

Forestry and the environment – a sustainable prospect¹

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*Of old the world by dreaming fed
Grey truth is now her painted toy*

W.B. Yeats

Part 1: The new agenda

Sustainable development – an emerging concept

Sustaining the world's resources has become a new priority for world leaders. Whether it ever becomes a 'painted toy' remains to be seen. When, in 1987, Dr Gro Harlem Brundtland, former Prime Minister of Norway, published *Our Common Future*, the report of the World Commission on Environment and Development, a fundamental shift in perceptions of the global environment commenced. Two years before its publication, one of the world's most horrific environmental disasters took place in Bhopal. The following year, the nuclear catastrophe at Chernobyl occurred. In addition to these momentous events, tropical deforestation was taking place at an alarming rate. The Brundtland report concluded that the burden of indebtedness was forcing many countries in the developing world to use their forest resource to meet debt repayments. Debt servicing and the human demands for land resources were impacting on forests faster than they could be regenerated.

From the Brundtland report, the concept of sustainable development emerged as a political issue. (Although the World Conservation Strategy of 1980 took the first step in popularising the concept of sustainability, the Brundtland report promoted it onto the world's political agenda.) The concept is encapsulated in *Our Common Future* as meeting the needs of the present without compromising the ability of future generations to meet their own needs. The report laid the foundation for UN General Assembly Resolution 44/228, which convened the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992. Among the issues that were to be tackled at the conference was the protection of land resources by, *inter alia*, combating deforestation (Humphreys, 1996).

The tropical forest issue

Meanwhile, during the 1980s, awareness was emerging among donor countries, non-governmental organisations (NGOs) and the tropical countries of the need to develop a plan for tropical forests. The Tropical Forest Action Plan, later to be known as the Tropical Forest Action Programme (TFAP), was subsequently formulated by the UN Food and Agriculture Organisation (FAO). It incorporated five action programme areas. These, however, had very limited impact on deforestation. In fact, when the plan was reviewed in 1990, many felt that it had not only totally failed to arrest deforestation, but had, in some

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curious way, exacerbated the problem. Strangely, or perhaps not so strangely, the main criticism came from those countries which had not paid their annual subscriptions to FAO!

Seventy-six of the 120 countries and regions that have tropical forests developed National Forestry Action Plans under the TFAP (Humphreys, 1996). These national plans were agreed between the donor countries and the country concerned. However, while slowing the destruction of the tropical forest resource, many of the implications of a process driven by countries in the northern hemisphere proved both politically and economically unacceptable for those countries whose dependence on wood was high.

Definitions of sustainability

By the time of UNCED, the world's forests were firmly established on the international agenda. All levels of political clout were being brought to bear on forestry issues, including the G7, the Council of the European Union and individual forestry ministers. Sustainable development and more specifically, sustainable forest management, had suddenly become the illusive target, as reflected by shifting definitions of its objectives. For example, in 1991, the International Tropical Timber Organisation (ITTO) defined sustainable forest management as follows:

Sustainable forest management is the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.

In 1992, meanwhile, the FAO formulated a definition of how sustainable development applied to forests:

Sustainable development is the management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for the present and future generations. Such sustainable development (in the agricultural, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

A series of four preparatory conferences took place prior to the Rio conference. At these, a definition of sustainable development was a major issue. At Rio itself, it was decided not to define sustainable forest management but to include a strong reference to it in one of the statements of principles.

During the process, a fundamental difference in philosophies emerged between the more developed countries of the northern hemisphere and the developing countries of the south. Essentially, the north regarded deforestation as a global problem where the forests played an essential role in the world's carbon cycle and global warming. Meanwhile, the south regarded the issue as regional and within their own competence to manage, given moral and financial support from the north. The south also expressed the view that the north consumes too much and that the global economic system is exploitative and is a driving force behind environmental degradation.

