CFA Newsletter

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CFA Newsletter
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Preparations are well underway in Vancouver, British Columbia, Canada, for the 20th **Commonwealth Forestry Conference**. We have received a number of exciting abstracts and our session hosts are busy reviewing and weaving the content into the fabric that will comprise the 20th Conference.

We are staging an impressive line of keynote speakers on each of the Conference topics and are pleased to reveal the first confirmed featured presenter, **Dr. Harini Nagendra**, who will give a talk on Monday, August 16, titled *"Urban Forestry in the Era of the Anthropocene: Science, Education, Action"*.

We look forward to presenting you with an engaging and thought-provoking event, while connecting together a truly global forestry community. Please register now at **cfc2021.ubc.ca/registration** to secure your spot. And don't forget to check our website at **cfc2021.ubc.ca** for programming updates as we begin to finalize the sessions.

As always, feel free to contact us with your comments, suggestions and questions at cfc.2021@ubc.ca.

Forest Scenes

A forest on caffeine? How coffee can help forests grow faster

Just like us, forests move faster with a little coffee in their system.

A recent experiment tested whether coffee pulp, a leftover of the coffee growing process, could help bring Costa Rica's rainforests back to life. Researchers from the University of Hawai'i at Manoa tested two plots to see how the coffee waste would affect deforested land, covering one parcel of grass with about 20 inches of the pulp and leaving the other untouched.

At each site, land had been exploited for years, either to grow coffee or raise cattle, and was eventually abandoned. It was dominated by invasive grasses, primarily an African species called palisade grass, used to feed grazing livestock. The grass can reach 16 feet tall when not trimmed by grazing animals, preventing native rainforests from easily regrowing.

After two years, the plot of land given a boost from coffee showed a dramatic improvement. Eighty percent of the plot was covered by young tree canopy, some trees already 15 feet – including tropical species that can grow as tall as 60 feet – versus just 20 percent in the untreated plot. In the coffee-fueled plot, trees were also four times taller on average, soil samples were more nutrient-rich, and invasive grasses had been eliminated.

The results were published in the journal *Ecological Solutions and Evidence*.

Not only does it give coffee producers a sustainable way to dispose of their waste, she says, but it also speeds up the timeline to bring back destroyed forests.

"It's an amazing win-win situation," says Rebecca Cole, a study author and ecologist from the University of Hawai'i at Manoa. "It takes tropical forest hundreds of years to grow back. To have [such] tall trees in only two years is really spectacular."

More research needs to be done, Cole acknowledges, to understand the long-term impacts of coffee pulp and whether it causes any unforeseen pollution.

Still, says Cole, "This really was like a forest on caffeine. I think it's really promising."

Looking for a win-win

Coffee beans are the seeds of a fruit called a coffee cherry that, when picked, looks like a bright red or yellow cherry. To get coffee beans, producers remove the fruit's skin, pulp, and other filmy bits. They then dry and roast the remains to make the grounds that end up in your morning cup. Approximately half the weight of a coffee harvest will end up as waste.

In Costa Rica, says Rakan Zahawi, a study author and director of the Lyon Arboretum at the University of Hawai'i at Manoa, coffee producers typically take all that leftover coffee residue to storage lots where it's left to decompose.

In the early 2000s, Zahawi visited a similar restoration project using orange peels.

"The difference was night and day," he says of forests treated with oranges and those left untouched, "There was a huge difference."

The idea stuck with him when he began working in Costa Rica and took notice of the waste generated by the country's large coffee industry. If the excess coffee pulp could be put to good use somehow, Cole and Zahawi thought, everyone involved – the coffee producers, land owners, and environmentalists – could benefit.

"Essentially it's a major waste product that's expensive to process, and they give it away for free," says Cole. Rather than paying for the waste to be composted and stored, the only cost to the researchers was renting dump trucks to shuttle the pulp.

How and why it works

The idea works like this: spread a foot and a half of the coffee pulp on an area covered in pasture grasses and the foliage underneath will smother and cook until it's asphyxiated, dies, and decomposes.

"You essentially kill all the roots and rhizomes of the grasses," says Zahawi.

Zahawi and Cole found that as the decomposed remains of the grasses mix with the coffee's nutrient-rich layer, it creates a fertile soil. That, in turn, attracts insects, which attracts birds, who then drop seeds into the plot, as does the wind.

Then comes the rebirth.

"It looks like a mess for the first two or three years, and then there's this explosion of new plants coming in," says Zahawi. "It's so nutrient rich they're sort of growing on steroids."

The key, they found, was to pile on the pulp – using a thick enough layer of pulp in an area flat enough for it not to wash away, and in a climate with a dry period that allowed the coffee to really bake. Essentially, it became like a very successful compost heap.

"If you stick your hand in this gook, it's really hot – not scalding but hot enough to smother [the grass]," says Zahawi.

A plastic tarp spread across a field and pinned down by weights would also kill the grasses. But "then you have all this plastic waste," says Zahawi. And new, fertile soil would still need to be brought in to attract new plants.

Cole says the most common way to restore forests is to plant trees. But compared to just dumping coffee byproduct and letting nature do the planting, it's labor intensive and expensive.

"I was kind of skeptical it was going to work. I thought we would just have a greener patch of grass," she says. Instead, they got the beginnings of a new rainforest.

Roadblocks and needed research

While Cole and Zahawi's experiment with coffee pulp successfully jump-started forest growth, there are downsides.

"Coffee pulp is really stinky," says Cole, who was raised on a Costa Rican coffee farm. "I grew up with the smell but a lot of people find it pretty offensive."

It also attracts a lot of flies and other insects that, despite attracting seed-dispersing birds, are pests for nearby humans.

"There's also some concern that it will have negative effects on watersheds. There can be some contamination," says Cole. Coffee pulp contains nutrients like nitrogen and phosphorus that can negatively impact streams and lakes, causing excess algae growth, for example. The pulp may also contain traces of pesticides used during production.

While this experiment was carried out away from water sources, Cole says their future research will look at the potential impact on surrounding areas.

Previous work using orange peels to regrow forests in Costa Rica was met with some backlash. When orange juice maker Del Oro began a partnership with a local protected area to spread truckloads of peels on former cattle pasture, its local competitor, TicoFrut, alleged the program was simply a way to dump waste. The program was stopped by Costa Rican authorities, who sided with the competing juice company.

A promising future for forests?

Dan Janzen and Winnie Hallwachs, a married team of tropical ecologists at the University of Pennsylvania, weren't surprised by the ecological success of Cole and Zahawi's reforestation experiment; Janzen forged the relationship between Del Oro and the protected area in 1996 for the same purpose and introduced Zahawi to the concept.

Two decades ago, he saw similar success.

Six months after the orange peels were distributed, Janzen said the small one-hectare plot "looked and smelled horrible."

"[One and a half] years later it was all gone, and in its place were no invasive African pasture grasses, but a marvelous species-rich patch of broadleaf plants growing from deep black loam soil. Basically, we had fertilized the place very intensively. We were sold," Janzen writes over email.

He thinks coffee pulp may escape the same fate as the failed orange peel project, saying it's "less tangled in thorny political issues," and grown by more small producers rather than two large competing companies.

In addition to researching the long-term impacts, Cole is interested in testing other agricultural by-products. As long as the crop waste is nutrient-rich and not harmful to human health, she would expect similar results.

nationalgeographic.com

Young woodland flourishes in East Devon highlighting Estate's vital role in sustainable forestry in the UK

John Wilding assesses the young woodland on Otterton Hill

Nine years after one of East Devon's most iconic hilltop plantations was saved from the rapid spread of a deadly tree disease, the green shoots of recovery are signalling the rescue programme's success. In 2012, 10 hectares of mature Japanese larch trees had to be felled at Otterton Hill near Budleigh Salterton in the UK after the crop came under threat from the deadly tree disease *Phytophthora ramorum*. The fungus-like pathogen had been found nearby and had already wiped out swathes of South West trees.

Clinton Devon Estates secured a licence from the Forestry Commission and in a race against time, harvested the trees, saving them before they became infected. Now the trees planted soon after in their place, are thriving and being used to highlight the importance of our commercial woodlands and the contribution they make to the economy.

The Estate hopes Otterton Hill's success will show the importance of its woodland management programme and help people to understand the reasons behind the sometimes difficult decisions it has to take. Not only do woodlands have many environmental and biodiversity benefits, they are also a living crop which contributes to the economy, through the timber produced and conifers in particular have a major role to play in sequestering carbon and year round removal of atmospheric pollutants like ammonia.

John Wilding, the Estate's Head of Forestry and Energy, said: "The success of the Otterton Hill woodland highlights the Estate's commitment to excellent forestry management and doing the right thing for the land and the environment. By raising awareness of this, we hope to show people that this work is part of a managed process – these trees are a long term commercial crop. While areas such as Otterton Hill are impacted at the time of the felling, what we create by replanting them is a whole new cycle of habitats.

"*Phytophthora ramorum* was, and continues to be, a great threat. The original trees were very vulnerable. As it's transmitted by airborne spores blowing across from plant to plant, in these cases we have no choice but to proactively remove trees and that is what we decided to do. It turns out we did it just in the nick of time, helping to rescue a 50 year old crop and also protecting further woodland from being infected, by creating a type of 'firebreak'. We replanted a combination of Douglas fir and oak and have accepted natural regeneration of sycamore, silver birch and pine, and so the cycle begins again but with a wider range of species." John continues: "Growing trees is a long term business and you're very unlikely to see the fruits of the trees you plant, as they follow a 50 to 80 year cycle. Every decision and action is about making the woods more resilient to the future, especially when facing challenges such as climate change."

The Estate manages 1,900 hectares of sustainable, high quality and multi-purpose woodlands, which deliver biodiversity, recreational and landscape benefits. Managed woodlands account for 17% of the Estate area in East and North Devon, comprising a rich mixture of both commercial conifers and native broadleaved species, which provide a wide range of habitats for many plants and animal species.

It's been a busy twelve months for the Estate's woodland team. Forestry workers were designated as key workers at the start of the first UK lockdown in March 2020. John explains: "Our work has never really stopped. The pandemic has really highlighted the importance of the timber industry to the economy and society. Throughout the pandemic demand has been very high and we've been exceptionally busy. "Our timber goes on to be used in many ways and supplies sawmills, manufacturers and wood processing industries to make products for construction, fencing for homes and in agriculture, packaging and biomass fuels. It is also used for pallet wood which has been very important recently as it's used to transport essential goods such as food and medicines. The demand for pallet wood last year was unprecedented, as the pandemic impacted supply chains. It goes to show that almost everything we buy is moved at some point on a softwood pallet."

The replanted woodland at Otterton Hill is also a haven for wildlife. Nightjars in particular favour newly felled woodland and were found across the site for the first few years, before they moved on to new felling areas. As the crop enters the "thicket stage" it affords ideal habitat for a different range of species with deer, songbirds and in particularly chaffinches flourishing as the cycle continues.

Clinton Devon Estates

Integrating urban greening in city planning

India has made several important commitments, such as the Nationally Determined Contributions (NDC) on climate change and the Bonn Challenge, to protect, conserve and promote forests. Yet the struggle to balance biodiversity priorities with those related to economic progress and growth persists. Achieving this fine balance while also dealing with the exigency of climate change is a challenge, however, it also provides a unique opportunity to integrate urban forests in urban development plans. Better integrating urban greening into the urban environment, especially at the planning level of tier 2 cities and upcoming urban areas, could be the game changer for India in meeting its national and international targets.

