta do gheilleagar na hÉireann ná €472.4 milliún i 2003.
- ▶ Ba í an fhostaíocht dhíreach san fhoraoiseacht ná 3,780. Ag cur na n-éifeachtaí aslaithe agus indíreacha san áireamh, measadh an fhostaíocht iomlán a thacaítear ag earnáil na foraoiseachta ná 7,182.
- ▶ Ba é aschur díreach in earnálacha na dtáirgí adhmaid (i. muilte painéalchláir, muilte sábhadóireachta agus táirgí adhmaid eile, ag fágáil troscáin as an áireamh) ná €952.0 milliún. Den mhéid seo ba oll-luach breise (GVA) é €312.3 milliún de, arbh ionann é agus 0.27% den Olltáirgeacht Náisiúnta (GNP).
- ▶ Bhí iolraitheoirí aschuir agus fostaíochta do na hearnálacha táirgí adhmaid rud beag níos ísle ná don earnáil foraoiseachta. Ba iad na hiolraitheoirí aschuir d'earnálacha na muilte painéalchláir, na muilte sábhadóireachta agus na dtáirgí adhmaid eile (gan troscán san áireamh) ná 1.61, 1.71 agus 1.72 faoi seach agus ba iad na hiolraitheoirí fostaíochta ná 1.68, 1.74 agus 1.81 faoi seach.

- ▶ Baineadh úsáid as na hiolraitheoirí le tionchar indéreach agus aslaithe na dtrí earnáil táirgí adhmaid a fháil amach. Ba é luach iomlán na dtrí earnáil don gheilleagar ná €1.65 billiún, beagnach 3.5 uair níos mó ná an figiúr d'earnáil na foraoiseachta de €472.4 milliún.
- ▶ Ba í an fhostaíocht dhíreach in earnálacha táirgí adhmaid ná 6,870. Nuair a fhaightear na tionchair indéreacha agus aslaithe ar fhostaíocht ag úsáid na n-íolraitheoirí fostaíochta, chothaigh earnálacha na dtáirgí adhmaid 12,246 phost san iomlán. Seo níos mó ná 70% den fhostaíocht iomlán atá ionchurtha síos d'earnáil na foraoiseachta amháin.
- ▶ Bhí na hiolraitheoirí réigiúnacha don fhoraoiseacht níos ísle ná na figiúirí náisiúnta. Ba é an t-íolraitheoir aschuir do Réigiún an Iardheiscirt ná 1.43, do Réigiún an Iarthair ná 1.36, agus do Réigiún an Oirthir Láir ná 1.56. Léiríonn na hiolraitheoirí níos ísle seo an sileadh de ghníomhaíocht eacnamaíoch a tharlaíonn de dheasca an chaiteachais ar ionchur ó lasmuigh de na réigiúin chomh maith leis an phá agus na tuarastail ón fhoraoiseacht a chaitear lasmuigh den réigiún.
- ▶ Measadh oll-luach cláir coilltíthe dar iomlán 15,000 heicteár ar feadh tréimhse cúig bliana ná €474.78 milliún. Ag glacadh leis go dtarlaíonn coilltíú ar thalamh feirme, léiríodh gurbh é glanluach an chláir coilltíthe don tréimhse chúig bliana ná €171.98 milliún más amhlaidh go raibh an talamh in úsáid faoi choinne tógáil eallaigh nó €157.43 milliún más amhlaidh go raibh an talamh in úsáid roimhe faoi choinne tógáil chaoirigh. Más féidir carnadh a dhéanamh ar íocaíochtaí díreacha ar na 15,000 heicteár ar fad, tá glanluach an chláir coilltíthe don tréimhse chúig bliana níos airde. Is ionann é agus €340.27 milliún san áit a dtagann an fhoraoiseacht isteach in áit tógáil eallaigh agus €328.47 san áit a dtagann an fhoraoiseacht isteach in áit tógáil chaoirigh.
- ▶ Rinneadh tionchar sóisialta na foraoiseachta a mheas sna trí cheantar sna cás-staidéir. Sna ceantair seo bhí dlús an chlúdaigh fhoraoise agus comhdhéanamh na speiceas cosúil lena chéile ach bhí aibíocht an chlúdaigh fhoraoise agus ráta stairiúil an choilltíthe difriúil. Sna ceantair ina raibh na foraoisí a b'óige agus inar tharla an coilltíú ag an ráta a ba ghasa (i. An Margadh Nua), ba é dearcadh an phobail gur bheag a thug an fhoraoiseacht do dhaoine ó thaobh fostaíochta agus áiseanna de, ach go raibh tionchar diúltach aici ar an timpeallacht. San Airnigh, bhí an dearcadh níos deimhní, rud atá le cur síos go dtí pointe áirithe do mheicníochtaí comhairliúcháin a bheith ar fáil agus in úsáid sa cheantar sin. Ach sa dá cheantar, nochtadh míshuaimhneas faoi cheannasacht na mbuaircínear sa chlár coilltíthe. Ba léir go rabhtas ag éileamh foraoise de chineál eile, foraois nár bh é táirgeadh an adhmaid an príomhchuspóir ann agus ina gcuirtear béim ar fheidhmeanna na foraoise mar aois agus mar áit ghalánta. I Síol Éalaigh, bhí tionchar sóisialta na foraoiseachta níos deimhní, ag léiriú stair fhada na foraoiseachta sa cheantar. Aithníodh go raibh feidhm mar áis agus mar chaitheamh aimsire ag na foraoisí i gceantar Shíol Éalaigh.

Introduction

Forests are a key component of the natural resources of rural areas and for much of the early part of the last century the sole role of many of these forests was to produce timber. However, in recent years, society's view of the role of forests has changed. Today society demands a broad range of functions from forests, including functions for the benefit of industry, recreation, housing, nature conservation and the environment. Many European countries, including Ireland, have taken on board the concept of multifunctional forestry and are committed to sustainable forest management. Thus forests should be managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations.

While a number of studies of the economic impact of forestry on the Irish economy have already been conducted, the variety of methodological approaches that have been used make it difficult to make meaningful and ongoing comparisons over time. Regular estimates of this impact are required as the forest estate in Ireland is still at a relatively juvenile stage, with over 50% of forest stands only half way through their first rotation. The economic impact will change as this estate develops. Furthermore, given that the forestry sector has many linkages with other industries, it is important that the full economy-wide contribution of the sector is quantified. This requires a methodological approach, which is transparent, replicable and sufficiently comprehensive in scope to allow for regular and consistent evaluation of the sector's performance. This methodological approach should be capable of assessing direct, indirect and induced economic impacts. The input-output techniques that were used in this study were highly suitable in this regard.

The multifunctionality of forests requires that all the outputs should be assessed if the aim is to appraise the overall contribution of forestry to the economy (Slee et al. 2004). In this context there is a greater need to investigate benefits not only in terms of economic values but also to consider how local communities interpret the meaning of rural quality, how they conceive the desired future of their area and how they perceive forestry as part of their social and physical environment (Wiersum and Elands 2002).

The objectives of this research project were:

1. To evaluate the direct and indirect economic contribution of the forestry sector to the national and local economies;
2. To evaluate the direct and indirect economic contribution of the wood products sector to the national economy;
3. To quantify the short-term economic consequences of alternative afforestation scenarios;
4. To evaluate the social contribution of forestry to local economies.



Background

A number of studies have been undertaken to examine the economic impacts of the forestry sector in Ireland. These have used either cost-benefit analysis (CBA) or input-output analysis. The most recent study undertaken was commissioned by the Irish Forest Industry Chain following a 22% cutback in government funding to the forestry sector in 2003 (Bacon and Associates 2003). A CBA was used to calculate the impacts of these cutbacks on the forestry sector and the economy as a whole. Both timber and non-timber values were considered, but the method did not allow for the calculation of the benefits and/or costs of forestry to local communities. Furthermore, in the Bacon and Associates study, externalities were essentially considered via the potential profit of trading CO₂ credits. A previous study by Clinch (1999) calculated the total economic value of the Irish Government's Strategic Forestry Plan of 1996 using a CBA. Along with the timber value, the values of a range of non-market outputs were calculated, including carbon sequestration, water quality, recreation, biodiversity and landscape. Different valuation methods were used to assess these values. Although the benefit of forestry expansion to community (or "community integrity") was mentioned as one of the issues in the Strategic Forestry Plan, Clinch did not consider this issue in his study. Both studies referred to above concentrated on evaluating the economic impacts of the forestry sector on a national scale and therefore local impacts to rural communities were not addressed. A further limitation to these studies is that the CBA methodology does not allow assessment of the backward and forward linkages that connect the forestry sector to other sectors of the economy.

The economic impact of forestry at regional level in Ireland has also been assessed. Crowley et al. (2001) chose an area in Co Cork as a case study and used input-output analysis to evaluate the contribution of the forestry sector to the economy in the case study area. They also estimated the employment generated by forestry and related the location of the home base of the employees to the centre of the case study. Although the results provide a valuable indicator of the economic contribution of the forestry sector within a local area, they are based solely on the contribution of timber production and no other forest functions are considered.

While a number of studies of the social impact of forestry have been conducted in other countries, many of these have concentrated only on assessing the employment generated by forests. This was partly due to the over-riding emphasis placed on the economic aspects of forestry in the past, but the lack of suitable social impact assessment techniques was also a critical factor. However, both these explanations are no longer valid. As already highlighted, the acceptance of the multifunctionality of forestry requires that the broad range of impacts is assessed, while developments in social impact assessment now mean that appropriate techniques are available. Most commonly social impacts are assessed using a combination of qualitative and quantitative data collection methods. Triangulation is often used to validate the findings (Guion 2002). Data triangulation involves the use of different sources of data in the study. Typically, this involves including all relevant stakeholder groups and interviewing a comparable number of people in each group. Methodological triangulation uses multiple qualitative and/or quantitative methods. Triangulation is achieved when outcomes are agreed by all stakeholder groups and/or when the results of the different methods used agree.

Triangulation methods have been used in recent socio-economic studies related to the forestry sector (Parkins 1999).

In Ireland investigations of the social impact of forestry have focussed on its impacts on farming activities and on farmers' attitudes to afforestation (Collier et al. 2003, Kearney 2001 and 2002, Leavy and McCarthy 2002, Ní Dhubháin and Gardiner 1994). Until recently, few studies attempted to expand beyond the farming sector in order to encompass the view of local communities. Those that have been conducted have relied on surveys to evaluate the public perception of forestry at regional/local level. For example, Kearney and O'Connor (1993) examined the impacts of forestry on two local communities. These communities showed very dissimilar views of forestry with the community (i.e. in Co Wicklow) with a high employment rate in forestry showing strong support. More recently O'Leary et al. (2000) examined the perceptions of two strongly contrasting populations (i.e. Wicklow and Leitrim) with regard to afforestation development in Ireland. Their survey showed opposing views between the two populations, with the community where forests were a more traditional feature of the landscape exhibiting a more positive attitude to forestry.

Methodology

This section of the report describes the methods used to determine the economic impacts of forestry. It also outlines the various afforestation scenarios considered in the study. The methods used to determine the social impacts of forestry are then presented.

Economic impact of forestry

The methodology used to determine the economic impact of forestry was input-output analysis. The technique of input-output analysis is widely applied throughout the literature in rural issues including forestry. Thomson and Psaltopoulos (1996) and Munday and Roberts (2000) give clear descriptions of the methodological and conceptual issues that arise when input-output modelling is applied to the forestry sector and emphasise the suitability of the technique in analyzing issues such as the role that it can play in rural development. An input-output model is based on the use of data organized in the form of an input-output table. This table provides a picture of the structure of an economy at a given point in time and describes the various flows of inputs into the productive process and matches these with outputs, which are consumed in final demand.

An input-output model is one in which inter-industry linkages are explicitly specified. Central to the use of input-output models is the assumption that the demand for inputs is in a fixed proportion to total output. Any increase in total output will lead to a specific increase in each input category, used in the production of that output. Input-output analysis uses techniques of matrix algebra to predict changes in output, employment and income in any sector or industry as a result of changes in final demand. More detail on the technological and methodological specifications is contained in Annex 1.

National input-output analysis

In this study the most recently published input-output table for Ireland, which related to the Year 1998 was used (CSO 2004a). In this table forestry was grouped with agriculture and fisheries. Using information supplied by researchers at Trinity College (O'Toole and Matthews 2000), data obtained from the Central Statistics Office (CSO) and surveys carried out by the project team, this sector was divided into its component parts, i.e. forestry, agriculture and fisheries. The following ways in which forestry contributes to the economy were then assessed:

- (i) *The direct contribution of forestry*
The direct contribution is the impact of the spending by the forestry sector on goods and services.
- (ii) *The indirect contribution of forestry*
The indirect contribution of forestry is that which occurs when suppliers to forestry firms purchase goods and services to meet demand.
- (iii) *The induced contribution of forestry*
The induced contribution of forestry refers to the additional consumer

expenditure that takes place when the wages and salaries generated from the direct and indirect contributions of forestry are in turn spent.

The sum of the direct, indirect and induced contributions represents the overall or total contribution of forestry. These contributions may be expressed both in absolute terms and in terms of multipliers for output (i.e. purchases of inputs), income and employment. The total contribution of the forestry sector can thus be expressed in terms of money and jobs. Both the indirect and induced contributions will be higher when leakages from the economy are lower - in other words, when the expenditure on imports from outside the country or region under analysis is lower.

Once the absolute contributions are estimated the direct, indirect and induced multipliers are obtained. From these multipliers two other multipliers are calculated: Type 1 multipliers reflecting the direct and indirect impact and Type 2 multipliers which represent the induced impact in addition to the direct and indirect impacts. The Type 2 multiplier represents the overall impact of expenditure or employment on the region or country.

The forestry sector's importance is further enhanced with its linkages to other producing sectors of the Irish economy. As well as the main forestry sector the 1998 Input-Output Table has Wood and Wood Products (excluding furniture) as the main upstream sector using forestry outputs. This study divides this sector into three sub-sectors, namely Panelboards, Sawmills, and Other Wood Products (excluding furniture) (hereafter this will be referred to as Other Wood Products). This is done using information from the Bacon and Associates Report (2003), our own survey data (see below) and the 1998 Input-Output Table (CSO 2004a).

Firms involved in forestry and the wood products sectors were surveyed to obtain data on employment, purchases and output. A questionnaire was devised (see Annex 2) and sent to over 30 firms. The aim of this survey was to gather data that could be used to divide the forestry sector into its component parts (i.e. forestry, agriculture and fisheries) and the wood products sector into its component parts (i.e. Panelboards, Sawmills, and Other Wood Products). Twenty-one completed questionnaires were returned, representing a response rate of over 50%.

Choice of local economies/case study areas

Three local economies were chosen as case studies. Each case study was defined as the area within a 20-mile radius of the centre of the case study (i.e. 1,256 square miles/3,254 km²). Shillelagh, Co Wicklow, Arigna, Co Roscommon and Newmarket, Co Cork, were the geographic centres of the three case study areas (CSAs). The Shillelagh CSA has a mature forest cover with second rotation forests present. It has an extensive forest infrastructure (i.e. nurseries, sawmills, etc.). The Arigna CSA has a middle-aged forest cover. This area has experienced very strong opposition to forestry in the past. The final CSA surrounding Newmarket, Co Cork, has a young forest cover and afforestation is expected to increase in the area. Local community groups have opposed recent afforestation development. Lists of the District Electoral Divisions (DED) that comprise each case study are given in Annex 3.