North and south positions still prevail, as witnessed by a recent statement by Nelson

Wong (1997) of the Malaysian Timber Council, “Deforestation in Malaysia began under the British colonial rule. Vast areas of virgin forest were cleared for rubber plantations. Rubber latex was supplied to Great Britain for tyre manufacturing for the British motor car industry. It is strange for developing countries to witness the plundering of their forest over the past few centuries and watched the empires of these developed countries grow richer and more powerful. Stranger still when they have sucked the third world dry, to turn around and tell the third world that they must keep their forests while we in the developing countries understand the importance of our forests. I don’t think we are in the business of keeping western environmentalists happy.”

Protection of Europe’s forests

In Europe, meanwhile, a ministerial conference in Strasbourg in 1991 passed six resolutions to protect Europe’s forests. Many research and forest protection initiatives within Europe are a direct result of this conference. For example:

- the monitoring of forest health was incorporated in Resolution 1;
- the present COST³ Action on forest physiology resulted from Resolution 4;
- EU-funded concerted action European Forest Ecosystem Research Network (EFERN) resulted from Resolution 6.

A second ministerial conference on the protection of forests in Europe took place in Helsinki in 1993. This conference, which led to the Helsinki Process, passed four resolutions dealing with sustainable forest management and biodiversity. A third ministerial conference is scheduled for Lisbon in 1998.

The UNCED definition of sustainability

A non-legally binding authoritative statement of principle for a global consensus on the management and sustainable development of all types of forest was agreed at UNCED in Rio. To some extent, this was a compromise between the aspirations of the north and the economic needs of the south. According to Humphreys (1996), the statement represents “a mean position of the lowest common denominator between North and South”. Principle 2(b) of the statement states:

Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual human needs of present and future generations. These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products. Appropriate measures should be taken to protect forests against harmful effects of pollution, including airborne pollution, fires, pests and diseases, in order to maintain their full multiple value.

The statement of principles thus became the basis for subsequent action. Several initiatives emerged as a result of the Rio conference. As far as Ireland is concerned, these fall into two main areas: sustainable forest management and certification. Initiatives relating

³ COST – Co-operation in Science and Technology, an EU initiative to foster networking and information exchange in science and technology.

to sustainable forest management include the UN's InterGovernmental Panel on Forests (IPF), the Helsinki process and the International Standards Organisation's (ISO) 14000 series, while those relating to certification include the Forest Stewardship Council (FSC). These initiatives are already influencing, or will soon influence, operations within the Irish forest industry, and will undoubtedly impact upon the course of future forest management in Ireland.

The InterGovernmental Panel on Forests

The first occasion that forests were discussed within the UN after the Rio conference was during the 1995 session of the Commission on Sustainable Development. At this high level meeting, the IPF was established, with a mandate to pursue consensus and to formulate options for further action to combat desertification and forest degradation. It would also promote management, conservation and sustainable development of all forest types. Its main task was to promote multi-disciplinary actions at the international level consistent with the UNCED Declaration and Agenda 21. (Agenda 21 is intended to be an action agenda for governments, aid agencies and other players in environmental issues up to the end of the century.)

The fourth and final session of the panel was held in New York in early 1997. Much of the debate centred around whether or not countries should enter into formal negotiations that would ultimately lead to the creation of a legally binding International Forest Convention. Some countries expressed support for such a convention, while others were strongly opposed to it. Disagreement existed even among strong political allies such as Canada and USA. The sudden about-face of most NGOs, who now state that they are against an International Forest Convention even though they initially advocated such a move, has also added much confusion (Moore, 1997).

Sovereignty, financial and trade related issues still stand between the international community and any consensus on forests. Agreement has yet to be reached regarding what sustainable forest management means in concrete terms, or how to balance commodity and economic values of forests with ecological and socio-cultural values.

The next stage in the process that will consider international forest policy will be the Commission on Sustainable Development and the UN General Assembly (Anon., 1997). Ireland supports the concept of a legally binding convention as the process moves towards the next UNCED event.