While forests play a critical part in the delicate balance of ecosystems, urban forests also provide much needed respite to citizens, and a space for communities to come together. Trees have been proven to help reduce the impact of carbon emissions and contribute to climate change mitigation. A fully grown tree can absorb up to 150 kg of CO_2 per year, and intercept over 15,000 liters of water per year, thereby reducing the risk of floods. Clearing out trees in large numbers for infrastructure development not only destroys the natural habitat of wildlife but can also impact temperatures. Trees can cool the air from between 2°C and 8°C, and as such are vital to cool increasingly concretized urban structures. It is important to remember that trees are a part of a larger forest ecosystem, which work together while balancing the needs of our planet. In relation to urban planning, where the felling of trees in one area is often compensated with the planting of saplings in another, we must consider viewing ecosystems with a wider lens in the approach going forward.

Cities around the world are demonstrating growing interest in investing in nature-based solutions. (Photo: Onkar Gotale/Unsplash)

To keep up with increasing urbanization, cities in India have had to ramp up urban infrastructure rapidly, often at the cost of urban green spaces. According to the U.N. World Urbanization Prospects 2018 report, around 34% of India's population already lives in urban areas. The city of Mumbai, India's commercial capital, lost 22.6% of its green coverage in the decade spanning 2001-2011 primarily due to a spurt of residential and commercial development in the suburbs. The Mumbai metro project, that has come under fire of activists for large scale felling of tree cover, gives hope to the city of over 21 million people, many of whom commute to work daily in overcrowded trains (over 8 million commuters traveling on around 2,800 trains per day) and overcrowded roads (vehicle density of 28,380 per 100,000 population). To build the above ground metro, many trees have had to be cut down. The most significant protests by activists in 2019 against the proposed felling of trees were at Aarey milk colony, an area with over 500,000 trees, leading to the relocation of a planned train depot. The change in plans however, some say, may cost over $500 million. In such situations, more planning at the project development stage could have minimized the damage.

Integrating urban greening in any development plans will be essential if India is to meet the NDC target of creating an additional carbon sink of 2.5 to 3 billion tons of CO_2 equivalent. This is to be achieve through additional forest and tree cover in India by 2030. Government actions signal an acknowledgment of the importance of forests. In 2014 the Town and Country Planning Organization of the Government of India's Ministry of Urban Development released a set of Urban Greening Guidelines. These recognize the need for green spaces to be planned, designed, developed and managed. In his keynote speech at GIZ India's Green Cluster conference on The Future of India's Forests, Siddantha Das, Director General and Special Secretary at MOEFCC, lists three objectives of forest management in India: conservation of resources; protecting the forest as a carbon sink; and ensuring the livelihoods of the people.

Despite the challenge ahead, there have already been success stories in India. The south Indian city of Auroville, based on a master design by the French architect Roger Anger, has a 2.5km wide green belt around the city zone that reduces the severe effects of climate change. Chandigarh, another city planned by the architect and urban planner Le Corbusier, has an 8km long linear park 'Leisure Valley' that runs along the city's center, in addition to green areas in every neighborhood sector. Even today, after several decades of growth and expansion, Chandigarh's green areas continue to grow; the city has around 1,807 municipal parks and 41% tree coverage. There is also still an opportunity for greening strategies to be considered in the smaller, tier two metros, that are not yet in the stage of rapid growth, and such planning may be possible.

In an encouraging development, on World Environment Day 2020, the Union Environment Minister, Shri Prakash Javadekar announced the implementation of the Nagar Van Scheme, through which over the next five years 200 urban forests are to be developed across the country. This is in addition to the existing National Afforestation Program and Integrated Development of Wildlife Habitats. The targets will be achieved through a Public Private Partnership (PPP) model, involving local communities, local bodies, civil society, and the private sector, as well as the concerned government departments. This information booklet[1] gives examples of exciting initiatives at the state and city level, several of which are community led in addition

[1] Link to the booklet: http://pibcms.nic.in/WriteReadData/userfiles/Final urban forestry booklet 3-6-2020.pdf

to private sector and Corporate Social Responsibility (CSR) initiatives, with a growing appreciation of the Miyawaki forest plantation method. However, there is a need to integrate the ongoing efforts into a larger campaign around urban forests, setting targets like those that were successfully met for sanitation through the National Swacch Bharat campaign. Such a campaign must also consider a wider perspective on urban forests to also include other areas of ecological concern, such as wetlands. For India, the adoption of initiatives such as Nagar Van by both state city actors will be a deciding factor in how rapidly it can move towards reaching the greening goals.

Priyanka Bhide
Co-founder and Director of Kubernein Initiative
This is an edited version of the article that appeared in the Spring 2021 edition of REVOLVE Magazine.

The Arbor Day Foundation and the Food and Agriculture Organization of the United Nations (FAO) recognise 120 Tree Cities of the World

Cities in 23 countries across 6 continents meet top urban forestry standards

Trees in Ljubljana, Slovenia.

The Arbor Day Foundation, along with the Food and Agriculture Organization of the United Nations (FAO), has announced the cities recognised through the Tree Cities of the World programme. 2019 was the first year of eligibility for this worldwide initiative and 68 cities from 17 countries were recognised for their commitment to urban forestry management. The programme has since grown and now includes even more cities worldwide.

A total of 120 cities from 23 countries earned this international designation in 2020, including Toronto, Canada; New York, USA; Guadalajara, Mexico; Birmingham, United Kingdom; Campo Grande, Brazil; Hyderabad, India; and Kampala, Uganda. The complete list of recognised communities is available here. To earn this recognition, each of these cities demonstrated its commitment to trees and forestry by meeting five qualifying standards related to the management and celebration of urban

forests. The cities recognised this year will join a network that continues to grow, providing an opportunity to learn best practices from one another as they strive for excellence in urban forestry.

"We proudly welcome all of the cities that have earned Tree City designation this year," said Dan Lambe, President of the Arbor Day Foundation. "They are taking the initiative in the development and maintenance of their urban tree canopies. The benefits that trees provide to urban areas are immeasurable, and many of the recognised cities have invested in their communities to create a more sustainable future. We aim to celebrate and appreciate the dedication and commitment of these cities with this recognition."

The Tree Cities of the World programme is a partnership of FAO and the Arbor Day Foundation, launched in 2019. Its vision is to connect cities around the world in a new network dedicated to adopting the most successful approaches to managing urban trees and forests. The first Tree Cities of the World Conference was held virtually in October 2020. It was a crucial moment to promote the network and the incredible efforts put in by the United Nations' FAO, the Arbor Day Foundation, and the five National Programme Leaders. Recognition through the Tree Cities of the World programme represents the first step toward achieving a green vision for qualifying cities.

"Urban forests and trees are a key element of sustainable urban development, but most of all, they help cities become greener, healthier and happier places to live. We join the Arbor Day Foundation in celebrating the efforts of the communities that have already joined the Tree Cities of the World programme and we are confident that many more will follow," said FAO Deputy Director-General Maria Helena Semedo. "Cities play a prominent role in building a more sustainable and equitable future. Our Green Cities Initiative can help support their efforts to increase availability and access to green products and services."

FAO's Green Cities Initiative – bringing together the urban food agenda with socio-economic and environmental goals – aims to improve people's well-being by promoting green spaces, green industries, green economy and a green lifestyle – through the integration of urban and peri-urban forestry, and sustainable agri-food systems into urban planning.

For more information on the Tree Cities of the World program and to see how your city can become involved, please visit TreeCitiesoftheWorld.org.

fao.org

Nearly half the Amazon's intact forest is on Indigenous-held lands

- *A new report from the Food and Agriculture Organization (FAO) of the United Nations and the Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean (FILAC) draws on more than 300 studies from the last two decades to demonstrate the protection that Indigenous societies provide for forests in Latin America and the Caribbean.*
- *According to the team's research, about 45% of the intact forests in the Amazon Basin are in Indigenous territories.*
- *The forests occupied by Indigenous communities in the region hold more carbon than all of the forests in either Indonesia or the Democratic Republic of Congo, home to the next two biggest swaths of tropical forest after Brazil.*
- *The report's authors say investing in securing land rights for Indigenous communities is a cheap and effective way to address climate change, while also helping these communities recover from the effects of the COVID-19 pandemic.*

A new report reveals that investing in securing the land rights of Indigenous and tribal communities across Latin America and the Caribbean could cut carbon dioxide emissions at low costs to governments, potentially benefiting the global climate.

"If there's investment in securing [Indigenous] land and rainforest, then there will be solutions that face climate change," said report co-author Myrna Cunningham Kain, a leader of the Miskito people in Nicaragua and president of the public rights organization Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean (FILAC). The report was published March 25 by FILAC and the Food and Agriculture Organization (FAO) of the United Nations.

What's more, the authors say that investing in Indigenous land tenure presents an opportunity to both address climate change and associated issues like biodiversity loss, along with helping hard-hit Indigenous communities recover from the COVID-19 pandemic.

Their research found that these community-managed areas in Central and South America and the Caribbean hold a staggering amount of forest – and carbon. Their review of more than 300 studies shows that Indigenous peoples hold sway over 3.2 million and 3.8 million square kilometers (1.24 million and 1.5 million square miles) of forest – more than a third of Latin America's forests. It's also among the least degraded: In the Amazon, around 45% of intact forest lies within Indigenous-occupied land.

Recently, research has shown that human impacts on the Amazon, the world's largest rainforest, may be pushing it toward a tipping point, beyond which it may lose its ability to bounce back from degradation. Instead, it may slide toward becoming a scrubby savanna.

"When you have almost half of the intact forest in the Amazon in Indigenous and Afro-descendant territories, then they have to be a big part of any discussion about a tipping point," said David Kaimowitz, manager of the FAO's Forest and Farm Facility and the lead author of the report.

Over the past two decades, governments across Latin America have implemented programs and policies that bolster Indigenous land rights and leverage traditional forest knowledge. The results demonstrate the protective benefits that Indigenous communities usually provide to forests, Kaimowitz said.

Indigenous-occupied forests in this region hold more carbon than those found in either Indonesia or the Democratic Republic of Congo, home to the next two biggest swaths of tropical forest after Brazil. And both the forests themselves and the carbon they contain are declining more slowly than in non-Indigenous-held areas. Research cited in the report found a loss of 0.3% of the carbon in these forests between 2003 and 2016. Over the same period, non-Indigenous parks and reserves lost 0.6% of their carbon. Outside these spaces, the loss of carbon was a much higher at 3.6%.

But economic difficulties, pressure to extract resources and a lack of public understanding about the importance of Indigenous rights has undermined these Indigenous programs in many places, Kaimowitz said.

"In many countries, they've tried them. They've succeeded, and now they're going in the wrong direction," he told Mongabay. "In just about every country we've looked at, government support for these Indigenous territories is declining rather than increasing at a time when they should be increasing dramatically."

Cunningham said it often comes down to a lack of appreciation for the values inherent in Indigenous cultures.

"A great example of that is Brazil, where there's a setback in the recognition of Indigenous peoples," she said. "There's a threat of going right back to not accepting the value and the rights of Indigenous peoples."

Mining, timber and agriculture threaten the forests inhabited by Indigenous communities. But there are also concerns with areas set aside for conservation and their impact on the rights of Indigenous peoples. Almost half of the area occupied by Indigenous peoples overlap with parks and reserves in Latin America. While in some instances, that might provide a strong buffer against incursions by loggers or miners that could destroy the forest, it can also create conflict if it makes Indigenous access to land rights more difficult.

But some countries are finding ways to provide communities with titles in cases where there is overlap with protected areas. A recent court case in Panama recognized the claim of the Naso Tjër Di people to their land even though they share it with a cross-border park and a protected forest.

"Practicing these cultures has made it possible for these [conservation] areas of intact forest to remain," Cunningham said.

Cunningham, who is also a physician, noted that the COVID-19 pandemic is further evidence that Indigenous value systems need to be integrated into the protection of the environment. Studies cited in the report warn that future pandemics could result from the continued destruction of forest.

