CFA Newsletter

No.95 December 2021 ISSN 1750-6417

Contents:

Lead
- Peter Wood

COP26
- World leaders promise to end deforestation by 2030
- Will COP26 forestry pledges to tackle climate change strengthen the fight against illegal timber trade?

Forest Scenes
- A strategy for solving Europe's imported deforestation problem
- Darwin inspires the way forests are planted
- Locating trees outside forests with WRI
- Community forestry in Bolivia
- Breeding trees to address 'wicked' challenges
- Private sector engagement and conservation in West Bengal
- Spain's untapped 'liquid gold'

Publications
- A Trillion Trees
- Biometry for Forestry and Environmental Data with Examples in R
- Routledge Handbook of the Political Economy of the Environment

Obituaries
- Ron Kemp

Around the World

CFA Newsletter
is the newsletter of the Commonwealth Forestry Association

Editor: Alan Pottinger

Contact: The Crib, Dinchope, Craven Arms, Shropshire SY7 9JJ, UK

Tel: + 44 (0) 1588 672868

Email: cfa@cfa-international.org

Web: www.cfa-international.org

The views expressed are not necessarily those of the CFA.

Publication of the CFA Newsletter is supported by a bequest from Jim Ball

Peter Wood 1932–2021

Peter Wood died peacefully in Oxford on the 4th October aged 89. The forestry world has lost a true man of the trees, for all reasons, who will be sadly missed but celebrated for his contributions to the profession, and especially to the CFA.

Peter was born in Hemel Hempstead in 1932 to Bertram Llewelyn and Gladys Lillian Wood. Soon after, his parents moved to Northern Ireland, where his brother Tony was born. At the beginning of World War II, when Peter was 7, his father – a civil servant – was posted back to London.

In their new home in Burghclere, near Newbury, Peter related that he found himself spending much of his free-time in a nearby forest called Great Pen Wood, building huts, catching snakes, climbing trees, and exploring.

When not in the wood, aged 11, Peter started attending St Bartholemew's grammar school and in his final year in sixth form, he won a biology prize for a study about the ecology of a swampy bit of his wood.

Peter recorded that after one weekend visit, his father (who would have liked to be a forester) left a book on British Forests lying around, hoping it might pique Peter's interest. It did! So, in 1951, he went to Trinity College, Oxford, where his tutor persuaded him to study Botany, suggesting that it had a better academic reputation than forestry.

During what Peter describes as three mind-broadening and happy years, in 1953 he and three college friends organised a month-long mountaineering trek across Iceland. It was a character forming expedition with some interesting ecology to study and he made a life-long friend out of one of the team.

Peter was awarded his BA in Botany in 1954. Since he had an interest in trees in the tropics, his tutor pointed out that the Colonial Office offered scholarships for postgraduate training in forestry, and Peter decided to take that opportunity.

Peter then had to do military service with the Royal Artillery where he served for two years, starting with training that he remembers as darkness, rain, cold and tiredness. He was selected for officer training and commissioned in 1955. While posted to Germany as second lieutenant, he applied to the Colonial Office in London for a scholarship to enter the Colonial Forest Service in what was then Tanganyika, now Tanzania. Peter was successful, and in 1956, after he was demobilised, he enrolled in the 4th year Honours school of forestry at Oxford.

Besides learning about geology and surveying, there he met and became friends with Stella, his future wife, both having an interest in hill walking and mountains.

At the end of what he described as a wonderful year at the then-named Imperial Forestry Institute, he began to prepare for his posting spending some of his £30 outfitting allowance not on a pith helmet and puttees, but on a pair of knee-length

lightweight boots made of black mosquito-proof leather, the purchase of which he said he never regretted!

Eventually, in July 1957, he received his marching orders to go to Tanganyika, leaving, not by boat as he had hoped, but by a noisy four propeller-engined Argonaut airplane. The East African Airways flight left from Heathrow at a time when it was a small group of Nissen huts. Peter relates that the parting from Stella was not a happy one, but it was to be the start of a period of long letter writing.

His flight went over the Alps, via Rome to Dar es Salaam. There, he was transferred to nearby Morogoro where the forestry department was headquartered. He shortly discovered that his posting would include the Ngorongoro Crater, the Serengeti plains, and an active volcano all in an area the size of Wales.

Peter Wood during his posting in Tanzania

And so at the age of 24, Peter found himself, only half trained, responsible for over half the forests on Africa's highest mountain, with the title of Assistant Conservator of Forests, West Kilimanjaro.

Peter related that in that first year, although he had plenty to do he was at times quite lonely and greatly missed Stella. And so in 1958, she joined him, they were married, and he continued not only to manage and conserve ecosystems, but also to set up home and start a family which, by the end of his posting, grew to three daughters.

After a year, Peter returned to Oxford to further his training and was awarded a Master of Arts degree in Forestry, after which he was then posted back to Tanzania, where he served successively as Assistant Conservator of Forests, Research Silviculturist and head of timber utilisation research.

During his twelve years in Tanzania, Peter thoroughly embraced his work in conservation and management of trees and forests promoting their importance in support of agriculture. He became an expert in teak (not only growing it, but also using the wood), managing a private 60 year old teak forest in the Usambara mountains for timber. He also embraced the local culture and mastered Swahili and made many friends, both expatriate and local.

During this time he learned to fly and gained his pilot's licence, developed his skill in dowsing for water, indulged in his love of wood-work, read extensively, painted watercolours and expanded his eclectic taste for music with African rhythms.

He witnessed Tanganyika's transition to the Republic of Tanzania, helping with the post-independence transformation. Peter said that there were times when work was difficult, and he didn't always get the administrative support he needed to conserve the forests in his charge.

He didn't suffer fools gladly, especially inefficient bureaucracies and said he regretted some of the criticism he made of superiors, although he got on very well with the local people. Because of this, when the time came to leave Tanzania, in 1969, he admitted that he left with mixed feelings when he and the family were on the boat in Mombasa.

Back in Britain, in 1969, Peter joined Oxford University's Commonwealth Forestry Institute as a Senior Research Officer, and he and his family eventually set up home in a house overlooking Port Meadow which reminded him of the plains of Africa.

He became head of the Institute's Unit of Tropical Silviculture, the function of which was to provide research and training for staff from developing countries, particularly from the Commonwealth, and to provide consultancy advice to Governments, NGOs and international agencies on all aspects of tropical forestry.

Peter providing training at the Oxford Forestry Institute

During his time in the Unit Peter visited a large number of Commonwealth and French African countries using his extensive experience in Tanzania, his large network of contacts and his immense knowledge of the relevant literature to provide valuable reports and advice on the management, conservation and utilization of forests.

There are few people who had such a comprehensive knowledge of the world's forests and tree species. He co-authored, with close friend and colleague Jeff Burley, "*A manual of species and provenance research*" which is still in use and demand in many countries.

At that time Peter became deeply involved in the formulation and teaching of courses on forest management and social and community forestry making lasting friendships with many of the students.

Peter left the Oxford Forestry Institute in 1983 to join the research staff of the International Council for Research in Agroforestry (now called the World Agroforestry Centre) in Nairobi, Kenya, accompanied by his wife. During that time, he helped develop concepts of agroforestry, particularly multipurpose trees, and co-authored another book which he entitled "A Tree for all Reasons".

Peter with Bob Newman (both Chairs of the CFA) and Her Majesty Queen Elizabeth II

Peter's travels continued to take him across the world, and he worked widely on agroforestry in many countries. He also became head of tropical silviculture in the International Union of Forestry Research Organisations.

After five years in Kenya, in 1988, Peter returned to Oxford as a part time freelance consultant and teacher. In 1992 he joined the Overseas Development Administration of the Foreign and Commonwealth Office, London as Senior Forestry Adviser. Here he provided advice to developing countries through the ODA country programmes, during which he made extensive trips visiting projects, sometimes at the expense of his family, he admitted. He also had significant input to the British overseas forest policy.

After retiring in 1996 from government service, Peter became Chairman of the Commonwealth Forestry Association and was very active in helping revitalise the association and organise the four-yearly Commonwealth Forestry Conferences, as well as being involved in many other initiatives, particularly strengthening his links with Indian colleagues.

In 2002 when he had turned 70, Peter's long and dedicated career was recognised with an OBE for services to Commonwealth Forestry. In his typically self-effacing way, Peter would like to explain what those initials stood for, but that can't be repeated here! Receiving that award was one of quite a few encounters with royalty, which later included the Queen's Commonwealth Canopy project, of which the CFA is a partner.

Shortly after receiving his award, the future of the Oxford Forestry Institute came under scrutiny. Peter tried to obtain listed status for the building so as to recognise its historical importance and he also helped colleagues to plead the case with the University for its continuation as a centre for forestry and forest science. Unfortunately, their efforts were not to be rewarded.

Peter continued to support the CFA for many years with sage advice and encouragement. In later years, when our executive meetings were online, he might appear to be meditating but was always listening and would frequently break into apposite poetical quotes, sometimes from Hilaire Belloc, all from perfect memory.

Although Peter achieved an immense amount for the world of forestry he would be the first to admit that he was supported throughout by Stella, their daughters and families.

Peter Wood was indeed a true conservator of forests and a real man of the trees for all reasons.

Marcus Robbins

COP26

World leaders promise to end deforestation by 2030

More than 100 world leaders have promised to end and reverse deforestation by 2030, in the COP26 climate summit's first major deal. Brazil – where stretches of the Amazon rainforest have been cut down – was among the signatories. The pledge includes almost £14bn ($19.2bn) of public and private funds. Experts welcomed the move, but warned a previous deal in 2014 had "failed to slow deforestation at all" and commitments needed to be delivered on.

UK Prime Minister Boris Johnson, who is hosting the global meeting in Glasgow, said "more leaders than ever before" – a total of 110 – had made the "landmark" commitment. "We have to stop the devastating loss of our forests," he said – and "end the role of humanity as nature's conqueror, and instead become nature's custodian".

The two-week summit in Glasgow is seen as crucial if climate change is to be brought under control. The countries who have signed the pledge – including Canada, Brazil, Russia, China, Indonesia, the Democratic Republic of the Congo, the US and the UK – cover around 85% of the world's forests. Some of the funding will go to developing countries to restore damaged land, tackle wildfires and support indigenous communities.

Governments of 28 countries also committed to remove deforestation from the global trade of food and other agricultural products such as palm oil, soya and cocoa.

These industries drive forest loss by cutting down trees to make space for animals to graze or crops to grow. More than 30 of the world's biggest financial companies – including Aviva, Schroders and Axa – have also promised to end investment in activities linked to deforestation. And a £1.1bn fund will be established to protect the world's second largest tropical rainforest – in the Congo Basin.

Prof Simon Lewis, an expert on climate and forests at University College London, said: "It is good news to have a political commitment to end deforestation from so many countries, and significant funding to move forward on that journey." But he told the BBC the world "has been here before" with a declaration in 2014 in New York "which failed to slow deforestation at all".

Hope and challenges ahead

Analysis by Matt McGrath, Environment Correspondent, BBC

There are reasons to be cheerful about the proposed plan to limit deforestation, specifically the scale of the funding, and the key countries that are supporting the pledge. It is also very positive that it will try to reinforce the role of indigenous people in protecting their trees. Studies have shown that protecting the rights of native communities is one of the best ways of saving forested lands.

But there are significant challenges.

- Many previous plans haven't achieved their goals. In fact, deforestation has increased since a similar pledge was launched in 2014.
- There are often disputes between donors and recipients – Norway suspended funding for an Amazon fund in 2019 in an argument with Brazil's president.
- There are also major questions over how a major financial pledge could be effectively policed. How can funders verify that forests are actually being protected without spying from satellites or challenging national sovereignty in some way?
- And question marks also hang over a key plank of the new plan, which is to try to remove the link to deforestation from consumer goods sold in developed countries. One aspect is eating meat from animals, raised on imported soy grown on cleared lands. Will governments push companies and consumers to eat less meat to save the world's most important forests?

