COFORD
NATIONAL COUNCIL FOR FOREST RESEARCH & DEVELOPMENT
AN CHOMHAIRLE NÁISIÚNTA UM THAIGHDE AGUS FORBAIRT FORAOISE

Forestry 2030

Ireland possesses the climate and soils to grow forests at a faster rate than most of the developed world. Yet the rate of planting of new forests has, over the past five years, fallen below the sustainable level of 15,000 ha per annum. A combination of funding and policy measures has contributed to the decline. This series of papers, ***Forestry 2030***, addresses key issues and charts a way forward. What these papers show is that the national afforestation programme is good value for money for the state and private sectors.

Afforestation – the planting of new forests - has been a part of government policy since the foundation of the state. It has delivered a thriving wood processing sector that employs many thousands in rural Ireland and in towns and cities. Output in 2008 was estimated at €1.89 bn or just under 1% of GDP. Without the contribution of new forests, Ireland's climate change targets will be very difficult to achieve. Renewable biomass will be needed in greatly increased amounts in the future. Most of the step-up in supply will come from young forests planted over the past two decades. However, to sustain supply and climate change benefits, increased afforestation over the next two decades is a must.

Forestry investment is unique in the level and breadth of green goods and services it provides to the economy and society. Nowadays, as well as jobs, forests are delivering on restoring biodiversity to our countryside, and play an important role in water quality. As an industry we take our environmental credentials very seriously, and have made huge strides in recent years in how we plan and manage our forests.

Forests are central to our future green economy. They provide employment, biodiversity and recreation, and are also a carbon fixing and renewable energy resource. We need to expand forest cover to maintain and grow these benefits. Creating new forests is a long term business requiring clear policies and sustained investment by both the state and private sectors. ***Forestry 2030*** sets a goal to afforest 300,000 ha over the next two decades – to achieve a national forest area of 1 million ha by 2030 – based on clearly defined economic, social and environmental grounds. It is an achievable target, and a green investment that will deliver enormous benefits to society.

The COFORD Council, October 2009

Papers enclosed

- Irish forestry and the economy
- Climate change and Irish forestry
- Irish forestry and renewable wood energy
- Afforestation – enhancing biodiversity in the Irish countryside
- Recreational value of Irish forests
- Irish forestry and the environment – a catchment-based approach

These papers are based on published work and reports compiled on behalf of COFORD by Dr Áine Ní Dhubháin (UCD), Dr Kevin Black (FERS Ltd), Dr Eugene Hendrick (COFORD), Dr Sandra Irwin (UCC), Michael Cregan (consultant) and Prof. Ted Farrell (UCD), with input from the COFORD Council.

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Irish forestry and the economy

- The forest industry, comprising growing, harvesting and processing of forest products makes a significant and growing contribution to the Irish economy. Output in 2008 was c. €1.89 bn, or just under 1% of GDP.
- Over 10% of Ireland is under forest, supporting a vibrant and export oriented forest products sector.
- Contribution to climate change by Irish forests absorbing carbon dioxide from the atmosphere is 4 million tonnes of carbon dioxide annually, or about 6% of total greenhouse gas emissions.

  In terms of complying with Kyoto targets, the annual contribution from afforestation post-1990 will be around 2.2 million tonnes of carbon dioxide per year, representing a projected annual saving to the taxpayer of €44 million, or €220 million over the five years from now to the end of 2012.
- Harvest from Irish forests in 2008 was 2.3 million cubic metres; of which 2.1 million were from Coillte and the balance (0.2 million) was from privately-owned forests. After processing into secondary wood products the harvest represents an additional store of circa 0.6 million tonnes of carbon dioxide, over and above forest growth.
- Employment in the forest sector is over 16,000 persons, spread across the country and contributing directly to both rural development and in adding value to forest harvest. It has been estimated that if 15,000 hectares are planted per year, on average 490 direct jobs would be required annually to establish, manage, harvest and process that timber. The direct employment (over 40 years) associated with 15,000 hectares planted in 2009 therefore averages 490 man-years annually.
- Apart from climate change benefits, forests provide the largest outdoor area for recreational use. This has been valued at €97 million, which in turn generates €268 million in economic activities for communities in rural areas. Annual visitor numbers to Irish forests are in excess of 18 million.
- There is a significant potential for wood fuel to displace fossil fuel, particularly in the generation of heat in industrial, commercial, domestic and institutional markets.
- Investment in business-led and national forest research (including COFORD funding of €4 m) is €14 million per annum, just over 0.7% of overall output. As a comparison, the most recent figures available for investment in ocean and fisheries sciences in the Marine Institute budget represented 1.1% of the overall output.