"We do believe that a lot of what is happening really relates with what Indigenous peoples have been saying traditionally about the relationship between human beings and the elements of nature," she said.

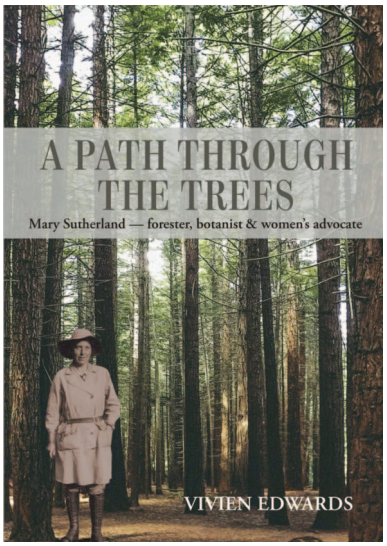
mongabay.com

Publications

A Path Through the Trees: Mary Sutherland – forester, botanist & women's advocate

Author: Vivien Edwards

Publisher: Writes Hill Press



In her introduction to this book the author Vivien Edwards wrote . . . *"Just over 100 years ago Mary Sutherland changed the status of women working in forestry when she graduated from the University of North Wales. She was the first woman forestry graduate in the world. It was daring to take up a male-only career in 1916, and an amazing achievement that she was successful in a climate of two world wars and economic depression, and when society generally disregarded women's contributions."*

Of course Mary's story is not just about gender bias, the early 20th century was also a time of huge timber demand and excessive forest exploitation and she had significant roles aimed at addressing some of the associated issues. After graduation she worked in British forests for the duration of the war and then for the British Forestry Commission. In1923 at the age of 29 she came to New Zealand and was employed by the fledgling State Forest Service (founded in September 1919), later at the Dominion Museum as a botanist and still later in the Department of Agriculture as its first Farm Forestry Officer.

She was equally involved in local society being an advocate for women's causes particularly access to higher education and she served on the Federation of University Women New Zealand and Wellington Branch committees.

However it is as a forester that she was particularly active, the 1920s and 30s were the formative years for the NZ State Forest Service (later it became, somewhat more simply, the NZ Forest Service) and a lot of consideration was given to matters such as the right species to plant, how to establish and manage those species and where and how to

record the investigations undertaken and the results achieved. Mary appears to have been relied upon to do a lot of the research and recording work, producing many reports and publications based around the activity of the Forest Service at that time and these remain valuable accounts of some of the thinking behind the forestry programmes, providing details around such matters as nursery and seed collection techniques, silviculture and also including good cost and performance information. At that time New Zealand was undertaking a plantation establishment programme of unprecedented scale and the interest in what was being done was almost worldwide. Accordingly Mary's reports surfaced in many places, for example writing in the Oxford publication *Forestry: an International Journal of Forestry Research* in 1936 she noted that. . . "The programme laid down (by the NZ State Forest Service) provided for the formation of 300,000 acres of (new) exotic forests and this has now been exceeded, hence the programme is being gradually reduced and activities are entering the era of silvicultural development and forest management" At that time 410,000 acres had actually been planted – laying the groundwork for a significant recast of the entire New Zealand forest industry and also potentially to once again trade New Zealand grown forest produce beyond the country's borders.

Mary's forestry attire included an off-white leather jacket, riding breeches and high boots – kit that became an integral part of her personality and which appears to be similar to that worn by the Woman's Land Army in the UK during WW1.

Not unexpectedly she encountered some male prejudice and conservatism however work colleagues and superiors almost universally recorded that her quiet and unassuming approach accompanied by good biological background and common sense usually won people over.

Mary was also proud of her professional status as a forester; she was an inaugural and lifelong member of the NZ Institute of Foresters (NZIF) serving on its Council and also serving as vice president at various times. In 1930 she was persuaded to submit a design for the seal of the Institute – and her design featuring a rimu sprig against a mountain-land skyline was successful and still remains in use today as the logo of the Institute. Upon her death in 1955 she left a bequest that is still recognised by way of an annual NZ Institute of Forestry Mary Sutherland scholarship.

Author Vivien Edwards has managed to access considerable information about Mary's professional, work and private life and has managed to weave this into an account which follows through the years well, providing wider insights into events such as the two world wars and the great economic depression. For example during WWI Mary worked in a number of roles which amongst other things recognised the generally neglected state of Britain's forests and the drastic shortages of timber. This included physical labour in a women's gang planting pruning and thinning areas of trees in the Forest of Dean, and later supervising a women's gang in Scotland. In 1918 she was part of the new Interim Forest Authority where amongst other things she was chief instructor training forewomen for forestry work. During WW2 while she was employed as botanist at the NZ National Museum in 1942 Mary determined to provide national service at the Woburn YWCA hostel supervising women directed to war work- while also tapping a book in Braille for the Foundation for the Blind and knitting socks for soldiers. Some 800 women were working on a fuse-filling munitions contract nearby and Vivien's account of life at the Woburn YWCA probably parallels many similar situations in other countries touched by the war.

Accordingly while this book is of interest to foresters both in New Zealand, Britain and other part of the world it is also a very readable account of aspects of the social history associated with events with which Mary Sutherland was involved. Author Vivien Edwards has reviewed letters, diaries and family records and included a number of photographs which make the book not only informative but also one likely to hold most reader's attention.

For the record;-

Mary Sutherland born 4 May, 1893 at the family home at 145 Osbaldeston, Stoke Newington, the third of 4 daughters of Scottish parents. Died March 1955 in Wellington, NZ.

The book, *A Path Through the Trees* is available for purchase in the UK where it is being sold through Summerfield Books (as suggested by staff at Bangor University) see https://www.summerfieldbooks.com/product/a-path-through-the-trees-mary-sutherland-forester-botanist-womens-advocate/ or NZ online from the publisher at https://www.bookpublishing.co.nz/.

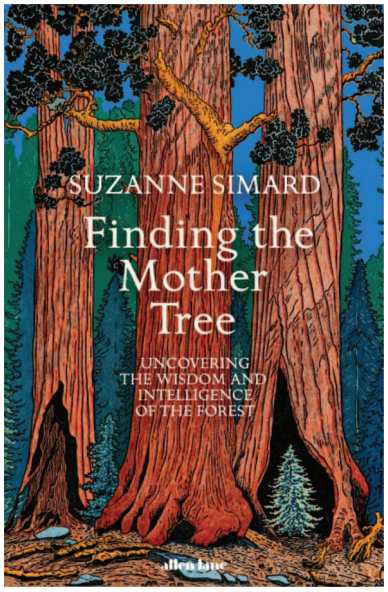
Peter Berg

Finding the Mother Tree: Uncovering the Wisdom and Intelligence of the Forest

Author: Suzanne Simard

Publisher: Allen Lane

In her first book, Simard brings us into her world, the intimate world of the trees, in which she brilliantly illuminates the fascinating and vital truths – that trees are not simply the source of timber or pulp, but are a complex, interdependent circle of life; that forests are social, cooperative creatures connected through underground networks by which trees communicate their vitality and vulnerabilities with communal lives not that different from our own.



Simard writes – in inspiring, illuminating, and accessible ways – how trees, living side by side for hundreds of years, have evolved, how they perceive one another, learn and adapt their behaviors, recognize neighbors, and remember the past; how they have agency about the future; elicit warnings and mount defenses, compete and cooperate with one another with sophistication, characteristics ascribed to human intelligence, traits that are the essence of civil societies – and at the center of it all, the Mother Trees: the mysterious, powerful forces that connect and sustain the others that surround them.

suzannesimard.com

Gender, Forests and Climate Change

Author: Paloma Marcos Morezuelas

Publisher: Inter-American Development Bank

As users of forest products and guardians of traditional knowledge, women have always been involved in forestry. Nevertheless, their access to forest resources and benefits and participation in forest management is limited compared to mens despite the fact that trees are more important to women, who depend on them for their families food security, income generation and cooking fuel.

Forest cover in Latin America and the Caribbean constitutes approximately 45% of the total land area. The forest is a source of income and subsistence for 85 million people in the region who live in forested areas, and particularly for the 8 million people who subsist on less than $1.25 per day. Moreover, forests provide hydrological and thermal regulation, climate regulation, soil protection and regeneration, and habitat for two-thirds of terrestrial biodiversity, and are key players in the carbon cycle.

As users of forest products and guardians of traditional knowledge, women have always been involved in forestry. Nevertheless, their access to forest resources and benefits and participation in forest management is limited compared to men's despite the fact that trees are more important to women, who depend on them for their families' food security, income generation and cooking fuel.

Forests play an important role in mitigating climate change. On one hand, they can reduce the greenhouse effect by absorbing atmospheric CO2 and storing it in biomass and soil. On the other hand, they become sources of CO2 emissions when they are felled and biodegrade, releasing the stored carbon. Emissions from the agricultural and forestry sector account for almost a quarter of total global anthropogenic emissions and 47% in the Latin American region.

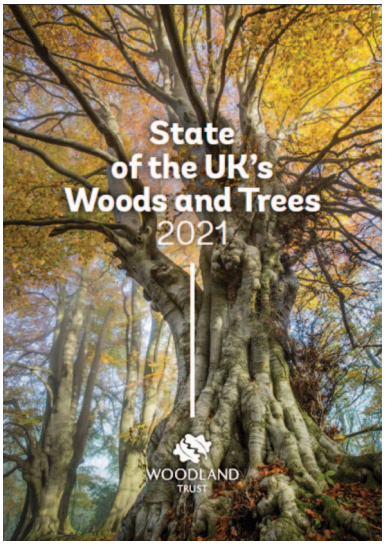
Download document at https://reliefweb.int/report/world/gender-forests-and-climate-change

State of the UK's Woods and Trees

Publisher: Woodland Trust

State of the UK's Woods and Trees 2021 is the first report of its kind laying out the facts and trends on the current state of the UK's native woods and trees. At a time when the demand for new woods and trees is escalating, our existing woods and trees are facing great pressure. A good understanding of their current state will enable us all to realise their vital role in tackling climate change, improving our wellbeing, and recovering nature.

From the wealth of data presented in this inaugural report, here is a summary of the key findings.



1. Woodland cover is gradually increasing, but woodland wildlife is decreasing

The trends for the UKs woods and trees are concerning. The UK's woodland cover has more than doubled in the last 100 years, but much of this is non-native trees. Existing native woodlands are isolated, in poor ecological condition and there has been a decline in woodland wildlife.

2. Woods and trees are vital for a healthy, happy society

They lock up carbon to fight climate change, improve our health, wellbeing and education, reduce pollution and flooding, and support people, wildlife and livestock.

3. Woods and trees are subject to a barrage of coinciding threats

Threats range from direct woodland loss to more insidious influences from climate impacts, imported diseases, invasive plants, mammal browsing and air pollutants.

4. Not nearly enough is being done

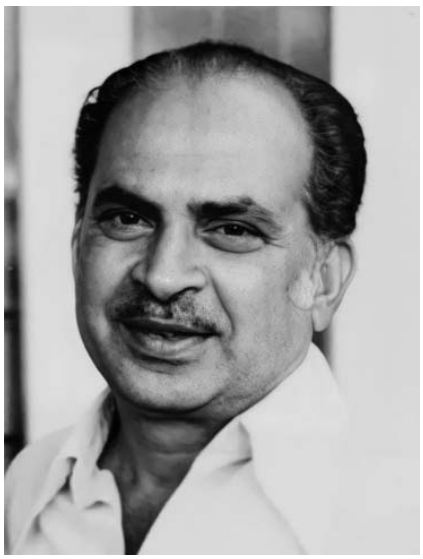
The report is a loud and clear warning sign that more needs to be done to protect and expand our woods and trees. We urgently need to scale up the many inspiring initiatives to create native woods, put more individual trees back in the landscape, and restore damaged woods.