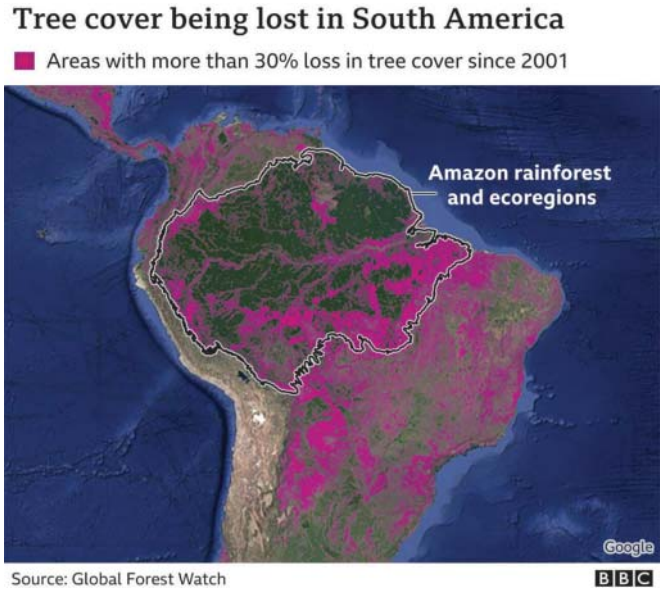
Ecologist Dr Nigel Sizer called the agreement "a big deal" – but that some will find the target of 2030 disappointing. "We're facing a climate emergency so giving ourselves another 10 years to address this problem doesn't quite seem consistent with that," said Dr Sizer, a former president of the Rainforest Alliance. "But maybe this is realistic and the best that they can achieve."

What was the failed 2014 agreement?

- The New York Declaration on Forests was a voluntary and legally non-binding agreement on deforestation in 2014
- It aimed to half deforestation by 2020, and halt it by 2030 – and 40 governments eventually signed up. But some key countries like Brazil and Russia weren't among them
- But the agreement failed, a report in 2019 found, saying deforestation was still continuing at an alarming rate

The deal's signatories include a number of key countries:

- Indonesia is the world's largest exporter of palm oil, a product found in everything from shampoo to biscuits. Production is driving tree destruction and territory loss for indigenous people.
- Meanwhile, Russia's huge natural forests, with more than one fifth of the planet's trees, capture more than 1.5 billion tonnes of carbon annually.
- In the planet's biggest rainforest, the Amazon, deforestation accelerated to a 12-year high in 2020 under Brazilian President Jair Bolsonaro.

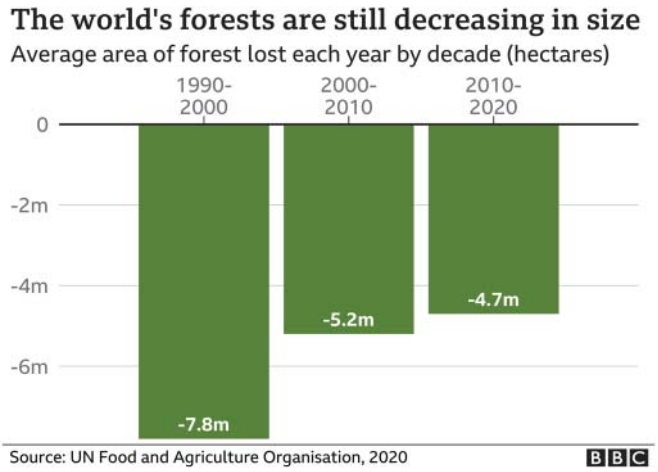


Asked whether leaders like Brazil's Mr Bolsonaro could be trusted to abide by the pledge, the UK's Environment Secretary George Eustice said "we should be really positive when countries engage. Last time there was an attempt at getting such a commitment on forests [in 2014], Brazil didn't take part, neither did Russia, neither did China. Brazil, they've really engaged with us on this agenda. It's a big step for them."

But pressed on whether the agreement will be enforceable, Mr Eustice said: "It doesn't go as far into talking about enforcement mechanisms and so forth, that's not the nature of these agreements." He said what was different about this pledge in particular is that there is "the finance to back [it] up".

US President Joe Biden said he was "confident" the global pledge could be met, telling world leaders: "All we need to do is summon the will and do what we know is right. We can do this." He said the US would lead by example, and announced it would spend $9bn (£6.6bn) to conserve and restore forests.

Ana Yang, executive director at Chatham House Sustainability Accelerator, who co-wrote the report *Rethinking the Brazilian Amazon*, said: "This deal involves more countries, more players and more money. But the devil is in the detail which we still need to see." But many people living in the Amazon, including in its urban areas, depend on the forest for their livelihoods and they need support in finding new incomes, she added.



Prince Charles told COP26 delegates that nations had to "honour" the rights of indigenous people as they were "experienced custodians" of their habitats. And speaking to members of the Global Alliance of Territorial Communities – representing 24 countries with tropical rainforests – he said: "We've got to work harder to save your forests, for all our sakes."

Tuntiak Katan, from the Coordination of Indigenous Communities of the Amazon Basin, welcomed the deal, saying that funds should be invested in supporting indigenous communities who are able to manage and protect forests. Mr Katan, an indigenous Shuar from Ecuador, told the BBC indigenous communities globally protected 80% of the world's biodiversity but faced threats and violence. "For years we have protected our way of life and that has protected ecosystems and forests. Without us, no money or policy can stop climate change," he said.

One of the biggest causes of forest loss in Brazil is to grow soy beans, much of which goes to China and Europe for animal feed for pigs and chickens, said Dr Sizer.

"We all end up consuming that, unless we're strict vegetarians and we don't eat soy. It's a very serious problem that we're all connected with."

Trees are one of our major defences in a warming world. They suck carbon dioxide out of the atmosphere, acting as so-called carbon sinks. They absorb around one third of global CO2 emitted each year. Under present targets, the world is on track for warming of 2.7C by 2100 – which the UN says would result in climate catastrophe.

Currently an area of forest the size of 27 football pitches is lost every minute.

Depleted forests can also start to release CO2. If too many trees are cut down, scientists are worried that the planet will reach a tipping point that will set off abrupt and unpredictable climatic change.

Georgina Rannard & Francesca Gillett
bbc.co.uk

Will COP26 forestry pledges to tackle climate change strengthen the fight against illegal timber trade?

Following the draft UN Climate Change Conference (CoP26) decision that emphasised the critical importance of safeguarding forests to protect biodiversity and the net-zero goal, TRAFFIC urges global governments to ensure efforts to reduce illegal logging are included in the bid to mitigate climate change.

A report released by UNESCO, WRI, IUCN in October 2021 acknowledged that human activities such as the degradation of the forests through agricultural conversion, unsustainable harvesting, and illegal logging are driving factors of deforestation (the second leading cause of carbon emissions). This has resulted in some forests emitting more carbon than they absorb and others not capturing carbon as effectively. Alongside this, the State of the World's Trees Report recently estimated 30% of nearly 60,000 trees are threatened with extinction in the wild due to forest clearance, habitat loss and the direct exploitation of timber and other products.

While The Global Forest Finance Pledge promises $12 billion over the next five years to protect forests, peatlands and other critical carbon stores, with at least $1.5 billion going towards efforts in the Congo Basin, TRAFFIC calls for this international pledge to include a focus on curbing illegal logging.

While the financial pledges made by governments at CoP26 are welcomed, it is fundamental that global governments work together to enhance the legality, sustainability and traceability of wild timber products. Governments need to also provide the vital resources needed by officers on the ground to tackle the unsustainable human activities that will perpetuate climate change emissions if left unchecked." Said Anastasiya Timoshyna TRAFFIC's Senior Programme Co-ordinator on Sustainable Trade.

The Congo Basin, home to the world's second-largest tropical rainforest, is crucial for climate change mitigation, a vital ecosystem for biodiversity and is a major source of the world's tropical timber. While according to the report, the World Heritage Forests in the Congo Basin remain carbon sinks, they are under increasing pressure of human activity.

"We are increasingly aware just how we depend on forests and the services they provide, such as freshwater, biodiversity and clean air. But in large parts of Africa, the loss of these forests is caused by shifting agriculture and unsustainable harvesting – without tackling these causes, there is simply no way to reach the climate goals or the sustainable development goals," said Nina Lande, Senior Adviser Department for Climate and Environment, Norwegian Agency for Development Cooperation (NORAD).

Since 2009, Central African timber exports to China have increased 60%. The country is now the top export destination for Congo Basin timber. The ever-increasing demand has put the Congo Basin rainforest and its vibrant species under threat from overharvesting and illegal logging.

Reducing deforestation, illegal logging, and the associated impacts on biodiversity loss and reduced carbon capture require targeted interventions throughout the supply chain; from the source, all the way through transit and finally at the consumer end. TRAFFIC is aiming to stop the destructive human activities threatening these vital ecosystems, local economies and the health of the planet with a five-year project that encourages the sustainable management of timber through supply chains.

"We aim to stop illegally sourced timber from ever reaching consumers by working with major timber trade associations in manufacturing and destination countries to enhance industry standards and incorporate legality verification systems along the supply chain," said Tom Osborn, TRAFFIC's Senior Manager – Global Projects. "It is only by reducing illegal logging and promoting sustainable harvesting, through initiatives such as our NICFI-funded project, that biodiverse ecosystems like the Congo Basin rainforests may be able to breathe easy again."

TRAFFIC is closely working with industry and governments to support the further development and update of national frameworks for forest and timber trade in six countries in the Congo Basin region[2].

"Breaking down the barriers enforcement officials face in their fight against illegal logging is vital to achieving a sustainable supply chain for timber from the Congo Basin. We are working with partners to develop new tools to verify the legitimate sourcing of timber products and support the communication and coordination between agencies to increase detection and investigation," said Tom Osborn.

TRAFFIC's 'Leveraging legality along China's timber supply to reduce deforestation,' project aims to draw upon China's and Viet Nam's significant market role in the timber supply chain from source countries in the Congo Basin to reduce unsustainable forestry operations and illegal logging that could threaten vital carbon sinks for climate change mitigation.

The project builds on relationships developed by working closely with government authorities to provide the most up-to-date identification techniques in manufacturing countries like Viet Nam. This project will also generate social and behavioural change communications to reach consumers in destination markets and reduce the motivations behind the purchase of products containing unsustainable timber products.

If the financial pledges are met and collaborative efforts are made from actors along the supply chain to prevent illegal logging and implement sustainable timber legality frameworks, legal timber trade can support local livelihoods, combat biodiversity loss and have long-lasting contributions to mitigate climate change.

traffic.org

Forest Scenes

A strategy for solving Europe's imported deforestation problem

Download the report at www.ifri.org

The European Union (EU) is the world's main trader in agricultural products, with imports totaling €142 billion in 2020. These imported agricultural products include commodities – palm oil, beef, cocoa, coffee, soy, etc. – that are responsible for deforestation in producing countries and thus create an "imported deforestation" problem for Europe.

Currently, forest area is increasing in Europe, mainly thanks to the contraction of agricultural land. However, this good news must be put into perspective by the losses of forest area that the EU's growing agricultural imports cause in third countries. In post-forest transition countries like European ones, these outsourced forest losses represent about one third of the gains in domestic forest area.

