

## Reforestation of the World - It Can Be Done

**The following is the text of a lecture by Tim Rollinson, Director-General of the British Forestry Commission, at the National Sustainable Development Centre's leadership lectures in St Andrews, Scotland on Thursday 23 April, 2009.**

I'm going to start my story right here on our doorstep, but it is as much a story of the world as a story of Scotland, so I'm also going to take you on a tour using my favourite carbon-neutral airline, Google Earth. Don't worry, we'll be returning here at the end to pick up your car.

I don't naturally dwell on history, but my story would be incomplete without it. We need to look back at where we have come from before we look forward.

Some 5000 to 6000 years ago about 50 to 60 per cent of Scotland was forested: probably forest interspersed with open spaces such as wetlands and bogs.

'Natural' changes to the climate then had a profound impact, with areas of pinewood, for example, dying out as the climate became windier and wetter about 4500 years ago.

Of course, humankind had an impact too. About 2000 years ago forest cover would already have been reduced to about half of its former glory. Then followed centuries of further clearance for uses such as woodfuel, ship building, housing, deer hunting and, of course, agriculture.

If you consider the iconic images of Victorian Scottish landscapes, they are often treeless and bare. Romantic, perhaps, in those days, but to an ecologist they are something akin to a barren moonscape.

Those woodlands that did remain after centuries of heavy exploitation and deforestation were generally remote or inaccessible, or they had remained useful to society. History taught us an essential lesson – woods that provide us with tangible benefits are more likely to stand the test of time. Woods with a limited range of uses rarely last.

At the beginning of the 20th century this combination of natural climate change and human influence had reduced Scotland's forest cover to an all-time low - just 5 per cent of the land area. So our forest history had been one of thousands of years of deforestation.

Not only had we lost our forests, we had also lost our forest culture. The deforestation had been so prolonged and gradual that we had rather grown used to a landscape without trees - and the open vistas of Scotland became the new paradigm. And much cherished.

We also found ourselves bereft of forestry skills, without adequate knowledge and lacking relevant science. We virtually had to start from scratch.

And that is what we did. Following the First World War, national concern about the lack of timber available to help us fight any future conflict led to the establishment of the Forestry Commission in 1919. The Commissioners had a single, and simple, objective – to create a strategic resource of timber.

The Commissioners were provided with funds, manpower and the political power to restore the country's forest resources.

The post-war emphasis was on production. The aim was to establish fast-growing plantations of trees. This mirrored what was happening in agriculture, where policy focused on production to increase yields for a nation recovering from the war effort.

Agricultural policy safeguarded the best-quality land for food production, so only the most marginal land was available for the new forests, introducing another challenge for the new foresters.

Plantation forestry was seen as the way forward - as the only means of quickly and efficiently establishing new forests. Many of these new plantations were established on upland grazing areas which had lost their tree cover, often centuries before.

The range of tree species that could be grown on this marginal land was heavily restricted - with an emphasis on fast-growing conifers, particularly Sitka spruce in the uplands and Scots and Corsican pine in the lowlands. Some of the new plantations were established on the sites of original native woodlands and, believe it or not, some of these were cleared with herbicides to make room for the productive new plantations.

The simple and singular objective to rebuild the nation's forest resource was achieved: the forest area of the UK was doubled in just 80 years.

1.5 million hectares of new forests were created. This was the biggest land use change in the UK in modern times and possibly, at that time, the biggest afforestation project in the world.

How was it done? A powerful organisation was created with dedicated research programmes and an emphasis on technological innovation. It had a large, motivated workforce. It worked in partnership with private owners and with the benefit of committed government backing.

Foresters scoured the world to find the fastest-growing species for our conditions. New scientific and engineering advances were made, for example, in ploughing, cultivation and fertilisation, soil fertility, tree breeding, road building and much, much more.

Some 30 years later, in 1950, the Commission employed more than 13,000 people. Today that figure is nearer 3500.

The annual timber harvest had reached 325,000 cubic metres, and income from the produce exceeded £2 million a year. The harvesting and marketing of timber had become a core part of the Commission's work.