We must work together to enable native woods and trees to become a source of widespread nature recovery and improve people's lives.

Download the report at https://www.woodlandtrust.org.uk/state-of-uk-woods-and-trees/

Obituaries

S. Shyam Sunder
1931–2021



Belonging to the Indian Forest Service (IFS), Shyam Sunder was the longest serving Principal Chief Conservator of Forests of Karnataka. (Photo credit conservationindia.org)

Someshwar Shyam Sunder was born on 15 December 1931 in Mangalore. We lost him to Covid related complications on 29 April 2021 at Bangalore. He is survived by his daughter and a son. Shyam Sunder is remembered most fondly by his family, of course, and his vast circle of relatives, colleagues, friends, and those who brushed shoulders with him even briefly, during his long illustrious and colorful innings as a professional forester. Few know that Shyam Sunder was a keen cricketer. He was a pace bowler. But those who came across him were bowled over by his pleasing personality, most genial nature, his integrity and professional standing.

Recruited to the Madras Forest Service in 1952, he opted for Mysore (now Karnataka) when the states were reorganized on a linguistic basis in 1956. In 1964, deputed to the French Institute Pondicherry, he was sent to study forestry in France and its practice in Cote d'Ivoire. Inducted into the Indian Forest Service at its initiation. He retired as the Principal Chief Conservator of Forests of Karnataka in December 1989. His career marked several high points: working in the state, on deputation, with Government of India and abroad. During his stint at the French Institute in Pondicherry, Shyam Sunder with Dr. Pascal produced

the vegetation map of Karnataka, something very few states in India have even today. As head of the Forest Department of Karnataka, Shyam Sunder had several brushes with authority and as a dedicated defender of forests, managed to do for conservation of forests that few others across the country have matched. He was the driving force behind the Karnataka Tree PreservationAct for tree protection on non-forest land. He initiated Urban Forestry in Bangalore in 1981. He brought in Karnataka the Forest Development Tax and the non-lapsable Forest Development Fund. Later other states followed Karnataka in introducing similar instruments for improved forest conservation. On his retirement, Shyam Sunderadvised several forestry-related bilateral and multilateral efforts including a major medicinal plants project in South India. He was an activeFellow of the Commonwealth Forestry Association and later worked as Chairman of South Asia region.

SaumyaHebbar, Shyam Sunder's grand-daughter fondly remembers her '*Ajja*' and writes, "He was well travelled and made friends across the globe. He invested in those friendships and left a mark wherever he went.He had the amazing ability to always view life as a glass half full, except when it was his rum glass, then of course it could be topped up just that little bit more.He always saw the good in people, no matter who it was and gave away possessions, money and gifts without hesitation."

During all these years, his pillar of strength, the 'woman behind the throne' and maybe Shyam Sunder's*raison d'etre* to excel, was his wife, Hira (meaning diamond in Sanskrit), with "a beautiful, enchanting smile", whom he was lucky to marry in 1956, when he was theAssistant Conservator of Forests at Pollachi. Following her death in 2002, many say that Shyam Sunder was never the same again.

In 2016, along with his longtime colleague S Parameshwarappa, Shyam Sunderco-authored a book "*Forest Conservation Concerns in India*." that brought out his most ardent concerns for the future of India's forests and their sustainable conservation, Shyam Sunder'smemoir "*Reliving the Memories of an Indian Forester*", edited by his son, Shivsharan Someshwar, was published in 2020.

S Parameshwarappa and Shiv Sharan

Alan Robert Eddy
1929–2020

Alan Eddy showing Prince Charles around the Victorian School of Forestry at Creswick, in 1974.

The recent passing of venerable forester and 61-year IFA member and Fellow, Alan Eddy, represents a loss of more than 70 years of forestry knowledge and community service. Alan experienced a variable 45-year forestry career, but is best known from his collective 16-year tenure as Senior Lecturer and Principal of the Victorian School of Forestry (VSF) at Creswick, during a period of profound social change.

Alan was a unique character in a profession not known for 'correct' demeanor amongst its practitioners. He stood out because of a rather proper, polite manner and strident adherence to correctly spoken and written English, befitting of the stereotypical 'British gentleman'.

He was also known for his strong work ethic, sharp mind, unrivalled attention to detail, and for being a font of reliably wise counsel – all traits that made him a highly respected and valued work colleague. For those who knew him better, he could be an entertaining raconteur with a dry and, at times, mischievous wit.

While his association with hundreds of forestry students during his lengthy tenure at the VSF ensures that memories of Alan will live on, a detailed record of his career will also endure in the auto-biographical reminiscences which he meticulously documented during retirement, including a series of recorded oral interviews.* Especially in relation to his early career, these historical records provide a fascinating window into a not-too-distant past of vastly different living and working conditions that today's foresters could scarcely countenance, let alone tolerate without complaint. Alan grew up in Melbourne's eastern suburbs. In 1946, at just 16 years of age, he accepted a scholarship to attend the Forests Commission's Victorian School of Forestry at Creswick. In his senior year in 1948, the School had enough students to enter a quite successful team in the local Clunes Football League.

Although never a footballer, Alan displayed an early aptitude for administration by taking the demanding job of Club Secretary – surely one of the youngest ever. He also supplemented his meagre student allowance by being a paid goal umpire and, despite having zero sporting interests, he would later chide his sports-mad family that, of them, only he had been a professional sportsman!

After graduating from Creswick, Alan was first posted in early 1949 to the Bruthen Forest District in East Gippsland, as a Junior Assistant Forester. For living quarters, he was assigned an unlined fibro-sheeting hut with no cupboards, no plumbing, and no electricity until an extension cord was run from the District Workshop to provide power to run a single light globe, an electric jug, and a toaster. Cold showers only were available in a galvanised iron toilet block at the rear of the District Office.

After a year, Alan was posted to the neighbouring Nowa Nowa District. At the time, the demand for wood was voracious as society was recovering from the privations of the recent World War. In the vast East Gippsland forests, resource inventory and roading were running just ahead of the timber harvesting that was progressing north into previously inaccessible areas. Roads, transport and communications were rudimentary but improving, but some forestry officers at Bruthen were still using horses to supervise sleeper cutting near the town. The foothill forests provided a wide range of products including sawlogs, firewood, posts and poles, railway sleepers, bridge beams, rails and fence palings, the occasional hewn boat keel, honey, wattle bark for a tannery in Bairnsdale, willow clefts for cricket bats, and grey gum billets for tool handle manufacture at a factory near Bruthen. Supervising all this activity was an understandably large task for forestry workforces, and especially junior foresters.

Alan returned to Melbourne in late 1950 to complete a Bachelor of Forest Science degree at Melbourne University. After graduating in late 1952, he was again posted Mirboo North District. Despite the presumption of a three-year posting, he had been there for less than a year before being suddenly posted to the nearby Heyfield District.

In late 1953, Heyfield was booming as new roading was progressively accessing remote mountainous forests to supply logs to nine recently established sawmills. Alan's duties were largely confined to supervising timber cutting in the flat land and lower foothill forests closer to Heyfield. However, one of his duties was the fortnightly pay run to the workers based at the Connors Plain forestry camp, about 100 km to the north, near where most new roading and logging activity was underway in the alpine ash forests.

The pay run was hardly a secret, and the two-hour drive with a car load of cash hidden under a hessian sack was stressful. On one occasion, a rough-looking man in a filthy grey coat stood in the middle of a remote stretch of road forcing Alan to stop. Fearing this to be the long-expected payroll robbery, Alan was reaching under his seat for a tyre lever until the man explained that blasting to widen the road was underway around the next bend! As 'hi-viz' safety vests and hard hats were unknown at the time, there was nothing to distinguish a road worker from anyone else. In April 1954, Alan married Nell and they began their life together in a rented house in Heyfield. But within months of settling in, Alan was shifted to the Ballarat District. This was an era in which graduate foresters bonded to the Forests Commission had little warning and no say in where, when, or for how long their postings were to last – often there was barely enough time for affairs to be put in order before reporting for duty in some new town. Alan and Nell perhaps suffered more than most in being shifted by the Commission four times (living in five different houses) during their first two years of marriage!

In 1956, Alan was promoted to District Forester at Maryborough in Central West Victoria. However, after an enjoyable two-year stint in this role, his relatively short field career ended when he was appointed to lecture full-time at the VSF starting in the first term of 1958. Later that year, Alan obtained permission from the Forests Commission to undertake one year's post-graduate study in the USA. He was awarded a Fulbright Scholarship and an English Speaking University San Francisco Branch Scholarship to the University of California, Berkeley Campus, where he obtained a Masters of Forestry in late 1959.

Upon returning to Victoria, he resumed his role of Senior Lecturer at VSF residing in a house in the school grounds at Creswick until the end of 1966. Alan never recalled this six-year phase of his career with much fondness, but he found compensations in his family life, the local Anglican church, and in nearby Ballarat where he was an active member of the Apex Club. At the time, the club was helping to turn the idea of a replica historical gold mining town into a reality on vacant land in Ballarat's southern suburbs. Subsequently, Alan became a Board member and chair of the landscaping committee at Sovereign Hill which has become one of Victoria's premier tourist attractions. From the start of 1967, Alan was posted to Melbourne for a two-year tour of duty in the Commission's Economics and Marketing Branch. In late 1968, he successfully applied for the soon-to-be vacant position of VSF Principal. In January 1969, Alan and his family returned to Creswick to reside in the Principal's residence in the school grounds.

Alan's nine-year tenure as VSF Principal coincided with increasing demand for forestry education and changing social mores that presented considerable challenges for the school's governance and its infrastructure. Substantially increased numbers of students from 1975 onwards, the introduction of female students in 1976, and shortterm Certificate courses for nongraduate Forests Commission field personnel necessitated the erection of additional accommodation buildings in the school grounds.

From the early 1970s, the graduate student body, perhaps later emboldened by the addition of female students, had become increasingly less willing to accept what were regarded as out-dated and unreasonably restrictive constraints on personal freedoms. For example, into the early 1970s, VSF students were not permitted to grow facial hair; own a motor bike; or drink alcohol on campus. Firstyear students were also prohibited from going out on a Saturday night. Most students were required to study for two hours every week night and all were required to participate in Saturday morning field work as part of their training. On weekends, senior students were only allowed to travel away from Creswick at the Principal's discretion.

Such rules may have once been appropriate, but young people were becoming more mobile and it was not uncommon for students to have active social lives elsewhere which these traditional rules prevented or substantially constrained. That Alan was able to progressively negotiate sensible rule changes or modifications while averting the potential for a student revolt was to his great credit, especially given that the school's academic standards were able to be maintained despite fears that greater student freedoms would erode them.

A particular highlight of Alan's tenure as VSF Principal was the overnight visit of a young HRH Prince Charles in 1974. The Prince dined with Alan and his family in the Principal's residence and slept that night in a spare bedroom. He was accompanied on his visit by a small contingent of on-edge bodyguards, and Alan later remarked that he pitied any possum that made a false move that night!

In early 1978, Alan was appointed to a Head Office position as the Forests Commission's Chief Forest Education Officer, and the family moved from Creswick back to Melbourne. Part of this role was to assist with the negotiations for the upcoming transfer of the Commission's VSF to the University of Melbourne.

Later, he was appointed to the newly created position of Policy Coordinator, but the need for this role disappeared after a new Labor Government came to power in 1982, bringing with it a propensity to rely on party committees and Ministerial advisers to guide policy direction and implementation. An early casualty was the 65-yearold Forests Commission, which was dismantled to facilitate the combining of forestry and other public land functions into a megadepartment named the Department of Conservation, Forests and Lands.