The EU case is in line with global trends. A clear distinction can be made between tropical areas, which are losing forests on a massive scale (-10 million hectares per year according to the Food and Agriculture Organization of the United Nations – FAO), and temperate areas, which are gaining forest area (+5 million hectares per year). Of the 10 million hectares of tropical forest lost each year, one third is due to a combination of multiple factors (forest fires, logging, etc.), while the other two-thirds can be unambiguously attributed to agricultural expansion. International trade is responsible for about half of this deforestation linked to agricultural expansion, which means that fighting imported deforestation comes to addressing about one-third of the total loss in tropical forest area.

Acknowledging its responsibility as large importer, the EU is currently heading towards a mix of mandatory and voluntary rules to tackle imported deforestation. A legislative proposal will be unveiled by the European Commission in December and other initiatives support these efforts, such as the Amsterdam Declarations Partnership bringing together nine European countries. In addition, some countries like France have already set up national strategies to combat imported deforestation. Stars are finally aligned to move forward with concrete plans on imported deforestation.

A pre-requisite: you can only manage what you can measure

Combating imported deforestation means knowing how to quantify and monitor the phenomenon. Tropical wood from Africa can pass through China, where it is processed before being imported into Europe. Therefore, complex traceability chains must be set up, with the support of customs and private intermediaries in the sector.

In addition, there are questions of timing. At what point can deforestation be considered "prescribed" and the products from this area disconnected from deforestation (the so-called "cut-off" date)? Should Ivory Coast cocoa from cocoa farms that replaced forests destroyed in the 2000's still be counted as a liability for imported deforestation?

Another fundamental question arises. What is meant by the term "forest cut-off" date underpinning the very concept of deforestation? The technical definition of a forest (distinct from its legal definition) is roughly based on two notions: land use and tree cover. A piece of land can have a forest use with no tree cover (just after a forest fire) and, conversely, a piece of land can have a closed canopy without having a forest use (an oil palm plantation).

It is also necessary to introduce the concept of forest degradation. Forest degradation is defined as the reduction in the capacity of the forest to provide goods and services, which is reflected in a reduction in tree biomass density. Countries define forests by setting their own tree cover thresholds. This results in several hundred definitions. When addressing imported deforestation, the choice of this threshold is critical. If it is low, heavy forest degradation can occur without this transformation being qualified as deforestation. If it is high, the conversion of vegetal formations that have all the ecological characteristics of forests into agricultural land might not be considered as deforestation.

Many sustainable production activities, such as selective logging, lead to forest degradation. However, with good forest management, this degradation can be limited and reversible. The same applies to certain forms of agroforestry (such as cocoa under forest shade) or the collection of firewood in dry forests. The challenge, then, is not to avoid all degradation, but to control the factors behind and keep degradation within sustainable limits. Regulatory frameworks (and independent certification schemes) must be mobilized for this purpose.

At first glance technical, the different issues refer to normative choices and the first task for policymakers will be to decide on these crucial matters.

A two-step approach: banning illegal deforestation and favoring zero-deforestation products

Adopted in 2018, the French national strategy to combat imported deforestation mentions the need to include the issue of deforestation in trade agreements and stresses the need to "assess the feasibility of setting up incentives for sustainable raw materials".

With these objectives in mind, we believe it is necessary to distinguish between illegal and legal deforestation, building on the EU Timber Regulation (EUTR) which has banned the import of illegally harvested timber. In terms of political feasibility, differentiating between legal and illegal is easier than boycotting agricultural production associated with deforestation that is considered legal in the producing country but deemed environmentally problematic. If legal agricultural production is banned, the EU would be exposed to trade retaliation risks and would likely face trade discrimination complaints before the World Trade Organization (WTO).

Ideally, producing and importing countries should agree on common forest definitions (adapted to each biome) and on cut-off dates after which deforestation cannot be prescribed. Yet, this would be a long and difficult process.

It seems more realistic to ban the imports of agricultural products from illegal deforestation and to modulate tariffs according to the information and guarantees that the actors in the sector provide to ensure that their production is "zero-deforestation". First, we can draw inspiration from the EUTR, which imposes due diligence obligations on importers to ensure that the wood they market does not come from illegal sources. As a complement, differentiated tariffs should be introduced based on independent certifications that include zero-deforestation criteria. These certifications would be accredited by public authorities and subject to a continuous evaluation process. Switzerland has just paved the way via an agreement with Indonesia that lowers customs tariffs up to 40% for certified palm oil (three standards approved).

"Governing" private certifications through incentives

The current lack of zero-deforestation certification for some commodities could be a hurdle, but the situation is changing fast. Since 2018, certifications such as Roundtable on Sustainable Palm Oil (RSPO) or Rainforest Alliance (cocoa and other commodities) have integrated such criteria. It is a fair assumption that certifications will follow suit and companies' demand will be much more pressing if the prospect of differentiated taxation at the EU's borders becomes clear.

For public authorities, this would be a way of driving the evolution of private certification, insofar as they could label those that integrate a zero-deforestation approach corresponding to European criteria and whose verification mechanisms are deemed credible. Beyond zero-deforestation criteria, certifications also address other important issues related to wildlife conservation, social dimensions, fair remuneration for small-scale producers, gender, etc.

Yet, the Achilles' heel of several certification schemes remains the risk of auditors (the private certification bodies) being "captured" by the companies that select and remunerate them. To some extent, the assessment of sustainability criteria remains subjective, and companies tend to select auditors known for their complacency and avoid the stricter ones. However, public authorities can require certification schemes to find solutions for ensuring a better independence of the auditors. This can be done through continuous performance evaluation and conditional reaccrediting. For instance, an accredited certification body can be attributed randomly instead of being selected by the company.

Designing a fair measure for small producers of the South

In all cases, importers will have to comply with the legal requirement for due diligence and ensure that the product is not associated with illegal land conversion. Risk management information systems will be useful: an importer may decide not to source from a risk area. If the information is insufficient and the import goes ahead, the importer will not only have to fulfil its due diligence obligation but also to demonstrate that its product can be labelled "zero-deforestation". Otherwise, they will not benefit from a favorable customs tariff.

The logical sequence would be as follows:

- If the due diligence suggests a high risk of illegality, then the responsible importer will not market the shipment.
- If due diligence is successful (no or negligible risk of illegality), but the product is not certified as zero-deforestation, then a higher tariff is applied.
- If the due diligence is successful and the product is certified as zero-deforestation, then it receives a favorable tariff. A zero-deforestation certification should also incorporate the guarantee of legality, thus facilitating due diligence.

The problem is that many tariffs have 0% rates (such as soy, natural rubber, or cocoa). Introducing a fiscal differential between zero-deforestation products and others will require an increase in some tariffs, and thus a review of existing and future bilateral trade agreements. While a unilateral increase in certain tariffs could be challenged at WTO level, there is room for maneuver based on the GATT Article XX General Exceptions agreement (protection of human, animal or plant life or health, conservation of exhaustible natural resources), if the principle of non-discrimination (between "similar" products from different trading partners) is respected. The additional fiscal revenues could also be used to fund programs helping small-scale producers in exporting countries to move towards sustainable practices and become certified. In addition, individual certification might not be the only instrument. Group certification and territories labelled "zero-deforestation" can be part of the policy instruments.

Such an allocation of additional fiscal receipts to producing countries in proportion to the taxes collected on their imports would refute accusations of protectionism and provide a "good faith" basis for defending this measure before the WTO. And as with all ecological taxation mechanisms, the aim would be for the yield of this import tax to decrease, i.e., the EU would eventually only import certified zero-deforestation products subject to the most favorable customs tariffs.

Alain Karsenty and Nicolas Picard
Ifri.org

A 150-year-old note from Charles Darwin is inspiring a change in the way forests are planted

More than 150 years ago Victorian biologist Charles Darwin made a powerful observation: that a mixture of species planted together often grow more strongly than species planted individually.

It has taken a century and a half – ironically about as long as it can take to grow an oak to harvest – and a climate crisis to make policymakers and land owners take Darwin's idea seriously and apply it to trees.

There is no human technology that can compete with forests for take-up of atmospheric carbon dioxide, and its storage. Darwin's idea of growing lots of different plants together to increase the overall yield is now being explored by leading academics, who research forests and climate change.

Scientists and policymakers from Australia, Canada, Germany, Italy, Nigeria, Pakistan, Sweden, Switzerland, the UK and the US came together recently to discuss if Darwin's idea provides a way to plant new forests that absorb and store carbon securely.

Why plant more forests

Planting more forests is a potent tool for mitigating the climate crisis, but forests are like complex machines with millions of parts. Tree planting can cause ecological damage when carried out poorly, particularly if there is no commitment to diversity of planting. Following Darwin's thinking, there is growing awareness that the best, healthiest forests are ones with the greatest variety of trees – and trees of various ages.

Forests following this model promise to grow two to fourfold more strongly, maximising carbon capture while also maximising resilience to disease outbreaks, rapid climate change and extreme weather.

In mixed forests, each species accesses different sources of nutrients from the others, leading to higher yields overall. And those thicker stems are made mostly of carbon.

Mixed forests are also often more resilient to disease by diluting populations of pests and pathogens, organisms that cause disease.

Darwin's prescient observation is tucked away in chapter four of his 1859 famous book On the Origin of the Species. Studies of this "Darwin effect" has spawned a vast ecological literature. Yet it is still so outside of the mainstream thinking on forestry that, until now, little major funding has been available to prompt use of this technique.

Darwin also famously described evolution by natural selection, a process by which genes evolve to be fit for their environment. Unfortunately for the planet, human-induced environmental change outstrips the evolution of genes for larger, slower reproducing, organisms, like trees.

Modern gene-editing techniques – direct DNA surgery – can help speed things up once careful laboratory work identifies the key genes. But only evolution of human practice – that is, changing what we do – is fast and far-reaching enough to rebalance the carbon cycle and bring us back within safe planetary limits.

Healthier trees capture more carbon

At our meeting we discussed a study of Norbury Park estate in central England, which describes how – using the Darwin effect

and other climate-sensitive measures – the estate now captures over 5,000 tonnes of carbon dioxide per year, making it quite possibly the most carbon-negative land in the UK. Such impressive statistics don't happen by accident or by sticking some trees in the ground and hoping; care and ecological nous is needed.

Trees of different ages also continuously provide harvestable timber and so steady jobs, in stark contrast to the other methods of forestry, where large areas are felled and cleared at the same time.

The UK government, like other administrations, has laid down requirements for responsible large-scale tree planting. These requirements continue to be revised and improved. There are still vital questions about which trees we should plant, where we should plant them, and what to do with them once they've grown.

It has been said that it is impossible to plant a forest, but it should certainly be possible to design a plantation that will blossom into a forest for future generations. We need forests to be a practical, dependable, and just response to our climate and biodiversity crises, and Darwin has shown us the way.

Rob MacKenzie and Christine Foyer
theconversation.com

Locating trees outside forests with WRI

The World Resources Institute is releasing new preliminary tree cover data that shows where billions of trees outside dense forests – previously invisible to governments, investors, and the public – are growing across 1.4 billion hectares of Sub-Saharan Africa and Latin America.

Why did we work with partners to create and test this new dataset? For years, forest researchers have produced increasingly accurate techniques to track where people are damaging, protecting, and restoring the world's carbon-storing and biodiversity-protecting dense forests.

But there are billions of trees sprouting up outside of lush tropical rainforests that our current monitoring systems haven't accurately and consistently detected. That is a serious problem: These trees – growing across agricultural landscapes like farms and pasture, in and around cities, and throughout sparse dry forests – are a vital source of income, food, and timber for rural and urban communities.

This less expensive method – released as part of the new Lab & Carbon Lab initiative – helps solve that problem by capturing tree cover for 2020 at 10-meter resolution, three times more detailed than past datasets. Most importantly, it can give well-deserved credit to the local communities whose work protecting and restoring trees outside of primary tropical forests has long been undervalued and underfunded.