Regional input-output analysis

Regional input-output analysis was carried out to determine the economic impact of forestry in the three CSAs. This involved using existing regional input-output models (Moloney and O'Sullivan 2003) that related as closely as possible to the three CSAs and within which some or all of the individual CSAs were located. These regions were the West, the Mid-East and South-West Regions. In addition, a number of the firms involved in forestry and the wood products sectors in the CSAs were surveyed. These firms received a similar questionnaire to those sent as part of the national survey. A detailed profile of the regions is contained in Annex 4. Tables 1 and 2 show some key comparable data for the regions and the state as a whole.

The West Region of Ireland comprises Counties Galway, Mayo, Roscommon and Galway Co Borough. It has a predominantly rural population (62.3%) with 3.4% of the labour force unemployed. The sectoral profile is very different to national profile, reflecting the rural dominance of the Region. Gross Value Added (GVA) at basic prices is the smallest of the three regions studied.

The Mid-East Region of Ireland comprises Counties Kildare, Meath and Wicklow and has a predominantly urban population (56.9%). The region's labour force in 2002 was 201,000; of these 6,600 people were classified as unemployed. Its sectoral profile shows that it is close to the national average for agriculture, forestry and fishing, with a slightly higher output in the manufacturing sector and less in the services sector.

The South-West Region comprises Counties Kerry and Cork and Cork City. The region has a population of 580,400 people (CSO, 2003) the second most populated region after Dublin. The region's labour force in 2002 was 289,800; of these 13,000 were classified as unemployed. In its sectoral profile it is closer to the national average than that of any of the other regions.

Table 1: Persons aged 15 years and over classified by region and economic status.

	EMPLOYED (000S)	UNEMPLOYED (000S)	LABOUR FORCE (000S)	UNEMPLOYMENT RATE (%)
West	186.1	7.3	193.3	3.4
Mid-East	210.9	8.2	219.0	3.7
South-West	276.8	13.0	289.8	4.5
State	1893.6	93.9	1987.5	4.7

Source: CSO 2004b

Table 2: GVA (€m) at basic prices by region and sector – 2001.

	WEST	MID-EAST	SOUTH-WEST	STATE
Agriculture/Forestry/Fishing	483	306	764	3,612
Manufacturing/ Building and Construction	2,966	5,317	9,539	42,210
Market and Non-Market Services	4,368	3,529	7,047	58,855
Total	7,861	9,202	17,447	103,245

Source: CSO 2004c

Scenario analysis

The afforestation scenarios considered in this study were influenced by the publication of the draft EU rural development strategy (CEC 2004). Many elements of this strategy were expected to have positive impacts on forestry throughout Europe. However, at the time of writing this report, one particular element which proposed a reduction in the grant-aid for afforestation from 100% to 50% was expected to have a major negative impact on forestry in Ireland. In particular, it was thought to make the target of 17% forest cover by 2030, as laid out in the Strategic Plan for Forestry, unattainable. However, at a meeting of the EU Agricultural Ministers in June 2005, it was agreed that establishment grants of up to 80% would be available for afforestation in less favoured areas of the EU (these areas currently cover 74% of Ireland) and 70% elsewhere. It is likely that as a result of the reduction in grant aid, afforestation rates will reduce, albeit not to the extreme extent initially envisaged.

Two afforestation scenarios are considered: the first is an annual afforestation rate of 15,000 ha, while the second scenario refers to an annual afforestation rate of 7,500 ha. The duration of the scenario analysis is five years. Thus neither of the scenarios, because of the limited duration being considered, will influence harvesting. The analysis assumes that all land afforested is used for farming and that the farming systems most likely to be converted to forestry are cattle rearing and sheep systems.

Social impact of forestry

Both methodological and data triangulation methods were used in the social impact assessment study. Methodological triangulation was made feasible through the use of a number of qualitative and quantitative data collection methods. Semi-structured interviews were held with stakeholders, and other data sources were accessed including censuses and newspapers. In order to make data triangulation possible, respondents from a number of stakeholder groups were interviewed.

Quantitative data

Information on demography and employment for each CSA was collected from the CSO reports. Forestry statistics for the areas were extracted from the Forest Service and Coillte databases. Other sources of information available locally were also consulted, including local libraries, county publications, etc. The information collected was used to generate a profile of each case study. Additional qualitative information related to the history and culture of the areas was added.

Qualitative data

Semi-structured interviews with stakeholders formed the core of the qualitative data. In order to reflect the variety of opinions and concerns, stakeholders in the three communities were divided into three categories:

1. Producers: people deriving their living from the land (e.g. farmers and foresters);
2. Consumers: people living in or visiting the area but not deriving their incomes from the land (e.g. community members and visitors);

3. Decision makers: people involved in public policy and lobbying (e.g. councillors, officers from administrations, local group representatives, NGOs, etc.).

Between 30 and 40 persons were interviewed in each case study with approximately one third in each stakeholder category. The identification of individuals for each category was initially done using key informants. These included representatives from organisations such as Teagasc, County Boards and Councils, and locally based rural development organisations. This initial group of respondents then guided the interviewer to further contacts – a process known as the “snowball effect”. An *aide-mémoire* was used to conduct the interview but the discourse was essentially a co-construction between the interviewer and the interviewee. The interview guide aimed at covering the objectives of the research and the following issues:

1. What is the perception of the respondent of the rural environment she/he lives in?
2. What role does forestry play in it?
3. How can this role be improved?

Unless people opposed it, each interview was recorded and subsequently transcribed. The transcripts were then analysed using a framework known as “grounded theory”. The key process in grounded theory is to break down the data into categories that are given a name or label. These categories form an index into which the recurrent subjects and themes in each interview are allocated (Bryman 2001). As further interviews are analysed the index is re-used and enriched with each new theme the reader comes across.

Results

The direct expenditure and employment data associated with the forestry and wood products sectors are presented in this section. Using multipliers calculated from national and regional input-output tables for 1998, the overall impact of the forestry sector on the national and regional economies is calculated. The overall impact of the wood products sector on the national economy is also presented. The results of the social impact assessment conclude this section of the report.

Contribution of the forestry sector to the national economy

Based on the values shown in the input-output table for 1998 constructed for this study, Table 3 reproduces the expenditure patterns of the forestry sector of the Irish economy for the year 2003. The sector has strong linkages to the domestic economy. Intermediate purchases account for 21.4% of all expenditure and imports account for only 25.9% of total expenditure. Wages and salaries make up 20.9% of expenditure. This latter value may be understated as the sector subcontracts much of its work to small operators. Total direct expenditure on domestic output is €189.2 million and imports are valued at €66.2 million. Total direct employment is 3,780.

The contribution of forestry to Gross National Product (GNP) is also calculated. The GNP for Ireland in 2003 was €116.4 billion (CSO 2005). This figure excludes profit repatriation and does not include intermediate purchases. Using the figures given in Table 3, the contribution of forestry to GNP was determined as follows. The value of domestic inputs to forestry is €189.2 million. Excluding the value of intermediate inputs and assuming no profit repatriation (which is valid as the industry is broadly Irish-based), the gross value added (GVA) of forestry is €134.5 million. This represents 0.12% of GNP.

Estimates of the direct, indirect and induced impacts of forestry on the Irish economy in the year 2003 are reported in Table 4. The expenditure and employment multipliers are also reported. The type 2 output multiplier is 1.85. Thus for each one million euro in expenditure in the forestry sector a further €850,000 in expenditure is generated in the rest of the

Table 3: Forestry - direct expenditure (€ millions –2003) and employment (units) by sector.

	EXPENDITURE	% OF TOTAL SPEND
Total Intermediate Inputs	54.7	21.4
Wages and Salaries	53.4	20.9
Profits	72.3	28.3
Net Other Domestic Inputs	8.8	3.4
<i>Total Domestic Inputs</i>	189.2	----
Imports	66.2	25.9
<i>Total Inputs</i>	255.4	100.0
Employment	3780	----

Table 4: Output and employment impacts of forestry for the year 2003.

OUTPUT					
	Direct	Indirect	Induced	Type 1	Type 2
€ millions	255.38	63.85	153.23	319.23	472.45
Multipliers	1.00	0.25	0.60	1.25	1.85
EMPLOYMENT					
	Direct	Indirect	Induced	Type 1	Type 2
FTEs	3780	869	2533	4649	7182
Multipliers	1.00	0.23	0.67	1.23	1.90

economy. The type 2 employment multiplier is 1.90. For every 100 jobs in the forestry sector an extra 90 full-time equivalent jobs are provided in other sectors of the economy. The results indicate that €255.4 million is the direct output in the forestry sector (year 2003). When the other impacts are taken into account, the overall value of forestry to the Irish economy is €472.4 million. Using Phillip's (2003) estimate (cited in Bacon and Associates 2003) of total direct employment in forestry (i.e. 3,780) the overall employment related to forestry sector activities is estimated to be 7,182.

Contribution of the wood and wood products sector to the national economy

An overview of the economic expenditures for industries involved in the wood and wood products sector is given in Tables 5 to 7 (CSO 2005). Total direct employment in this sector is 6,870. The "other wood products" has the largest share of employment (66.3%), followed by the sawmill sector (23.4%).

The panelboard sector has the smallest share of employment (10.3%). In contrast, this sector has the highest per capita wage of €42,553. This is followed by the sawmill sector with an average per capita wage of €30,491. The lowest import levels are in the sawmill sector. Only 21.3% of its total inputs are imported.

Table 5: Panelboards - direct expenditure (€ million –2003) and employment (units).

	EXPENDITURE	% OF TOTAL SPEND
Total Intermediate Inputs	60.9	34.8
Wages and Salaries	30.0	17.1
Profits	28.8	16.5
Net Other Domestic Inputs	3.9	2.2
<i>Total Domestic Inputs</i>	123.6	-----
Imports	51.4	29.4
<i>Total Inputs</i>	175.0	100
Employment	705	-----

Table 6: Sawmills - direct expenditure (€ million –2003) and employment (units).

	EXPENDITURE	% OF TOTAL SPEND
Total Intermediate Inputs	128.7	40.2
Wages & Salaries	49.0	15.3
Profits	60.3	18.8
Net Other Domestic Inputs	14.0	4.4
<i>Total Domestic Inputs</i>	252.0	----
Imports	68.3	21.3
<i>Total Inputs</i>	320.3	100
Employment	1607	-----

Table 7: Other wood products - direct expenditure (€ million –2003) and employment (units).

	EXPENDITURE	% OF TOTAL SPEND
Total Intermediate Inputs	196.9	41.0
Wages & Salaries	97.0	20.7
Profits	41.5	8.7
Net Other Domestic Inputs	16.6	3.5
<i>Total Domestic Inputs</i>	352.5	----
Imports	127.2	26.6
<i>Total Inputs</i>	479.7	100
Employment	4558	-----

The contribution of the three wood products sectors to GNP is also calculated. Using the figures given in Tables 5, 6 and 7, the GVA for the panelboard sector is €62.7 million (i.e. wages and salaries plus profits plus net other domestic inputs), for the sawmill sector the GVA is €123.3 million while the GVA for the other wood products sector is €155.1 million. Thus the total GVA for the three sectors is €341.1 million. As the profits in the panelboard sector are largely repatriated (the companies in this sector were mostly foreign-owned at the time of this study) these should be excluded from GVA, yielding a value of €312.3 million. This represents 0.27% of GNP.

Information presented in Tables 8, 9 and 10 represents the total impacts (direct, indirect and induced) in the economy as a result of expenditure in the panelboard, sawmill and other wood products sectors in 2003. Impact estimates are not directly aggregateable with the data presented in Table 4 due to an overlap in indirect and induced impacts. General comparisons do, however, further support the conclusion regarding the importance of these sectors to the Irish economy. For example, there were 12,246 full-time equivalent (FTE) jobs associated with the three processing sectors in 2003. This is 70% more than the total employment attributable to the forestry sector alone. Total related expenditure of the three sectors is €1.65 billion. This is nearly 3.5 times the forestry sector figure of €472.4 million.

Table 8: Panelboards - expenditure and employment impacts – Year 2003.

OUTPUT					
	Direct	Indirect	Induced	Type 1	Type 2
€ millions	175.0	43.8	63.0	218.8	281.8
Multipliers	1.00	0.25	0.36	1.25	1.61
EMPLOYMENT					
	Direct	Indirect	Induced	Type 1	Type 2
FTEs units	705	162	317	867	1184
Multipliers	1.00	0.23	0.45	1.23	1.68

Table 9: Sawmills - expenditure and employment impacts – Year 2003.

OUTPUT					
	Direct	Indirect	Induced	Type 1	Type 2
€ millions	320.3	99.3	128.1	419.6	547.7
Multipliers	1.00	0.31	0.40	1.31	1.71
EMPLOYMENT					
	Direct	Indirect	Induced	Type 1	Type 2
FTEs units	1607	514	691	2121	2812
Multipliers	1.00	0.32	0.43	1.32	1.74

Table 10: Other wood products - expenditure and employment impacts – Year 2003.

OUTPUT					
	Direct	Indirect	Induced	Type 1	Type 2
€ millions	479.7	95.9	249.4	575.6	825.0
Multipliers	1.00	0.20	0.52	1.20	1.72
EMPLOYMENT					
	Direct	Indirect	Induced	Type 1	Type 2
FTEs units	4558	957	2735	5515	8250
Multipliers	1.00	0.21	0.60	1.21	1.81

Contribution of forestry to the regional economies

The study also investigates the economic impact of the forestry sector at regional level. Previous work carried out by Moloney and O'Sullivan (2003) was used to produce three regional tables. Table 11 provides the estimates of direct expenditure and employment for each of the three regions. The West has the largest forestry sector, with €55.51 million (21.7% of national total) in direct expenditure occurring in this region.

Using the data shown in Table 11 and multipliers calculated from the regional input-output tables, the overall impact of the forestry sector in the specific regions is determined (Table 12).

Table 11: Forestry - direct expenditure and employment in three regions – Year 2003.

REGION	DIRECT EXPENDITURE (€ MILLIONS)	EMPLOYMENT (UNITS)
West	55.51	822
South-West	33.30	493
Mid-East	44.42	657
State	255.38	3780

Table 12: Expenditure and employment impacts of forestry for the year 2003 by Region.

SOUTH-WEST					
Expenditure					
	Direct	Indirect	Induced	Type 1	Type 2
€ millions	33.30	4.33	9.99	37.63	47.62
Multipliers	1.00	0.13	0.30	1.13	1.43
Employment					
	Direct	Indirect	Induced	Type 1	Type 2
FTEs units	493	59	128	552	680
Multipliers	1.00	0.12	0.26	1.12	1.38
WEST					
Expenditure					
	Direct	Indirect	Induced	Type 1	Type 2
€ millions	55.51	6.11	13.88	61.62	75.50
Multipliers	1.00	0.11	0.25	1.11	1.36
Employment					
	Direct	Indirect	Induced	Type 1	Type 2
FTEs units	822	90	181	912	1093
Multipliers	1.00	0.11	0.22	1.11	1.33
MID-EAST					
Expenditure					
	Direct	Indirect	Induced	Type 1	Type 2
€ millions	44.42	9.33	15.55	53.75	69.29
Multipliers	1.00	0.21	0.35	1.21	1.56
Employment					
	Direct	Indirect	Induced	Type 1	Type 2
FTEs units	657	85	184	742	926
Multipliers	1.00	0.13	0.28	1.13	1.41

Impact of afforestation scenarios

Based on Moloney (2003), Bacon and Associates (2003) and the authors' survey data, Table 13 gives the breakdown of the expenditure on the development of 15,000 hectares in 2003. Excluding the premium payments, total expenditure is €34.80 million. This involves the purchase of materials worth €13.57 million and €21.23 million in labour costs. The sectoral employment related to this expenditure is 2375 FTEs (Phillips 2003, cited in Bacon and

Associates 2003). This employment is broken down between the nursery (603 FTEs) and establishment (1,772 FTEs) sectors. The estimated yearly value of premiums is €5.6 million.