In 1984, Alan was seconded from the Department to assist the Victorian Government's Board of Inquiry into the Timber Industry. In 1986, the Inquiry developed a Timber Industry Strategy to guide Victorian forest management into the future, and Alan returned back to the Department to take up a new role as research coordinator. However, within days he was summoned to a meeting with his Director to be told he was to be sacked (supposedly) because the Minister for Conservation, Forests and Lands, Joan Kirner, didn't like him!

Fortunately, before Alan had time to clean-out his desk, the newly appointed Director of the Department's State Forests and Lands Division had heard of his 'sacking' and decided to utilise Alan's talents by appointing him to be his Executive Assistant. This proved to be a productive partnership in which Alan's diligence and attention to detail was essential, such as for example, his central role in the development of a Code of Forest Practices for Timber Production which evolved through several dozen drafts to its eventual ratification by State Parliament in 1989.

In 1989, Alan retired from the Department at age 60, but continued to work in forestry as a research officer for the Victorian Timber Industry Training Board until 1993.

Alan was a tremendous servant of the profession through the Institute of Foresters of Australia which he first joined in 1959. From 1975 to 1989, he was a member of the IFA Executive; and was the book reviews editor and a member of the editorial committee of *Australian Forestry* from 1978 to 1989. He became an IFA Fellow in 1983. From 1981 to 1985 he was also Chairman of the Australian Branch of the Institute of Wood Science.

If one incident can convey the sharpness and wit of Alan's character, perhaps it was the time late in his final Head Office posting when he remarked to a colleague who was well known for colourful language and an occasionally blunt, no-nonsense style, that: ". . . there is only one four letter word that you don't know – tact".

Alan will be sadly missed.

*Mark Poynter and Barrie Dexter are forestry colleagues and friends of Alan Eddy. *Alan Eddy's oral and written memoirs of his forestry career can be accessed via the Victoria's Forestry Heritage website: www.victoriasforestryheritage.org.au/people1/articlesabout/218-eddy-alan.html*

This article was published in The Forester Feb/Mar 2021

Bob Scholes 1957–2021

The Intergovernmental Panel on Climate Change has learned with shock and sadness of the death of long-time IPCC author Bob Scholes, who died aged 63 on 28 April 2021 while on a hike in Namibia. Professor Scholes was an author of the Third, Fourth and Fifth IPCC Assessment Reports.

Scholes also led many aspects of the expert work of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), including co-chairing the Land Degradation and Restoration Assessment. Recently, together with the Co-Chair of IPCC Working Group II, Hans-Otto Pörtner, he co-chaired the Scientific Steering Committee of the IPCC-IPBES co-sponsored workshop on climate change and biodiversity that was held in December 2020.

He was Distinguished Professor of Systems Ecology and Director of the Global Change Institute at the University of Witwatersrand in South Africa. In a statement the University said it was "shocked and saddened by the sudden loss of such a giant in the field of climate science, not only in South Africa, but in the world."

"He was among the top one per cent of environmental scientists worldwide, based on citation frequency, and published widely in the fields of savanna ecology, global change, and earth observation," it said.

In tribute, Working Group II Co-Chair Debra Roberts, the IPCC Bureau Member from South Africa, said: "We have lost one of our very best. Bob was a pioneer in all that he did. He was a commanding intellect and never allowed anyone to be complacent about science."

"He was generous with his knowledge, a mentor to many and someone who cared deeply about Africa, its ecosystems and its people. He committed his life to understanding the way the planet works and how we might find ways of dealing with its challenges. As a result he played leading roles in the IPCC and IPBES assessments, and both communities will be poorer without him. There is no doubt in my mind that he lives on through his work – a lasting legacy to this generation and many more to come. Hamba kahle Bob," she said.

Bob Scholes had over three decades of field experience in many parts of the African savannas and the world. Among his other international commitments, Scholes was a member of the steering committees of several Global Earth Observation (GEO) bodies including chair of the Global Terrestrial Observing System and the Group on Earth Observation Implementation Planning Task Team.

Born in 1957, Bob Scholes was a Foreign Associate of the US National Academy of Sciences, Fellow of the Royal Society of South Africa, Member of the South African Academy and a winner of South Africa´s National Science and Technology Forum Lifetime Contribution to Science Award.

He is survived by his wife Professor Mary Scholes and a son.

Article published in www.ipcc.ch

Geoff Stocker 1941–2021

Geoff Stocker at Mt Wilhelm PNG (Image courtesy Phil Spence)

Born in Lorn (Maitland) NSW 28.05.1941, raised on family dairy farm, Hunter Valley, earning a scholarship from Maitland Boys High, to commence his forestry degree at UNE, Armidale 1959, then to the *Australian Forestry* School, Yarralumla ACT (Diploma of Forestry), graduating with BSc (Forestry) UNE 1963.

During the first year at the AFS Geoff, along with half of that year's intake, spent six months at the "Waldorf," a world war II era uninsulated prefab hut across the road from the Forestry School. This was a character-building experience for all, that cemented enduring friendships that have lasted a lifetime.

Geoff joined the Canberra Pistol Club while at Forestry School and later became the NT pistol champion for ten years and in 1968 represented the Territory at the Australian Championships and Olympic elimination trials in Melbourne. He was a keen gun/rifle collector and crack shot producing some impressive photos of feral buffaloes and pigs that he despatched.

Appointed to the Forestry and Timber Bureau, Northern Regional Station at Berrimah NT, Geoff's early focus was on the establishment of tropical *Pinus* plantations on Melville Island and elsewhere in the top end, including significant early visits to Central American states in search of suitable provenances of *Pinus caribaea*, including v. *hondurensis* and v. *bahamensis*, contributing in part to the genetic basis of exotic pine breeding in northern Australia. He also supervised graduate students and through this was instrumental in documenting indigenous burning practices and fire dynamics in tropical landscapes even though this was not his specialist field of research.

Geoff married his beloved wife Jacquie who was teaching in the Territory, in 1967, moving to the Atherton Tablelands, Queensland in 1971 to establish the then Queensland Regional Station (QRS) of the national Forest Research Institute (FRI), an arm of the Commonwealth Forestry and Timber Bureau.

Geoff and Jacquie purchased a 170 acre ex-dairy farm, *'Los Cerros'* at Jaggan, near Malanda and proceeded to establish Droughtmaster cattle, also creating one of the earliest commercial introductions of grafted avocado plantations on the tableland, in addition to developing a burgeoning interest in the culture, breeding and production of tropical orchids and bromeliads. Geoff and Jacquie raised two wonderful daughters Lucy (born 1973) and Elise (1975) who have blessed them with six grandchildren to whom Geoff was a loving Pa and very much endeared.

While Principal Research Scientist and Head of QRS, thence to become CSIRO Tropical Forest Research Station in Atherton (1971–1985), Geoff and his 12 to 16 member staff established the Soils, Ecology and Botany research groups. This active team researched the description and scientific investigation of

Australia's tropical rainforests and related forest environments, in collaboration with the then Queensland Department of Forestry research office, also in Atherton. Geoff and his group designed and implemented a broad range of foundation studies in tropical rainforest ecology, dynamics and rainforest tree growth, including a series of pivotal long-term reference plots extending from sample sites at Eungella Range (inland from Mackay), north via the Tablelands, coastal forests and highlands to Iron Range on to Cape York Peninsula. Also with a focus on the scientifically informed management of the region's tropical cabinet-wood species, Geoff's widely published research and field experiments did much to define and delineate key species' regenerative responses to forest disturbance and environment, as a basis to improved tropical forest silviculture of the region's valuable and ecologically complex forests. In 1983, Geoff produced his doctoral research thesis on the *'Dynamics of Rainforests in North East Australia'* (UNE).

He also actively engaged in the public discourse over the declaration of the Wet Tropics World Heritage Parks' establishment registering his strong opposition to total protection as the only management option for the tropical rainforests. A strong voice for forest management and practical conservation. He championed the potential offered by small private growers of cabinet wood species to create a commercially viable niche industry and critical of State government royalty policies that he viewed as not supportive of developing this potential.

Moving from CSIRO, Geoff extended his professional interests in Papua New Guinea, with appointment as Professor and Head of the Forestry School at University of Technology (UniTech) in Lae, and Director of the Forestry Research Institute, PNG. He is well remembered by friends and colleagues there and the Senior Botanist at FRI, Kipiro Damas, indicated that they have discussed having Geoff's portrait framed and hung in their meeting room in his memory. Kipiro also noted that the PNG FRI Botanists and Ecologists will always remember him for introducing the sling shot (catapult) method of collecting botanical specimens from tall trees.

After his Forestry career Geoff redirected his love of the tropics and his experience into local government service as a Councillor on the Eacham Shire Council before it was amalgamated by the State government with the Atherton, Herberton and Mareeba Shires to form the Tablelands Regional Council (TRC) in 2008. Geoff served as a councillor in the amalgamated TRC which then de-amalgamated from the Mareeba Shire in January 2014. Geoff was Deputy Mayor of TRC from January 2014 until he retired at the March 2016 council elections. He was highly respected by his local Tablelands community and championed the cause of improved planning of landscape management and support of rural industries within the region. As recently as the last 6 months he was still making submissions to and giving evidence to Senate Inquiries into bushfires and reef protection measures.

Geoff had a bloodwood *(Corymbia stockeri)* and two orchids (*Dendrobium stockeri* and *Bulbophylum stockeri*) named in his honour – a fitting professional recognition of his love of Botany, tropical Forestry and tropical orchids. He left a lasting legacy in a huge rockery that was landscaped into the surrounds of Geoff and Jacquie's Upper Barron home built in 2013 – filled with orchids and tropical vireyas – as well as the impressive rainforest patches preserved or established and nurtured on their farm.

He was a quiet, unpretentious achiever who was much admired and respected for his wise counsel to his family, friends and colleagues. He was a valued mentor to many. The world is diminished with his passing... But it is a far better place because he was here.

(Compiled from notes kindly provided by Jacquie Stocker, Lucy Stocker, Greg Unwin, David Cassells, Don Gilmour, Rod Keenan, Bob Thistlethwaite and Roger Underwood) This article was published in The Forester Feb/Mar 2021

Robert Thistlethwaite 1941–2021

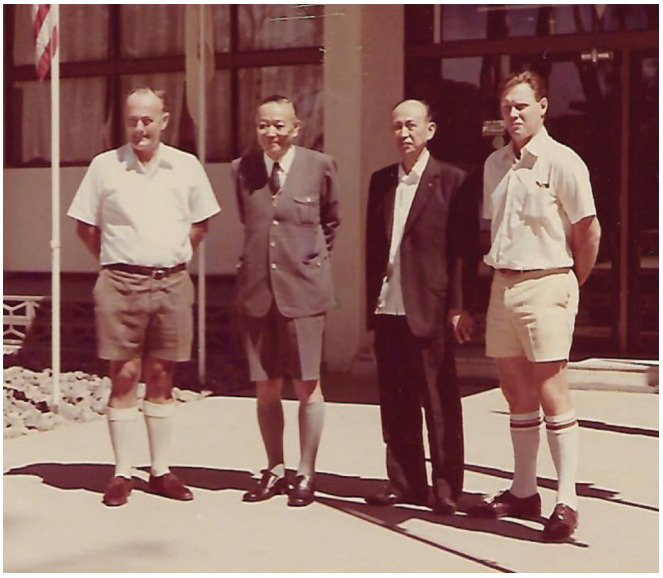
Dr Robert 'Bob' Thistlethwaite was a member of the IFA for 56 years after joining as a student member in 1963. He gave valued service to the Institute through various executive positions and remained an active and enthusiastic member up until very recently.