We're not stopping here. Soon, we expect the data to detect trees outside and inside forests across 5 billion hectares of Africa, Latin America, South Asia, and Southeast Asia's tropical, subtropical, and southern temperate zones. We will also show how tree cover is increasing and decreasing every year within each 10-meter by 10-meter square.

Now, it's your turn to explore the data and help us improve it:

1. Access the trees in mosaic landscapes data at **resourcewatch.org/data/explore/Trees-in-Mosaic-Landscapes** and the technical specifications at **github.com/wri/sentinel-tree-cover/wiki/Product-Specifications**.
2. Read our overview article which highlights the major insights at **www.wri.org/insights/new-data-detects-monitors-trees-outside-forests**
3. Tell us how you could use the data and suggest improvements by filling out this survey at **forms.office.com/Pages/ResponsePage**

We look forward to collaborating with you all more in the future, and we encourage you all to stay tuned for opportunities to learn more about this data in the coming months.

Dow Martin
World Resources Institute

Community forestry is central to Bolivia's climate plans, but bottlenecks remain

The Bolivian government sees community forestry as a way to achieve objectives related to both climate change and development. However, to truly unleash the potential of community forestry, the capacity of communities needs to be strengthened and the regulatory environment needs to be improved, says Humberto Gómez Cerveró.

Between 31 October and 12 November, leaders from 196 countries will meet in Glasgow for the 2021 United Nations Climate Change Conference, known as COP26. Alongside the COP, hundreds of experts will join the GLF Climate conference, to discuss ways in which better landscape management can contribute to climate change mitigation and adaptation. In the lead-up to these events, Koen Kusters interviewed several members and partners of Tropenbos International about the relationship between community forestry and the climate agenda. Here he talks to Humberto Gómez Cerveró, of the Bolivian Forest Research Institute (IBIF), who has been helping the Bolivian government with strengthening the role of community forestry in its climate plans.

The government's climate plans are described in the Nationally Determined Contribution (NDC). The Bolivian NDC is quite different from those of most other countries, explains Gómez Cerveró. This is because it does not mention targets for reduced greenhouse gas emissions. In the view of the Bolivian government, including such targets would be to assume part of the responsibility for global warming, while it is developed countries that are primarily responsible. The Bolivian government is also against participating in carbon offsetting programmes, where actors from developed countries pay for emission reductions in the Global South – it is seen as the 'commercialization of Mother Earth and its environmental functions'. Instead, the Bolivian government focusses its NDC on policies and actions for joint mitigation and adaptation, in a way that is aligned with the national development plan.

What is the role of the forest sector in Bolivia's NDC?
'The forest sector is one of the three focus sectors of the NDC, next to water and energy. The NDC is quite ambitious with regard to the role of forests, and community forestry in particular. It mentions a goal to have 4.5 million hectares reforested in 2030, which would be achieved through agroforestry practices by local and indigenous communities, among others. It also includes a goal to increase the forest area under community management from 3.1 million hectares in 2010 to 16.9 hectares in 2030. That would be a five-fold increase. I have not seen other NDCs that include similar commitments to community forestry.

Are these goals going to be achieved?
'I think it is good to be ambitious. However, since the submission of the first NDC in 2016, progress has been slow. The government primarily invests in energy and water, and much less in forestry. The role for us, as civil society, is to remind the government of its own ambitions, and to provide support to achieve the goals. Up until recently, a main problem was the lack of an implementation strategy; there was no governance structure to ensure that NDC goals are integrated in the policies of different government departments, and to ensure that there is budget to implement programmes. To address this, civil society organizations have pushed the government to adopt a mechanism for implementation of the NDC. This is called the joint mitigation and adaptation mechanism. It means to actively involve local governments and communities, and develop joint agreements on mitigation and adaptation goals. Based on these agreements, these local actors then get money from the central government. Support for agroforestry and community forestry is a key part of these agreements.'

What is the main difference between community forestry and industrial forestry, when it comes to achieving climate objectives?
'If done well, both types of forestry will result in climate change mitigation, and the provision of environmental services. The main difference, I think, is that industrial forestry does not enhance local communities' resilience, and it does not allow communities to control the future of their own landscapes. Also, private forest enterprises pay national taxes, but that money does not flow back to the landscapes where the timber was harvested. Moreover, a system in which local labourers work for large-scale companies may create all kinds of social challenges. In the mining sector, for example, it has been associated with alcohol abuse and prostitution. Having said that, it doesn't mean that there is no room for commercial companies in the forestry sector. It's all about finding a good balance.'

A good balance between industrial and community-based forestry, what does that look like?
'Certain parts of the value chains of timber and other forest products are very complicated for local and indigenous communities. Think of making deals with foreign buyers. We can't really expect that people in these communities learn how to speak Chinese, for example. So there is a need to create commercial relations between communities and businesses. These relationships can have many forms, depending on the preferences of the community. In some cases, a community may decide to give a company access to its forest, for which the community receives a part of the revenues. In other cases, a community may decide to conduct logging operations, and sell the timber to a company for further processing and trading. These are all forms of community forestry… The main idea is that the community controls how to use the forest, and how to use the benefits in favour of the community. This comes with its own challenges, for example related to community-level governance.'

Why is community-level governance a challenge?
'Indigenous communities in Bolivia own their land collectively, and many NGOs believe that the benefits from the use of those areas will therefore also be shared collectively. But if you go down to communities, you will see that this is not necessarily the case. When commercial opportunities arise, it can lead to

opportunistic behaviour, and tensions within the community. New systems may need to be developed to organize the way in which benefits from community forestry activities are shared at community level. A major limitation is often the lack of financial literacy. Therefore, the work that we are doing right now is aimed at strengthening the capacity of community-based forestry organizations.'

What other challenges are there?

'Although indigenous communities in Bolivia have ownership rights to their territories, they do not have the rights to commercially use the natural resources on their own terms. If they want to engage in forestry activities, they need to adhere to the same regulations as commercial companies. This means they have a comparative disadvantage. For example, communities usually don't have access to finance that is needed to invest in basic equipment. This is because banks are not providing credit to communities with collective land titles. Such bottlenecks need to be addressed. If we don't do that, you will see that communities will end up leasing their forests to commercial companies. Again, it is up to civil society organizations to bring these issues to the attention of the government, and to propose alternatives. Increasing the area under community forestry will only result in increased resilience, if communities have the necessary capacity, and if the regulatory environment enables them to use and manage the forest on their own terms.'

globallandscapesforum.org

Breeding trees to address 'wicked' challenges

Trees can be bred to address environmental challenges

With the eyes of the world on COP26 in Glasgow, researchers have called for a new approach to plant breeding to address global challenges such as climate change. Writing in the scientific journal Trends in Plant Science, scientists from Scotland's Rural College (SRUC), and the Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF), argue that trees can be bred to give them broad maximum value, while also addressing environmental challenges.

They looked at different plant breeding methods related to four sets of values – ensuring participation, protecting the environment, making use of modern technology, and supporting the market – and how progress can be made through breeding for multiple values to address both global livelihood needs and environment concerns.

Co-author Ian Dawson, reader at SRUC and a fellow at CIFOR-ICRAF, said while their paper focuses on trees, the 'systems approach' was relevant for plant breeding more widely. "We explore how we can go about plant breeding better to address the multiple global production, consumption and environmental challenges that create the 'wicked' or hard to solve problems that we as humans in the 21st century face," he said.

"As our 'case study' we consider trees as our group of plants, because they are essential for addressing many of the human wellbeing and environmental challenges we currently face, and because they are very diverse in their features and uses. "This diversity is a good starting point for developing the 'systems approach' in plant breeding that is needed for addressing wicked problems, including the needs to mitigate and adapt to climate change."

sruc.ac.uk

Private sector engagement and conservation in West Bengal: monitoring compensatory afforestation

Regulations, incentives or collaborations are three major modes for involving the private sector in the conservation paradigm.

Activities of the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in India conform to the Regulations parameter in the afore-mentioned list. It enforces user agencies (including Private Sector entities) to comply with Compensatory Afforestation (CA) related statutory provisions of providing equal quantum of non-forest land for plantation raising purpose and the cost of such against every parcel of forest land diverted. Thus, raising the cost of demand over forest land for non-forestry purposes that dis-incentivises the process.

Regulations, incentives or collaborations more or less define the three important parameters for involving Private Sector in the Conservation paradigm. These together surmise the compliance factor, the incentive mechanism for promotion of voluntary initiatives, as well as development of collaborative approaches that are vital in the Conservation realms of the nature and natural resources involving the Private sector.

The Compensatory Afforestation (CA) dimension in India, made mandatory against every parcel of notified forest land diverted for non-forestry purpose, follows the strategy of compensating loss of 'land by land' and 'trees by trees'. Compensatory Afforestation Fund Management and Planning Authority (CAMPA), constituted under Compensatory Afforestation Act, 2016, has been given the responsibility to ensure thus in India. It enforces user agencies – mostly the public utility services industry, mining companies, infrastructure and transportation network building authorities, etc., that also represent private sector participants – to comply with statutory provisions of providing equal quantum of non-forest land for plantation raising purpose and the cost of plantation raising activities for every parcel of forest land diverted. Therefore, the work of CAMPA in India more or less conforms to the Regulations parameter in the afore-mentioned list of modalities in involving Private Sector in the Conservation paradigm.

Photo from West Bengal – the Sunderban landscape

Photo from West Bengal – the Sunderban landscape

The very origin of CAMPA lies in the Forest Conservation Act, 1980 legislation. The Section 2 (ii) of this act specifies that "any forest land or any portion thereof may not be used for any non-forest purpose (except with the prior approval of the Central Government in India)". CA is the most important pre-condition for prior approval of diversion proposal of forest land for non-forest purposes.

All such proposals are to be submitted with a comprehensive scheme for CA. The CA is mandated to be raised on suitable non-forest land, equivalent to the area proposed for diversion, at the cost to be paid by User Agency requisitioning such diversions. The Honourable Supreme Court of India, in order dated 29th October 2002 (in Writ Petition (Civil) No. 202/95), directed that a Net Present Value (NPV) of forest land diverted was also to be collected from the User Agency, in addition to the monies collected for the purpose of Compensatory Afforestation.

All such funds received in connection with diversion of forest land was ordered to be deposited with an *ad hoc* CAMPA, till the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) is established by an act of the Indian Parliament.

On 10th July 2009, the Supreme Court again ordered to:

- Create a permanent institutional mechanism for utilisation of these funds, and
- Specified creation of a two-tiered structure of *ad hoc* CAMPA – at National and the State / Union Territory level. The State level *ad hoc* CAMPA is to receive funds from the National CAMPA.

Nevertheless in 2013, the Comptroller and Auditor General (CAG) of India, in their published audit report, identified that the funds collected for CA continued to be underutilized in the states. This made the apex court in India take a serious view in this matter. However, in compliance to the series of orders of the honourable Supreme Court of India, a Compensatory Afforestation Fund Bill 2015 was introduced by the government in Lok Sabha (the lower house of the Indian Parliament) on May 8, 2015 to regulate the collected funds. The bill was subsequently sent for examination under a standing committee of the Parliament. After incorporating the observations and suggestions of the standing committee, the bill was finally passed by the Parliament and was notified on 3rd August, 2016 as the Compensatory Afforestation Act, 2016.

This Act provides for a National CAMPA at the national level and a State CAMPA in each state and union territory in India. The State authority constituted under this Act is responsible for the management of the state fund in individual states and also its utilisation for the purpose of the Act. The manner of utilisation of NPV deposited in the State CAMPA funds, as well as the interest accruing from these deposits, has now been specifically delineated to remove any ambiguity or misappropriation possibilities.