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Climate change and Irish forestry

Forests provide a range of raw materials for industry as well as services to society. In order to sustain production and service provision a well balanced age structure is needed at the national forest level. One of the main services provided by forests - climate change mitigation - is strongly dependent on having young age classes to balance out harvest and other decreases in carbon stocks. In the Irish context this entails the need to continue afforestation at a 15,000 ha plus level for the next two decades. Achievement of this goal will not only sustain the ability of the national forest estate to remove carbon dioxide from the atmosphere, it will also provide a renewable energy resource and a sustainable raw material for construction and a range of other uses. Expansion of the national forest estate should therefore be a key component of national climate change and land use policy.

- Climate change, caused by emissions of greenhouse gases, is forecast to have devastating impacts on human society, unless emissions are checked and reversed.
- Deforestation (loss of forest cover) is one of the major contributors to climate change, and currently accounts for 17% of global greenhouse gas emissions.
- On the other hand, the forestry sector provides a range of opportunities to mitigate rises in greenhouse gas levels, including:
    - afforestation/reforestation;
    - forest management;
    - reduced deforestation (land use change from forest to non-forest);
    - increased use of wood products;
    - use of forest products for bioenergy to replace fossil fuel use.
- The total carbon reservoir or store in Irish forests currently exceeds one billion tonnes of carbon dioxide, most of which is in the soil.
- Annual removal of carbon dioxide from the atmosphere by Ireland's forests exceeds 6 million tonnes per annum, or 3.6 million tonnes net of carbon dioxide removed in roundwood harvest.
- Kyoto forests - those established since 1990 – will sequester 11 million tonnes of carbon dioxide over the 5-year period to the end of 2012, which will have in today's terms a value to Irish Exchequer of €220 million.
- Pre-1990 forests also sequester carbon, and contribute to climate change mitigation, but are not currently part of Ireland's forest carbon accounting regime.
- Maintaining the climate change benefits of Irish forests will require continuation of the national afforestation programme at a rate exceeding 15,000 ha per annum over the next two decades.
- Deforestation at the national level needs to be controlled in order to protect the climate change mitigation benefits of Ireland's forests.
- Wood energy and wind are the most important renewable sources. Government policy foresees major growth in the use of wood for energy generation in the future, another reason to maintain a 15,000 ha per annum afforestation programme.
- Forests also have an important role in helping society to adapt to existing and future climate change.
- Forests are themselves vulnerable to the impacts of climate change, and this must be considered when planning the management of future forests.

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Irish forestry and renewable wood energy

- Government targets for renewable energy are:
  - Overall 40% of electrical consumption from renewables by 2020;
  - 12% renewable heat by 2020 (5% by 2010);
  - 30% co-firing with biomass at the 3 peat power plants by 2015;
  - 800 MW of CHP by 2020 with emphasis on biomass CHP;
  - 10% transport biofuels by 2020 (5.75% 2010).

- Wood is a renewable, climate-friendly fuel. It can be grown and supplied from Irish forests at a cost of between €110-€125/tonne, if delivered straight from the forest.

- Current use

  After wind energy, wood fuels are the largest contributor to renewable energy generation in Ireland – contributing about 4.7 PJ of energy to renewable energy use. Overall, renewable energy contributed just 2.9% of total primary energy requirement in Ireland in 2007, far below a sustainable level and an indication of the challenge ahead in the move to renewable energy.

- Wood biomass usage in 2008 was:

Biomass use type	**2008 000 m³**
Domestic and light industrial use	
Firewood including imports	54
Wood chips (solid underbark)	63
Short rotation coppice (SRC)	1
Sub total	118
Industrial use	
Use of residues and post consumer recovered wood (PCRW) by wood-based panel mills (WBP), sawmills and Edenderry Power	611
Total biomass input	729

The largest single use of wood for energy is within the forest products sector itself.

Overall, the use of wood fuels saved some 380,000 tonnes of CO_2 in 2008 (over and above carbon sequestered in Irish forests). This equated to greenhouse gas emission savings in the region of €7 million.

Wood fuel use in recent years has increased considerably, as cofiring at the Bord na Móna Edenderry plant expanded to commercial scale. Use of wood chip in commercial applications also increased, in line with new SEI grant-aided boilers coming on stream. Continuation of these policies is essential to drive the market for wood fuels.