The first scenario examines the impact on the economy of an afforestation programme of 15,000 ha for 5 years (2006-2010). The economic activity associated with this afforestation programme is two-fold. First, there is the expenditure on afforestation, i.e. €34.80 million per year (Table 13). Second, there is the income received by the landowners in the form of premiums which amount to an estimated €5.6 million annually on 15,000 ha. Table 14 provides an estimate of the direct and total impacts associated with the expenditure on establishing 15,000 ha per year. The results exclude premiums, which are dealt with separately. Given a direct expenditure of €34.80 million and based on a gross output multiplier of 1.85 for the forestry sector, the overall expenditure in the economy due to afforesting 15,000 ha is €64.38 million per year. The related direct employment is 2,375 FTEs. The sectoral employment multiplier is 1.9, meaning that the total employment related to the establishment of 15,000 ha is 4,513 FTEs.

The annual value of premiums associated with 15,000 ha of land afforested is estimated to be €5.6 million (see Table 13). Thus an annual afforestation rate of 15,000 ha for 5 years attracts €84.0 million in premium payments (i.e. €5.6 million x (5+4+3+2+1)) due to the cumulative nature of these payments (Table 15). The indirect and induced effects associated with these premiums amount to €68.88 million resulting in a total value of €152.88 million. The overall employment impact from this stream of income is 542 FTEs.

Table 13: Expenditure and income related to the afforestation of 15,000 ha – (2003 prices).

CATEGORY	€ MILLION
<i>Expenditure</i>	
Plants	9.29
Planting	5.89
Cultivation	7.88
Fertilisation	3.49
Fencing	8.25
Total	34.80
<i>Income</i>	
Premiums	5.60
Overall Yearly Total	40.40

Table 14: Total expenditure and employment associated with an annual afforestation rate of 15,000 ha (excluding premiums).

	DIRECT	INDIRECT + INDUCED	TOTAL
<i>Expenditure</i>			
€ millions	34.80	29.58	64.38
Multipliers	1.00	0.85	1.85
<i>Employment</i>			
FTEs units	2375	2138	4513
Multipliers	1.00	0.90	1.90

Table 15: Total expenditure and employment impacts associated with forestry premiums on 15,000 ha for 5 years.

	DIRECT	INDIRECT + INDUCED	TOTAL
Premiums (€ million)	84.00 ¹	68.88	152.88
Multipliers	1.00	0.82	1.82 ²
Average Yearly Employment (FTEs units)	-----	542	542

¹ 15*5.6² Household expenditure multiplier

Table 16 shows the overall impact of planting 7,5000 ha/year and 15,000 ha/year for 5 years. The table is a combination and consolidation of the previous two tables. In the case of 15,000 ha per year, the average yearly expenditure is €64.38 million and the annual value of premiums is €30.57 million (from Table 15, €152.88 million/5). Thus the total economic activity associated with 15,000 ha afforestation is €94.95 million per year. The total employment associated with this activity is 5055 (i.e. from Tables 14 and 15) yielding an average annual value of 1011. Assuming fixed production coefficients, similar results for an annual afforestation rate of 7,500 ha are produced (Table 16).

The above section indicates the gross impact (both direct and indirect) of the specified annual afforestation rates. It is a gross impact because it does not take account of the alternative uses to which the land could be put to if not afforested. The following section examines the net impact of an afforestation rate of 15,000 ha by taking into account these alternative uses. To do this it is assumed that the land afforested will be previously farmed, either to rear cattle or sheep.

Data on expenditure and income related to the two farming systems of interest were drawn from the Teagasc National Farm Survey (NFS) (Connolly et al. 2004) (Table 17). In any farming system there is expenditure on inputs and overhead costs (i.e. direct and overhead costs in the NFS). Also there is the expenditure of the “profit” from farming as represented by the family farm income in the NFS. The annual economic activity arising from cattle rearing on 15,000 ha is €7.99 million in expenditure and €4.17 million in family farm income (FFI). Similar values for the sheep enterprise are €7.41 million and €5.19 million respectively.

Table 16: Average annual economic activity, and total economic activity over 5 years, associated with various afforestation rates.

ACTIVITY	7,500 HA		15,000 HA	
	Per year	5 years	Per year	5 years
Expenditure (€ million)	32.19	160.95	64.38	321.90
Premiums (€ million) – 4 years	15.29	76.44	30.57	152.88
Total	47.48	237.39	94.95	474.78

Table 17: Direct economic activity associated with two farming systems (per year and for 5 years).

	€ PER FARM	€ PER HA	€ MILLION PER 15,000 HA	€ MILLION PER 15,000 HA FOR 5 YEARS ¹
<i>Cattle Rearing</i>				
Gross output	21,403	811	12.16	182.41
Direct payments	10,850 ²	411	6.16	92.47
Costs (direct + overhead)	14,066	533	7.99	119.88
Family farm income (FFI)	7,337	278	4.17	62.53
Farm size (ha)	26.4			
<i>Sheep Farming</i>				
Gross output	31,316	839	12.59	188.90
Direct payments	15,580	418	6.26	93.98
Costs (direct + overhead)	18,417	494	7.41	111.09
Family farm income (FFI)	12,900	346	5.19	77.81
Farm size (ha)	37.3			

¹ These are the figures in the previous column multiplied by 15 to represent the cumulative nature of activity

² Includes REPs payments

Accounting for the indirect and induced economic activity the total economic activity associated with cattle rearing and sheep farming on 15,000 ha for 5 years is €302.80 million and €317.35 million respectively (Table 18).

In determining the costs/gains to the national economy associated with switching from agriculture to forestry it is essential to take into account “stacking”, i.e. that it will be possible for some farmers who afforest to continue to attract their full farming income entitlements under the single payment scheme while also receiving forestry premiums for the land afforested. For the purposes of this analysis two additional scenarios are therefore considered:

- a) stacking is not possible on the 15,000 ha per annum of land being considered:
- b) stacking is possible on the 15,000 ha per annum of land being considered.

Table 18: Total economic activity associated with two farming systems on 15,000 ha for 5 years (€ million).

	DIRECT	INDIRECT +INDUCED	TOTAL
<i>Cattle rearing</i>			
Economic activity	182.41	120.39	302.80
Multiplier	1.00	0.66	1.66
<i>Sheep farming</i>			
Economic activity	188.90	128.45	317.35
Multiplier	1.00	0.68	1.68

Table 19 shows the net impact on economic activity arising from an annual afforestation programme of 15,000 ha for 5 years assuming stacking of direct payments is not possible on any of the land afforested. In this case the economic activities associated with running the farm are lost to the economy (i.e. the expenditure on inputs and the family farm income) if the land is afforested. This analysis shows that the net effect on the economy of an afforestation programme of 15,000 ha for 5 years if it occurs on land that is used for cattle rearing is €171.98 million, or €157.43 million in the case of sheep farming.

The economic impact of switching from agriculture to forestry where stacking of direct payments is possible was also examined. First, the total economic activity associated with direct payments (from Table 17) for the two farming systems is calculated. This was shown to be €168.29 million in the case of cattle rearing and €171.04 million in the case of sheep farming (Table 20).

The net economic activity associated with an afforestation programme of 15,000 ha for 5 years where farmers retain single payments on the entire area planted is €340.27 million where forestry replaces cattle rearing and €328.47 million where forestry replaces sheep farming (Table 21).

In undertaking this scenario analysis only the direct and overhead costs of the two farming systems examined were considered. This assumes that forestry replaces a “steady-state” farming system already in existence thus the investment costs of machinery and buildings in the two farming systems have not been taken into account.

Table 19: Net impact on economic activity (€ million) arising from an afforestation programme of 15,000 ha for 5 years (assumes no stacking of agricultural payments).

ACTIVITY	TOTAL ECONOMIC ACTIVITY	NET ECONOMIC ACTIVITY
Forestry replacing cattle rearing	474.78 less 302.80	171.98
Forestry replacing sheep farming	474.78 less 317.35	157.43

Table 20: Total economic activity associated with direct payments for two farming systems on 15,000 ha for 5 years (€ million).

	DIRECT	INDIRECT +INDUCED	TOTAL
<i>Cattle rearing</i>			
Economic activity	92.47	75.82	168.29
Multiplier	1.00	0.82	1.82
<i>Sheep farming</i>			
Economic activity	93.98	77.06	171.04
Multiplier	1.00	0.82	1.82

Table 21: Net impact on economic activity (€ million) arising from an afforestation programme of 15,000 ha for 5 years (assumes stacking of agricultural payments).

ACTIVITY	TOTAL ECONOMIC ACTIVITY	TOTAL VALUE OF DIRECT PAYMENTS	NET ECONOMIC ACTIVITY
Forestry replacing cattle rearing	474.78 less 302.80	168.29	340.27
Forestry replacing sheep farming	474.78 less 317.35	171.04	328.47

Socio-demographic, economic and forestry background of the three case study areas

Newmarket case study area

Newmarket is located in the north-western part of Co Cork, close to the border with Co Limerick and Co Kerry. In total 56% of the CSA is in Co Cork, 23% in Co Limerick and 21% in Co Kerry. The area is essentially rural with three towns situated on its periphery, namely Castleisland in the west, Newcastle West in the north and Mallow in the south-east. Although rural, the area is quite close to Cork city with the south-east border no more than ten miles from the city. The central part of the case study area coincides approximately with the ancient barony of Duhallow. Today it is known as the Duhallow Region and is designated as a disadvantaged area (i.e. Objective one area) *vis à vis* the allocation of EU structural funds.

The population density is quite low reflecting the rural character of the area. From 1946 to 1971 the CSA experienced a constant decline in its population (Table 26, Annex 3). The 1981 census showed an increase in the population but since then the population in this area has been at best stagnating. Employment figures show the current importance of the secondary and tertiary sector and the decline in the numbers employed in the primary sector. Between 1981 and 2002 the share of employment in the primary sector fell from 33% to 10%. In the same period the tertiary sector increased its share from 38.3% to 61.9% while the secondary sector's share remained roughly the same.

Forestry in this area is essentially confined to high grounds (80% of Coillte afforestation took place at elevations of 200 m or greater). This is reflected in the main soil types, i.e. podsols and boglands (28% and 54% of area respectively), on which these forests were established. Just over 34 % of the forest area in the case study is privately owned. These privately owned forests are predominantly on poorer soils and higher grounds, as well as on steep valley slopes which are often difficult to cultivate. They are also found on wet parts of farms where land drainage for agriculture proved ineffective.

Afforestation in this area has been subject to controversy since the early 1990s when the Coillte estate started to expand. Increased demand for land for afforestation resulted in an increase in land prices. Farmers who wished to extend their holdings could not afford it and forestry was then perceived as a depopulating agent (Crowley 1998). In 1993, an action group based in the Cork/Kerry border also started to challenge what they called the "blanket afforestation" of the area and its associated ecological and social impacts (The Kingdom Newspaper 1993). Similar concerns were brought up in the neighbourhood of Rockchapel village, which is located approximately 10 km north of Newmarket. More recently another dispute related to afforestation in Coolea at the southern border of Newmarket CSA was highlighted (Ketch 2003). In this case a local resident group objected to the afforestation of a 33 ha site by Coillte in partnership with a local farmer on the basis of the absence of a consultation process with the local community.

Three mountain ranges characterise the area, they are clockwise from north: the Mullaghareirk, the Ballyhoura and the Boggeragh Mountains. The south of the case study area is criss-crossed by the Blackwater River system. Dairying is a major farm enterprise in this area. Tillage (essentially sugar beet) is also quite substantial but is confined to the most fertile sites on the south and eastern part of the CSA. There are strong regional variations in terms of the size of farms and farm incomes. Farms located on lower grounds that are mainly

specialised in dairying and tillage production tend to be bigger and more economically viable than smaller scale farms located in the hills. The latter essentially rely on cattle and sheep farming.

The Duhallow region served as a case study for research conducted by Teagasc (Frawley et al. 2002) regarding low-income farming and rural poverty. The study used household incomes as the main indicator of social exclusion, along with a set of deprivation indicators to measure participation of households in community life. The study showed that 36% of the farmers in the Duhallow area were in poverty. The average farm size owned by these “impoverished” farmers was 28 ha. The study further showed that those most at risk of poverty were drystock farmers as well as those farming less than 20 ha and/or operating hill farming.

The decline in population combined with the prevalence of low income farming in the Duhallow area encouraged a group of people to come together in the late 1980s with the objective of improving the quality of life in the rural area and to “stem the decline in population”. This group initially called the “Blackwater Valley Tourism and Fishing Development” later came under the umbrella of IRD (Integrated Rural Development) Duhallow. This community-based company was established in 1989 and currently administers many programmes and initiatives aimed at encouraging rural development and combating social exclusion.

A summary of the main socio-demographic and forest parameters for the Newmarket CSA is given in Figure 1.

There are eight industries involved in the forestry sector (including Coillte) in the Newmarket case study area (Table 22). The figures refer only to businesses that are based (i.e. their offices are located) in the case study area and do not account for operators that may be involved in the case study but are based outside the area.

Figure 1: The main socio-demographic and forest characteristics of the Newmarket case study area.

- ▶ Rural and remote area but relatively close to Cork City
- ▶ Share between economic sectors:
 - Primary: 10%
 - Secondary: 28%
 - Tertiary: 62%
- ▶ Change of population between 1946-2002: -8.6%
- ▶ Population density: 27 persons/km²
- ▶ Proportion of total area farmed (AUA): 73%
- ▶ Average farm size: 35.3ha
- ▶ Proportion of total area under forest: 13.4%
- ▶ Breakdown of forest ownership:
 - Private: 34.2%
 - Public: 65.8%
- ▶ Breakdown of species:
 - Broadleaf: 10.4%
 - Mixed: 2.6%
 - Conifer: 87.0%

Table 22: Forest industries in the Newmarket case study area.

SECTOR	NUMBER OF FIRMS
Establishment	4 establishment contractors
Maintenance	3 management companies
Harvesting	None
Processing	None
Coillte	43 employees of which 28 live in the CSA

Shillelagh case study area

Although situated in a rural area, the centre of the Shillelagh case study area i.e. Shillelagh village, is located within commuting distance of Dublin. It also benefits from being close to Wexford town, which is an important location for employment. Population levels within the CSA increased by 31% during the period 1946 to 2002 (Table 30, Annex 3). This trend is probably a consequence of its proximity to the capital and the developing commuting pattern of people to work in the capital and live in the southern counties (i.e. Co Wicklow, Carlow and Wexford). The fact that almost 65% of employment is in the tertiary sector reflects this tendency.

Shillelagh village is located in Co Wicklow but a large part (i.e. 35%) of the CSA also encompasses the north of Co Wexford and the eastern part of Co Carlow. Counties Wicklow and Wexford together represent 60% of the total population of the CSA and 67% of the total area. There are important landscape and farming variations along both the north-south and east-west axes. In the north of the CSA, where uplands dominate, sheep farming is the main activity. Moving to the southern and eastern part, tillage becomes more dominant, often associated with drystock farming. Farm holdings over 50 ha are well represented in the area. These variations in farming activity reflect important differences both in soil quality and elevation within the case study area: the uplands are dominated by podzols while brown earth soils compose half of the land in Co Carlow at the eastern part of the CSA.