Photo from West Bengal – the Sunderban landscape

Uploading geo-referenced polygons for every parcel of CA land has been made mandatory on the E-Greenwatch portal for the purpose of monitoring on a real time basis, as well as analysing status of these plots temporally over time, utilising GIS and remote sensing technologies. The data in this regard has been kept in the public domain for the sake of total transparency in this matter.

West Bengal Compensatory Afforestation Fund Management and Planning Authority (WBCAMPA) was notified and constituted on 30th September, 2018 vide S.O. No.4856 (E) dated 14.9.2018 by the Ministry of Environment Forests & Climate Change (MoEFF & CC), Government of India (GoI). The Government of West Bengal, Department of Forests subsequently established the State Compensatory Afforestation Fund – West Bengal (SCAF) vide Notification No. 217-For/FR/O/D/8M-21/2018 dated 06.02.2019, for the purpose of management by the WBCAMPA.

The entire exercise has now streamlined the forest land diversion process and has thus ensured a control over the unrestricted loss of habitats and biodiversity associated with the forest eco-systems. **The Private sector has been statutorily involved in this process**, by enforcing them to bear the cost of any forest / environmental losses in connection with their entrepreneurial initiatives. Thus, raising the cost for any further demand over the forest land for non-forestry uses.

Sudeep Budhaditya Deb
Deputy Chief Executive Officer, West Bengal Compensatory Afforestation Fund Management and Planning Authority, Government of West Bengal, India
iucn.org

Spain's untapped 'liquid gold'

For centuries, people have tapped pine trees to extract resin. But in one Spanish province, locals believe this age-old practice could save rural towns while also helping the planet.

Stretching north from Madrid, north-west Spain's autonomous Castilla y León region is a patchwork of vast mountain ranges, high plateaus and medieval towns. While most visitors come to marvel at the *castillo* castles that lend the region its name or admire the enchanting cathedrals in León and Burgos, much of the area is blanketed in scrubby sierra and high-altitude *meseta* plains that extend as far as the eye can see.

But in the provinces of Segovia, Ávila and Valladolid, a drastically different landscape emerges. Here, amid the Tierra de Pinares and Sierra de Gredos mountain ranges, a thick, 400,000-hectare **protected forest** of fragrant resin pines stretches up into the mountainous folds. Shielded from the hot Spanish sun and lined with trails and, this forested frontier is a popular hiking destination for locals and tourists. And, if you visit at the right time of year and look closely, you may see workers crouched next to the tree trunks, continuing a centuries-old tradition of collecting the pine's "liquid gold".

Deep in the forests of Spain's autonomous Castilla y León province, workers carry out the age-old practice of resin tapping (Credit: Susan Girón)

A booming market

Pine resin has been used by different civilisations for thousands of years. In Spain and across much of the Mediterranean, it was used to waterproof ships, treat burns and light torches, among other things. But according to Alejandro Chozas, a professor in the forestry engineering department at Madrid Polytechnic University, it wasn't until the 19th and 20th Centuries that the extraction of pine resin became truly profitable in the Castilla y León region.

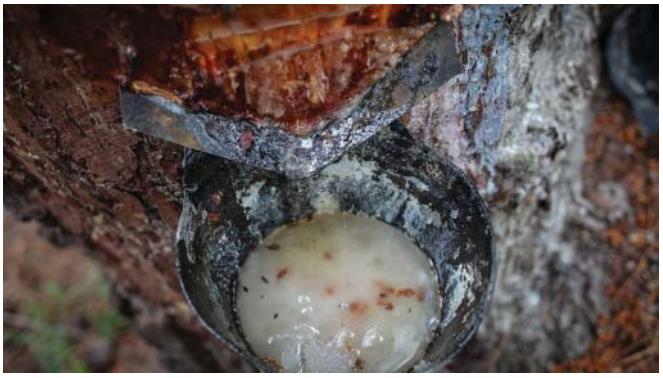
As technology and industrialisation helped turn the thick, milky sap into things like plastics, varnishes, glues, tyres, rubber, turpentine and even food additives in the mid-19th Century, the owners of Castilla y León's dense *Pinus pinaster* forests saw an opportunity. Soon, workers were hacking into the bark of resin pines across the region in order to collect the valuable sap. And while this time-consuming process has now ceased across much of the world, in the past decade it has experienced something of a rebirth in Castilla y León, which is home to more resin manufacturers than anywhere else in Europe and one of the last places on the continent where the practice persists.

Today, many families in the region proudly display old pine resin extracting tools and photographs of their relatives "bleeding" the trees (Credit: Susana Girón)

From "death" to life"

Mariano Gómez, was born in the Ávila province and worked for 32 years as a pine resiner. "My father was a resin producer and I learned from him. In the beginning, I used lumberjack axes, but my hands would get very sore with them. Today the tools are better designed for each task, [but] they are [still] manual," he said. Gómez and many other locals keep ancient resin axes and tools that belonged to their ancestors in their homes.

Despite the extraction process remaining practically unchanged since the industry began, current resin manufacturers have developed more efficient and ergonomic tools, as well as chemical products that stimulate resin secretion. As a result, yields and productivity have greatly improved. Yet, while the focus for workers in the past was to extract the trees "to death" with highly aggressive methods, there has since been a shift to "to life", which minimises the number of incisions to the bark and reduces the damage to the tree.



The thick, milky-white sap of resin is used to make things like plastics, varnishes, glues, tyres, rubber, turpentine and even food additives (Credit: Susana Girón)

"Bleeding" the trees

In the warmer months of March to November, local producers carefully extract resin from the pines by first stripping away the outer layer of the tree's bark. Then, a plate is nailed onto the trunk and a collector pot is hooked on it. Next, extractors use their axes to cut diagonal incisions into the bark, "bleeding" the trees and causing its resin to seep into the pot. When their pots are full, they pour the sap into 200kg containers.

Producers then send the containers to factories to begin the distillation process, which extracts the resin's turpentine. When the liquid turpentine is removed, it develops a viscous and yellowish appearance that solidifies when it cools and turns into shiny, amber-like stones.

The practice and tools of resin extraction were often passed down from generation to generation (Credit: Susana Girón)

Local pride

During the peak of Spain's pine resin extraction in 1961, when 55,267 tons of resin were extracted, more than 90% of it came from the forests of Castilla y León. In the decades since, a lack of demand and sharp fall in prices led production to steadily decline. It nearly disappeared in the 1990s, leading many to worry that this deeply rooted Spanish tradition was coming to an end.

In Castilla y León, resin has not only been an economic lifeline for rural communities, but a trade passed down from generation to generation. Talk to locals and you will soon realise that almost every family has at least one person who has either "bled" the trees, or been involved in its distillation. Much of the economic and social activity in these towns has always been marked by the resin industry, and communities hold this legacy as an important part of their culture.

Some Spanish experts claim that pine resin could provide a viable alternative to petroleum (Credit: Susana Girón)

An eco alternative to oil?

According to several studies, at the current rate of extraction, the Earth's **oil reserves are expected to run dry** sometime after 2050. Yet, Blanca Rodríguez-Chaves, the vice dean of the faculty of law at the Autonomous University of Madrid and an expert in environmental policies, believes that resin could provide an adequate alternative. She maintains that most products made with petroleum – like, plastic, for instance, which is not bio-degradable – can also be made with resin and decompose more easily.

"Resin is the petroleum of the world today and in the future. The intention is that all uses of petroleum are replaced by resin," she said. "Plastics are already being made from resin. [It is used] in the cosmetic and pharmaceutical industry in addition to all its applications in construction or in the manufacture of varnishes and glues. The forest is the great supplier of renewable resources and energy that allows [us] to substitute petroleum products, and here the resin plays the main role."

Rodríguez-Chaves also believes that pine resin's untapped potential could mean big things for Spain. "Spanish resin is the highest purity in the world and, currently only Portugal and Spain are producing resin in Europe."

In Castilla y León, an estimated 80% of towns in 14 local provinces are considered "at risk of extinction" due to urban migration

Rural return

In addition to its environmental benefits, pine resin's proponents also believe it could offer a solution to Spain's rural exodus. According to a report by the Bank of Spain, 42% of the country's towns are affected by depopulation, as increasing numbers of young people leave the countryside to search for better job opportunities in the cities. This phenomenon is exacerbated in Castilla y León, where 80% of towns in 14 local provinces are considered "**at risk of extinction**".

Yet, because of the newfound interest in pine resin, some young people have recently started returning to the region in search of work. Guillermo Arranz is one of them. He lives and works in Cuéllar (Segovia) and is the fourth generation of resin workers in his family. "The pine forest is my office and [it gave me the] chance to keep working in the place where I was born. What I like most about my job is the freedom of not having a boss, and of course, the direct contact with nature and my people."

When Isabel Jiménez started extracting resin three years ago, men thought she'd only last a few weeks (Credit: Susana Girón)

"My kingdom"

Vicente Rodríguez, who works as a resin producer in his hometown of Casavieja and is one of roughly 30 resin producers in Ávila province, echoes Arranz's sentiments. "We are the] few ones [left]. People are still surprised when they see us resining the pines. They think that we are something of the past. But they do not understand that the future of these areas [are connected to] resin. I returned to my roots and the mountains because I like this."

Roughly 95% of Spain's pine resin extraction takes place in Castilla y León (Credit: Susana Girón)

Isabel Jiménez is one of the area's few female pine resiners. Given the toughness of the work, traditionally women have been limited to supporting tasks. "I still remember when I started extracting resin and men made jokes and bets on how many weeks I was going to last. And here we are still more than three years later. I am a physically strong woman. And I am here because, in addition to being a lifestyle for me and a source of income, this is my kingdom. My little piece of land on Earth."

Autonomy in work

Today, roughly 95% of Spain's pine resin extraction takes place in Castilla y León, and Arranz and Rodríguez believe that the best way to preserve these ancient forests is to give greater control to the pine tappers themselves.

"The future is to allow resin producers to manage [their] own territory. If the government gave us aid in exchange for cleaning or monitoring the mountains, we would work the entire year and there would be many more resin workers willing to work the mountains that are not being [worked] yet," Rodríguez said.

By attracting more young people to live and work in these rural towns, Rodríguez believes the region could see an increase in ecotourism, with more companies offering guided forest walks and local museums holding resin workshops.

Today, there are a number of local museums dedicted to resin, as well as companies offering guided "Resin Routes" into the forest (Credit: Susana Girón)

Resin tourism

In order to help make this a reality, the resin-rich area of the Tiétar Valley (Ávila) has recently applied to become a protected Unesco Biosphere Reserve**.** There are also several museums in the area dedicated to resin, such as the **Casillas Museum**, the **Nava de Oro Museum** and the **Oña Museum**, where visitors can see the traditional heather huts where early resin workers slept, as well as ancient tools used to extract the resin.

There are also several **companies** that offer guided "**Resin Route**" tours from the local museums into the forest, allowing people to see the *pegueras* (kilns) where resin would be transformed into waterproof glue and experience what life was like for extractors.

On weekends, these leafy forests may be filled with the sound of footsteps of hikers who come to escape the bustle of nearby cities. But if you listen closely, you can still hear the drop-drop-drop of Spain's liquid gold as it falls into the pots hanging from the tree trunks.

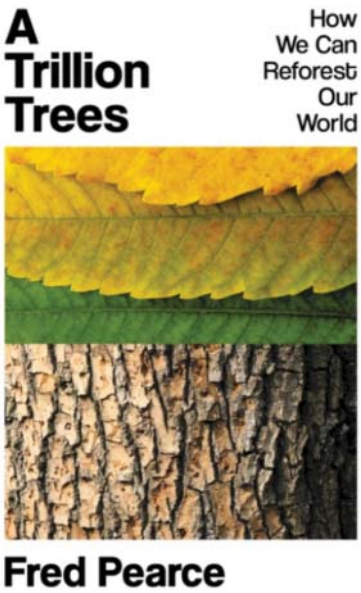
bbc.com

Publications

A Trillion Trees: How We Can Reforest Our World

Author: Fred Pearce

Publisher: Granta Books



Trees keep our planet cool and breathable. They make the rain and sustain biodiversity. They are essential for nature and for us. And yet, we are cutting and burning them at such a rate that many forests are fast approaching tipping points beyond which they will simply shrivel and die. But there is still time, and there is still hope.