By the end of the decade private landowners were finally warming to schemes designed to encourage them to plant land in trees, and nearly 240,000 hectares had been dedicated to forestry.

The creation of the new forests was a big success. But the single-minded objective of building up a strategic reserve led to conflicts – and those conflicts were mostly about loss: loss of access in some areas; loss of some valuable semi-natural habitats; loss of the open vistas for which Scotland had become known; and loss of some native woodlands.

The young, dense, monocultures intruded into open landscapes - even if they had been forested at some point in the past - often with insufficient or no attention to planning. Abrupt boundaries between the forest and the neighbouring land were often unnatural and awkward on the eye.

These perceptions hindered public acceptance of reforestation, but they also provided us with more valuable lessons.

The first was that there is an innate dislike of change. The longer people have to 'get used' to a deforested landscape, the harder it becomes to repair the damage. Imagine parts of the tropics in future centuries with well-meaning pressure groups fighting to prevent reforestation of what were once our cherished rainforests.

And the second lesson? When reforesting, do it sensitively and with an eye to the multiple benefits of woodland rather than single-purpose, 'here and now' imperatives.

Lack of public acceptability jeopardises reforestation just as surely as lack of government will, because forestry is every bit as much about people as it is about trees.

The continued expansion was fuelled by tax relief for high-income earners in the 1970s and 1980s. Many of you will remember the tax avoidance stories of the rich and famous at the time. This led to increasing conflict, especially between forestry and nature conservation interests. This conflict reached its peak at the end of the 1980s, when forest expansion had moved to some of the remotest parts of Scotland. In the far north, in Caithness and Sutherland, environmental groups vigorously challenged continued expansion plans in what became known as the Flow Country.

I joined the Commission in 1976 and had the great pleasure of working in the New Forest in Hampshire. As one of the oldest medieval hunting forests, the New Forest was an unusual part of the Commission's forest estate. We were managing the Forest for millions of visitors a year, for some of our rarest and most endangered wildlife – and producing 20 lorry loads of timber every week.

This covered everything I had been taught at university – multiple-purpose forestry in practice. But my experience was unusual. For my contemporaries, working in the uplands of Scotland, forestry was centred around the creation and management of single-purpose conifer plantations for timber. They took my experience as something of a joke – not 'proper' forestry. Twenty years later, they were doing just what I had been doing back then.

Policy and practice were unsustainable. Things had to change - and they did. The era of single-purpose plantation forestry came to an end.

From the 1980s onwards, in response to public concerns, the Forestry Commission began to revise its objectives with a move to increasing planting of native species on its own land. Changes to support mechanisms for private owners encouraged them to do the same.

This move continued – away from creation to management of the new forests, with the Commission playing a more general stewardship role in forest management.

And so the single-purpose objective of creating a strategic reserve was replaced by a much wider remit that embraced visual amenity, recreation, access and biodiversity management. Multi-purpose forestry was the new buzz phrase, long before the term 'sustainable development' came into common use.

By the 1990s the Commission was fully committed to this new multi-purpose forestry. The demands of commercial production, recreation and conservation had to be carefully balanced. Forests were recognised as being valuable environmental resources and managed as a whole.

Post-war forests were carefully restructured as they reached maturity. They were reshaped to fit the landform, to look more natural, and to fully benefit the wider environment, not threaten it. Broadleaf planting and long-term management were encouraged by grant assistance.

Restoring native woodland in areas such as Glen Affric and Sherwood Forest has been widely welcomed, and these initiatives started to have a major positive impact on the countryside.

Foresters worked hand in hand with conservation groups. Wildlife projects helped protect bird species, the dormouse, the pine marten and the red squirrel.

Consultation with people with an interest in the forest became an essential part of the forest managers' toolkit.

Today, the spectrum of activities that people want from us ranges from quiet walking, mountain biking, horse riding and even husky dog-sledding through to rather louder events such as motor rallying. People flock to listen to the Royal Philharmonic Orchestra, Status Quo or the Zutons at one of our many summer forest concerts.