Forestry has a strong legacy in this area, not only in the vicinity of Shillelagh but also in Co Wicklow as a whole and to a lesser extent Co Wexford. During the last 100 years Co Wicklow has built up a stronger forestry tradition than most counties in Ireland. Avondale house, the first forest centre established in Ireland 100 years ago, is the symbol of this interest. The development of a forest-based industry in the county has been an important support to many rural economies (e.g. Glendalough, Glenealy, Aughrim, Shillelagh) and in some areas of rural Wicklow forestry still accounted for 40% of household incomes in 1999 (Wicklow County Council 1999). Part of the forest estate in the county consists of the remains of old demesne plantings that are of significant amenity value. Since the mid 20th century, the composition of plantations shifted from hardwoods to exotic conifers, the latter being essentially concentrated on upland areas. The variation in soil quality in the case study area also influences forest cover in the area. In Ireland the majority of forests are established on higher grounds and are characterised by podzols and bog land soils. The situation in this CSA is quite different as afforestation carried out by the state occurred essentially on podzolic soils (33%) and also for a large part on brown earth soils (22%). There is evidence that recent private afforestation is being carried out on better quality soils in the south of the CSA (i.e.

South Wicklow and North Wexford) allowing a shift in planting from conifer to broadleaved species.

A summary of the main socio-demographic and forest characteristics of the Shillelagh case study area is given in Figure 2.

There are 38 industries based in the forestry sector (including Coillte) in the Shillelagh case study area (Table 23).

Figure 2: The main socio-demographic and forest characteristics of the Shillelagh case study area.

- ▶ Close proximity with urban centres (i.e. Wexford and at commuting distance from Dublin)
- ▶ Forestry is part of the local history
- ▶ Share between economic sector:
 - Primary: 8.5%
 - Secondary: 27.0%
 - Tertiary: 64.5%
- ▶ Change of population between 1946-2002: +31%
- ▶ Population density: 47 persons/km²
- ▶ Proportion of total area farmed (AUA): 73.6%
- ▶ Average farm size: 42.2 ha
- ▶ Proportion of total area under forest: 9.6%
- ▶ Breakdown of forest ownership:
 - Private: 27.4%
 - Public: 72.6%
- ▶ Breakdown of species:
 - Broadleaf: 11.7%
 - Mixed: 7.3%
 - Conifer: 81.0%

Table 23: Forest industries in the Shillelagh case study area.

SECTOR	NUMBER OF FIRMS
Establishment	4 nurseries, 10 establishment contractors
Maintenance	3 management companies
Harvesting	3 harvesting contractors
Processing	17 sawmills
Coillte	49 employees of which 10 live in the CSA

Arigna case study area

Arigna village is located in Co Roscommon very close to the border with Co Leitrim. These two counties form 64% of the CSA. Parts of counties Cavan and Sligo are also included within the CSA. However the most representative county for this CSA is probably Leitrim as 90% of the total area of this county falls inside the CSA and 90% of its population lives in the CSA. The area is known for its coal mining history. Mining was carried out in Arigna for

400 years until 1990 when the last mine closed. Today an interpretative centre, opened in Arigna village in 2003, testifies to this cultural and historical heritage.

The demography in this area is characterised by a constant decline in the population over the past decades. Between 1946 and 2002 the population dropped by 34% and even over the period 1981-2002, when the rest of the country was experiencing an increase in its population, the population in this area declined by 3% (Table 28, Annex 3). Figures on employment show the importance of the primary sector with 14% of the persons at work employed in this sector (Figure 3). However, there has been a major shift in the sectoral employment over the past two decades: from 1981 to 2002 the primary sector's share decreased by 28.2% while the tertiary sector's share increased from 35.2 to 60%.

The development of forestry in this area coincided with the downturn in agriculture. Farmland made available in the 1960s following this downturn was bought by the state for afforestation. However, since 2000, Coillte dramatically decreased its purchase of new lands for forestry. In contrast the private forest estate has expanded in the case study area since the beginning of the 1990s. Figures from the Forest Service show a very high proportion of non-farmers involved in private afforestation: in 1992 they were responsible for about 50% of the total area planted that year in Counties Roscommon and Leitrim and in 2000 they were responsible for 42% and 21% of the total areas planted in those counties respectively. In contrast non-farmers were responsible for only 1.5% and 2% of the areas afforested in Counties Wexford and Wicklow respectively in 2000.

The CSA shows regional disparities in landscape and farming from north to south. High elevations characterise the northern part of the CSA with a dominance of drystock farming

Figure 3: The main socio-demographic and forest characteristics of the Arigna case study area.

- ▶ Essentially rural area. No close proximity with urban centre
- ▶ Strong reliance on agriculture
- ▶ Share between economic sectors:
 - Primary: 14%
 - Secondary: 26%
 - Tertiary: 60%
- ▶ Change of population between 1946-2002: -34%
- ▶ Population density: 19 persons/km²
- ▶ Proportion of total area farmed (AUA): 60.3%
- ▶ Average farm size: 23.9 ha
- ▶ Proportion of total area under forest: 11%
- ▶ Breakdown of forest ownership:
 - Private: 42.2%
 - Public: 57.8%
- ▶ Breakdown of species:
 - Broadleaf: 13.0%
 - Mixed: 2.0%
 - Conifer: 85.0%

and a high proportion of rough grazing. The majority of farm holdings are less than 25 ha. The southern part of the CSA is characterised by lower elevations with drystock farming still the dominant farming system but dairy farming becomes more important as one moves from the Roscommon to the Sligo border.

The Arigna area has experienced very strong opposition to forestry development in the past and resistance is still present. The background to this opposition is outlined below. Growth rates for trees are high on the wet mineral soils of Leitrim and its surrounds. As highlighted earlier the State began to purchase land for afforestation in these areas in the 1960s. Emigration from this part of Ireland was high at the time (as it was throughout the country). As the population declined, people began to associate tree planting with rural depopulation and the perception developed that “trees replaced people” (Sweeney 1983). The antipathy towards forestry continued when EU funding made afforestation attractive to the private sector. Uptake of this grant-aid by farmers was initially limited but financial and commercial institutions recognised the potential of forestry. The inflation-proof aspect of forestry and the tax-free capital gains on plantation maturity made investing in forestry particularly attractive (Neeson 1991). An additional incentive was that rotation lengths typically matched the duration of pension funds (35-40 years). All these factors, coupled with the availability of grant-aid for forest establishment to non-farmers (albeit at a lower rate to what farmers were receiving), prompted these institutions to buy land and afforest it. Local landowners did not welcome the prospect of a competitor for the land they expected to have an opportunity to buy in order to consolidate their small holdings. The purchase of land by institutions, which were more often than not based in Dublin, was also reminiscent of the days of the absentee landlord. This opposition culminated in 1987 when damage was caused to machinery that was being used in afforestation within the case study area (Guckian 1987). Some of the quotes in local newspapers at the time demonstrate the strength of the opposition to forestry: “the issue of present day forestry policy is essentially a question of the survival of Leitrim’s population or their replacement by multi-national trees” (Guckian 1987). People in the area believed that forestry replaced people and was some form of sinister depopulating force (Gallagher 1991). More recently a study by O’Leary et al. (2000) examined the perceptions of forestry held by a sample of Co Leitrim’s population. Their main findings were that the majority of those interviewed considered the extent of forest cover in their county to be excessive. They also believed that forestry occupied land that should be used for agriculture. Interestingly, those interviewed ranked the importance of the ecological functions of forests higher than the economic ones. In contrast, Frawley (1998) found that farmers who had afforested land in the region were satisfied with their decision to plant trees. Commenting on this contrast, O’Leary et al. (2000) suggest that the primary reason for the negative attitudes to forestry in Leitrim is prejudice.

There are 38 industries involved in the forestry sector (including Coillte) in the Arigna case study area (Table 24).

Values and perceptions

The analysis of the interviews allowed the identification of various issues and perceptions in relation to forestry within each of the case study areas. These issues are collated under three main themes:

Table 24: Forest industries in the Arigna case study area.

SECTOR	NUMBER OF FIRMS INVOLVED
Establishment	14 establishment contractors
Maintenance	1 management company
Harvesting	3 harvesting contractors
Processing	4 sawmills/1 panelboard mill
Coillte	43 employees of which 8 live in the CSA

- Forestry and the local community;
- Forestry and the environment;
- Forestry and its potentialities.

It is important to note that what is recorded in these results are the opinions and perceptions of those surveyed. Where appropriate, direct quotes from those interviewed are presented to illustrate the perceptions. The case study area from which the quote arises is indicated by the first letter of the name of the area (i.e. N for Newmarket, S for Shillelagh and A for Arigna).

Overall, the opinions of those interviewed of forestry varied between the three case study areas. In the Newmarket case study area strong opposition to forestry was expressed. This opposition was based on a number of perceptions including the limited impact of forestry on the local community as well as its negative impacts on the environment. In Arigna opposition to forestry continues albeit less strongly voiced that has been the case previously. In contrast, the views of forestry expressed by those interviewed in Shillelagh were positive.

Forestry and the local community

In the three case study areas the employment impact of forestry was discussed. In both Newmarket and Arigna concerns regarding the monitoring and consultation process involved in afforestation were expressed and the role of farm forestry in local communities alluded to. The historical and cultural context of forestry in the Arigna and Shillelagh areas was also discussed.

Local Employment: Many of those interviewed highlighted the employment that forestry had generated in rural areas in the past. In the Shillelagh case study area, for example, the reliance of the economies of villages, such as Glenealy, Aughrim and Shillelagh, on forestry was mentioned.

Up to the 1970s the vast majority of the people around the village (i.e. Shillelagh) would have worked around the Coolattin Estate in the forest or on the farmland. (S)

Other parts of the Shillelagh CSA, such as those located in Co Wexford, were also involved in forestry through state forest nurseries up to the mid 1970s. A former forester, who worked for what was then the Forest and Wildlife Service, recorded a total of five nurseries in operation back in the 1960s. Most of these are still operating today, although not with the same amount of staff.

You will probably look at 600 people working between those 5 units back in the 1960s” ... In addition around 50 foresters would have been working in this area, that would have been around the time when they split the administration between forestry and wildlife. (S)

However, there was clear recognition that employment levels have fallen.

There wouldn't be that many people employed in forestry now compared to 10 to 20 years ago because there is not that much planting going on now. There are just a few people involved in forest maintenance and most of the harvesting and cutting is done by contractors. Not necessarily local people...So I suppose the forest economy is very small even in this area. (S)

Going back 20 years ago, when Coillte more or less started forestry development, I remember 22 people from this parish working for Coillte. For all the forestry here now there is only one full-time and two part-time jobs. (N)

Similarly, in Arigna, the lack of employment generated by the forests was referred to with particular reference to the type of forest being planted.

There is very little direct employment generated locally and harvesting work is mainly done by people from outside the area. (A)

The type of forestry that is done here involves big machinery that needs one or two operators. The labour input is very low. (A)

Professional foresters interviewed gave a number of reasons for this lack of employment. One was the changing nature of forest work: as the forest stands became more mature harvesting work took over from establishment work, involving more machine-based operations and less labour intensive work. Another argument given for the lack of employment related to the difficulty in relying specifically on locals for forest jobs.

People don't realise the potential forestry has to offer economically and socially. For example, a lot of harvesting work is carried out by people coming from Co Tipperary. Most of the employment generated is not local because people don't seize the opportunity. (N)

In Arigna, foresters surveyed highlighted that mechanisation was a fact of life in many industries including agriculture and forestry and that very few are willing to undertake the physically demanding work that is associated with manual work in forestry.

Surprisingly in Arigna, no mention was made of the employment generated by downstream industries especially given the presence of a large panelboard mill which is generating considerable employment in the area. A possible explanation for this was given by foresters in Newmarket who commented on the fact that people do not always make the connection between forestry and jobs that are created downstream and in allied sectors.

People don't make the link between forestry and employment. The main source of employment in the area is in the processing industry, mainly in the south of the County. Also there are a lot of truck drivers employed in the area. (N)

However, in Shillelagh, the employment generated by wood processing industries was recognised.

Sawmilling activity is everywhere. Particularly around Shillelagh and Aughrim. These give a lot of employment, particularly in Aughrim which is a rural location where you wouldn't have too much activity. This will have a very significant impact on the spending power of the local economy. (S)

Planning and Consultation Process: In both the Arigna and Newmarket CSAs dissatisfaction was expressed with the planning and consultation process that pertains to forestry development. In particular opinions were expressed that afforestation developments that are not currently subject to an impact assessment procedure (i.e. developments less than 50 ha) should still be subjected to some form of appraisal as they too have impacts for people living nearby.

The planning procedure for plantations under 50 ha is totally unsatisfactory because you can get a group of four houses totally surrounded by forests and the people that are living in those houses never had the opportunity to make an objection. (N)

There are problems and certain areas get too much forestry. With a little more sensitivity in the planning process I think we can reach a balance that will be satisfactory for everybody. (N)

Concerns were also expressed about the environmental guidelines produced by the Forest Service over the past 15 years. Although the production of these guidelines was perceived by those interviewed as a positive move, it was felt that they should have been produced earlier demonstrating an absence of long-term planning in the approach to afforestation.

The approach to forestry was wrong: the guidelines were designed after the bulk of afforestation took place. There was no consideration for land suitability prior to afforestation, such as bogs that should have never been planted because they are important for the community as a whole. There is no long-term management regarding land use and forestry. (N)

Related to the issue of planning is the consultation process. For local communities, the placement of adverts in local newspapers (which is the official way people are notified of an afforestation proposal in their community) as part of the consultation process is not satisfactory. In general, the need for a much more straightforward approach to consultation was expressed.

At this point in time planning should involve more consultation with local communities. Consultation is the key to comprehension on both sides. (N)

Some foresters interviewed agreed with this sentiment and even took it a step further.

The lack of communication with locals has led to negative perceptions from the general public. The forestry sector should be supported by foresters through, for example, their involvement in environmental education and through direct consultation with the public. (N)

In Arigna the absence of a local contact to whom concerns regarding afforestation proposals can be brought was particularly highlighted.

Farm Forestry: Despite the general negative perceptions of forestry expressed in Newmarket, farm forestry was seen as a suitable alternative to farming and as a welcome complement to farm incomes, especially for those operating hill farms.

What was the other alternative offered to farmers anyway? Social welfare received every month through the post was not an alternative for me. (N)

Similar to other parts of the country, it was mostly reclaimed lands or lands too poor or wet for any viable farm production that were afforested in the Newmarket CSA. Typically the farmers interviewed would not consider planting good quality land and some complaints were made about the lack of monitoring of the quality of land considered for afforestation.

You never see anybody visit and monitor the land before the agreement is given. Some of the lands allocated to forestry could have been of better interest to the community. Even some lands given to forestry could have been used for fattening cattle or even dairying. (N)

Mention was often made in Newmarket of the situation in the early 1970s when afforestation rates began to increase in Ireland and the Land Commission operated as a regulator ensuring that lands afforested were not suitable for farming. Indeed on some occasions lands bought by the government for afforestation were handed back to farmers. This was seen by the farming community as a positive interference and it deplored the absence of such a regulation system today.