If we had a trillion more trees, the damage could be undone. So should we get planting? Not so fast. Fred Pearce argues in this inspiring new book that we can have our forests back, but mass planting should be a last resort. Instead, we should mostly stand back, make room and let nature – and those who dwell in the forests – do the rest.

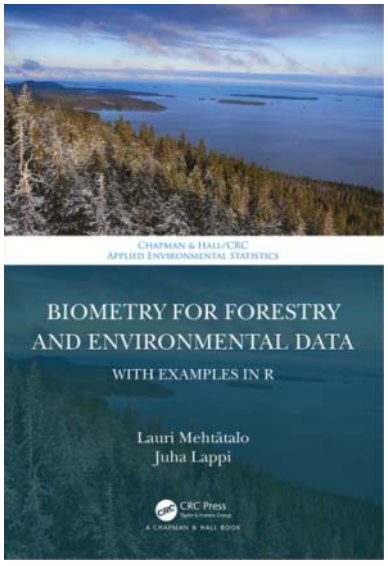
Taking us from the barren sites of illegal logging and monocrop farming to the smouldering rainforests of the Amazon, Fred Pearce tells a revelatory new history of the relationship between humans and trees – and shows us how we can change it for the better.

Here we meet the pilot who discovered flying rivers, the village elders who are farming amid the trees, and the scientists challenging received wisdom. And we visit some of the world's most wondrous treescapes, from the orchid-rich moutaintops of Ecuador to the gnarled and ancient glades of the South Downs. Combining vivid travel writing with cutting edge science, *A Trillion Trees* is both an environmental call to arms and a celebration of our planet's vast arboreal riches.

Biometry for Forestry and Environmental Data with Examples in R

Authors: Lauri Mehtatalo and Juha Lappi

Publisher: CRC Press



Biometry for Forestry and Environmental Data with Examples in R focuses on statistical methods that are widely applicable in forestry and environmental sciences, but it also includes material that is of wider interest.

Features:

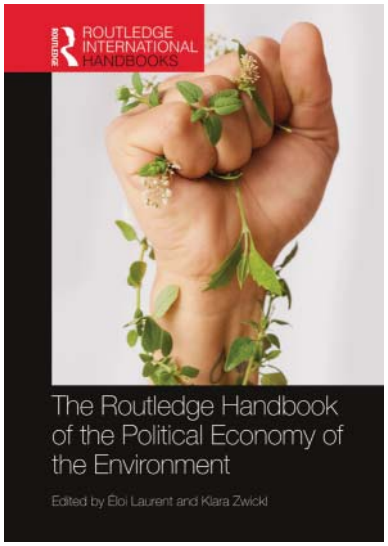
- Describes the theory and applications of selected statistical methods and illustrates their use and basic concepts through examples with forestry and environmental data in R.
- Rigorous but easily accessible presentation of the linear, nonlinear, generalized linear and multivariate models, and their mixed-effects counterparts. Chapters on tree size, tree taper, measurement errors, and forest experiments are also included.
- Necessary statistical theory about random variables, estimation and prediction is included. The wide applicability of the linear prediction theory is emphasized.
- The hands-on examples with implementations using R make it easier for non-statisticians to understand the concepts and apply the methods with their own data. Lot of additional material is available at www.biombook.org.

The book is aimed at students and researchers in forestry and environmental studies, but it will also be of interest to statisticians and researchers in other fields as well.

Routledge Handbook of the Political Economy of the Environment

Editors: Éloi Laurent & Klara Zwickl

Publisher: Routledge



Featuring a stellar international cast list of leading and cutting-edge scholars, *The Routledge Handbook of the Political Economy of the Environment* presents the state of the art of the discipline that considers ecological issues and crises from a political economy perspective. This collective volume sheds new light on the effect of economic and power inequality on environmental dynamics and, conversely, on the economic and social impact of environmental dynamics.

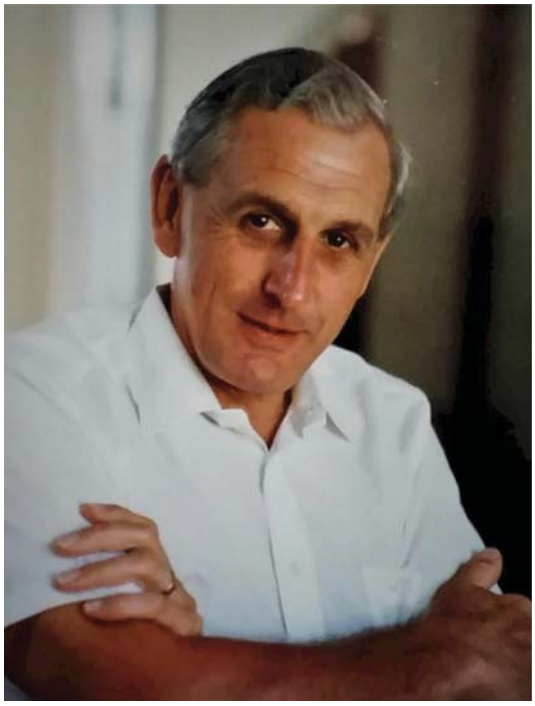
The chapters gathered in this handbook make four original contributions to the field of political economy of the environment. First, they revisit essential concepts and methods of environmental economics in the light of their political economy. Second, they introduce readers to recent theoretical and empirical advances in key issues of political economy of the environment with a special focus on the relationship between inequality and environmental degradation, a nexus that has dramatically come into focus with the COVID crisis. Third, the authors of this handbook open the field to its critical global and regional dimensions: global issues, such as the environmental justice movement and inequality and climate change as well as regional issues such as agriculture systems, air pollution, natural resources appropriation and urban sustainability. Fourth and finally, the work shows how novel analysis can translate into new forms of public policy that require institutional reform and new policy tools. Ecosystems preservation, international climate negotiations and climate mitigation policies all have a strong distributional dimension that chapters point to. Pressing environmental policy such as carbon pricing and low-carbon and energy transitions entail numerous social issues that also need to be accounted for with new analytical and technological tools.

This handbook will be an invaluable reference, research and teaching tool for anyone interested in political economy approaches to environmental issues and ecological crises.

The book contains the chapter **Political Economy of Forest Protection** by Alain Karsenty.

Obituaries

Ronald Kemp 1930–2021



Ron – as he was known to friends and colleagues – died in East Surrey hospital on the 28th August, 2021 aged 91. This obituary draws heavily on his memoires ***As Far as I Remember***, completed at the end of 2020.

Ron was born in 1930, the youngest of five brothers, and spent his childhood at Theydon Bois, Essex and attended nearby Chigwell school. During cycle rides there, Ron recognised that he enjoyed his own company and personal thoughts, which was to influence his choice of profession. His interests were English, poetry and natural history, and he took zoology and botany to higher school certificate level, gaining a prize largely through self-tutored efforts.

He started military service in the RAF in 1948, where his fitness and notable upper body strength served him well. He became a radar operator with posts in the UK and Germany, and developed an interest in photography. Ron was accepted to Jesus College, Cambridge, where he found lectures in zoology and genetics uninspiring, but had time to study English literature in which he received better grades (2.1) than natural sciences.

On graduating, Ron obtained a forestry probationer's award (prior to admission to the Colonial Forest Service) for a degree in forestry at Oxford University. There he had time to develop his interests in genetic improvement and conservation, and also in writing – attending lectures in the English faculty.

In 1954, before doing the last year of the course, Ron took up his probationary appointment as Assistant Conservator of Forest in Nigeria. He was posted to Naraguta, Jos Plateau, where he gained experience of routine forest management, and learned Hausa.

Prior to taking leave for his final year in Oxford, he needed a special study and decided to concentrate on the use of eucalyptus in forest plantations. This enabled him to pursue his interest in genetic diversity. He continued to develop his expertise in photography and interest in vehicles.

On his second tour, Ron's responsibilities as Forest Research Officer covered the whole Northern Region. Besides species trials, topics embraced savanna woodland and high forest management.

Research responsibilities enabled him to attend his first international conference on Miombo Woodlands in (then) Northern Rhodesia (now Zambia), which underlined the need for fast growing exotic species to ensure adequate supply of forest products. This was the justification for the trials which Ron initiated, giving him experience in establishing nurseries.

Nigeria received its independence at this time and Ron was closely involved helping to supervise voting in his area, while being an astute observer, and keeping photographic records of professional, political and personal events.

During his next leave he spent time in Europe and ordered a Citroen with pneumatic suspension to make his extensive travelling in Nigeria more comfortable. In 1960 Ron was promoted to Senior Forest Research Officer, focusing on research into fast growing species.

He helped develop the newly designated Yankari Game Reserve in Bauchi province which became a focus for local leaves. In 1964 Ron was promoted to Principal Forest Research Officer requiring time at Ibadan, where he got to know the University Professor of Forestry, John Wyatt-Smith. He then return to Naraguta and established a Savannah Forestry Research Station, associated with Samaru University.

At the end of 1966, compassionate leave was taken for the death of his father. On return at Samaru, he began to take an interest in tropical pines for plantations. In 1967 he was promoted to Deputy Director of the Department of Federal Forest Research (the highest post a non-national could obtain) which meant a move back to HQ in Ibadan. These events made him consider retirement from life in Nigeria.

In May 1967 Eastern Nigeria seceded as Biafra, which started a two-and-a-half year civil War. Ron left the northern region at the end of the year and was based in Ibadan, with responsibilities that extended to the whole country.

During his next leave in 1968 Ron planned the return trip overland to Nigeria, kitting out a Land Rover especially for the journey, which took them via Sicily, Malta, Algeria and thence across the Sahara, a journey full of sight-seeing and adventures.

When Ron finally left Nigeria, John Wyatt Smith had retired as Professor of Forestry at Ibadan and taken the post of Senior Forest Advisor at the UK's Ministry of Overseas Development (ODM), where he had initiated a Unit of Tropical Silviculture (UTS) in the Commonwealth Forestry Institute (CFI) in Oxford, with Alan Lamb as its head.

Ron returned to take up a three-year appointment at CFI and his first job was to explore and collect seed throughout the natural pine forests of Central America. He sailed to Guatemala with his Land Rover and spent four months travelling throughout the region, getting to know the pines, and making professional contacts.

On return to Oxford, Ron met Ann Hughes at the CFI, who in 1971 – to his "undying gratitude" – became his wife, setting up home in Tackley, and accompanying him on some of his overseas trips. In due course they were to have a daughter and son – Sophie and James.

Ron took over from Alan Lamb as head of the UTS in 1972. He was still involved in the Central America pine seed work, but was able to leave field work to other staff and become actively involved in international collaboration and conferences.

In 1977, Ron's mother died. This, and family commitments, prompted him to consider a change of job. He applied to ODM, and in 1978 was accepted as Senior Forestry Adviser, taking over from John Wyatt-Smith. He and the family then moved to Warlingham to facilitate commuting to London.

Then began a life of intensive overseas travel and international meetings. His first trip to Sri Lanka started inauspiciously as he left his briefcase on a train and had a traumatic time regaining it. At this time the UK aid programme came under threat and Prime Minister Margaret Thatcher demoted ODM to an Overseas Development Administration (ODA) of the UK Foreign and Commonwealth Office (FCO). Ron nearly lost his post as adviser, but by surreptitious and astute examination of evidence, was able to counter the justifications.