Bob attended the Australian Forestry School in Canberra in the early 1960's and was always a passionate researcher. He completed his PhD in 1970 from ANU on the topic "Forests and water supply in the Cotter catchment, with reference to P. radiata (D Don) plantations". Bob commenced his professional career in 1971 when he was appointed Principal Research Officer with the Papua New Guinea Department of Forests and oversaw forest plantation research, with a wide range of tropical and exotic species. In early 1978 he became Principal Research Officer with the Department of the Interior in Darwin and OIC of the Berrimah Research Laboratory. This followed an 8-year stint working in primary industries with a focus on agriculture, animal industry development and agro-forestry ventures.

In 1986 Bob was invited to join AIDAB's (now AusAID) Pacific Regional Team as its Natural Resources Advisor to undertake identification, establishment, and appraisal of aid-funded projects for nine Pacific island countries across forestry, agriculture, and artisanal fishery sector. In 1989 Bob established his own natural resources and environmental consulting company which focused mainly on the 22 island nations of the Pacific basin.

In the mid 1990's and into the 2000s Bob continued to work in Australia as a consultant for companies he established to focus on genomic research for tree improvement.

Bob was a highly active member of the IFA and regularly participated in field trips, functions, and meetings. Bob was the Queensland Divisional Chair for 6 years (2001-2007), and IFA Director for 6 years, a Member of 2009 Conference Committee, Chair of the Tropical Forestry special interest group, and was an Executive Member of the Association of Consulting Foresters of Australia. Bob was the first member of the Queensland Division to obtain accreditation in July 2007 under the Registered Professional Forester scheme in General Practicing Forester, and he was made a Fellow of the IFA in 2009.



Kevin White Assistant Director PNG Forests greets Dr Kisaku Mori and the OIC Mori Research with Bob Thistlethwaite at the Davara on Ela Beach Port Moresby. (Photo credit Bob Thistlethwaite)

Bob Thistlethwaite's contribution to Forestry in Papua New Guinea 1971–1975

Much of the plantation development work of PNG Forests at that time is summarized in Bob's detailed paper on "*Further domestication of PNG's indigenous forest species*". This work summarized early plantation development in PNG together with detailed trial work of PNG species.

Bob was involved with Dr Kisaku Mori D. Agr., supported by a small team of Japanese scientists and officials, to investigate the presence of Shiitake in PNG. Jack Simpson, Department of Forests pathologist based at Bulolo in Morobe Province, guided the Mori team to Castanopsis forests where Shiitake was identified on the first morning of the field visit. After Dr Mori's field visit, Shiitake was found widely distributed on Fagaceae, especially on Castanopsis in the highlands of PNG. At the Tari market in Hela Province, different varieties of edible mushrooms were being sold. Shiitake was known locally "*abus long abus*" or meat with meat and was highly prized.

Shiitake party *L to R: Bob Thistlethwaite, Jack Simpson, Dave Lamb (partly obscured at rear), OIC Mori Research, Egon Horak, Kisaku Mori in Castanopsis forest at Bulolo. Photo credit Bob Thistlethwaite*

A hard Saturday afternoon at Elome Creek a short walk north of Efogi. From left: Alan White, Kev White, Bob Thistlethwaite, Chris Done. Photo credit Bob Thistlethwaite.

A sample of Bob's PNG Travel Snippets

Travel went with the job in PNG and, except for road travel around Port Moresby or inland to Brown River, was by air.

- But in all the travel I did during my time there and subsequently as a consultant, only once when I was really concerned on a flight from Moresby to Madang on a Fokker, when in the Okapa area the pilot realised he was flying up the wrong valley for his approach to Goroka. A cliff appeared ahead and disturbingly close. He stood the plane almost on its tail, hung on the props and side-slipped out of danger. We exited the aircraft at Goroka a bit white around the gills, decided we would stay in Goroka for the night and forget flying on to Madang. I did not know that the Fokker was so versatile but subsequently learned that it was originally designed for military operations. The pilot was of course feted by all but fit enough to fly on to Madang in the morning.
- And, yes, there was a pilot strike, and we were stranded on Daru Island and lucky to get a small room at the Daru Hotel which was adequate, with good plain food and a congenial host. The influx was such that the stock in the private bar was rapidly depleted, and when all the beer was gone, we gradually worked our way through all other offerings on the bar shelves. The Daru Pub was locally called the Cerberus Arms, because all the crockery and cutlery were branded with "HMAS Cerberus". How, we did not ask. I decided to do a little exploration of the hotel and in a shed tucked away under a couple of trees at the back I found a hotel employee beavering away filling bottle. He had two huge casks from which to choose, both branded with Portuguese markings, one containing red wine and the other white – perhaps emulating Mateusz Rose and Casals Inhos – but unfortunately not the same calibre. The bottles were already

labelled with what they had originally contained, and it was interesting to see a white wine in a bottle labelled Beaujolais. To feed the thirsty throng in the public bar, waiters moved through selling fried fish heads, some with backbones attached. A roaring trade and the kina were rolling in. Tuesday came, the strike was off, and we gratefully boarded the flight to Moresby.

Messages of Condolences from PNG Identities

Eko Maiguo Principal Bulolo Forestry College; Osia Gideon Professor of Forestry and Mex Peki PhD Head Forestry Department UNITECH Lae all expressed messages of sympathy and acknowledging working with Bob during his time and afterwards with Ausaid.

Obituary prepared by Kerrie Catchpoole of the Queensland Division of the Institute of Foresters of Australia together with PNG contribution by TPNG forester Dick McCarthy.

Around the World

England: Forestry Commission Chair welcomes new Trees Action Plan to treble tree planting rates in England

The Forestry Commission has welcomed a new government commitment to protect, enhance and restore nature and help meet Net Zero by 2050, using nature-based solutions to tackle the climate and biodiversity crisis, including new commitments for tree planting and tree health in England. This builds on the recommendations of the Dasgupta Review on the Economics of Biodiversity.

Launched today during a landmark speech by the Environment Secretary George Eustice, the England Trees Action Plan (ETAP) will aim to at least treble tree planting rates in England by the end of this Parliament, reflecting England's contribution to meeting the UK's overall target of planting 30,000 hectares per year by the end of this Parliament.

As the government's expert forestry advisors and custodians of the nation's forests, the Forestry Commission will be a key delivery partner in meeting this ambition.

The Forestry Commission Chair Sir William Worsley announced a new flagship grant scheme – the England Woodland Creation Offer (EWCO). The new scheme for farmers and landowners will support the creation of a range of woodland types and sizes, including through natural colonisation, and especially where their location and design will provide public benefits.

The offer will be open to applications of small areas of land from 1 hectare upwards, providing greater incentives for farmers and landowners to consider tree planting as a sustainable option. The grant is due to launch soon and particularly incentivises the creation of new native woodland, especially where this extends existing priority woodlands or benefits water habitats by planting along rivers, or provides recreational access to the public.

The ETAP will provide a raft of new measures to boost tree planting and establishment including an enhanced role for private finance, improving woodland management in England, supporting a thriving green economy and bringing trees closer to people.

Supported by over £500m from the Nature for Climate Fund between 2020 and 2025, this is a once in a generation plan to help achieve this vision.

Biosecurity is central to protecting both the Government's significant investment in tree planting, ensuring our trees and woodlands are protected in the long term. In addition to the action plan, we will be introducing a three-year tree health pilot scheme to build the resilience of England's trees, woods and forests and to enhance the benefits trees provide, by mitigating and minimising the impact of pests and diseases. This builds on the elements being introduced in the action plan to expand the tree health grants provided to treat or fell diseased trees and to restock following a tree health issue.

The Nature For Climate fund will help us deliver the English portion of the government's manifesto commitment to increase tree planting to 30,000 hectares per year across the UK by 2025, alongside peatland restoration and nature recovery.

gov.uk

Global: Transparent wood is here and it could be the future of sustainable housing

Living in a transparent house made of see-through wood may not be everyone's idea of a dream home, but it could be a possibility in the not too distant future.

As scientists look for sustainable, green materials to build with, researchers at the University of Maryland have put wood back under the spotlight.

The team, led by Liangbing Hu, has managed to turn ordinary sheets of wood into transparent material which they say is nearly as clear as glass.

The 'invisible wood' as Dr. Hu describes it, is also stronger and lighter than glass with better insulating properties. Researchers hope it could become an energy-efficient building material.

How to make clear wood

Wood is made of tiny fibres called cellulose, and lignin, a glue-like material that bonds those fibres together to give it strength. Lignin also gives wood its brown colour and prevents light from passing through it.

Transparent wood has been made before, but early attempts involved removing the lignin using hazardous chemicals, high temperatures and a lot of time. It's also expensive to make and the finished product is brittle.

This new technique is so cheap and easy, it could even be done in the garden.

Metre-long planks of wood are brushed with a solution of hydrogen peroxide, explains the report in the scientific journal *Advanced Materials*.

They are then left in the sun, or under a UV lamp for an hour. This allows the peroxide to bleach out the brown chromophores while leaving the lignin intact, turning the wood white.

The next step is to infuse the channels, or veins of planks with a tough transparent epoxy, which Hu says can be thought of as a strengthening agent.

Epoxies are commonly used in adhesives and to coat, laminate and infuse materials like wood and carbon to provide waterproofing, strength and durability.

The epoxy fills in the spaces and pores in the wood then hardens, making the white wood transparent.

A similar effect takes place when a piece of white paper towel is dipped in water and placed on a patterned surface. The white paper towel becomes translucent because the light passing through the water and cellulose fibres is not scattered by refraction.

Benefits of clear wood

The final product is a piece of wood that allows more than 90 per cent of light to pass through it and is more than 50 times stronger than transparent wood with the lignin completely removed.

It's also more insulating than glass and may take less energy to manufacture. Plus if it's cut a little thicker the wood would be strong enough to become a structural part of a building.

While the technology has yet to be scaled up to industrial levels, the researchers say it has great potential as a new building material.

"The transparent wood is lighter and stronger than glass. It could be used for load-bearing windows and roofs," Hu told the New Scientist**.** "It can be potentially used to make a see-through house."

The transparent wood also emits a "high optical haze" that could potentially be used in solar cells, which convert the sun's energy into electricity.

"If you place the transparent wood in front of a solar cell, the amount of light absorbed will be higher, and efficiency can increase up to 30 per cent," explains Hu.

'Invisible glass' offers new possibilities for architects and engineers, looking for greener building materials. But the question is, would you want to live in a transparent house?

euronews.com

Rwanda: Govt to allocate 80 per cent of state forests to private operators

Through Public-Private Partnership, the government is set to allocate 80% of state forests to private operators by 2024, according to the Minister for Environment, Jeanne d'Arc Mujawamariya. She disclosed this as the country joined the rest of the world to celebrate the International Forest, Water and Meteorological Days on March 23, 2021. The sale of state-owned forests is part of the country's seven-year National Strategy for Transformation, which runs through 2024.

"To date, 22.148 hectares equivalent to 36% of state forests are now managed by private investors for sustainable management and value addition. Forests currently occupy 30.4% equivalent to 724,662 hectares across the country," Mujawamariya disclosed. The minister made strong case for the restoration and conservation of forests, saying that they are a source of food, medicine, clean water and shelter.

Jean Pierre Mugabo, the Director General of Rwanda Forestry Authority, said that 53% of the country's forests are plantations, 21% wooded savannas in the east, and 19% natural mountain rainforests while 6.2% are shrubs.

The government owns 27% of the total forests equivalent to 65,000 hectares without considering national parks. Forests are among the major revenue generators in the country, fetching an annual income of Rwf67 billion, according to official figures.