When the process of afforestation started it was concentrated in the uplands. The Forestry Department was then buying farms and was swapping these lands with low quality ones with farmers, therefore keeping good lands for farming and low quality ones for forestry. This was perceived very positively by farmers. Now afforestation is expanding down hills and towards the valley and there is a feeling that even good quality farmlands have been planted. (N)

The increased representation of farmers in the afforestation programme was referred to in Arigna. As highlighted earlier, this area had experienced strong opposition to forestry, especially private afforestation, in the past thus the increased involvement of farmers in the afforestation programme was welcomed. Particular mention was made in this CSA of the Farm Partnership Scheme operated by Coillte.

Coillte now works on a leasing system. Farmers are leasing their lands for forestry, it is a partnership between themselves and Coillte. They get a bit of an income every year and then at the final stage they get a lump sum. Forestry now has begun to be seen as a type of farming. (A)

Forestry as Part of the Local History and Culture: It was only in Shillelagh that the clear sense of forestry being perceived as part of the local community came across in the interviews. This area has a long history of forest cover. What is left of the old demesnes that once covered this area is now essentially managed for amenity and conservation purposes. This type of forest cohabits with conifer plantations that are mostly located in upland areas. During the course of the interviews a number of people (both foresters and local inhabitants) mentioned the quality of the hardwoods (usually oak) that once grew in the area and the use of the hardwood

timber in prestigious buildings such as Westminster Hall or in supplying timber for the British navy.

The timber from the woods in Shillelagh has been used to build prominent buildings in London and also some ships that sailed on the high sea for many, many years. (S)

These testimonies generate an impression of pride but also a feeling of loss in that the management practices and skills that were once associated with the hardwood forests are now gone. Some foresters that have been involved in and know about the history of this area in part shared this feeling.

You feel that in addition to losing the quality of those timbers you also lost the skill of knowing how to grow them. If you go and ask a forester: would you mind putting this woodland back into full production potential - I don't know anybody that could do it. (S)

Such a forest culture is absent in Arigna and foresters interviewed in the area used this fact as an explanation for the opposition to forestry in that area.

Opposition to forestry is mainly due to a lack of forest history in this area... It is a fact of life that farming is changing and forestry is one of the visual illustrations of this in the landscape. (A)

However, it is clear that the way in which forestry developed in the Arigna area had a major bearing on attitudes there.

The area experienced very strong opposition to forestry about 10 years ago. The main reason for this was the introduction of pension schemes from investment companies. Big management companies were buying lands on behalf of these investment companies. Their clients were based everywhere, even the UK, but very few were from this area. (A)

The high proportion of non-farmers involved in the afforestation process in Arigna concerned the interviewees. For people inside the community the involvement of the private sector has led to competition between investors and local communities, to the detriment of the latter.

There is an unfair competition between forestry and private individuals regarding the purchase of lands. It was the case when Coillte was the main operator but it is still the case with the main management companies operating in the area. There is no regulation system that will give the priority on the purchase of lands to local communities. (A)

Funds initially targeting farming and rural communities were allocated to non-residents, and served individuals rather than community interests. (A)

The attitude in Arigna to Coillte and state forestry is much better. This was attributed, by those interviewed from both the professional and public side, to the public consultation process that now exists in Coillte which allows the views of the local community to be considered. According to foresters the implementation of a "Social Forum" seems to have played a role in this process. About three years ago Coillte invited applications from various organisations and NGOs (e.g. enterprise boards, local councils, universities, conservation

groups) and set up a panel for this forum. The forum meets twice a year to discuss issues arising from Coillte's forestry operations in the region. Field visits to forest sites are also organised. In parallel Coillte engages in sponsorship for local events and projects (such as Gaelic sport clubs and the Arigna Mining Centre) in an attempt to strengthen its relationship with local communities. Also the presence of a local Coillte office in the case study area allowed people to identify a local contact when issues related to forestry arose.

You may not agree with what they are doing but at least you have a contact. You can have your say. (A)

Contribution to Local Communities: The general public in Arigna often argued that forestry had not benefited local communities in the way it was meant to.

I don't think forestry has benefited the community the way it could have. It benefits certain individuals, certain companies, certain groups but in a very narrow way. (A)

Forestry is essentially perceived as a business venture rather than as a means to supplement a local and rural economy.

There is a pot there and there is a lot of very strong interest in forestry...I think that's one of the biggest problems about forestry, not equitable but may be more justice based in the distribution of the pot. (A)

Forestry and the environment

In Newmarket and Arigna common concerns were expressed regarding the perceived negative impact of forests on aspects of the environment such as the landscape and watercourses. In Arigna, concerns about the potential negative impact of forestry on archaeological features and walking routes was also mentioned. Those interviewed in these areas rarely, if ever, highlighted any positive environmental contributions that forests made. Yet in most cases it was a particular form of forest that interviewees referred to, namely, a coniferous monoculture. In contrast, in Shillelagh interviewees drew attention to the positive contributions of forests to the environment, particularly in terms of amenity and conservation.

Landscape: Overall there was a perception among those interviewed in Newmarket that forestry does not belong to the traditional Irish landscape or rather to the representation they have of the Irish landscape. However, forestry in this context almost always referred to commercial Sitka spruce plantations.

The open landscape is the real Irish landscape. The presence of forestry in this landscape doesn't make it attractive anymore for the tourists and the visitors. (N)

Those interviewed in Arigna shared these views and expressed opposition on landscape and cultural grounds to the types of forests they found around them.

Blanket afforestation is using non-indigenous species that are alien to the people and alien to the landscape. (A)

We have some concerns about blanket planting right up the side of the mountains, it has interfered too much with the landscape. (A)

The impact that forests have on the landscape led to feelings of isolation among some of those interviewed in Newmarket and Arigna.

I remember the time when the landscape was totally open and when you could see over the valley, keeping a visual contact with your neighbours. The expansion of forestry – especially down the valley – is creating a feeling of isolation. (N)

This perception of isolation was often associated with the representation people have of the landscape they live in.

The open Irish landscape is the reflection of the Irish personality.... Traditionally the landscape was open and people could see each other's houses and farms. Now the view is blocked by forests and people feel displaced by trees. (N)

Some of those interviewed in Newmarket expressed concern that the planning procedure as it relates to forestry does not take sufficient account of the integrity of the Irish landscape.

There should be more cohesion in the planning over the whole area; there should be a holistic approach to it. There is a strong sense that there is a loss of the traditional open Irish landscape and that should be considered too. (N)

While the main issue people have in the context of forests and the landscape relates to the species planted, some negative impacts of management practices on the landscape were referred to in the Newmarket area.

There are a lot of windblows in Sitka spruce plantations and that gives a feeling of desolation. (N)

There is no maintenance done on those trees. They were planted so close they are the size of a fishing rod. Also there are a lot of windblows in those forests and they don't seem to do anything about it. (N)

In Shillelagh forestry is an accepted part of the landscape and those interviewed were happy with the current level of forest cover. Yet, even here, people alluded to the importance of keeping forestry development under control so it does not negatively impact on the natural environment and the sceneries in this area. These are highly valued not least because of the economic value that they indirectly generate through the tourism and film industries. The current level of forestry development seemed acceptable to those interviewed and many felt that the Indicative Forest Strategy (IFS) developed for the county played a crucial part in maintaining the appropriate balance in land use.

If there were to be a major change in landuse to forestry that will of course involve the County Council. So that's why we have the Indicative Forest Strategy in order to guide people in the area. (S)

Filming is a big activity in Co Wicklow: 40 to 50% of films shot on location in Ireland are shot in this county. This has a lot to do with scenery, obviously if we didn't have the mountains and the forests we wouldn't have so many films shot here. (S)

There was also a concern that not only should forestry development be kept under control in Shillelagh but that a balance in species mixture should be achieved in order to respect the traditional character of the forest landscape.

Hardwoods are mainly the legacy of the former demesnes, the old estates... When the forestry programmes started in the late 40s, early 50s, 90 to 95% of what was planted was conifers. That's mainly what's there if you look around Wicklow. But now and again broadleaves are encouraged... We wouldn't want to see just a continuous line of conifers all over the place. (S)

Watercourses: In both Newmarket and Arigna forestry was perceived to have negative impacts on the watercourses. In Newmarket, the main river system present is the Blackwater which is renowned for fishing and is an important natural asset that local communities value.

We have floodings in the area that are more frequent than in the past. Forests were established essentially on uplands and on bog soils. These soils don't operate anymore as a water regulator. In this case the impact is felt up to towns such as Mallow and Fermoy and by urban dwellers too. (N)

We have a problem with the acidification process. This is a sensitive area because of the Blackwater which is renowned for fishing and angling. (N)

In Arigna forestry practices have been vigorously accused of causing the decrease in fishing stocks in the area. Trout fishing is an important tourism asset in the region. There has been a decline in this form of tourism and forestry is still considered responsible by both fishermen and tourism organisations, even though there is recognition that responsibility is probably shared.

It wouldn't be fair to let it all onto forestry and there is a big debate between foresters and farmers as to whose fault it really is but it is giving us concerns. (A)

Amenity value: Only in Shillelagh was the amenity value of forests mentioned. A large part of the area has high amenity value with many recreation and tourism activities being undertaken there. In particular the sceneries of the Wicklow mountains attract a considerable number of foreign tourists but they are also an important leisure area for urban dwellers living in the Dublin area. This is reflected in the fact that Coillte manages several forest parks in the CSA with recreational facilities such as picnic areas and forest walks. In general terms, those interviewed in Shillelagh seemed to consider that forestry is part of what makes the place attractive, although they found it difficult to identify the specific role forestry plays in the recreational experience.

This area is a recreational area for 25% of the country and there is a very good synergy between all the activities. So is that because forestry is there? I don't know but they go well together. (S)

There is a huge number of activities that can be done here and the fact that the Wicklow mountains are covered with forestry, it's a combination: the forestry and the mountains... the facilities are there so the tourism product is ideal. (S)

In both Arigna and Newmarket few of those surveyed referred to the amenity value of forests. Those who did were negative.

The Sitka spruce forests are of no interest as amenity woodland for people..... would be more acceptable for people if they had amenity woodlands with broadleaved species or with a mixture. (N)

The low amenity value of forests in general in the Newmarket area was confirmed by the foresters interviewed.

Forests in the area have a very low use for amenity; the main objective so far has been timber production. But the situation now is changing and we try to develop opportunities such as picnic areas and marked roads. We are also developing horse riding and long distance trails and we encourage a mixture with broadleaves in new afforestation sites. (N)

The one exception to the negative commentary on the amenity values was the case of the “Island Forest” in Newmarket. This forest, initially owned by Coillte, has been handed over to the local community. The forest is now jointly owned by the community and Coillte, the latter still benefiting from the extraction of timber from the woodland. This initiative was perceived very positively, not so much because an amenity area had been created close to the village, but for the benefit gained from Coillte and the local community working together on a common project.

Archaeology: Concerns were expressed in Arigna about the impact that forestry has on archaeological features. A traditional and historic feature of the countryside in the vicinity of Arigna is the presence of sweat houses. These constructions, built underground, were the ancestor of the public sauna. Sweat houses as old as 2,000 years have been recorded in this area and some of them were still in use up to 20 years ago. In particular there was a fear that the Forest Service’s archaeological guidelines would not be adequately applied. One interviewee mentioned that the implementation of these guidelines is left to the local forester.

They will agree with all that regulation but if the person (i.e. the forester) doesn’t care or doesn’t know and has no instructions then he won’t consider it (i.e. the archaeological feature). (A)

Open access to countryside/walking routes: In Arigna and Shillelagh many walking routes are found, including the Sligo Way and the Leitrim Way in Arigna. These routes are important in attracting tourists to the two areas. Parts of these routes cross forestry lands and their existence relies very strongly on the forest owner’s co-operation in allowing them through their lands. As private owners, essentially farmers, now undertake a substantial amount of afforestation there was a concern expressed that this trend could interfere with existing walking paths. It was felt that these should have open access, as is currently the way in Coillte forests.

In Arigna a number of forest walks have been set up in small woodlands and these are perceived as socially important and mainly for the benefit of the local communities. When asked about the use that they make of the forest for recreation purposes it became evident that the local people do not consider commercial forestry to be attractive enough for recreation.

I would like to walk in a woodland not in an artificial forest. To me there is something alien about it. They are not the type that should be there. (A)

The marked routes and walks were initially set up at the initiative of either the county councils or local community groups, but are now essentially supervised by the Tourist Board. A good relationship exists between the latter and Coillte regarding the management and forest operations that take place in forests that cross the routes. This relationship was initiated by Coillte.

They are proactive to us rather than us being proactive to them. (A)

However, there is a concern that as the commercial element of Coillte is emphasised and if the company were to be privatised it would be to the detriment of the amenity element of their policy.

We have seen their amenity budget over the last 10 years greatly cut and as they move to be much more commercial as a company their quality maintenance of some of the tourist amenities fell away a lot. (A)

Forestry plays an important role in the tourism industry: having proper walks through the forests and all that kind of thing. And one of the concerns that has been expressed and it is something we will have to keep an eye on: if Coillte is ever privatised we will have to ensure that the forest walks will remain open. Now the vast majority of what has been planted is private so it is something we will have to look at as well that is even the private ones will be kept open to a certain extent. (S)

As mentioned above, these marked routes and trails are set up at the initiative of local groups or a county council but the maintenance is the responsibility of the owner of the land they cross. The maintenance sometimes becomes an issue, particularly in the case of private ownership.

The community would install the work but the ongoing maintenance may not be clearly defined and that is a problem with the way marked routes, with the long distance routes. There is a national problem with the ongoing maintenance irrespective of whether they are Coillte lands or private lands. (S)

Importance of Preserving Natural Habitats (e.g. acidic oak woodlands): In Shillelagh the conservation and landscape values of forests within the region were referred to. There are, for example, a large number of areas within the CSA that have protected status as a result of being assigned an environmental designation such as Natural Heritage Area (NHA). The “Millennium Forest” project was a real success in this area. This project was set up in 1997 in order to protect and manage the remaining native woodlands of Ireland. This project is a joint venture with Coillte. Three “Millennium Forests” are located in the CSA (two in Co Wicklow and one in Co Wexford). Most of the woodlands identified for the “Millennium Forest” project were initially already benefiting from an environmental designation because of the ecological habitat they offer. One forester involved in this project gave a good summary of the change of approach with regards to the issue of conservation and forestry.

In 1963 or around that time this person was given the job to bring an axe and to ring-bark all the oak trees. They had planted Douglas fir and wanted to give a

chance to Douglas fir to establish.... Now it would be considered as a sacrilege.

(S)

Forestry and its potentialities

One of the aspects teased out during the course of the interviews related to the future role of forestry in the case study areas. What emerged was that many of those who had expressed negative opinions of forestry in the Arigna and Newmarket case study areas were able and willing to describe a form of forestry that was acceptable to them. In general, the views expressed in Arigna and Newmarket were that more space should be given to broadleaved and mixed forests and that farm forestry should continue to be encouraged, albeit on land not suitable for agriculture. The view that there should be “more control” exerted over forestry development in the future was also expressed. In Arigna the timber craft industry is well represented and is considered by those interviewed to be something that should be encouraged more. In Shillelagh the wish that more broadleaves be planted was also expressed. However, here the opinions of the future role of forestry were much more positive with interviewees hoping that the existing knowledge and management skills within the area would be built on and exploited to a greater extent.