The ODA Forestry Research Programme was also under pressure but Ron was able to maintain its standing in face of competition for funds from country projects. This enabled the Central America programme (centred in Siguatepeque, Honduras) and its work on pines to continue and develop, which he facilitated during several visits to the region.

In 1978, Ron made one of several visits to Nepal, consolidating aid for Gurkha resettlement centres. In 1979, he was part of the China-British Government Forestry Mission, and in 1980 made a first tour of the Pacific Islands. At that time he was able to sample a flight in Concorde (having been able to upgrade for £15). In 1981, further trips were made to Vanuatu when his return with a presentation ceremonial club (i.e. a weapon) required some negotiation as carry-on baggage.

Then followed many trips in the 80's to India in support of projects and initiatives: The Mysore Paper Mill; the Western Ghats, and Social Forestry in Karnataka, which provided opportunities for Ron to show off his well-known trekking stamina. Ron made several visits to Bangladesh and the Sundarbans forest, to Sri Lanka (Mahaweli Development project) and also to Burma.

During the 80's Ron was closely involved in getting the UK to take a leading role in the Tropical Forestry Action Plan (TFAP) and in the International Tropical Timber Organisation (ITTO). The 1988 meeting of ITTO in Rio de Janeiro resulted in a Brazil-UK Forestry Technical Cooperation Programme and became key to securing an increase of funding to the UK forestry aid. A Times newspaper leading article entitled "Green Diplomacy" referred to it as "a triumph for quiet diplomacy of the sort that will be needed time and time again to preserve the worlds environment".

But there was criticism from NGOs of the UK's involvement in the timber trade which led to the establishment of an independent UK Tropical Forest Forum (UKTFF) whose aim was to clarify the issues involved (often misunderstood). Ron chaired the Forum.

Ron's championing of the UK's contributions to sustainable forest management led to the UK Forestry Initiative, when Mrs Thatcher pledged a further £100 million on tropical forestry activities. This was a fitting prelude to Ron's retirement which came in 1990 around his 60th Birthday.

In retirement Ron helped to advise on projects and initiatives, including Mount Cameroon and Limbe Botanic Gardens, and a conference on African Rainforests and Conservation of Biodiversity. He participated in the World Commission on Forests and Sustainable Development and the strategic plan for forests 2017–2030.

The forestry profession has lost someone who has influenced the lives of family, friends, and colleagues immeasurably for the better, and Ron will continue to enrich the memories of all those that knew him.

Marcus Robbins

Around the World

USA: How Bezos' latest plan to protect forests could backfire

Jeff Bezos' $2 billion plan, announced last week, to plant trees and restore landscapes across Africa and the US has already raised red flags for some conservation experts and activists. Last year, after he pledged $10 billion to fight climate change, activists in the US called him out for not doing enough to cut down Amazon's pollution or work with local communities while crafting his environmental plans. This time, he's facing similar criticisms on a global scale.

The Bezos Earth Fund announced its latest round of funding on November 1 during a high-profile United Nations climate summit taking place in Glasgow. There aren't many details out yet, but the fund says it will funnel $1 billion towards planting trees and "revitalizing" grasslands in Africa, as well as restoring 20 different landscapes across the US. The other $1 billion will support sustainable agriculture initiatives.

The hope with the new conservation investment is to preserve ecosystems that naturally draw down and store planet-heating carbon dioxide pollution. That builds on a commitment Bezos made in September to spend $1 billion to create and manage so-called "protected" areas for conservation. The Bezos Earth Fund also says it wants local communities and Indigenous peoples "placed at the heart of conservation programs."

"THE WORST-CASE SCENARIO IS THEY DO A LOT OF DAMAGE"

But without safeguards in place, the initiative could potentially harm ecosystems and infringe on local and Indigenous peoples' rights, some experts say. Instead of flinging money into these projects, they'd rather see Bezos cut pollution from the behemoth businesses he's founded.

"Organizations like the Bezos Earth Fund have tended to sort of hire people in Seattle to fix Africa. And that doesn't work," says Forrest Fleischman, who teaches natural resources policy at the University of Minnesota. "Sort of the best-case scenario [with inexperienced donors] is that they waste all the money, and the worst-case scenario is they do a lot of damage."

There are heated debates flaring up right now around how to conserve and restore ecosystems. That's, in part, because of a stream of splashy, new projects to tackle climate change and biodiversity loss. Last year, for instance, the World Economic Forum launched an initiative to plant a trillion trees. That was met with pushback from a cadre of forestry and conservation experts, who warned that aggressive tree-planting campaigns have, at times, led to monocrops of a single species of tree. Those tree farms don't offer the same kinds of ecological benefits as natural forests that are teeming with diverse species. They might even harm ecosystems by putting a lot of trees where they don't belong, like in savannas and grasslands.

"Many believe that nothing bad can possibly come from planting trees, but planting trees . . .in grasslands and savannas does irreversible damage to grasslands and savannas," Rhodes University ecologist Susanne Vetter wrote in an email to *The Verge*. Environmental groups like the World Resources Institute have mistakenly mapped those ecosystems as degraded forests suitable for tree planting in the past, Vetter wrote in an opinion paper published in the journal Frontiers in Sustainable Food Systems in 2020.

The Bezos Earth Fund said that it will work with AFR100, a partnership between 31 governments in Africa that is advised by WRI and aims to restore 100 million hectares of land across the continent by 2030. AFR100 "advocates actively against the conversion of natural ecosystems, like grasslands and savannas, into tree plantations," a spokesperson said in an email to *The Verge*. Each country that's part of AFR100 ultimately makes decisions based on input from experts and local communities, says Bernadette Arakwiye, a research associate for WRI based in Rwanda. The maps Vetter referenced in her paper have been updated and don't necessarily inform decisions on which lands to restore, according to Arakwiye.

But splashy climate change commitments like the Bezos Earth Fund can easily fall into pitfalls associated with tree planting because of their focus on speed and scale, says Prakash Kashwan, an associate professor of political science at the University of Connecticut. "Designing restoration projects that are environmentally good requires working with each individual landscape based on what the landscape is like," he says. "If our goal is to learn from indigenous engagements with nature, one fundamental principle is to slow down."

theverge.com

Global: Over 100 countries at COP26 pledge to end deforestation by 2030

Countries representing 85 per cent of the world's forests have committed to ending deforestation within nine years, in a renewed effort to stem the carbon dioxide emissions released by trees being cleared, overwhelmingly for agriculture.

The Glasgow Leaders' Declaration on Forests and Land Use, to be issued on 2 November by over 100 countries plus the European Union at the COP26 climate summit, comes alongside £14 billion of new funding to combat forest loss over five years. The money is being supplied by 12 countries including the UK, plus private organisations including the Bezos Earth Fund.

In a further initiative, 30 financial institutions managing $8.7 trillion in assets, including the UK-based firms Aviva and Schroders, will announce on 2 November that they will no longer invest in activities linked to deforestation.

Experts welcomed the renewed focus on forests and the new funding, but warned that the way deforestation is tackled will be key to whether the 2030 goal is met.

"We cannot reach climate goals if we don't keep trees standing," says Frances Seymour at the World Resources Institute, a think tank in Washington DC. She says it is good that trees are one of the UK government's four priorities at COP26, along with climate finance, ending coal use and phasing out cars that use fossil fuels.

The 2030 goal is identical to one made seven years ago by a smaller group of countries, known as the New York Declaration on Forests. They also set an interim goal of halving deforestation by 2020, a target that was missed by a wide margin.

However, a key difference is the new plan is signed by several countries that were missing last time, including those with the worst levels of deforestation. Brazil, where deforestation rates have rocketed under President Jair Bolsonaro, is chief among those. "Having all the main players on it is significant, that is a big step," says Stephanie Roe at the University of Virginia.

While £14 billion looks big, it still isn't on a par with what will be needed to meet the deforestation targets of the 2015 Paris Agreement to tackle climate change. Meeting those goals would mean spending an estimated $45 billion to $460 billion a year to protect, restore and enhance forests. Nonetheless, Roe says the funding is a "very welcome and critically needed addition".

So, is it realistic that deforestation could be halted by 2030? "Yes, I think it is feasible. It is difficult, but it is feasible," says Seymour. "The main constraint in most places is political will."

She says there is precedent for action, citing the example of Brazil in the early 2000s, which successfully used policies to slow deforestation rates at the time. Other reasons for hope include a growing awareness among governments that trees aren't just important for locking away carbon, but also for protecting against the impacts of extreme weather, such as preventing soil erosion. Modern satellite monitoring of forest loss also helps, she adds.

However, there is little detail in the new declaration on how the goal will be met – such as paying countries for preventing projected clearances – or how progress will be monitored. The goal also isn't binding. Seymour adds that the new funding won't help unless simultaneous efforts are made to cut off the agricultural subsidies that drive much logging.

We need to know that measures will be used to stop forest loss, says Constance McDermott at the University of Oxford. "It is not possible to comment on these very bold and flashy promises without seeing, in full view and detail, how they will be operationalised," she says. It is key that efforts benefit local and Indigenous communities as well as biodiversity, rather than consolidating money and power in the hands of a few states and corporations, she says.

On average, 10 million hectares of forest were cleared globally each year between 2015 and 2010, with an analysis saying last year that deforestation rates must fall by a million hectares every year to end deforestation by 2030. Despite the huge challenge that presents, Roe says we shouldn't be too cynical of the new initiative, because there would be rapid climate benefits if the world curbs deforestation: "If we change it around, then it's immediate emissions savings."

newscientist.com

Africa: How domesticating the African baobab tree could secure its future

The famous baobab tree is being domesticated. Farmers seldom plant baobabs because they take between eight and 23 years to flower – and potentially begin bearing fruit – but a pair of researchers in Ghana have got them to flower in less than three years.

The work could lead to plantations of baobabs springing up all over Africa. "That is our vision," says Kenneth Egbadzor at Ho Technical University in Ghana. "What we need now is funding."

In parts of Africa, *Adansonia digitata*, known as the African baobab tree, is already an important food source. Its fruit, seeds, leaves, flowers and roots are edible. Fibre from the bark is used to make mats, ropes and hats, and every part of the tree is used in traditional medicines.

The pulp of the fruit has been approved as a food in the US and Europe in recent years, where it is being promoted as a "superfood", so the fruit is now exported too. However, all harvesting is still done from wild trees. "There are no known commercial plantations," says Egbadzor.

Domesticating the baobab has long been seen as an important goal. The widespread cultivation of the trees would diversify farming and improve food security, say Egbadzor and his colleague Jones Akuaku, also at Ho Technical University. This is

especially important in a changing climate. Baobabs store water in their trunks and can keep fruiting during droughts.

Because of the value of baobab products, farmers would also be able to earn more money, alleviating poverty, the pair say.

In recent years, various teams have tried methods such as grafting – widely used for fruit production globally – to speed up fruit production, and Egbadzor and Akuaku have achieved the best results yet.

The pair soaked the baobab's tough seeds in acid to get them to germinate. When the seedlings were seven months old, branches from mature trees that were already fruiting were grafted onto the seedlings. The first tree started flowering 20 months later, when it was just 1.7 metres high.

The results should encourage farmers to plant baobabs, says Egbadzor. Being able to collect fruits from much smaller trees will also be an advantage. Harvesting fruits from big trees, whose trunks are too smooth to climb, is difficult.

"Without doubt, I can say that baobab is becoming effectively domesticated, because different ways of propagating the species are being mastered," says Kolawolé Valère Salako at the University of Abomey-Calavi in Benin. Egbadzor and Akuaku's results are the best so far, says Salako, but need to be repeated to ensure the results are consistent and scalable.