The Helsinki Process

Discussions surrounding the introduction of mechanisms of putting the Helsinki conference resolutions into practice began in 1994. A follow-up expert group approved a list of six pan-European criteria and 20 suitable qualitative indicators which will be the tool for gathering and assessing information on how the signatory states have succeeded in implementing the general guidelines for sustainable forest management, as described in Resolutions 1 and 2 of the Helsinki conference (Anon., 1994). These criteria are as follows (from Humphreys, 1996):

- maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles (three indicators);
- maintenance of forest ecosystem health and vitality (four indicators);
- maintenance and encouragement of the productive function of forests (wood and non-wood) (three indicators);

- maintenance, conservation and appropriate enhancement of biological diversity (five indicators);
- maintenance and appropriate enhancement of protective functions in forest management (notably soil and water) (two indicators);
- maintenance of other socio-economic functions and conditions (three indicators).

The Forest Service represents Irish interests both at the IPF and in the Helsinki Process.

ISO 14000 series

The ISO is an international body for the development of standards. The ISO 14000 series deals with environmental management systems (EMS), certification and labelling. For example, ISO 14001 deals with EMS's, while 14004 outlines a procedure for drafting environmental quality systems. The ISO 14000 series is not specific to forest management, nor does it specify performance levels. An ISO working group is, however, now actively engaged in drafting a reference document for the use of ISO 14001 by forestry organisations. Ireland is represented at ISO meetings by the National Standards Authority of Ireland.

The Forest Stewardship Council

The formal establishment of the FSC initiative in October 1993 by the World Wildlife Fund for Nature (WWF) was essentially a reaction to the failure of the ITTO to introduce a labelling programme for forest products. Given its governmental representative nature, the ITTO could not, or was not prepared to, introduce a labelling system, as such a move could have been regarded as being illegal under GATT (Humphreys, 1996).

There is much debate about principles, criteria and more specifically, the indicators, used by the FSC. The cost of certification and who bears that cost, are also major issues. At issue too is the certification process itself. The FSC accredits certifiers who assess whether a forest is 'well managed' according to predetermined indicators. Products from certified forests can then be traced through the system to the final consumer. This certification process applies to wood products from tropical, temperate and boreal forest, both planned and natural. Irish Woodworkers for Africa represents the interests of the FSC in Ireland.

Part 2: Sustaining the Irish forest resource

A national forest

There are fundamental aspects concerning Irish forests which are unique to this island and which must be considered if we are to be consistent with the Helsinki resolutions and the aspirations in the Government's strategy document *Growing for the Future* (Department of Agriculture, Food and Forestry, 1996).

One essential for applying sustainable forest management to Irish forestry practice is to decide whether our forests represent a series of individual wood lots, where sustainability is measured within the boundaries of the wood lot, or a national forest, where the sustainability of that resource is enshrined in national policy and supported by law. There is a strong argument that our national forest is a single unit of management. The overwhelming need in Ireland, which experienced a dramatic drop in forest cover to under 2% by the second decade of this century, was, and still is, the restoration of the national forest. While the sustainable management of this national forest is an important issue, it must take account of the sustainability of individual sites.

Establishing the forest resource

The first task of Irish foresters was to develop, or more correctly, to re-establish, this forest and associated ecosystems. This process was begun in Ireland almost a century ago. Since then, foresters have been rebuilding a forest resource principally on land regarded as being marginal for agriculture. The focus during this period has been to generate an economic production unit within which the main product is wood. This focus is likely to continue in our nationally owned forest, given the encapsulation of a commercial ethos in law in the form of the 1988 Forestry Act. It is the intention that it should also happen in private woodlands. In fact, wood production is the very *raison d'être* for the re-creation of Irish forests. The aim of *Growing for the Future* is to build on the achievements of the past so that forestry can realise its full potential contribution to Ireland's economic and social well-being.

The new forest resource

Since the establishment of the forest plots at Avondale almost 95 years ago, the species signpost has firmly pointed down the conifer route. Initially, this signpost directed foresters towards a broad band of European coniferous species particularly suited for many old estates acquired during the 1930s. Although not described as such, diversity was the underlying result, having been so dictated by soil conditions and plant availability. The resultant plantations generated a mixed forest resource which has now been almost completely replanted with North American species, the wood value of which is considered the deciding issue.