These trends have continued to the present day, with sustainability replacing the stewardship ethic.

This journey to understand - and then to put into practice - sustainable development has not been straightforward. Our experience has shown that it requires a balance between the economic, the environmental, and the social values of forests.

But we also need to define the principles of sustainable forest management, and then the criteria against which sustainability can

be assessed - and then measured. Working with the industry, with environmental groups, and with other government agencies, we produced a Forestry Standard for the sustainable management of forests in the United Kingdom. This was published in 1998.

In parallel, work was proceeding to define a standard for certifying that wood products traded in the market places had come from sustainably managed forests. A forest certification standard - the UK Woodland Assurance Standard - was published in 2000. The UK became the first country in the world to have all of its public forests independently audited against the new Standard.

As a critical watershed in the Commission's history we were recognised as a world leader in sustainable forest management, receiving a 'Gift to the Earth' from WWF in 2001 for our work on forest certification.

The journey to put sustainable development into practice has not been an easy one. All areas of management, including forest planning, public consultation on management plans, the use of chemicals in forests, the harvesting of wood products, health and safety, employment practices and so on are all looked at and assessed by an independent auditing authority.

At the same time, the broadening of the remit and work of the Forestry Commission continued apace. I'm going to describe some of the sheer breadth of what these forests now provide.

Today, the Forestry Commission is the largest single producer of timber in the UK - the result of the creation of all the new forests. No surprises there, perhaps. But we also find ourselves to be the largest single provider of outdoor recreation in Britain, and the largest manager of rare and protected habitats.

The mature woodlands and arboreta also provide an enduring and quite unique environment for other quiet recreational pursuits such as orienteering, camping and wildlife watching. Our Forest Holidays business provides cabin, caravan and camping holidays in 24 stunning wooded locations throughout Great Britain.

And with nearly 50 visitor centres, many set within our Forest Parks, we are uniquely placed to tell the stories of our forests.

And we are making increasing efforts to reach new audiences, particularly hard-to-reach groups whose mobility may be limited by reasons of geography, affordability or disability.

Not so long ago I visited a fabulous project we set up in Dalby Forest. This forest is one of the most visited places in North Yorkshire, welcoming more than 300,000 visitors every year. The all-timber visitor centre is clad in locally-sourced timber shingles made from Yorkshire larch. The building structure contains added insulation and uses natural ventilation to lower its energy consumption. It is powered by energy from photo-voltaic panels and a wind turbine. Heating is provided by a biomass boiler which runs on woodchips from the local area. The building also uses rainwater harvesting and bio-filtration sewage systems in its wastewater management.

Among the many accolades the project has won is the Prime Minister's Award for Better Public Buildings.

This is just one of many similar projects we have around Great Britain.

Back in 1976 when I joined the Forestry Commission, if someone had said that I would end up being responsible for managing semi-urban fishing lakes designed to provide disabled access, providing forests for classrooms, rehabilitating criminal offenders, and managing rock concerts, I would have been delighted – but in disbelief.

But today we do all these things, and more.

Where not so long ago the forest was the preserve of the forester, today forests are for everyone. As I said before, forestry is every bit about people as it is about trees.

The restoration of our forest cover has also continued apace, but with a completely new emphasis. We are creating new woodlands on derelict land, restoring old mine workings and contaminated industrial sites. We are creating woods in and around towns for local people. And we continue to restore Scotland's native woodlands. Since 1989 the area of Caledonian pinewood has expanded by almost 50 per cent. We aim to have about 35 per cent of Scotland's forests to be native by the middle of the century.

The ecological importance of forests is illustrated by their very high contribution to species diversity. Forests are home to more than 90 per cent of all terrestrial species. Almost 170 of the current list of the threatened or rare species found in Scotland depend on woodlands. This is more than one-third of the terrestrial priority species list found in Scotland, yet woodland covers just one sixth of the land area.