Domestication will contribute to the protection of the tree, says Dietrich Darr at Rhine-Waal University of Applied Sciences in Germany, who leads a project to encourage the use of the baobab.

"Increasing commercialisation in some areas is increasing the pressure on the [wild baobab] resource," he says. "The long-term ambition is to develop agroforestry systems including baobabs and some other crops in order to release pressure on these natural baobab stands."

But it is possible to exploit wild baobabs in sustainable ways, and in some places there are more baobabs near human settlements than elsewhere, says Darr. There are also still vast areas in Africa where baobabs aren't intensively utilised, he says.

Recently, many of the oldest and largest baobabs in Africa have died off, likely as a result of climate change, a study reported in 2018. Some of the trees were more than 2000 years old. The species isn't regarded as threatened, but numbers are declining in places.

Protecting wild baobabs will remain important even if baobabs are widely cultivated, says Egbadzor. "The natural variability has to be conserved even after domestication."

newscientist.com

Global: One in three trees face extinction in wild, says new report

At least 30% of the world's tree species face extinction in the wild, according to a new assessment. They range from well-known oaks and magnolias to tropical timber trees. Experts say 17,500 tree species are at risk – twice the number of threatened mammals, birds, amphibians and reptiles combined.

Conservation groups are calling for urgent protection efforts amid threats such as deforestation, logging and climate change. "We have nearly 60,000 tree species on the planet, and for the first time we now know which of these species are in need of conservation action, what are the greatest threats to them and where they are," said Dr Malin Rivers of the charity Botanic Gardens Conservation International in Kew, London.

For a healthy world, we need tree species diversity, added Sara Oldfield, co-chair of the Global Tree Specialist Group of the International Union for the Conservation of Nature. "Each tree species has a unique ecological role to play," she said. "With 30% of the world's tree species threatened with extinction, we need to urgently scale-up conservation action."

The report, State of the World's Trees, found that at least 30% of the 60,000 known tree species face extinction. Some 142 species have already vanished from the wild, while 442 are on the very edge of extinction, with fewer than 50 individual trees remaining.

The biggest threats to trees globally are forest clearance for crops (impacting 29% of species), logging (27%), clearance for livestock grazing or farming (14%), clearance for development (13%) and fire (13%).

Climate change, extreme weather and sea level rise are growing threats to trees. But the authors say with conservation action, there is hope for the future.

"The report gives us that road map to mobilise the wider conservation community and other key players to ensure that tree conservation is at the forefront of the conservation agenda," said Dr Rivers.

The experts are calling for a number of actions, including:

- Preserving existing forests and expanding protected areas (currently at least 64% of all tree species can be found in at least one protected area)
- Keeping threatened species in botanic gardens or seed banks in the hope they can one day be returned to the wild (currently about 30% of all trees are backed up in this way)
- Providing education to ensure reforestation and tree planting schemes are carried out scientifically, with the right tree in the right place, including rare and threatened species
- Increasing funding for tree conservation.

Scientists estimate that one million animals and plant species are threatened with extinction. Over the past 300 years, global forest area has decreased by about 40% and 29 countries have lost more than 90% of their forest cover. Research shows that seven main commodities drive more than half of deforestation worldwide.

Trees at particular risk of extinction include:

- Large tropical trees known as dipterocarps that are being lost due to the expansion of palm oil plantations
- Oak trees lost to farming and development in parts of Mexico, Chile and Argentina
- Ebony and rosewood trees being felled for timber in Madagascar
- Magnolia trees at threat from unsustainable plant collecting
- Trees such as ash that are dying from pests and diseases in the UK and North America

bbc.co.uk

Global: People, climate change make even forests carbon emitters

New study finds human activity since 2001 has caused harm in even the world's most protected forests.

Humans and climate change have transformed 10 of the world's most highly protected forests into net emitters of carbon over the past 20 years, according to a new report.

Land clearance and deforestation, as well as forest fires of increasing scale and severity, meant the forests released more carbon into the air than they stored, the study by UNESCO, the World Resources Institute, and the International Union for Conservation of Nature (IUCN) found.

Among the World Heritage forests contributing to emissions were the Sumatran rainforest, the Kinabalu Park in Malaysian Borneo, and the Blue Mountains in Australia.

Yosemite and the Grand Canyon in the United States were also net emitters.

"Our finding that even some of the most iconic and best protected forests, such as those found in World Heritage sites, can actually contribute to climate change is alarming and brings to light evidence of the severity of this climate emergency," said Tales Carvalho Resende, of UNESCO and co-author of the report.

The researchers used global satellite mapping with ground level monitoring to estimate the gross and net carbon absorbed and emitted by the World Heritage forests between 2001 and 2020, and to determine the causes of some of the emissions.

They found that, as a whole, World Heritage forests absorbed the equivalent of approximately 190 million tons of carbon dioxide from the atmosphere each year, which is equivalent to about half the United Kingdom's annual emissions from fossil fuels.

But they also found that some sites, despite remaining net carbon sinks overall, showed spikes or clear upward trajectories in emissions that threatened the strength of the future sink.

"We now have the most detailed picture to date of the vital role that forests in World Heritage sites play in mitigating climate change," Resende said. "All forests should be assets in the fight against climate change."

There are 257 World Heritage forests across the globe, which cover a combined area of 69 million hectares (170 million acres) – roughly twice the size of Germany – and represent some of the world's most biodiverse ecosystems.

They not only absorb carbon dioxide from the atmosphere, but also store substantial amounts of carbon – approximately 13 billion tons, more than the carbon in Kuwait's proven oil reserves, according to the report.

The researchers warned continued landscape fragmentation and degradation as a result of human activity was likely to lead to more frequent and intense climate-related wildfires, and urged governments to reinforce protection and improve land management at the World Heritage sites, as well as their surrounding areas.

It also recommended protection of the forests be integrated into the world's climate strategies.

"Protecting World Heritage sites from increasing fragmentation and escalating threats will be central to our collective ability to address climate change and biodiversity loss," Tim Badman, Director of IUCN's World Heritage Programme, said in a statement.

10 carbon-emitting World Heritage forests

Tropical Rainforest Heritage of Sumatra, Indonesia
Río Plátano Biosphere Reserve, Honduras
Yosemite National Park, US
Waterton Glacier International Peace Park, Canada/US
Barberton Makhonjwa Mountains, South Africa
Kinabalu Park, Malaysia
Uvs Nuur Basin, Russian Federation/Mongolia
Grand Canyon National Park, US
Greater Blue Mountains Area, Australia
Morne Trois Pitons National Park, Dominica

aljazeera.com

Amazon: Fires have affected almost all the region's endangered species

Almost all the endangered species in the Amazon rainforest have seen their habitats negatively affected by fires over the past two decades, researchers have found.

Home to a tenth of the world's known species and around 40 per cent of the planet's remaining tropical forests, the Amazon ecosystem hasn't evolved to cope with the fires that are often set within the rainforest to clear land for cattle farming.

A team led by Xiao Feng at Florida State University says that the region appears to have entered a new phase in 2019, when Amazon fires skyrocketed following a relaxation of deforestation enforcement encouraged by Brazilian president Jair Bolsonaro. While fires in recent years have been closely studied, their impact on biodiversity has been less well-documented.

To address the gap, Feng and colleagues combined satellite data of forest fires between 2001 and 2019 with maps of the ranges of more than 3000 species of mammals, birds, reptiles and amphibians, plus modelling to estimate the distribution of more than 11,000 plant species.

Up to 85 per cent of the region's species that are already on the IUCN Red List of threatened species, such as the endangered white-cheeked spider monkey (*Ateles marginatus*), were found

to have had between 5 and 15 per cent of their geographic range affected by fires, such as by a loss of habitat or fires directly killing individuals.

"Most of the species have been somehow impacted either to a small degree or a large degree," says Feng. While most of the total 14,000-plus species only suffered a small encroachment on their ranges, the biggest impact was on endangered species and those only found in a few places, such as *Remijia*, a group of flowering plants.

The research also reveals how closely the impacts on biodiversity followed Brazilian government policy. The effect was greater during rampant deforestation before 2009, and disappeared almost completely between 2009 and 2018 in the face of Brazil's anti-logging measures.

It then picked up in again in 2019 during the relaxation in enforcement under Bolsonaro, in what the team says was one of the "most extreme" years for biodiversity impacts from fires since 2009. "Policy plays a critical role in this whole process. The data shows the impact on biodiversity is very sensitive to policy," says Feng.

The research comes with some caveats. The study doesn't cover all the Amazon's plants – it is missing about 14 per cent of verified species in the region – and the satellite data for the fires is likely to be an underestimate because clouds hid some blazes. "Our goal was not to get some scary number but to be conservative about what has happened," says Feng. The true picture is likely to be worse.

Alexander Lees at Manchester Metropolitan University says: "These new estimates are still likely to be very conservative given the patchy nature of the distribution of many Amazonian species, which is not captured by existing range maps."

Even if the amount of forest being burned stays steady in years to come, the Amazon could see worse impacts on biodiversity if fires burn the inner parts of the region because the heart of the rainforest has a greater richness of species. "In terms of the future, I'm not that optimistic. We are not allowing the forest to recover," says Feng.

newscientist.com

Brazilian Amazon endures fastest rate of deforestation in 15 years

Deforestation in the Brazilian Amazon has jumped to a 15-year high, according to figures that raise fresh questions about Brasília's commitment to ending the destruction of the world's largest rainforest.

More than 13,200 sq km of rainforest was razed in the 12 months between August last year and July – a 22 per cent jump from the previous year and the highest rate of deforestation since 2006 – according to the data released on Thursday by the National Institute for Space Research. In the past three years, Brazil has lost more than 30,000 sq km of tree cover in the rainforest – an area the size of Belgium – mostly at the hands of illegal loggers, cattle ranchers, gold miners and land grabbers. The stark data comes just weeks after Brazil won plaudits for its commitments at the COP26 summit in Glasgow, including a pledge to eradicate illegal deforestation by the end of this decade, if not earlier.

While hailed by diplomats, the pledges were met by scepticism from environmental campaigners, who highlighted that President Jair Bolsonaro regularly signals his support to those tearing down the forest. One week before the COP summit, the rightwing populist leader met gold miners in a camp in the northern Amazonian state of Roraima.

"Since his election campaign, Bolsonaro has been saying he is against [environmental protection groups] Ibama and ICMBio and any type of monitoring in the field. This has the power to greatly accelerate the situation [regarding deforestation]," said one environmental enforcement officer based in the rainforest. "Today, these illegal groups firmly believe that they can deforest or mine in protected areas or inside indigenous lands. That's the big change, and I actually think it's the worst change that could happen." Marcio Astrini, executive secretary of the Brazilian Climate Observatory, said the data released on Thursday reflected the "results of a persistent, planned and continuous efforts" by the Bolsonaro administration to hollow out the nation's environmental protection policies. "Unlike the propaganda that the government and its allies took to COP26 in Glasgow, this is the real Brazil, from the scorched earth to the out of control organised crime in the Amazon," he said.

Joaquim Leite, Brazil's environment minister, said the data did not reflect the government's more recent efforts to combat deforestation, including the hiring of 700 more environmental enforcement agents and the allocation of greater funding to the country's environmental protection bodies. "The results have yet to show up in the numbers. We are going to start executing budgets worth millions [of reais] for Ibama and ICMBio to make them more modern," he said.

The issue is likely to increasingly weigh on Brazil's international relations, particularly with European nations. Earlier this week Virginijus Sinkevicius, the EU's commissioner for the environment and oceans, told the Financial Times that Brussels sought to ban imports of foods, such as beef and soyabeans, from areas at risk of deforestation. Draft legislation being considered by the bloc would, if passed, force companies to prove that products they sold into the EU's single market did not contribute to legal and illegal deforestation or forest degradation through agricultural use.

ft.com