A new political drive in the early 1950s resulting from the influence of Sean McBride in government coincided with the arrival of the Cuthbertson, and later, the Clark ploughs. These factors allowed for an afforestation push onto peatland, peaty gleys and poor mineral soils, the acquisition of which was conditioned by price. For three and a half decades, there existed a very close relationship between the price of a pair of shoes – unfashionable men's shoes at that – and the maximum price payable for an acre of land for afforestation. Acres planted became more important than their ability to grow wood economically and even less, their ability to accommodate a diverse range of species. It is on such land that approximately three quarters of our national forest resource exists.

Biodiversity in forests

The forest should be defined as an ecosystem within which a dynamic relationship and interdependence exists between flora and fauna and their environment. It is essentially a place where a relationship exists between all elements of the system. For this forest to be sustainable, the activities undertaken by man – be they wood harvesting, hunting, recreation or even bird watching – must not be to the detriment of the ability of the other elements of the ecosystem to respond, recover and continue the dynamic process of renewal and change. This ability encompasses the totality of relationships including carbon cycling, nutrient and water budgets and, most essential of all, the biological entities that drive the process. Whether these biological entities are complex, diverse, simple or narrow, depends on the ecosystem. Their function is to ensure that the cycle is capable of completion. Species numbers may not be as significant as species function.

Biodiversity must be seen in the context of resilience, response and recovery. Genetic resources associated with species, the habitat they require and their resilience in times of stress, lie behind the logic of conservation. "You take my life" says Shylock in *The Merchant of Venice*, "when you take the means by which I live". This same logic lies behind

the significance of habitats and the Habitat Directive that we are obliged to follow. Biodiversity should not be seen as an end in itself, but rather, as a means of supporting resilience and adaptability.

Resilience and adaptability

Any debate as to whether our peatland should ever have been planted is irrelevant at this stage. What is of more importance is whether or not, within the context of sustainable forest management, such areas should be reforested as the current forest cover is harvested.

Among the aspects to be considered in respect to the felling of mature peatland forests will include the impact of harvesting operations on the physical and chemical properties of water (in relation to both fish and human consumption), the peat itself and the landscape. The oxidation and buffering capacity of the growth medium will also require further consideration and should be supported by continued scientific investigation.

To assess such impacts, a total analysis of how harvesting and establishment operations are to be undertaken has yet to be tried and tested. Some Irish research is being undertaken that will help to chart the future course of events. Legally, of course, there is no such argument. The 1946 Forestry Act is quite specific in that it caters for the licensing for the felling of all trees in a forest context. As part of the licensing process, the licensee is obliged to replant the area felled or a similar area, by agreement with the Forest Service. Thus, the precept of sustaining forest cover is observed. If, however, research shows that the impacts are unacceptable in the context of the sustainability of the site itself and thus compromise our obligation to practise sustainable management, the legal obligations contained in the act will require modification. In the case of peatland forestry, oxidation following drainage and planting could be such that the peat itself is diminished. This could bring into question the long term sustainability of peatland forestry if the rate of carbon sequestration is less than the rate of oxidation.

On the credit side, however, a new ecosystem development process has commenced within these areas which will, without doubt, influence strict legal interpretations. Initial ground preparation has changed surface configuration, allowing new microclimates to develop with a consequential impact on species range. Shelter is contributing towards the broadening of both species range and function. Controlled by soil fertility and micro-organisms, the process is helped by natural regeneration and the build-up of forest litter. The process of species diversification has commenced which must surely balance many of the possible negative influences.

Life Cycle Analysis

Considerations regarding sustainability in forestry generally extend beyond felling and replanting. It also applies to all aspects of forest growth and harvesting and must, of necessity, cover the long and short term interests of all our citizens and the ability of future generations to meet their needs from this resource. They must therefore outweigh immediate economic considerations.