The restoration and expansion of native woodlands will boost opportunities for many of these threatened species, especially where expansion is focused on allowing interlinked populations to develop and species to migrate to new areas as they adapt to a changing climate. We are also finding that many of the priority woodland species are using the 20<sup>th</sup>-century plantation forests.

Capercaillie are now found in planted pine, fir and spruce forests. Black grouse increasingly use spruce forest clearings and margins where they have been managed to create an open canopy structure.

The development of areas of old growth spruce, fir and larch is encouraging a whole suite of raptor species to nest in these new forests including goshawk, red kites, buzzards and even sea eagles.

The most obvious example of the value of the 20th century forest to our native wildlife is the red squirrel, which thrives in mixed conifer forests.

Our journey to understand sustainable development has taken us 80 years, equivalent, perhaps, to the lifetime of a conifer tree. Many countries now, sadly, find themselves in the same position we were in back in 1919. Many of them have come to us to see what we did, what we got right, what we got wrong, what we learned along the way.

Having moved on so far from the days of the single-purpose objective to sustainable management of forests for many uses, the picture was beginning to look pretty rosy. Perhaps we had it all cracked.

And then we noticed that the world around us was changing.

As we have seen, deforestation continues around the world at an alarming rate.

There can be few more graphic examples than the Brazilian state of Rondonia. Images taken from NASA satellites some 30 years ago show lush, thick rainforest, but with a road running through the area.

The road brought access to the area. It brought people and machines. They brought logging, mining, small-scale farming, and ranching. The trees began to go.

Today, the satellite images show very little of the forest left.

The drivers of deforestation - principally conversion of forests to agriculture - remain largely unchecked. For many developing countries, forest exploitation is the early first step to economic development.

It is a well travelled path - one already travelled by the UK and most countries in Western Europe, the US and China. In the space of just a few centuries, mankind has removed more than one-half of Earth's original forest cover. Just one-fifth of the world's original forest cover remains relatively undisturbed.

Recognising the problem, the world's leading scientists came together under the auspices of the Intergovernmental Panel on Climate Change (IPCC) to assess the role of forests in mitigating climate change. Their latest report makes it clear that reducing current roles of deforestation must be a cornerstone of our global effort.

But the IPCC also notes that forest restoration - through afforestation and restoration of degraded forests - can play as big a part in the longer term and should be at the heart of future climate change strategies.

Governments around the world are working under the UN Convention on Climate Change to address these issues.

Here in the UK, the Forestry Commission has tasked some of our leading scientists to produce an independent assessment of the contribution that forests and woodlands can make in mitigating and adapting to climate change.

Measures to tackle deforestation are now rising up the political agenda and should feature as part of a new global deal to be agreed at Copenhagen at the end of this year. This is welcome news, but measures to restore forest cover lag behind. Too far behind.

This is important for the future of our planet. With a global population already approaching 7 billion, and forecast to increase to more than 8 billion by 2025, the pressure on all of our natural resources is immense. But forest cover continues to fall.

However, we know from our own hard-won experience that restoring forests can be done. Forests can recover.

Of course, not all converted or degraded forests are suitable for restoration. Some of the world's most productive agricultural lands were former forests, and should remain in agriculture. Large areas of land that were once covered by forest have been converted to urban and industrial uses.

However, vast areas of marginally productive lands could grow trees once more.

Fortunately, there are many examples of successful restoration around the world, including Scotland and the rest of the UK.

We need to draw on them, learn the lessons of what makes successful restoration, and spread the best practice globally. This is why our experience here in Scotland and the rest of the UK is now so valuable and so sought after. In a sense, we got there first. We deforested long before most other countries.

But we did do something positive about it.

That is part of the reason why, for a country with such little forest cover, we are highly respected internationally and punch well above our weight.

However, asking and encouraging poor countries to stop deforestation when we, a relatively prosperous nation, exploited and lost most of our own forests centuries ago, can get a rather frosty reaction. And rightly so.

But if we are not too late we can restore the balance between man and nature in forest landscapes. We can reverse the trend.