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- Future use and supply

  Projections to 2020 indicate that to meet the Government targets outlined a biomass supply of around 4 million green tonnes per annum will be required. It is unlikely that the forest sector could supply more than half of this volume – but it is a target that highlights the need for afforestation to get back to a level of at least 15, 000 ha per year, and the need to drive supply and demand for wood fuels from short rotation forestry and other sources. There is also scope to considerably expand supply from final harvesting residues and more intensive thinning of both publicly and privately owned forests.

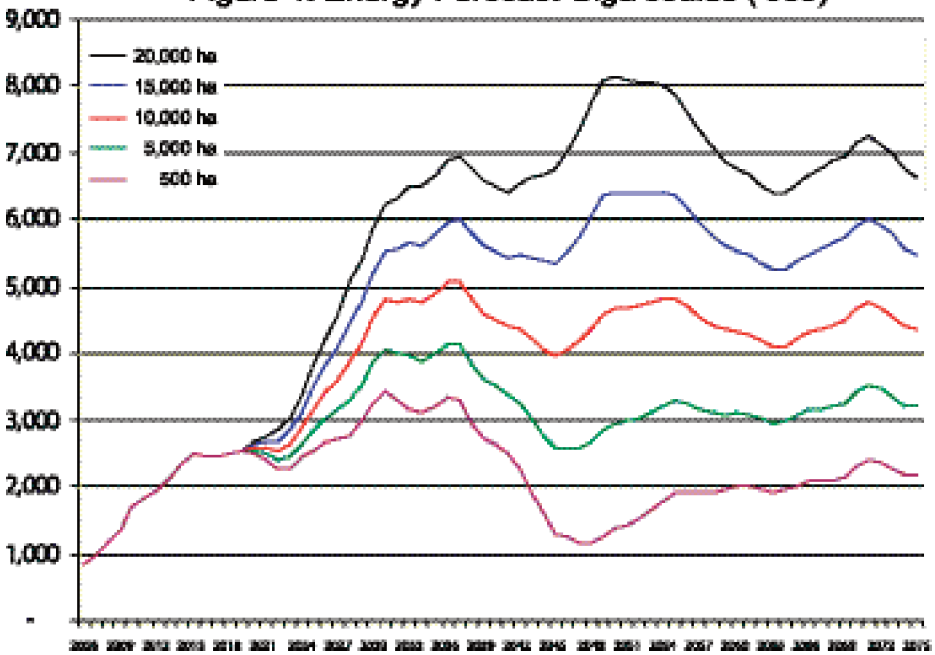
  COFORD is currently updating production forecasts from the forests of Ireland and these are now available for privately owned forests. This work is taking place in tandem with the Bioenergy Working Group of the Department of Communications, Marine and Natural Resources.

- Need to sustain supply of wood fuels over the long term

  Sustaining wood fuel production beyond 2020 from Irish forests is dependent on a continuation of policy measures and critically on the level of afforestation over the next two decades. Wood fuels are mainly sourced from young forests. A balanced age class structure at national level is therefore a prerequisite for sustained supply. Planting since 1990 has established about 250,000 ha of new forests. As the figure shows – an annual afforestation programme of c. 15,000 ha per year, and preferably considerably more, needs to be put in place for an extended period – up to two decades – to provide the long-term sustainable supply of wood energy that is needed to sustain renewable forest energy.

  Simply stated, if afforestation continues to fall below 15, 000 ha per year as in recent years then wood fuel supply will not be sustainable in the long term. It will therefore not be possible to meet the government's long term targets for renewable energy from our national resources. As security-of-supply is a key issue in government energy policy, national afforestation levels and funding must reflect this need.

Figure 1: Energy Forecast Giga Joules ('000)



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Afforestation - enhancing biodiversity in the Irish countryside

What is biodiversity and why is it important?

- The Convention on Biological Diversity defines biodiversity as the variability among living organisms from all sources including among other things, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
- At least 40% of the world's economy and 80% of the needs of the poor are derived from biological resources. The richer the diversity of life, the greater the opportunity for medical discoveries, economic development, and adaptive responses to new environmental challenges such as climate change and disease outbreaks (www.cbd.int).
- Diversity within ecosystems provides for quality of life and boosts ecosystem stability.