Minimum impact operations must be considered in the context of sustainability. The assessment of such impacts must be undertaken from an economic as well as an environmental viewpoint. Among the recognised methods of such assessment is Life Cycle Analysis (LCA), also known as Life Cycle Assessment. This method identifies and evaluates the inputs and outputs of processes in terms of environmental costs, if any. In an ideal situation, all material and energy inputs are traced back to their extraction from the

environment and all releases traced back to the environment. These are then registered in a life cycle inventory (Frühwald and Solberg, 1995). Research workers are currently assessing the flows of energy inputs from seed sowing to final harvesting. Under the current methods of assessment, wood and wood products emerge high among all primary production systems in regard to energy and carbon cycling. In this context, forests and the use of wood products contribute to the fight against greenhouse gases in three ways:

1. carbon sequestration by harnessing CO₂ during tree growth;
2. substitution with wood of high fossil energy products such as plastic, steel and aluminium;
3. reuse of wood products for energy, thus avoiding the use of fossil fuels.

Forest and wood products emerge as highly positive. Indeed, it only remains a matter of time before their value in the context of overall impact on the environment becomes manifest to all. It will thus help to counteract public perception that it is environmentally detrimental to fell a tree.

LCA is a new discipline which can be of enormous help to forestry and wood production, assuming, of course, that the same criteria are used in the assessment of other production processes.

Building the ecological reserve

In Ireland, approximately 5,000 ha of forest cover is being felled annually, and approximately 22,000 ha planted – a ratio of over four to one. The move onto better quality land has resulted in an improvement in wood production capacity, biodiversity and multi-functionality. The generation of a series of national forest ecosystems is therefore in an upward spiral. These areas are now new ecological assets in that they are workshops for ecosystem development and change, with the continual cycle of felling and regrowth providing homes for plants with varying requirements (Rackham, 1995). The afforestation process currently taking place on better land is therefore not only laying the foundation for wood production, but is also generating an ecological resource, thus adding to Ireland's natural heritage.

Applying sustainable forest management to new forests

The norms which governed the establishment of our existing forests no longer apply today. Gone is the government dictate that forests can only be established on land unsuitable for agriculture – a factor which limited species diversity given altitude and fertility constraints. Afforestation, assisted by grant availability, is now competing with conventional agriculture for the use of our lowlands. On such land, species diversity will undoubtedly increase, given its inclusion as a new condition for grant aid and the fact that fertility is no longer a limiting factor in species selection. Fertilisation is also not normally required, while herbicide usage, if considered necessary at all, is minimal and confined to the initial half decade. These factors will prove positive in the LCA process. In addition, landscape impacts are not as critical on lowland as they can be at higher elevations, where visibility is over a very much greater area. Meanwhile, association and integration with lowland farming present an opportunity to introduce or increase the woodland component in the landscape, thereby promoting biodiversity by providing a greater boundary:area ratio.

Conclusion

Sustainable forest management is not limited to the silvicultural aspects of forestry. Instead, it encompasses the entire forest environment, including socio-economic aspects and its impact upon rural development. Irish forests are multi-functional in nature, where people are, and must remain, the prime beneficiaries. While wood is harvested for economic benefit, this benefit must be seen within the context of rural communities and environmental impact. LCA will be a way of measuring the broad sweep of sustainability issues and will pinpoint the operations and practices which cause the highest cost to the environment.

In regard to rural development, distant economic benefit is not conducive to rural harmony. Similarly, distant control alienates communities and leads to local disenchantment. Sustainable forest management requires diplomacy as well as technical skill. It helps to replace monologue with dialogue, and affirms local involvement. Although perhaps not listed among criteria for success, sustainable forest management in the Irish context must include acknowledgement of the environmental benefits of forests, be they carbon sequestration, habitat creation, soil protection or the provision of opportunities for recreation. It must also include the appreciation of wood use as an environmental plus, and the recognition of wood, whether it be for fuel, construction or paper, as the world's ultimate renewable resource.

Irish laws and government encouragement for forest development are ensuring a net increase in forest cover and wood grown in Ireland, an increase which is projected to continue for at least the next 30 years. Our skills as foresters must match the challenges that confront us all. We must not be found wanting.

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