Through privatisation of state-owned forests, the government hopes to make Rwf200 billion in annual revenues in case all the privatisation efforts go according to studies.

According to Mugabo, a forest coverage map produced in 2019 showed that there was a more than 20% increase in forest coverage over the previous ten years, which is equivalent to a 5% afforestation rate over 10 years. However, he said that the eastern and southern provinces have less forest cover, which requires efforts in afforestation.

In 2011, Rwanda committed to restoring two million hectares of degraded land, including natural forests by 2030. Today, the country has 708,629 hectares under restoration, an effort which has created more than 22,000 jobs and resulted in 102,154,014 tonnes of carbon dioxide being sequestered.

Rwanda's efforts are in line with the global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030. Studies show that, between 1990 and 2010, Rwanda lost 37 percent of its forest cover due to forest degradation.

newtimes.co.rw

Pakistan: CM directs coordinated efforts for forests, wildlife protection

Chief Minister Khyber Pakhtunkhwa Mahmood Khan has termed the protection of forests and wildlife as one of the key focused areas of his government and directed the Forests and Wildlife Department for coordinated and concerted measures in this regard.

He also directed for starting practical work on the installation of CCTV cameras in forest check posts and strengthening the capacity of forest guards across the province. He issued these directives while chairing a meeting of Khyber Pakhtunkhwa Wildlife and Biodiversity Board here the other day, said a news release issued here on Saturday.

Provincial Minister for Forests, Ishtiaq Urmar, Chief Secretary Dr. Kazim Niaz and Secretary Forests Islam Zeb and others were attended the meeting. The chair also directed the high ups for taking result oriented steps for setting up private sector Game Reserves in suitable places in the province. The meeting approved constitution of a Research Committee of the board for research oriented input to the department for the protection and enchantment of wild life.

The meeting approved in principles, the establishment of Wildlife and Biodiversity Fund and directed the quarters concerned to table the matter before the provincial cabinet for formal approval. He also stressed the need for restructuring the Wildlife and Biodiversity Board to include maximum number of experts of the relevant field, researchers and social scientists with an aim to give it more effective role for the protection of wildlife.

On this occasion, the Chief Minister directed the concerned authorities to ensure the holding of quarterly meetings of all the boards of provincial government.

pakobserver.net

Ghana: World Cocoa Foundation, Forestry Commission of Ghana join forces, reaffirm commitment to ending deforestation

The World Cocoa Foundation (WCF) and the Forestry Commission of Ghana (GFC) are building a partnership to further align the Ghana Cocoa Forest REDD+ Program (GCFRP) and the Cocoa & Forests Initiative to achieve no deforestation commitments.

The Memorandum of Understanding, signed by GFC and WCF, commits the parties to working together in six regions where the government of Ghana has made action to protect and restore forests a priority. The work in these Hotspot Intervention Areas has already started, with active engagements in the Asunafo-Asutifi, Bia-Juaboso, Kakum and Sefwi-Bibiani landscapes. It is aligned with commitments spelled out in the Ghana framework for action signed in November 2017 for the landmark Cocoa & Forests Initiative, a unique partnership of 35 companies, governments and cocoa-growing communities.

As part of the Memorandum of Understanding, GFC will facilitate the development of strategic initiatives, collaborate on protocols for data collection and ensure stronger monitoring on social and environmental issues. WCF is responsible for facilitating the coordination and convening the actions of the 35 cocoa and chocolate companies that have signed the Cocoa & Forests Initiative. WCF will also support monitoring and evaluation, innovation and private-public learning.

"This partnership represents a phenomenal collaboration with the private sector to ambitiously contribute to real and verifiable emission reductions in Ghana's precious forest landscapes, which are home to diverse forms of wildlife and also provide important livelihood options for rural dwellers," said GFC Chief Executive John Allotey. "The GCFRP is already achieving significant impacts with inclusive governance arrangements and the GFC encourages other like-minded institutions to strategically partner with the program for visible impact at scale."

"With our partner GFC, we aim to accelerate our journey towards forest positive cocoa," said WCF President Richard Scobeyt. "Ending cocoa-related deforestation requires all stakeholders to work together. Today, WCF and cocoa and chocolate companies are strengthening our collaboration with the government of Ghana."

The Cocoa & Forests Initiative is a public-private partnership to end cocoa-related deforestation and forest degradation and promote forest restoration. Nearly three dozen cocoa and chocolate companies and governments collaborate within the framework of CFI with other stakeholders such as NGOs, farmer organizations and civil society organizations on the development and implementation of business-driven solutions.

In 2020, cocoa and chocolate companies announced major strides towards 2022 Cocoa & Forests Initiative targets with, for example, more than four million tree seedlings distributed to farmers to establish agroforestry systems and reforest degraded forests in Côte d'Ivoire and Ghana.

The Cocoa & Forests Initiative contributes to Sustainable Development Goals 13 (Climate Action) and 15 (Life on Land) and is aligned with the Paris Climate Agreement.

The GFC and the Ghana Cocoa Board led in the design and development of the world's first commodity-driven emission reductions program – the Ghana Cocoa Forest REDD+ Program (GCFRP). The program covers 5.9 million hectares of the cocoa-forest mosaic landscape. The goal is to significantly reduce deforestation and forest degradation over a twenty-year period in a phased implementation approach by promoting climate-smart cocoa production, lower risk cocoa farming, landscape level land-use planning, strategic tree tenure reforms and forest rehabilitation interventions.

candyindustry.com

Global: Wood-based foam to replace Styrofoam and other plastics

The Smart Foams research project at Aalto University uses artificial intelligence to develop wood-based foams. Wood-based foam materials can replace Styrofoam and bubble wrap in packaging, for example.

'The project is based on biomimetics – a field which emulates natural phenomena. We use AI to develop a foam with properties similar to wood, such as strength, flexibility and resistance to heat,' says Professor **Mikko Alava** in a news release by Aalto University.

The researchers strive to optimize the properties of the foam. A mixture of lignin, wood fibre and laponite (nanoclay), for example, can be processed into shock and heat resistant foam and used instead of plastic.

Lignin is the compound that binds wood fibres together. As a dried foam it is hard and water resistant and even conducts electricity.

The project makes use of machine learning to exclude superfluous materials and processes, thanks to which the development work is considerably accelerated, says postdoctoral researcher Juha Koivisto**.** The most unexpected feature of the foam is its edibility.

'The method can be used to make foam out of powdered carrots, cowberries, cranberries or beetroot, and that can be further processed into crisps which resemble potato crisps,' says Koivisto.

Several technologies can be used to make foam. Paper manufacturing technologies can be used to produce a desired thickness, but the method is slow. Extrusion or 3D printing produces hard, elongated bubbles for a strong, baton-like structure.

'On the basis of existing data, AI makes suggestions on how we could add the desired property into the material with the least effort,' Koivisto adds.

The project has received funding from Business Finland to look for commercial applications and markets for the new material. Commercial production and use as packaging, for example, requires that the foam is truly biodegradable and cheap and that it can be produced in considerable quantities. 'In tons and tons' is the expression used by Alanko in the Finnish version of the news release.

The foam can also be used as insulation material in construction, being light in weight, heat-insulating and strong. It is water-resistant and therefore fire-safe.

The foam is very similar to cork, but is tens of times lighter.

forest.fi

Global: Wooden floors rotted by fungi generate electricity when walked on

Fungi have helped scientists make a breakthrough in transforming wood into a useful source of clean electricity, which could one day lead to "energy ballrooms".

The possibility of applying pressure to wood to produce an electric charge, known as the piezoelectric effect, has been discussed since the 1940s and 1950s. However, the vanishingly small amount of electricity the process produces has held back the idea. Now, a team led by Ingo Burgert at ETH Zurich, Switzerland, has discovered how to tweak the internal structure of balsa wood to make the piezoelectric output 55 times higher. The solution was to deliberately rot the wood.

Burgert and his colleagues applied a white rot fungus (*Ganoderma applanatum*) to balsa wood for several weeks. This rapidly decayed the lignin and hemicellulose within the wood, reducing its weight by almost half. They found the sweet spot was six weeks of treatment to create wood that was more compressible – meaning it could generate more electricity from the pressing and releasing action when pressure was applied – without losing its strength.

The team then rigged up nine blocks of the decayed wood, covered with a wooden veneer, to create a prototype "energy floor" that was wired up to power an LED. "It's clear this is only a first step in this direction. But it's important to show there's potential," says Burgert.

The amount of electricity generated is still very small, just 0.85 volts from one cube of decayed wood 15 millimetres across. Initially, the electricity could power remote sensors, for example ones that detect whether an older person has fallen over, suggests Burgert. However, in the longer run he envisages energy floors such as a wooden ballroom producing a much greater output, and is talking with companies about commercialising an energy wood product.

The development could lead to more buildings being made from wood, which are already being encouraged because wooden structures have a lower carbon footprint than those made from concrete and steel. The UK's Climate Change Committee has said that the 15 to 28 per cent that wood makes up in construction materials in new homes today should climb to 40 per cent by 2050 to help meet the country's net-zero target.

Team member Javier Ribera at the Swiss Federal Laboratories for Materials Science and Technology says: "We can do much more than just the traditional use of wood. We can tune the properties, we can do many other things with wood, that could be part of future smart cities or new building materials."

For now, the technique is only possible with balsa, which Burgert says has a particularly low density and thin cell walls. More research will be needed on different fungal treatments for other tree species.

Xiping Wang at the United States Department of Agriculture, who wasn't involved in the study, says the results are promising. "The proposed fungal pre-treatment of native wood does represent a breakthrough at the fundamental level," he says.

newscientist.com

Global: Sustainable farming & forestry could reduce extinction risks by 40%

Making timber and crop production sustainable would address some of the biggest drivers of wildlife decline. This finding comes from a new tool, STAR, that allows companies, governments and civil society to accurately measure their progress in stemming global species loss.

Ensuring sustainability of crop and timber production would mitigate the greatest drivers of terrestrial wildlife decline, responsible for 40% of the overall extinction risk of amphibians, birds and mammals, according to a paper published in *Nature Ecology & Evolution*. These results were generated using a new metric which, for the first time, allows business, governments and civil society to assess their potential contributions to stemming global species loss, and can be used to calculate national, regional, sector-based, or institution-specific targets. The work was led by the IUCN Species Survival Commission's Post-2020 Taskforce, hosted by Newcastle University (UK), in collaboration with scientists from BirdLife and 53 other institutions in 21 countries around the world.

"For years, a major impediment to engaging companies, governments and others in biodiversity conservation has been the inability to measure the impact of their efforts," said IUCN Director General Dr Bruno Oberle. "By quantifying their contributions, the new STAR metric can bring all these actors together around the common objective of preserving the diversity of life on Earth. We need concerted global action to safeguard the world's biodiversity, and with it our own safety and wellbeing."

The authors applied the new STAR (Species Threat Abatement and Restoration) metric to all species of amphibians, birds, and mammals – groups of terrestrial vertebrate species that are comprehensively assessed on the IUCN Red List of Threatened Species. They found that removing threats to wildlife from crop production would reduce global extinction risk across these groups by 24%. Ending threats caused by unsustainable logging globally would reduce this by a further 16%, while removing threats associated with invasive alien species would bring a further 10% reduction, according to the paper. STAR can also be used to calculate the benefits of restoration: global extinction risk could potentially be reduced by 56% through comprehensive restoration of threatened species' habitats, according to the paper.

Actions that benefit more species, and in particular the most threatened species, yield higher STAR scores. The results reveal that safeguarding Key Biodiversity Areas, covering just 9% of land surface, could reduce global extinction risk by almost half (47%). While every country contributes to the global STAR score, conservation in five mega-diverse countries could reduce global extinction risk by almost a third (31%), with Indonesia alone potentially contributing 7%.