Forests and biodiversity

- Forests are home to a major portion of global terrestrial biodiversity including more than half of all terrestrial species. In particular, forest canopies are among the most species rich terrestrial habitats supporting about 40% of invertebrate species, of which 10% are considered canopy specialists.
- Historical clearance of indigenous forests and replacement with agricultural land or urban development have greatly reduced biodiversity.
- In Ireland, plantation forests have been established to replace the native forests that were cleared over the centuries. Plantation forests compare favourably with many other intensive land uses in terms of the biodiversity they support, for instance, annual crop agriculture, especially when they replace degraded forest or when they are established on deforested land.
- Research has shown that establishing plantation forests on improved and semi-improved grasslands will be neutral or positive for biodiversity, particularly in landscapes that contain little semi-natural woodland habitat.
- An extensive UK study found that non-native conifer plantations provide suitable habitat for a wide range of native flora and fauna and make a positive contribution to biodiversity conservation.
- While natural forests are rich in biodiversity as they are structurally complex ecosystems, structural diversification in plantations can be improved through management practices.

Habitat creation

- Afforestation allows for forest expansion, and plantations contribute to biodiversity within landscapes through habitat supplementation or complementation, connectivity and buffering effects. Plantations can maintain or create wildlife corridors enhancing connectivity between areas of native ecosystems. Even relatively small forest fragments facilitate biodiversity conservation in human-dominated environments.
- The biodiversity of afforestation sites can be enhanced by the inclusion of supplementary habitats such as deadwood, hedgerows, wet habitat, open space, semi-natural woodland and species rich grasslands.
- Prior to canopy closure, afforestation leads to an increase in the relative abundance of competitive plant species, generalist spiders and some ground nesting birds through the exclusion of grazing livestock, forestry drainage and changes in nutrient management.
- Afforestation increases the amount of forest habitat and forest edge habitat in the landscape and so benefits species affiliated with these habitats and ecological processes related to landscape-scale factors.

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- Native riparian woodlands are biodiversity 'hotspots' and provide refuge for communities of flora and fauna of high conservation value and act as a source for the expansion of such species to other areas. The creation of riparian woodlands results in an increase in flora and fauna associated with this ecosystem. These woodlands can also reduce fragmentation in the landscape by connecting isolated woodlands.

Species protection

- The scarcity of natural woodlands in Ireland means that plantations have the potential to provide important habitats for populations of some forest species that would otherwise be even scarcer. Managed forests can provide important habitats for a range of native species and may provide habitat for threatened populations of forest specialists including rare plants, animals and fungi.
- Afforestation has buffered the detrimental effects on biodiversity of agricultural intensification by acting as a refuge for a wide range of native forest plants and animals.
- Forests are home to a diversity of birds as well as nationally important populations of some rare or declining species, e.g. Hen Harrier, Nightjar and Merlin and may provide opportunities for other species to colonise Ireland. For example, Ireland does not have a resident population of woodpeckers, but the Great Spotted Woodpecker bred in Ireland in 2008, and the presence of forest specialists, such as crossbills and siskin, as breeders in Ireland is due in large part to increased afforestation in recent times.
- Early successional forests can provide habitat for bird species of scrub and open habitat, including those of conservation concern such as the Grasshopper Warbler, Whinchat and Linnet. Such species would be scarcer in the largely agriculture-dominated landscape of Ireland in the absence of plantations forests.
- Conifer plantations in Ireland provide strongholds for the native red squirrel which is threatened by the grey species.
- Woodland is the primary habitat for pine martens, whose population in Ireland has increased in response to afforestation.
- Lesser Horseshoe Bats in Ireland are dependant on woodland habitats, including plantation forests, for successful foraging.
- The positive value of plantations for groups such as beetles, hoverflies, spiders, moths and butterflies have been substantiated by studies in planted forests.

The future of biodiversity in plantation forests

- Ireland is committed to the principles of Sustainable Forestry Management and inherent to these are the conservation and enhancement of biodiversity in forests through improved planning, training and management practices.
- The Forest Biodiversity Guidelines have been developed to conserve and enhance biodiversity in Irish Forests.
- Ireland's forest industry has changed from the single goal of timber production to the modern approach of multiple use, which includes a range of wood products, biodiversity value, carbon sequestration and use for leisure activities. Several measures support this diversification including Ireland's National Biodiversity Plan, Forest Biodiversity Guidelines, the Native Woodland Scheme, and the Forestry Environment Protection (Afforestation) Scheme (FEPS).
- Ireland's forest estate is largely fragmented; however the government target of expanding the national forest cover from 10% to 17% by 2030 may help reduce this, particularly through careful planning of these newly established forests. The increased planting of native broadleaf species in recent years is likely to enhance overall landscape biodiversity in Ireland's agriculture-dominated landscape.