Restoration means building sustainable relationships between communities, commercial interests and the damaged ecosystems on which they all depend.

Five years ago, WWF, IUCN (the world conservation union) and the Forestry Commission joined forces to launch a Global Partnership on Forest Landscape Restoration. Our aim is to raise awareness of the importance of restoring the world's forest resources. We have gained support by inviting all decision makers and influential organisations to join a movement to restore forests.

Today, this partnership includes governments of countries as diverse as Switzerland, El Salvador, Finland, Italy and Vietnam. It includes international organisations such as the UN/FAO, the Centre

for International Forestry Research, the International Tropical Timber Organisation, the World Bank and many others.

The list continues to grow. Last year the Government of China joined the partnership, and we are working closely with it to share experience and expertise.

Returning the landscape to its original state is just one solution - there are many alternative strategies, each requiring the participation of all those with a stake in the forest. Remember, forestry is as much about people as it is about trees.

The partnership is establishing a learning network, because there is no magical, one-size-fits-all blueprint for restoring forest landscapes. The partnership works from the 'bottom up', bringing together practitioners, sharing and learning all the time, through experience and from one another.

The focus is on highlighting the diversity of these solutions and the lessons from them, not on reducing them to some convenient but unworkable formula.

So, what does this diversity look like? Let's look at some examples from around the world.

We'll stay in Brazil, but move to a more positive story. The scale of past deforestation and fragmentation in Brazil's Mata Atlantica forest is enormous.

The forest once covered more than a million square kilometres, but is now just seven per cent of the original area, with only small patches remaining. These are home to 19 species of primate and more than 160 bird species. Sadly, almost all of the endemic species, birds, primates and amphibians are now considered endangered. Less endangered are the other inhabitants of the area - people. Seventy per cent of all Brazilians live here.

In the Veracel region, a partnership between two international pulp and paper companies is operating several forest restoration sites. One is primarily a pulp-producing plantation, but this happens alongside restoration of fragments of the degraded forest. The natural forest is providing biodiversity corridors between the highly commercial eucalyptus plantations. 48 per cent of the land is reserved for the recovery and protection of native forests, nearly the same amount that the companies use to grow their eucalyptus crops.

So commercial and environmental gains can go hand in hand.

I've just returned from Australia, where I saw another commercial project at work - Alcoa's mine rehabilitation programme.

In many parts of the world, mining is a major contributor to deforestation and land degradation. Mined land is usually cleared of all vegetation. Mining can also mean chemicals, sedimentation and severe disruption of the landscape.

But restoration can be highly effective. In the UK, the Forestry Commission has restored many mining and industrial sites, for example, in the Welsh valleys and in the Nottinghamshire coal fields, to productive, healthy urban forest.

The Jarrah forest on Perth's doorstep covers 1.8 million hectares. Less than ten per cent of the forest remains in old-growth condition, but it still has an estimated 780 different plant species. Alcoa has two operating bauxite mines in the area. Since mining started 12,500 hectares of forest have been cleared, but 10,600 have been rehabilitated.

Alcoa's objectives are to return a self-sustaining jarrah forest ecosystem that fulfils all of the pre-mining land uses.

Let's go to the mountainous Minshan region of China. Here, a community enterprise and farmers' association supported by Carrefour, the international supermarket chain, is repairing the fragmentation of forests caused by construction, mining and tourism development.

The project will also help to save one of the world's best loved creatures, the giant panda that relies on the forests. There are only about 1,600 giant pandas remaining in the wild, most now confined to forest areas high in the mountains of south-western China.

Local people, forest companies, protected area authorities and government agencies have reached agreement on a vision and targets for restoration work. The protected forests will be expanded by 30 per cent, and local people supported in managing and developing forest resources in a sustainable way.

Carrefour is selling a range of forest products, such as honey, walnuts, Chinese pepper and dried mushrooms, harvested by local people in its Sichuan stores. These new and valuable income streams help prevent illegal harvesting and hunting, and give the giant panda space to live.