Forest Management and Species: It was a commonly expressed opinion in both Arigna and Newmarket that some space should be left for a type of forestry other than commercial forestry. In fact people seem to object as much to the main species planted in commercial forestry as to the objective of that type of forestry.

It almost went too far down a particular road to be able to bring it back again. People got very strongly established, I understand people that are involved in Sitka spruce sites, particularly who put huge investment in harvesting processors. I understand there is a difference between softwood and hardwood and that it involves different machinery. I think the whole idea is to feel that there is a balance. (A)

There is no place for such type of forestry. We would have no objections with the normal forests: the oak, the ash, and the broadleaves. We would have no difficulties with that. But we have difficulties with this massive growth of Sitka spruce. (N)

It was clear that broadleaves were the preferred species type amongst those surveyed. Even some of those that had already planted coniferous forests indicated that they would have preferred to plant broadleaved species. Most of these were located in the lowland parts of Arigna. The general opinion was that it is more difficult to convince the Forest Service to provide grant-aid for broadleaved than for conifer plantations.

I know the argument that Leitrim soils are difficult for growing that sort of tree (i.e. broadleaf). But if you take our plantation as an example, a lot more sites could have been broadleaves. I know a lot of people who would have been in the same situation as me who wanted to plant broadleaved trees but the forestry inspector would have said no. (A)

There is general acknowledgment that broadleaves require a long-term management approach. One argument put forward is to extend the duration of premium payments (currently 20 years) for broadleaf planting.

If you plant up your land and 20 years you get a grant for that and then at the end of the 20 years you don't get anything. They should continue the grant for broadleaves for more than 20 years because it takes a long time to produce. (A)

There was also an acceptance that broadleaves cannot be introduced everywhere because of site constraints. However, some argued that broadleaves could be introduced on suitable sites and that this introduction may be of some commercial and ecological benefit in the future if a long-term management approach is adopted.

Some soils here are quite fertile but it's very patchy: you can have a big oak or some ash and somewhere else you will be better planting alder because it is so damp. (A)

They talk about non-wood products. About ecology, just to have a genetic diversity instead of reducing all your forest to one or two species. (A)

The main argument against planting broadleaves is that it is not commercial. That it is not sustainable because rotations are much longer... But you have to take a longer term approach with broadleaves. (A)

The interest in broadleaves in Arigna is also related to the presence of a number of small-scale businesses within the area that rely on these species for raw material. One interviewee that planted broadleaves was involved in a timber structure houses project.

I have been planting trees and hopefully I will be able to utilise them for wood construction for myself and for a lot of other people around this area that will be for craft; like making rustic furniture. (A)

I suppose the general feeling outside this area is that forestry is a welcome development and it would be here too if this development was controlled. ... If it was not too intrusive and included a mixture with broadleaves. (A)

In Shillelagh, although there was a general acceptance of the current species mix and an understanding of the economic rationale for conifer plantations, there was also a demand and a concern that a balance should be achieved with other species.

I see forestry as a way of farming as well as an industry in itself. But I would like to see more indigenous trees. I understand the economic reasons for growing the Sitka spruce but I would much prefer to see, especially in this area where there is an history of oak, more broadleaves. (S)

Farm Forestry: Even though farmers often expressed reserved, if not negative opinions towards forestry, there was recognition that afforestation schemes offered farmers the possibility to increase farm incomes. This was particularly true for those operating hill farming and/or small-scale farms.

For farmers it is recognised as an alternative choice even though it is often the last choice. (N)

When afforestation programmes started they offered a means to farmers to complete their incomes and to obtain revenue from lands that were not suitable for farming. It was especially appropriate in the north of the county where farming has always been small-scale and with low incomes. (N)

Farmers in both Shillelagh and Newmarket believed that forestry should be restricted to marginal lands that cannot be used for farming.

I can understand that other farmers may plant more lands as this is always better than having land that is left there doing nothing. But it should be restricted to bad quality lands. (N)

However, in Shillelagh there was recognition that the planting of broadleaves was increasing as one moves south towards Co Wexford and this is essentially due to the fact that farmlands are of better quality.

Now there is mixed planting of all kinds in the area: they see there are advantages, and not least the return on investment. And the forest premiums that are available from the EU certainly have encouraged the planting of hardwoods. (S)

Among some of the farmers interviewed who had afforested part of their land, concern was expressed about the future of their plantations. These concerns were mainly to do with the value of the final crop.

Back 10 years ago afforestation was the only viable option but I won't do it anymore. The outlook for Sitka spruce is very poor and there is very little added-value to the final product. (N)

The timber produced here is of very low quality. It is cheaper to import wood from Eastern Europe than to harvest local forests. (N)

The management of plantations was seen as a means to increase the value of the output, but some felt that not enough was being done in this direction.

There is a lack of training regarding plantations over 10 years. Once the establishment and maintenance stage is over there is nothing really done in terms of management to improve the quality of the timber. (N)

However, other farmers still saw forestry as a suitable alternative to farming and were hoping for the development of a market for small diameter timber.

There are some prospects for the market of small diameter woods. The Co-op intends to set up a project to use firewood as a means of generating power. (N)

Skills and Knowledge of Forest Management and Timber Processing and Craft: The tradition of forestry that prevails throughout the Shillelagh CSA is associated with a savoir-faire related to the use of timber for woodcraft, furniture-making, garden sheds, etc. This economic activity, though local and generally small-scale, is well developed in the area. There have been a few initiatives locally to try and organise this activity in a more consistent way and to create a trademark for the area. However, it seems to be difficult to bring these initiatives to fruition.

There is awareness here and there is a skill. The skill may be limited to a few people but it does exist. But there is not enough cohesion within the community to do something with it. (S)

Knowledge associated with the forest industry and culture also extends to the expertise associated with the management of forests. A number of foresters who had been in the profession in the 1960s expressed concerns over the fact that today's forestry offered a limited scope for silviculture.

I have to admit that I feel sad that all ideas of growing quality timber have been pushed aside. We are not really interested in growing high quality timber anymore. (S)

Silviculture has gone out of forestry and I think it is a great pity. Back in the '60s when I moved into forestry, the woods were thinned, the drains were kept free and you had very little windthrows. (S)

It is a recurrent theme, mainly in the section of the Shillelagh CSA that is based in Wicklow, that forest production as well as the professional skills associated with forest management should be capitalised on. The aim would be to add value to the timber locally.

In the long-term, if there is going to be a lot of timber production in Co Wicklow we will have to encourage some kind of processing other than just logs or fencing or sending it off somewhere else to be processed. Encourage the timber using industry in the area. (S)

An interviewee also mentioned a project funded by "Leader+" that was set up in partnership with a group from Finland to look at the option of heat treatment of Sitka spruce timber.

It is a fantastic product: it is Sitka spruce but you won't recognise it is Sitka spruce. The Irish timber is so knotty – you can't get clean Irish timber. If we had continued the regime we had back in the 1960s and into the 70s we now would have had a good product. (S)

This concern also applies to the use and management of species other than Sitka spruce.

Basically we got totally obsessed with growing Sitka spruce because it grew fast and there was a ready made market for it. We couldn't afford to wait 150 years for oaks. So basically they were left aside. I would love to see even on a small-scale those species given a chance to show how well they can perform if they are managed properly. (S)

As mentioned earlier there is a fair number of small-scale timber-using businesses based in the Arigna CSA. These very often involve only one self-employed person. However, this activity is highly prized and outputs are marketed locally. Interestingly, among the small business owners interviewed there was a common agreement that what initially encouraged them to move to the area was the property price and quality of life aspect. As they became more numerous and started to organise themselves into a network they then attracted others.

I have a small family and we were sick of renting. This part of the country is cheap so that's why we moved here... Woodcraft is not big money so it is easier to sustain yourself when your base costs are low. (A)

Discussion

The analysis presented in this report shows that the activities of the forestry and wood products sectors had a significant impact on the national and local economies. In 2003 forestry generated a direct gross output of €255.4 million. For every euro of output from forestry a further 0.85 euro of economic activity was generated yielding a total (including indirect and induced impacts) output of €472.4 million in 2003. The sawmill, panelboard and other wood products sectors together generated directly and indirectly a gross output of €1.65 billion.

The employment generated directly and indirectly in forestry was estimated to be 7,182 while in the wood products industries it was 12,246. These estimates of the economic impact of forestry and wood products sectors are not directly aggregateable due to an overlap in indirect and induced impacts.

The gross value added (GVA) of forestry was shown to be €134.4 million. This represents 0.12% of GNP. The total GVA of the three wood products sectors was shown to be €312.3 million representing 0.27% of GNP. These estimates are aggregateable, thus the GVA of the forestry and the wood products sectors combined account for 0.38% of GNP.

The regional input-output analysis showed, as expected, that the regional multipliers for forestry were lower than the national figures. This reflects the leakage of economic activity that arises due to the expenditure on inputs from outside the regions as well as the spending of wages and salaries from forestry outside the region. The output and employment multipliers in the Mid-East region were somewhat higher than those in the West and South-West regions. This reflects the greater development of industry in the Mid-East region, which made it possible for a greater proportion of the inputs to forestry to be purchased there than was possible in the two other regions.

The economic impact of changes in the annual rate of afforestation was considered in a number of scenarios. This analysis showed the overall value of an afforestation programme amounting to 15,000 ha per annum over five years to be €474 million. However, as most land currently afforested is in agriculture, the net value is smaller as the economy would lose the expenditure and income associated with the farming systems. Where land used for cattle rearing is afforested, the net gain from afforesting 15,000 ha annually for five years is €171.98 million, or €157.43 million if the previous land use was sheep farming. If stacking of direct payments is possible on all 15,000 hectares, the net value of the afforestation programme for the five year period is higher, amounting to €340.27 million where forestry replaces cattle rearing, and €328.47 million where forestry replaces sheep farming. It is important to be aware that what is compared in this analysis is forestry at establishment stage replacing farming in a “steady state” phase. If the comparison was made between investing in forestry and investing in farming on the same piece of bare ground the results would differ from those above, as one would be required to take into account all the investment costs associated with forestry and agriculture. In this short-term analysis the value of the afforestation programme is solely due to the grants and premiums which are funded by the State and the EU, while the money being displaced in agriculture is only approximately half State and EU-funded. This is because in the comparison above the returns from the sale of

timber are not included while the returns from agriculture are. These limitations reflect the difficulties that arise when comparing land uses with very different production cycles.

A defining feature of the forest resource is its multifunctional character. Therefore, it is highly appropriate that this research has drawn on a range of different methodological approaches and disciplinary perspectives to arrive at the conclusions. The different perspectives adopted at national, regional and local level analyses add considerable value to each other and the approach represents a distinct innovation in terms of forestry research in Ireland. This work represents the first comprehensive effort to assess the social impacts of forestry in Ireland. The approach taken was to examine these impacts in three case study areas in which the extent of forest cover and species composition were similar but where the maturity of the forest cover differed. It was evident that the age of the forest and therefore the length of time the forests were part of the landscape in the case study area had a strong bearing on the social impacts of these forests. In Newmarket, where afforestation was a relatively recent phenomenon, the forests in the area were not perceived to fit well into the social and physical environment of the area and were considered to have contributed little in terms of employment and amenity while impacting negatively on the environment. The survey of forestry businesses in the area confirmed that only a small number of forestry-related businesses operated there and that the harvesting and processing sectors were not represented, reflecting the immaturity of the forest cover. However, in Arigna where the number of businesses operating in forestry was higher, the value of forestry as a source of local employment was hardly ever mentioned by those interviewed. Even when referred to by the interviewer the direct employment benefit from forestry was often contested. Most of those interviewed believed that forestry-linked employment is primarily generated through the processing and timber craft sector rather than by timber production.

A key element of sustainable forest management is community participation and consultation with stakeholder groups. Improved dialogue between local communities and foresters and a more collaborative and participatory approach to forestry decision-making has also led to the resolution of many forestry conflicts in other parts of the world (Daniels and Walker 2001). In this study the value of consultation was clearly evident in Arigna case study. Here the relationship between Coillte and the local community has improved as a result of the consultation process now used. Of key importance is the presence of a local forester, clearly identifiable by stakeholders as the contact person to whom comments and complaints can be lodged. Furthermore the existence of the social forum within Coillte has provided a platform for discussion and exchange of views for community and agency representatives. These two initiatives were introduced as part of the process of Coillte receiving certification. In contrast, the lack of consultation mechanisms available to local people with regard to private afforestation projects in their area was highlighted in both Arigna and Newmarket. Unlike the situation with Coillte, local people find it hard to identify an interlocutor and feel that they have no-one to consult with when projects commence. Even the foresters surveyed in Newmarket recognised that greater consultation with the public is required. However, it is not clear whether consultation meant the same thing to those involved in forestry and the general public. As was evident from some of their comments, the general public, including farmers, wanted to influence which lands should be afforested and with what species. From the foresters' perspective consultation may have meant greater dialogue with the local community as to the choice of species planted but without giving the local community the power of veto. Nevertheless the evidence from Arigna is that the form of consultation process

employed there has improved the attitudes towards, and consequently the social impact of, forestry.

Most of the perceived negative impacts of forestry are associated with the species planted. As is the case with much of the rest of the country, the forest cover in the three areas was dominated by conifers, specifically Sitka spruce. In Arigna and Newmarket the rate at which the forest cover has extended has been rapid with perceived negative impacts on the landscape. While there were sound silvicultural reasons for choosing Sitka spruce, given that the sites planted initially were in upland areas where the species had already proven capable of good growth rates, the lack of species diversity inevitably has led to a rather bland landscape. In recent years government policy has been to increase the broadleaf component of the national afforestation programme to 30% (Department of Agriculture, Food and Forestry 1996). Thus monocultural coniferous forests that comprise much of the forests in the case study areas will not be planted in the future. Nevertheless, the study highlights the different roles the local communities expect forests to play. It is clearly government policy that the primary emphasis in the afforestation programme is timber production, with forests managed according to the principles of sustainable forest management. On the other hand, the demand in Arigna and Newmarket was for a different type of forest: one where timber production is not the primary objective and where the amenity and landscape functions are emphasised. Whether it is possible to deliver the latter benefits while also providing timber for both craft businesses and sawmills is not clear. A possible solution would be the introduction of a two-tier afforestation programme. One tier would continue to have timber production at its core with the current requirements regarding plantation management and productivity continuing. The second tier of the afforestation programme would emphasise the amenity and ecological functions of forestry. This would differ from the current Native Woodland Scheme and Neighbourwood Scheme in that, in the case of the former, it would not be necessary to plant only native species, and in the case of the latter, individual landowners could apply. It should be possible to gain funding for this amenity scheme in the rural development budget as support for "environmental" forestry has already been identified. Introducing this two-part afforestation scheme would not only increase the level of broadleaf cover in the country but would remove one of the key causes of conflict between the general public and foresters.

Forests as a land-use are dynamic and their social impacts change as they develop. The social impacts of forestry in the Newmarket area have been mostly negative so far. However, results from the other case study areas show that the age and diversity of forests have a major bearing on their social impacts. It is possible that more positive social impacts will emerge as the forests in Newmarket mature and younger forests are established with a greater diversity of species. Yet society's view of forests is also dynamic. Increasing pressure for the multi-functional forests may mean that in time the level of satisfaction felt by those in Shillelagh about their forests may reduce. It would be very interesting to test these hypotheses in ten years time.