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Recreational value of Irish forests

- The development of forests for recreation is seen as an important aspect of sustainable forestry due to increasing demands for access to forest-related recreational activities, and a developing recognition of the wide ranging benefits they can provide to society. The EU Forest Action Plan (2006) acknowledges the multifunctional role of forests. This includes their social and cultural values - '*attractive to city dwellers, they provide opportunities for recreational and healthy activities and represent a not inconsiderable cultural heritage*'.
- The value of forests for recreational activities has been recognised for many years in mainland Europe with its rich heritage of forests and woodlands. The growth in land areas in Ireland under forests from 1% at the beginning of the 20th century to the current c. 10% has provided Irish people and visitors with the opportunity to increasingly enjoy their use for recreation. Forests are the most important outdoor recreational facility in Ireland.
- While walking is the most popular activity, forest recreation embraces other specialised activities including orienteering, mountain biking, horse riding and fishing. Irish forests are well served with roads, tracks, rides, and increasingly with purpose built trail and cycle tracks in selected locations. Forest Service Guidelines provide direction on assessing the forests' recreational potential.

  The Dobris Assessment states that tourism is likely to become the largest single economic activity in the EU and currently accounts for 5.5% of the EU's GNP. Land use for tourism has been correspondingly growing, with the more specialized forms of tourist activities, noted above, gaining in popularity.
- The utilization of forests for recreation is attested to in the total number of annual visits to western European forests. It is cited, for the mid 1990s, as being in the region of 1.4 billion – equivalent to an average of 6.5 visits per person per year. Fitzpatrick and Associates have estimated that the figure has more than doubled between 1998 and 2005, with 18 million people visiting Irish forests per annum, representing 4.5 visits per person. In the future it seems likely that demand will increase for a higher quality of forest recreation experience (e.g. more organised and specialised recreation activities and a higher expectation in relation to visitor facilities). As the Irish figure of visits per capita is less then the European average, it is likely that the expansion of public use of forests for recreation will continue for the next number of years.
- The main providers of access to lands in State ownership for recreation are Coillte, National Parks and Wildlife Service (NPWS) and Waterways Ireland. Coillte manages c.445, 000 hectares while NPWS manages 66,000 hectares in the National Parks. An audit by the National Waymarked Ways Advisory Committee of the Irish Sports Council identified that over 53% of all walking routes are on public roads while 55% of the remainder are on forest lands. The forest estate in Ireland is well distributed across the country and as such can provide recreational opportunities to an increasingly urbanised population.
- The monetary value of the recreational use of forests and trails has been examined in a number of recent studies. Fitzpatrick and Associates (2005) estimated that the annual 18 million visits to Irish forests provide a non-market value of €97 million or €5.40 per person. The total economic activity generated by domestic forest users is estimated at €268 million. Walking tourism generally by overseas visitors accounts for €138 million per annum. As a substantial number of trails commence or travel through forests, foreign visitors benefit significantly from the recreational facilities provided by Coillte. It has been demonstrated that the provision of nature reserves in Irish forests significantly increase the monetary returns from forest sites to the recreational users and enhances their willingness to pay for access.

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- Research has shown that the value of trails is currently greater in Ireland for the domestic user than for overseas visitor. For both categories the demand for trails is likely to be greatest in urban areas and around existing popular tourist venues.
- Small-scale private forest holdings in Ireland are a relatively new phenomenon. They have expanded since 1973 with an estimated 17,000 holdings and an average size of 10.6 ha. A survey of forest owners gave timber production as the main objective for their forest but 42% included recreation as an objective.
- In forests used intensively for recreation, the forest manager has to take into account a range of extra issues in addition to timber management.

Irreversible change in rural Ireland and the extent to which the country is now urbanised will increase demand on forests and on the countryside for outdoor recreation.