"We are in the midst of a biodiversity crisis and resources are limited, but our study shows that extinction risk is concentrated in relatively small areas with greater numbers of highly threatened species. The STAR methodology allows us to consistently measure where and how conservation and restoration could have the biggest impact," said Louise Mair of Newcastle University, lead author of the study. "At the same time, our analysis shows that threats to species are omnipresent, and that action to stem the loss of life on Earth must happen in all countries without exception."

To show how the metric can be used by individual institutions, the authors applied STAR to an 88,000-hectare commercial rubber initiative in central Sumatra, Indonesia, where the major threats to biodiversity are crop production, logging and hunting. By abating these threats within its concession area, the company could report reducing overall extinction risk by 0.2% across Sumatra, 0.04% across Indonesia and 0.003% globally. These scores would be due in part to safeguarding the area's populations of Tigers *Panthera tigris* (Endangered) and Asian Elephants *Elephas maximus* (Endangered), as well as Leaf-nosed Bats *Hipposideros orbiculus* (Vulnerable), which are only found in the region.

Measuring contributions to biodiversity targets and assessing biodiversity-related risk – both facilitated by STAR – can feed into companies' Environmental, Social and Governance reporting. "The STAR metric provides a powerful new tool that will be valuable to governments, the private sector and others for assessing potential contributions of different actions in different locations to global conservation of species," Melanie Heath Director of Science, Policy & Information at BirdLife.

The STAR metric will be available in time to inform major international negotiations for nature in 2021. These include the IUCN World Conservation Congress in Marseille, France, in September, followed by the Fifteenth Conference of the Parties to the Convention on Biological Diversity, in Kunming, China.

"The post-2020 Global Biodiversity Framework seeks to identify specific actions that will improve the overall state of biodiversity," said Elizabeth Maruma Mrema, Executive Secretary of the Convention on Biological Diversity. "STAR provides a way to measure how reducing threats in a particular place can decrease overall extinction risk, linking proposed actions to achieving the Convention's vision of living in harmony with nature."

birdlife.org

Global: Fiercer, more frequent fires may reduce carbon capture by forests

Global study shows blazes diminish forest density and tree size, making woods likely to sequester less carbon

More fierce and frequent fires are reducing forest density and tree size and may damage forests' ability to capture carbon in the future, according to a global study.

Although forest fires are naturally occurring phenomena and natural forests regenerate, global heating and human activity have caused the frequency and intensity of fires to rise. Wildfires burn 5% of the planet's surface every year, releasing carbon dioxide into the atmosphere equivalent to a fifth of our annual fossil fuel emissions.

Researchers analysing decades of data from 29 regions in Africa, Australia, North America and South America have found that sites that had fires every year had 63% fewer individual trees and 72% less basal area – a measurement which reveals the trees are much smaller – than places that never burned. Landscapes with fewer, smaller trees are likely to sequester less carbon.

There is growing interest in planting trees as a natural climate solution, with the Trillion Trees campaign attracting the support of the global politicians and business leaders and even the enthusiastic backing of Donald Trump in the final year of his US presidency.

But researchers warned that afforestation efforts to sequester carbon would have to choose planting locations carefully and take heed of changes to fire frequency, with regular blazes changing the species within wooded areas as well as tree size.

"Planting trees in areas where trees grow rapidly is widely promoted as a way to mitigate climate change. But to be sustainable, plans must consider the possibility of changes in fire frequency and intensity over the longer term," said Dr Adam Pellegrini of the University of Cambridge, who is first author of the paper.

"If you plant trees that are not adapted for fire, those forests may sequester carbon for 20 or 30 years but you have to ask yourself how stable is that carbon?"

The study, published in Nature Ecology and Evolution, found that savannah ecosystems and tropical regions with more extreme wet and dry seasons were the most sensitive to changes in fire frequency. In tropical areas, grass grows more vigorously in the wet season before drying out and burning more intensely in the dry season, with hotter and more frequent fires hindering the ability of some trees to recover from the fire.

"Our study shows that although wetter regions are better for tree growth, they're also more vulnerable to fire," said Pellegrini. "That will influence the areas we should manage to try and mitigate climate change."

The tropics is the favoured area for climate-motivated afforestation because fast-growing, dense natural tropical forests sequester more carbon than temperate woodlands.

Previous studies have shown how frequent fires reduce the levels of nutrients such as nitrogen in the soil. The new research shows that this can favour slower-growing tree species that can thrive with fewer nutrients. But these trees may limit the recovery of the wider forest by retaining nutrients rather than moving them into the soil where they can be used by other species.

"As fire frequency and intensity increases because of climate change, the structure and functioning of forest ecosystems are going to change in so many ways because of changes in tree composition," said Pellegrini. "More fire-tolerant tree species are generally slower growing, reducing the productivity of the forest."

In the past, the majority of carbon released by wildfires was recaptured, as ecosystems regenerated, but more frequent or intense fires do not allow for such natural recovery.

Fire cycles are a positive and necessary part of some landscapes, however, ensuring a diversity of plants and animals. If fires are suppressed by people in savannah systems, the species-rich grassland can be rapidly covered by a less diverse treescape.

The research effort, a collaboration with the managers of 374 forest plots across four continents where experimental burning was carried out or prevented, will next examine the impact of fires and their frequency on biodiversity.

theguardian.com

Global: Dinosaur-killing asteroid strike gave rise to Amazon rainforest

The asteroid impact that killed off the dinosaurs gave birth to our planet's tropical rainforests, a study suggests. Researchers used fossil pollen and leaves from Colombia to investigate how the impact changed South American tropical forests. After the 12km-wide space rock struck Earth 66 million years ago, the type of vegetation that made up these forests changed drastically. The team has outlined its findings in the prestigious journal Science.

Co-author Dr Mónica Carvalho, from the Smithsonian Tropical Research Institution in Panama, said: "Our team examined over 50,000 fossil pollen records and more than 6,000 leaf fossils from before and after the impact."

They found that cone-bearing plants called conifers and ferns were common before the huge asteroid struck what is now the Yucatan Peninsula in Mexico. But after the devastating impact, plant diversity declined by roughly 45 percent and extinctions were widespread, particularly among seed-bearing plants.

While the forests recovered over the next 6 million years, angiosperms, or flowering plants, came to dominate them. The structure of tropical forests also changed as a result of this transition. During the late Cretaceous Period, when the dinosaurs were still alive, the trees that made up the forests were widely-spaced. The top parts did not overlap, leaving open sunlit areas on the forest floor.

But post-impact, forests developed a thick canopy that allowed much less light to reach the ground.

So how did the impact transform the sparse, conifer-rich tropical forests of the dinosaur age into the rainforests of today, with their towering trees dotted with multi-coloured blossoms and orchids?

Based on their analysis of the pollen and leaves, the researchers propose three different explanations.

Firstly, dinosaurs could have kept the forest from growing too dense by feeding on and trampling plants growing in the lower levels of the forest.

A second explanation is that falling ash from the impact enriched soils throughout the tropics, giving an advantage to faster-growing flowering plants.

The third explanation is that the preferential extinction of conifer species created an opportunity for flowering plants to take over.

These ideas, say the team, aren't mutually exclusive, and could all have contributed to the outcome we see today.

"The lesson learned here is that under rapid disturbances. . . tropical ecosystems do not just bounce back; they are replaced, and the process takes a really long time," said Dr Carvalho.

rnz.co.nz

Global: Ancient kauri trees capture last collapse of Earth's magnetic field

Several years ago, workers breaking ground for a power plant in New Zealand unearthed a record of a lost time: a 60-ton trunk from a kauri tree, the largest tree species in New Zealand. The tree, which grew 42,000 years ago, was preserved in a bog and its rings spanned 1700 years, capturing a tumultuous time when the world was turned upside down – at least magnetically speaking.

Radiocarbon levels in this and several other pieces of wood chart a surge in radiation from space, as Earth's protective magnetic field weakened and its poles flipped, a team of scientists reports in *Science*. By modeling the effect of this radiation on the atmosphere, the team suggests Earth's climate briefly shifted, perhaps contributing to the disappearance of large mammals in Australia and Neanderthals in Europe. "We're only scratching the surface of what geomagnetic change has done," says Alan Cooper, an ancient DNA researcher at the South Australian Museum and one of the lead authors of the study.

The study not only nails in fine detail the timing and magnitude of the magnetic swap, the most recent in Earth's history, but is also among the first to make a credible, though speculative, case that these flips can affect the global climate, says Quentin Simon, a paleomagnetist at the European Center for Research and Teaching in Environmental Geoscience in Aix-en-Provence, France. But some paleoclimate scientists are skeptical of the team's broader claims, saying other records show few traces of climate upheaval.

Earth's magnetic field is created by the flow of molten iron in the outer core, which is prone to chaotic swings that not only weaken the field, but also cause the poles to wander and sometimes flip entirely. The magnetic orientations of minerals in rock record long-lasting reversals, but can't capture the details of a flip lasting hundreds of years, like the one 42,000 years ago.

Radioactive carbon-14, however, can mark these shorter fluctuations. The isotope is produced when cosmic rays – charged particles from outer space – slip past the magnetic field and strike the atmosphere. It is taken up by living things, and its specific half-life makes it a standard clock. The team used radiocarbon to date the kauri wood by lining it up with accurate, but coarse, radiocarbon cave records from China. And by measuring finer carbon-14 changes in the rings, they tracked how its production varied over 40-year intervals, as the magnetic field ebbed and surged. "It's just amazing you can do this back 42,000 years ago," says Lawrence Edwards, a geochemist at the University of Minnesota, Twin Cities, who worked on the Chinese cave records.

Spikes in radiocarbon indicated the magnetic field weakened to some 6% of its present day strength by 41,500 years ago. At that point the poles flipped and the field recovered some strength, before crashing and flipping back 500 years later. Cooper notes that not only was Earth's cosmic ray shield down; the Sun's was, too. Evidence from ice cores suggests that, around this same time, the Sun was experiencing several "grand minima" – episodes of low magnetic activity. The resulting cosmic ray assault charged the atmosphere to a level that would have knocked out today's power grid and created aurorae in the subtropics, Cooper says. "What happens when the atmosphere is that ionized?" he asks. "God only knows." (The paper is the first Cooper has led since he was fired in 2019 from the University of Adelaide following allegations that he bullied staff and students; Cooper has denied the allegations.)

To explore the consequences, the team ran a climate model, which suggested the cosmic ray bombardment would have eroded the ozone layer, reducing the heat it normally captures from ultraviolet rays. The high altitude cooling would have changed wind flows, which in turn may have led to "drastic changes" on the surface, including a cooler North America and warmer Europe, says Marina Friedel, a team member and doctoral student in stratospheric chemistry at ETH Zurich.

This is where other scientists say the study gets too speculative. Ice cores from Greenland and Antarctica that span the past 100,000 years capture stark temperature swings every few thousand years. But they show no shifts 42,000 years ago. A few Pacific Ocean records do show swings. But even if the shift occurred mostly in the tropics, as Cooper and colleagues suggest, it should be seen in the ice, says Anders Svensson, a glaciologist at the University of Copenhagen. "We just don't see that."

The study team goes further to argue that a climate shift could account for a spate of curious events 42,000 years ago. Most notably, large mammals in Australia went extinct around that time. Neanderthals vanished from Europe, and elaborate cave paintings began to appear in Europe and Asia. Still, neither milestone in human evolution lines up well with the flip 42,000 years ago, and neither was sudden, says Thomas Higham, an archaeologist and radiocarbon expert at the University of Oxford. Linking them to the field reversal, he says, "seems to me to be pushing the evidence too far."

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