In the USA, one of the areas hit hardest by the forest fires of 2002 was the Upper South Platte River watershed, which provides 90 per cent of the drinking water for nearly one million people in Colorado City. The watershed, which was already struggling under the ravages of earlier fires, experienced severely degraded water quality and damaged water treatment and storage facilities.

Yet out of this scarred landscape, a positive healing transformation is taking place on the ground and in the affected communities, but the most dramatic and exciting change is the co-operation between partners. Seeking to restore ecosystem functions damaged by past fires and to restore water quality, landowners, companies, water authorities and government agencies came together to work on restoration efforts and wildfire co-ordination.

Private landowners and government agencies at all levels have adopted community wildfire protection plans that establish priority actions and co-operation. Wildlife species have returned to make this their home again.

A real-life example of a phoenix rising from the forest flames.

The Shinyanga region of northern Tanzania used to be covered with dense acacia scrub and miombo woodland, but by the 1980s much of the landscape had been transformed into semi-desert.

Forests were felled and large blocks of land converted into cash crops. The forests that had provided dry-season fodder for cattle, firewood and other essential products had virtually died out.

In 1985 a soil conservation programme was set up. Its first task was to raise awareness about the importance of restoring the degraded land, so technical training was essential.

Five years later, the area was covered with dense scrub again. Carefully controlled collection of firewood, thatching grass, medicinal products and other forest products started in 1991.

And then the water began to flow. A well that used to be empty in the dry season is now full throughout the year. A dam was built and now provides water for cattle and fresh fish for people.

There are now more than 15,000 individual enclosures and 280 communal enclosures covering 70,000 hectares of land and encompassing 172 villages.

We started our journey today in Scotland, and we are going to finish our trip here too, at Loch Katrine in the Trossachs, the setting for Sir Walter Scott's 'Lady of the Lake', and Rob Roy's heartland.

Here, the Forestry Commission is embarking on a major forest landscape restoration programme in the heart of Scotland's first National Park.

In 2005, Scottish Water and the Forestry Commission agreed a 175-year lease that passed the management of the 10,000-hectare Katrine catchment area over to the Commission.

Previously managed as one of the largest sheep farms in Scotland, all 17,000 sheep were removed in the early part of this decade as part of measures to tackle a *Cryptosporidium* outbreak, in this, Glasgow's main water supply. This was perhaps the biggest, and certainly the quickest, 'de-stocking' on this scale in the UK.

The principle objective is to protect the catchment of the loch by creating 2,000 hectares of new native woodland and the sensitive management of the existing relic woodland, including areas of wood pasture. This will form part of a major forest habitat network stretching from the east shore of Loch Lomond *to* Callander.

The work will not only provide a range of different native woodland types, but will also conserve important open ground habitats and priority species such as black grouse and golden eagle.

Sometimes the problems appear so big that we can't see the solutions no matter how hard we try. Maybe there is an inherent arrogance in the planet's most advanced species that makes us think we must invent new solutions.

The introduction to our climate change movie takes an almost tongue-in-cheek view of this and the way we expect solutions to come from technology and science, when some of the best answers we have are right in front of our noses. Answers that often have little to do with cutting-edge technology or innovation. Answers that simply make good sense.

In seeking to resolve natural problems we must not forget that nature itself is often pretty robust. Given enough time it will find its own way. But to make that happen in the short timescales we have before us will require some help.

And that's the big point I'm making: we can restore the forest that we have lost and are continuing to lose. Although we can't replace a

pristine rain forest once it has gone, we can replace the functions it provided. In destroying our natural forests we have contributed to the disruption of the whole precarious balance of our planet as much as when we plundered all the coal, the oil, the gas.

The difference is, the only one of those we can replace is the forest.

So, we can do it. Our experiences here in the UK and around the world have proved that. But it isn't happening on the scale that's needed.

How negligent would we be if we didn't do this? Would our children ever understand why we didn't act?

I was asked to challenge you. My challenge is to ask you what needs to happen to turn today's loss into tomorrow's gain?