This research set out to address two of the many functions of forestry, namely timber production and social functions. The values of the remaining functions of forests have yet to be thoroughly assessed. Efforts are currently underway to quantify the carbon sequestration potential of Irish forests as well the biodiversity within these areas. Once these data are available, work can begin on valuing these outputs. The current and projected recreational

value of Irish forests has also been under-researched. While Clinch (1999) and Bacon and Associates (2004) addressed some of these issues, there is an urgent need to update and expand this research and to estimate the total value of forestry in Ireland.

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Annex 1.

Input-output analysis: concepts and methodology

This section provides a description of the input-output modelling techniques used in this study. The conventional interpretation of input-output modelling is of models characterized by unemployment and excess capacity that is a passive supply framework; imperfect competition; and a short-run focus. The input-output methodology assumes fixed relative prices, or zero response to changes in relative prices. There is no simultaneous calculation of prices and quantities.

The development of input-output models originates from the work of Leontief (1936). This work can be viewed as an improvement in the calculation process of a system already in use in the USSR at that time. Millar and Blair (1985) in their introduction to input-output techniques refer to Leontief comparing his work to Quesnay's *Tableau Economique* published in 1758. Leontief (1941) said his "work may be best described as an attempt to construct a *Tableau Economique* of the United States".

An input-output model is one in which the inter-industry linkages are explicitly specified. The United Nations states that:

the input-output system is a theoretical scheme, a set of simultaneous linear equations in which the unknowns are the levels of output of various branches, and in which the parameters are empirically estimated from the information contained in the input-output table (United Nations Statistical Office 1968).

Figure 4 provides a stylised representation of an input-output table. The input-output model and solution shown assumes that the final demand sector is exogenous to the system and there is no feedback into final demand after the initial stimulus. This is called an open input-output model. It should be noted, however, that the assumption that the multiplier effect that comes about as a result of changes in final demand is somewhat restrictive. Changes may also come about from changes in gross output (Midmore and Harrison-Mayfield 1996). However, for the purpose of this study it is assumed that the multiplier effects that result come about because of changes in expenditure in the model due to changes in overall output of a sector.

An input-output table describes the various flows of inputs into the productive process and matches these with outputs, which are consumed in final demand. It represents the productive structure of an economy at a given point in time. The table shows the inter-industry transactions, the final demand and primary input sections. An expenditure by one agent must be an income for another agent and total expenditure must equal total income.

Central to the use of input-output models is the assumption that the demand for inputs is in a fixed proportion to total output. Any increase in total output will lead to a specific increase in each input category, which is used in the production of that output. The ratio representing the amount of a given input required for a unit increase in gross output is defined

Figure 4: Stylised Structure of Input-Output Transaction Table.

Output Inputs			Total Outputs = Total Inputs
	Quadrant 1 Elements of Intermediate Demand n * n matrix	Quadrant 2 Elements of Final Demand n * m matrix	
	Quadrant 3 Primary Inputs to the Productive Sector p * n matrix	Quadrant 4 Primary inputs to Final Demand p * m matrix	
Total Inputs = Total Outputs			

Source: Miernyk 1965

as a technical coefficient. The technical coefficient for any sector ($a_{i,j}$) gives the input required from sector i to produce a unit increase of sector j 's output.

$$a_{i,j} = z_{i,j}/X_j \quad (1)$$

where: $z_{i,j}$ = total input from sector i to j ; and

X_j = total output of sector j .

An input-output model is based on the use of data organised in the form of an input-output table. This table provides a picture of the structure of an economy at a given point in time. It is a statistical description of the economy. The table itself is useful as a data source, independent of the technology assumptions used to motivate a Leontief model. It is important that the table is regarded as distinct from the uses to which it is put.

An input-output model makes behavioural assumptions. These tie things down to such an extent that the model is uniquely calibrated on the data from an input-output table. The first assumption is the homogeneity assumption. This assumption is that each sector produces a single output with fixed input structure. This means that all products of a sector are either perfect substitutes for each other or are produced in a fixed proportion to each other and there is no substitution between products of different sectors. The amount of inputs used by a sector is in fixed proportion to the output demanded by that sector. There is a fixed relative price structure and at these relative prices there is an infinite supply of the factors of production at the prevailing level of factor prices.

Taking a flow of intermediate goods from sector i to sector j as $z_{i,j}$, production in sector i as X_i , and final demand for output from sector i as F_i , then given a fixed technical coefficient matching the output in sector j with amounts of inputs from sector i , then:

$$X_j = \sum a_{ij} * X_i + F_j \quad (2)$$

Equation 2 indicates that total output is the sum of products for intermediate use and output that is consumed in final demand. If A represents the matrix of technical coefficients

a_{ij} , X represents the matrix of gross output and F represents the matrix of final demand from domestic and foreign institutions, then equation 2 can be rewritten as:

$$X = (I - A)^{-1}F \quad (3)$$

The input-output model and solution shown above assume that the final demand sector is exogenous to the system and there is no feedback into final demand after the initial stimulus. This type of structure is called an open input-output model. This is the model form employed in the current study.

Annex 2.

Example of questionnaire used in the survey of firms involved in the forestry and wood processing sectors

Input-Output Questionnaire

Name of the Company: _____

Address of the Company: _____

Name of Respondent: _____

Telephone Number: _____

Fax Number: _____

Email: _____

Section 1 – Description of Business

1.1 Is your company a limited company? Yes: No:

1.2 Where is your head office located? _____

1.3 What percentage of shares is owned by persons or organisations within the country? _____

1.4 Where does the owner of the company live? Within the County: Other Counties:

1.5 Please, specify what year is covered by your return for this questionnaire?

From ___/___/___

To ___/___/___

Please indicate the currency you used for answering this questionnaire:

Euro, €: EIP, £:

Section 2 - Description of the Activities

2.1 Please indicate (in %) what are the main activities your company is concerned with:

- Forest establishment: _____ %
- Forest management and maintenance: _____ %
- Forest harvesting: _____ %
- Haulage/Transport: _____ %
- Others (please specify) _____ %
- _____ %
- _____ %
- _____ %

2.2 What proportion of your activity is provided directly by:

- Coillte: _____ %
- Private owners: _____ %
- Management companies: _____ %
- Others (please specify): _____ %
- _____ %
- _____ %

2.3 Is your activity: Seasonal: All year round:
 If seasonal, please indicate what are your additional activities over the year:

2.4 What percentage of your contracts are located within 50 miles from your home/office base:

Section 3 - Labour

Do you have any employee(s) working for your company:

Yes No:

If yes, please provide the following details:

	Male	Female
• Total number of Full-Time employees:	_____	_____
• Total number of Part-Time employees:	_____	_____
• Average number of hours worked by part-time employees per week:	-----	
• Average number of hours worked by full-time employees per week:	-----	

Please give the following information with reference to activities carried out by your company:

	Total volume of activity per year	Number of annual contracting hours for those activities
Forest Establishment		
• Site preparation	_____ ha/year	_____
• Planting	_____ ha/year	_____
• Fertilisation	_____ ha/year	_____
• Fencing	_____ m/year	_____
Forest Maintenance		
• Filling in	_____ plants/year	_____
• Vegetation cleaning	_____ ha/year	_____
• Pruning	_____ ha/Year	_____
• Shaping	_____ ha/Year	_____
Forest Harvesting		
• Thinning		
o Felling	_____ m ³ /year	_____
o Extraction	_____ m ³ /year	_____
• Clear felling		
o Felling	_____ m ³ /year	_____
o Extraction	_____ m ³ /year	_____
Transport/Haulage	_____ tonnes/year	_____
Others (please specify):		
•		_____
•		_____
•		_____

Section 4 - Purchases from Suppliers for Current Production Purposes

4.1 *The purpose of this question is to determine the nature and extent of your company's linkages in terms of purchases from other sectors in the region and beyond.*

From which of the following sectors does your company purchase products/services. A detailed description of each sector is provided at the end of this questionnaire for your convenience. We are interested in all purchases made by your company and used for production of the products/services sold during the year. This includes purchases for production, distribution and administrative purposes.

Purchasing from Manufacturing/Agricultural Suppliers

	Sectors of Suppliers	% Purchased in Ireland from:			% Purchased outside Republic of Ireland	Total Purchase Value
		Manufacturers	Retailers	Wholesale		
1	Agriculture and Fishing	%	%	%	%	
2	Forestry Products: A Roundwood					
	B Reproductive Materials					
	C Others					
3	Petrol Products and Natural Gas	%	%	%	%	
4	Other Energy	%	%	%	%	
5	Metal and Metal Products	%	%	%	%	
6	Mineral Products	%	%	%	%	
7	Chemical Products	%	%	%	%	
8	Agricultural/Industrial Machinery	%	%	%	%	
9	Office Machine	%	%	%	%	
10	Electrical Goods	%	%	%	%	
11	Motor Vehicles & Other Transport Equipment	%	%	%	%	
12	Wooden Products & Furniture	%	%	%	%	
13	Paper/Printing Products	%	%	%	%	
14	Other Manufactured Products A	%	%	%	%	
	B	%	%	%	%	
	C	%	%	%	%	
	TOTAL					

Purchases from Private/Public Services Suppliers

	Sectors of Services	% Purchased in the Republic of Ireland	% Purchased outside the Republic of Ireland	Total Purchase Value
15	Building & Construction	%	%	
16	Repair/Scrap Services	%	%	
17	Road & Rail Transport A Road	%	%	
	B Rail	%	%	
18	Other Transport Services A Maritime	%	%	
	B Others	%	%	
19	Communication Services	%	%	
20	Credit & Insurance Services	%	%	
21	Financial/Legal & Computing Services	%	%	
22	Professional Consultancy Services	%	%	
23	Other Services	%	%	
24	Rent of Dwellings	%	%	
25	Local Authority Services	%	%	
26	Other Public Services	%	%	
	TOTAL			

4.2 Please indicate the total cost to your company of each of the following expenses:

Wages and Salaries (incl. Income taxes) _____

Other Taxes (VAT/exercise/corporation taxes) _____

Income Taxes
 • Employers PRSI _____
 • Employees PRSI _____

Depreciation Allowance _____

TOTAL _____

Section 5 - Sales to Customers

5.1 *The purpose of this question is to determine the nature and extent of your company's sales linkages with other sectors in the region and beyond*

Please indicate your main sources of incomes from sales of goods and/or services:

Sales to Manufacturing/Agricultural Customers, Companies/Government

Sources of Incomes	Sales in the Republic of Ireland	Sales in other Countries	Total Sales Value
TOTAL			

Definition of the Sectors

Manufacturing/ Agriculture Sectors

- 1 "Agriculture & Fishing":
 - Vegetable products from agriculture, wine, olive oil
 - Animal products from agriculture and hunting
 - Fishing products
- 2 "Forestry Products":
 - Sub-sector A, Roundwood only
 - Sub-sector B, Reproductive materials: i.e. seeds, seedlings, cuttings, plant cells, etc.
 - Sub-sector C, Others: Forest Products such as vegetable products from the forest, forest fruits, etc.
- 3 "Petrol Products and Natural Gas":
 - Crude petroleum, Natural gas and bituminous shale
 - Refined petroleum products
- 4 "Other Energy":
 - Coal and lignite briquettes
 - Lignite and lignite briquettes
 - Electricity power
 - Gas (distributed by pipes), Steam, Hot water, Compressed air
 - Water (collection, purification and distribution)
- 5 "Metal & Metal Products":
 - Iron ore, Non-ferrous metal ores, Pig iron, Crude steel, Hot rolled and cold-rolled sheets
 - ECSC products,
 - Steel tubes, Extruded and drawn metal, Cold-rolled products, Cold-formed steel parts and sections, Non-ferrous metal
 - Foundry products, Metal products which are forged, stamped, embossed or cut
 - Products of secondary processing of metals, structural metal products
 - Products of boiler making, tools and finished metal articles, except electrical equipment
- 6 "Mineral Products":
 - Gravel, stone sand, clay, salts of potassium and of natural phosphates, Rock salt, Marine salt, Other minerals, Peat
 - Brick and pottery products, Cement, Lime, Plaster
 - Building and construction materials made of concrete cement or plaster
 - Article made of asbestos
 - Stones and other non-metallic mineral products, Millstones and other abrasive products
 - Glass, Ceramic products
- 7 "Chemical Products":
 - Petrochemical and carbochemical products, Other basic chemical products
 - Paints, Varnishes and Printing inks
 - Other chemical products mainly for industrial and agricultural uses
 - Pharmaceutical products
 - Soaps, Synthetic detergents, Perfumes, Cosmetics, Toilet preparations
 - Artificial and synthetic fibres
- 8 "Agricultural/Industrial Machinery":
 - Agricultural machinery and tractors
 - Machine tools for metal working, tools and equipment for machinery; Textile machinery and accessories, sewing machines;
 - Machinery for the food and chemical industries, bottling, packaging, wrapping, and related machinery; Rubber; Artificial plastics; Working machinery
 - Mining equipment, machinery and equipment for metallurgy, for the preparation of building materials, for building and construction, for the mechanical handling and lifting;
 - Gears and other transmission equipment;
 - Machinery for working wood, paper, leather and footwear, laundering and dry-cleaning equipment, other machinery and medical equipment
- 9 "Office Machines":
 - Office and data processing machines, measuring, precision and control instruments;
 - Medico-surgical equipment, orthopaedic appliances, optical instrument and photographic equipment; Clocks and watches
- 10 "Electrical Goods":
 - Insulated wires and cables, electrical motors, generators, transformers, switches, etc.
 - Electrical equipment for industrial use, batteries and accumulators; Telecommunications equipment, meters and measuring equipments, electro-medical equipment;
 - Electronic equipment, radio and television receiving sets, sound reproducing and recording equipment, gramophone records and pre-recorded tapes;

- Electric household appliances, electric lamps and other forms of electric lighting, installation of electrical equipment
- 11 "Motor Vehicles & Other Transport Equipments":
 Motor vehicles and engines; Bodywork, trailers and caravans;
 Spare parts and accessories for motor vehicles
 Boats, steamers, warships, tugs, floating platforms/rigs, material from breaking up of boats;
 Locomotives, other railway and tramway rolling stock; Vans and wagons; Cycles and motorcycles; Invalid carriages;
 Aircrafts, helicopters, hovercrafts, missiles, space vehicles and other aeronautical equipment;
 Perambulators, invalid chairs, carts, etc.
- 12 "Wooden Products & Furniture"
 Sawn, planed, seasoned, steamed wood; Veneered and ply wood, fibre board and particle board, improved and preserved wood;
 Carpentry, wooden buildings, joinery, parquet flooring; Wooden containers; Wooden articles;
 Sawdust and shavings;
 Articles of cork; straw, basket ware, brooms, brushes; Wood and cane furniture; Mattresses
- 13 "Paper & printing Products":
 Wood pulp, paper, board;
 Products of pulp, paper and board;
 Products of printing and publishing
- 14 "Other Manufacturing Products"
 Sub-sector A:
 Meat and meat products
 Milk and dairy products
 Other food products
 Beverages
 Tobacco products
 Sub-sector B:
 Textiles/Clothing
 Leather/Footwear
 Rubber & Plastic Products
 Sub-sector C:
 Other Manufacturing Products
- Public/ Private Services**
- 15 "Building & Construction":
 Construction of dwellings; Non-residential buildings
 Civil engineering work; Demolition of building
- 16 "Repair/ Scrap Services":
 Scrap metals, waste paper, rags, salvage, other products for recovery and demolition;
 Repair of motor vehicles and bicycles
 Repair of footwear and leather articles, electrical households goods, watches and clocks, jewellery
- 17 "Road & rail Transport Services":
 Sub-sector A- "Road Transport Services"
 Sub-sector B- "Rail Transport Services"
- 18 "Other Transport Services":
 Sub-sector A: "Maritime Transport Services"
 Sub-sector B: "Other Transport Services"
- 19 "Communication Services":
 Services of Post/Telecom; Other private communication services
- 20 "Credit & Insurance Services":
 Services of central banking authorities, other monetary institutions, other credit institutions and insurance (incl. banking, building societies, insurance (VHI), hire purchase)
- 21 "Financial/ Legal & Computing Services":
 Services of financial and insurance auxiliaries; Real estate; Lawyers; Accountants; Tax advisers; Management consultants;
 Publicity services;
 Computer and data processing services
- 22 "Professional Consultancy Services":
 Technical and professional consultancies

- 23 "Other Services":
Private services for refuse disposal, sanitation, cleaning;
Services of hostels, economic and employers associations;
Laundries; dry cleaning and similar services;
Recreational/Cultural services;
Lodging and Catering services;
Personal and Other services
- 24 "Rent of Dwellings":
Rents of business premises
Rent of dwellings. Includes actual rent of rented dwelling and imputed rent of owner-occupied dwellings.
- 25 "Local Authority Services":
Refuse disposal; Sanitation
Services of social welfare, hostels, tourist offices, employers' and professional associations, economic association provided by government;
Recreational and cultural activities provided by government (entertainments, sports grounds and clubs, libraries, museums, botanical and zoological gardens)
- 26 "Other Public Services":
Public Health Services;
Public Education Services;
Services provided by non-profit institutions

Annex 3.