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Irish forestry and the environment – a catchment-based approach

- Government policy on forestry, as set out in '*Growing for the Future*', published in 1996, is to achieve a forest cover of 17% of the land area by 2030. In order to reach this target, it was necessary to afforest 20-25,000 ha per annum. However, in the past decade, annual planting has been well below this level.
- Since the publication of '*Growing for the Future*', our thinking on which areas should be planted and which should be left unplanted, or developed for amenity, rather than commercial purposes, has been greatly refined. It is now accepted that the large-scale planting of blanket peatland in the west is neither aesthetically, nor environmentally acceptable. Forest ecosystem research has significantly improved our understanding of how forests interact with the atmosphere, soils and surface waters.
- The improvement in our knowledge has led to a proliferation of regulation in an attempt to minimise the potential impacts of afforestation. Unfortunately, due to a lack of scientific information, this has resulted in somewhat arbitrary limits on planting often through over-application of the precautionary principle. It has also emphasised, through the trouble-shooting, problem-solving approach we have taken to research, the potential negative effects of forestry, while ignoring the environmental benefits of carefully planned, well-managed forestry enterprises.
- The Forest Service has recently published an '*Indicative Forestry Statement*', which provides a framework for the identification of regions suitable for afforestation for purposes ranging from commercial forestry to amenity. The Indicative Forestry Statement (IFS) is grounded in research carried out over the past fifteen years. It integrates several spatial datasets which take account of forest productivity, aesthetic and conservation values, surface water quality and fisheries and current land use. It recognises four categories, from sites suitable to a range of forest types, through those with limitations, to those classified as unsuitable, unproductive or unplantable.
- The end-product, the IFS category map, identifies the degree to which different areas of the country are suitable for forestry under these four categories. It will be particularly valuable for the implementation of policy by the Forest Service, for local authority planners and for private forestry companies. It is an important step towards a science-based approach to the selection of appropriate sites for afforestation.
- The IFS category map takes an essentially broad-brush approach to suitability. It was published at the scale of 1:1,800,000. The challenge now is to develop a rational system for its application at forest level.
- At present, afforestation proposals in areas classified as suitable for certain types of forest development (Category 2 on the IFS map) are considered on a case-by-case basis. Situations where wildlife might be threatened, or those which might be considered acid-sensitive, or vulnerable to eutrophication fall into this category, or the more stringent Category 3, which covers areas suitable for nature conservation or amenity. Development proposals for areas greater than 50 ha are subject to environmental impact assessment, as are smaller areas where the proposed development is adjudged to have a significant environmental impact. Irrespective of the size of the proposed development, applicants in acid-sensitive areas may be required to carry out tests on the buffering capacity of surface water. The application of this regulation, for small developments can lead to anomalies, where an application is refused despite the presence of a far larger forest area nearby.
- The impact of any forest, or forest operation, is best expressed at the catchment scale. A catchment can be defined as an area where the water which falls on the surface would, if it flowed over the surface, tend to

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flow towards a common point, a stream or river. A catchment can be of any size encompassing anything from a single stream to a river with many tributaries. The boundaries of the catchment are user defined, in this case, by the Forest Service.

- Using the catchment as the basis for forest planning not only allows the rational management of afforestation proposals, it also facilitates integrated catchment management. This is true irrespective of the primary environmental service provided by the catchment, whether this be aesthetic, biodiversity, or surface water quality. Put very simply, a 10 ha block of forest in a potentially sensitive 300 ha catchment is unlikely to have any measurable impact on water quality, whereas a 100 ha block in the same catchment may well have a detrimental effect. Similarly, the impact of a forest development in a visually sensitive area is best measured not as an absolute area, but as a proportion of the catchment in which it is located. In the case of wildlife, the hen harrier for instance, protection can best be served by habitat management at the catchment scale, ensuring that, on the one hand, the balance between forested and non-forested land is appropriate and on the other, that the forest itself is planned and managed to provide suitable breeding habitat on an ongoing basis. Afforestation at an appropriate scale in sensitive catchments may often enhance the catchment objectives through achieving an optimal balance, as in the case of the hen harrier, rather than the current practice of often imposing blanket bans on forestry in such areas.
- The implementation of such a catchment approach will require careful planning. The benefits, however, are considerable. It offers the promise of a scientific basis for the implementation of the indicative forest strategy at local level. The amount of forestry and indeed its management will be guided by the environmental services considered worthy of protection at local level and the potential impact of the forest on the provision of these services. It will do away with arbitrary thresholds based on area, such as the 5 ha limit in areas sensitive for fisheries and instead impose limits that a have a sound scientific foundation linked to the environmental service provided by the catchment and the potential impact of the forest.
- The catchment approach offers a rational, scientific-based approach to the implementation of the Forest Service indicative forestry strategy at local level.

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