Details of the district electoral divisions that comprise the case study areas and population trends in these areas

Table 25: List of the district electoral divisions (DEDs) in Newmarket case study area.

COUNTY CORK	
RD/UD ¹	DED
Kanturk	BARNACURRA
	CLONFERT WEST
	GLENLARA
	KILMEEN
	NEWMARKET
Mallow	TINCOORA
	BALLYNAMONA
	CLENOR
	KILSHANNIG
	MILLTOWN
Macroon	SKAHANAGH
	AGHINAGH
	KILBERRIHERT
Cork Millstreet RD	MOUNTRIVERS
	DRIPSEY
	COOMLOGANE
	DRISHANE SKAGH
COUNTY LIMERICK	
RD/UD	DED
Croom RD	BALLINGARRY
	CASTLETOWN
Newcastle RD	BROADFORD
	DROMTRASNA
	KILMEEDY
	NEWCASTLE RURAL
Rathkeale RD	BALLYALLINAN
Killmallock RD	KILMALLOCK
COUNTY KERRY	
RD/UD	DED
Tralee RD	CORDAL
	KILMURRY
	MOUNT EAGLE
Killarney RD	COOM
Listowel RD	KILLARNEY RURAL
	DUAGH TRIENEARAGH

Table 26: Population trends in Newmarket CSA (1946-2002).

1946	1951	1961	1971	1981	1991	2002
121209	116965	107520	105770	112737	109718	110809

¹ RD = Rural District; UD = Urban District

Table 27: List of DEDs in Arigna case study area.

COUNTY CAVAN		ELPHIN
RD	DED	KILGLASS NORTH
ENNISKILLEN No2	DERRYLAHAN	KILGLASS SOUTH
	DERRYNANANTA	ROOSKY
	DOWRA	ROSSMORE
	DUNMAKEEVER	STROKESTOWN
	ESKEY	TULSK
	KILLINAGH	
	SWANLINBAR	
	TEEBANE	
	TUAM	
BAWBOY	BALLYCONNELL	
	BALLYMAGAURAN	
	BAWNBOY	
	BENBRACK	
	BILBERRY	
	DOOGARY	
	KINAWLEY	
	LISSANOVER	
	PEDARAVOHERS	
	TEMPLEPORT	
	TIRCAHAN	
COUNTY ROSCOMMON		COUNTY SLIGO
RD	DED	UD
CASTLEREAGH	BELLANAGARE	SLIGO NORTH URBAN
	BUCKILL	SLIGO WEST URBAN
	EDMONDSTOWN	
	FRENCHPARK	
BOYLE	AGHAFIN	RD
	ALTAGOWLAN	SLIGO
	AUGHRIM EAST	DED
	AUGHRIM WEST	BALLINTOGER EAST
	BALLYFARNAN	BALLINTOGER WEST
	BALLYFORMOYLE	BALLYMOTE
	BOYLE RURAL	BALLYNAKILL
	BOYLE URBAN	BALLYSADARE EAST
	BREEDOGE	BALLYSADARE WEST
	CLOONTEEM	BRICKLIEVE
	CREEVE	CALRY
	CREEVE	CARRICKBANAGHER
	CROGHAN	COLLOONEY
	CROSSNA	DRUMCLIFF EAST
	DANESFORT	DRUMCOLUMB
	ESTERSNOW	DRUMFIN
	KEADEW	GLENCAR
	KILBRYAN	KILMACOWEN
	KILCOLAGH	KNOCKNAREE
	KILLUKIN	LAKEVIEW
	KILLUMMOD	LISCONNY
	KILMACUMSY	RIVERSTOWN
	KILMORE	SLIGO EAST URBAN
	LISGARVE	AGHANAGH
	LOUGH ALLEN	BALLYNASHEE
	MANTUA	COOLAVIN
	OAKPORT	CUILMORE
	ROCKINGHAM	DRUMRAT
	RUSHFIELD	KILFREE
	TIVANNAGH	KILLADOON
	TUMNA NORTH	KILLARAGHT
	TUMNA SOUTH	KILMACTRANNY
	ANNAGHMORE	KILSHALVY
	BALLYGARDEN	SHANCOUGH
	CLOONYQUIN	TEMPLEVANNY
	CREGGA	ANNAGH
	ELIA	CARTRON
ROSCOMMON		CLOONOGHILL
		COOLANEY
		KILTURRA
		LEITRIM
		OWENMORE
		STREAMSTOWN
		TEMPLE
		COUNTY LEITRIM
		RD
		Carrick-on-Shannon
		DED
		AGHACASHEL
		ANNADUFF
		BALLAGHAMEEHAN
		BARNAMEENAGH
		CARRICK-ON-SHANNON
		DRUMREILLY EAST
		DRUMREILLY WEST
		DRUMSHANBO

	DRUMSNA
	GORTNAGULLION
	GOWEL
	KESHCARRIGAN
	KILTUBBRID
	LEITRIM
	MOHER
	YUGAN
BALLINAMORE	BALLINAMORE
	CLOVERHILL
	CORRALA
	DRUMREILLY NORTH
	DRUMREILLY SOUTH
	GARADICE
	GREAGHGLASS
	KILLYGAR
	NEWTOWN GORE
	OUGHTERAGH
MONORHAMILTON	STRALONGFORD
	ARIGNA
	BELHAVEL
	CLOONCLARE
	CLOONLOGHER
	DRUMAHAIRE
	DRUMKEERAN
	GARVAGH
	GLENADE
	GLENANIFF
	GLENBOY
	GLENCAR
	GLENFARN
	KILLANUMMERY
	KILLARGA
	KILTYCLOGHER
	LURGANBOY
	MAHANAGH
	MANORHAMILTON
	MUNAKILL
	SRAMORE
MOHILL	ST PATRICKS
	AGHAVAS
	BEIHY
	BREANDRUM
	BUNNYBEG
	CARRIGALLEN EAST
	CARRIGALLEN WEST
	CASHEL
	CASTLEFORE
	CATTAN
	CLOONE
	CORRIGA
	DRUMARD
	DRUMDOO
	DRUMOD
	FENAGH
	GORTERMONE
	KEELDRA
	LISGILLOCK
	MOHILL
	RINN
	RIVERSTOWN
	ROOSKY
	ROWAN

Table 28: Population trends in Arigna case study area (1946-2002).

1946	1951	1961	1971	1981	1991	2002
101537	94821	78554	68584	69280	65423	67163

Table 29: List of DEDs in Shillelagh case study area.

COUNTY WEXFORD					
UD/RD	DED				
ENNISCORTHY UD	ENNISCORTHY RURAL			BALTINGLASS	
	ENNISCORTHY URBAN			DONAGHMORE	
ENNISCORTHY RD	BALLINDAGGAN			DONARD	
	BALLYCARNEY			DUNLAVIN	
	BALLYHUSKARD			EADESTOWN	
	BALLYMORE			HARTSTOWN	
	BALLYVALDON			HOLLYWOOD	
	BOLABOY			HUMEWOOD	
	BREE			IMAEI NORTH	
	CASTLE TALBOT			IMAEI SOUTH	
	CASTLEBORO			LUGGLASS	
	CASTLEDOCKRELL			RATHDANGAN	
	EDERMINE			RATHSALLAGH	
	FERNS			STRATFORD	
	KILBORA			TALBOTSTOWN	
	KILCORMICK			THE GRANGE	
	KILLANN	RATHDRUM RD		TOBER	
	KILLOUGHRUM			TUCKMILL	
	KILMALLOCK			ARKLOW RURAL	
	KILRUSH			AUGHRIM	
	KILTEALY			BALLINACLASH	
	MARSHALSTOWN			BALLINACOR	
	MOYACOMB			BALLINDERRY	
	NEWTOWNBARRY			BALLYARTHUR	
	ROSSARD			BROCKAGH	
	ST MARY'S			CRONEBANE	
	THE HARROW			DUNGANSTOWN SOUTH	
	THE LEAP			DUNGANSTOWN WEST	
	TINNACROSS			ENNEREILLY	
	TOMBRACT			KILBRIDE	
GOREY RD	ARDAMINE			KNOCKRATH	
	BALLOUGHTER			AVOCA	
	BALLYBEG	SHILLELAGH RD		RATHDRUM	
	BALLYCANEW			TROOPERSTOWN	
	BALLYELLIS			AGHOWLE	
	BALLYGARRETT			BALLINGATE	
	BALLYLARKIN			BALLINGLEN	
	BALLYNESTRAGH			BALLYBEG	
	CAHORE			CARNEW	
	COOLGREANY			COOLATTIN	
	COURTOWN			COOLBALLINTAGGART	
	FORD			COOLBOY	
	GOREY RURAL			CRONELEA	
	GOREY URBAN			KILBALLYOWEN	
	HUNTINGTOWN			KILLINURE	
	KILCOMB			KILPIPE	
	KILGORMAN			MONEY	
	KILLENAGH			RATH	
	KILLINCOOLY			SHILLELAGH	
	KILNAHUE			TINAHELY	
	LIMERICK				
	MONAMOLIN			COUNTY CARLOW	
	MONASEED			UD/RD	DED
	ROSSMINOGE			CARLOW UD	CARLOW URBAN
	WELLS				GRAIGUE
	WINGFIELD			BALTINGLASS No2	CLONMORE
NEW ROSS RD	BARRACK VILLAGE				HACKETSTOWN
	TEMPLELUDIGAN				HAROLDSTOWN
COUNTY WICKLOW					KINEAGH
UD/RD	DED				
ARKLOW TOWN	ARKLOW NO 2 URBAN				RAHILL
	ARKLOW NO.1 URBAN				RATHVILLY
BALTINGLASS No1 RD	BALLINGUILE				TIKNOCK
					WILLIAMSTOWN
				CARLOW RD	AGHA
					BALLINACARRIG
					BALLINTEMPLE
					BALLON

	BALLYELLIN
	BALLYMOON
	BORRIS
	BURTONHALL
	CARLOW RURAL
	CLOGRENAN
	CLONEGALL
	CORRIES
	CRANEMORE
	FENNAGH
	GARRYHILL
	GRANGEFORD
	JOHNSTOWN
	KELLISTOWN
	KILBRIDE
	KILLEDMOND
	KILLERRIG
	LEIGHLINBRIDGE
	MUINEBEAG RURAL
	MUINEBEAG URBAN
	MYSHALL
	NURNEY
	OLD LEIGHLIN
	RATHANNA
	RATHORNAN
	RATHRUSH
	RIDGE
	SHANGARRY
	SLIGUFF
	TANKARDSTOWN
	TEMPLEPETER
	TULLOW AND TULLOWBEG
	TULLOW
IDRONE RD	TULLOWBEG
	BALLYMURPHY
	COONOGUE
	GLYNN
	KYLE
	MARLEY

KILDARE COUNTY	
UD/RD	DED
ATHY No1 RD	BALLAGHMOON
	BALLITORE
	BELAN
	BURTOWN
	CARRIGEEN
	CASTLEDERMOT
	DUNMANOGE
	GRANEY
	GRANGEMELLON
	JOHNSTOWN
	KILKEA

Table 30: Population trends in Shillelagh case study area (1946-2002).

1946	1951	1961	1971	1981	1991	2002
110496	110377	104401	105339	125748	121423	141549

Annex 4.

Profiles of regions used in regional input-output analysis

West Region

The West Region of Ireland comprises Counties Galway, Mayo, Roscommon and Galway County Borough. The region has a population of 382.3 thousand people (CSO, 2003). Galway is the largest county with 209.0 thousand people. 57,241 of Galway's population are living in Galway City. Mayo has a population of 117.5 thousand. Roscommon is the smallest county with a population of 55.8 thousand. The region has a predominantly rural population (62.3%).

The region's labour force in 2002 was 193,300; of these 7,300 (3.4%) people were classified as unemployed. The sectoral profile is very different to national results, reflecting the more rural dominance of the area. Gross Value Added (GVA) at basic prices is the smallest of the three regions studied.

Mid-East Region

The Mid-East Region of Ireland comprises Counties Kildare, Meath and Wicklow. The region has a population of 412,625 (CSO, 2003), the fifth most populous region in Country. The region has a predominantly urban population (56.9%). This is due to the urban spread of Dublin. Meath has a majority of non-urban residents but in the other counties the urban population predominates. Wicklow, which contains our regional study area, accounts for 27.8% of the total population.

The region's labour force in 2002 was 201,000; of these 6,600 people were classified as unemployed. The region accounted for 8.5% of national GVA total. This is less than its national share of population and employment reflecting the commuter nature of the region. Its sectoral profile shows that it is close to the national average, with a slightly higher output in the manufacturing sector and less in the services sector.

The agriculture/forestry/fishing sector is approximately the same size as the national average. This sector accounts for 3.3% of Regional GVA.

The South-West Region

The South-West Region of Ireland comprises Counties Kerry and Cork and Cork City. The region has a population of 580.4 thousand people (CSO, 2003) the second most populous region after Dublin. Cork's population is 447.8 thousand people and Kerry's population is 132.6 thousand people. The region has a predominantly urban population (54.1%). This is due to the Metropolitan Cork Area with an estimated population of approximately 230,000 inhabitants, and is the second-largest conurbation in the country. Kerry has two substantial urban areas.

The region's labour force in 2002 was 289.8 thousand; of these 13,000 people were classified as unemployed. In its sectoral profile it is closer to the national average than that of any of the other regions. The fact that the South-West is the only region outside Dublin with a service sector employment close to the average for the State as whole demonstrates clearly the role of Cork City in providing higher order services for the South-West Region.

The regional economy of the South-West is a microcosm of the national economy in a number of ways. It is the only region with a service sector proportion close to that of the state as a whole. It contains a representative blend of large and small urban centres and rural population, while also possessing a mix of foreign-owned and indigenous industries. Some relatively unique features are the traditional dominance of agriculturally-based industry and some emergent clusters of electronics and chemical firms. The region also has a large tourism sector.

