CFA Newsletter

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CFA Newsletter
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Nigeria's rare and threatened trees

IITA Forest Unit planting threatened trees in the new Tree Heritage Park, IITA, Ibadan, Nigeria (Photo: D. Bown)

The IITA Forest Center (forestcenter.iita.org) has its origins in projects that have been implemented over the past 7 years at the headquarters of the International Institute of Tropical Agriculture (IITA) in Ibadan (est. pop. 3.5 million), southwestern Nigeria. When established 50 years ago, the 1000 ha campus was largely secondary semi-deciduous Guinea-Congo rainforest and about 5km from the city. Today the campus is peri-urbanised yet retains 360 ha of original forest. Though fragmented, it is well protected and contiguous with wetland and cultivated areas that provide a diversity of habitats for indigenous species, including once common trees that are now threatened, such as iroko *Milicia excelsa*, and forest-dependent fauna, notably the tree pangolin *Manis tricuspis* and endemic Ibadan malimbe *Malimbus ibadanensis*.

Nigeria has one of the highest deforestation rates in the world; the present rate is 3.5% or 350,000-400,000 ha/yr, and shows no sign of decreasing. With annual population growth at +/-2.6%, high levels of poverty, rising unemployment and an economic downturn due to falling oil prices, there is increasing pressure than to collect 'free' forest resources such as timber, fuelwood, bushmeat, and medicinal plants, and to clear forest patches for settlement, access, and agriculture – a situation aided and abetted by poor forest governance.

As Nigeria's forests disappear or are degraded, populations of tree species decline rapidly. Little is known about the effects of localised threats brought about by selective logging or bark removal but when few 'mother' trees are left we might expect impacts on ecosystems, reduced reproductive capacity, and loss of genetic diversity that may be vital for adaptation to climate change. To give an example of how rapidly quite common trees can disappear, an estimated 80% of Nigeria's Senegal rosewood *Pterocarpus erinaceus* was lost between 2009 and 2015 for export to China. This species is slow growing, taking on average 40 years to reach 40cm dbh and up to 400 years to attain 15m (Duvall 2008). Recovery of original populations is therefore unlikely in the short term, as is establishment of plantations.

Concern about declining tree species by the IITA Forest Unit came about through implementation of a five-year project www.reforest-iita.org funded by the A.P. Leventis Foundation in 2010 to utilise forest resources for conservation, research, and education. Project activities included establishing a nursery and Ethnobotanical Garden, and propagating over 80 species of indigenous trees for forest restoration. This project was followed by another, also funded by the Leventis Foundation, to set up Nigeria's first Forest School and a Tree Heritage Park for the country's threatened tree species.

To raise awareness further of the threats facing Nigeria's native trees, the IITA Forest Unit partnered with Botanic Gardens Conservation International (BGCI) Global Trees Campaign from November 2015 to May 2017 on a project funded by the Mohammed bin Zayed Species Conservation Fund. For logistical reasons the focus was on locations for seed collecting that were within reasonable travelling distance of Ibadan and where the Forest Unit had conservation partners. These included Okomu National Park (Edo State), Omo Forest Reserve (Ogun State), Akure Forest Reserve, Ondo State, and various locations in Ekiti State.

The project began by compiling a list of 'at risk' species with reference to the IUCN Red List and in consultation with experts. There were 55 species on the list of which 17 were already red-listed. During the project a further 16 species were red-listed, confirming our initial estimate of threat. Red List species do not yet include *Pterocarpus erinaceus* but evidence for red listing as Vulnerable or Endangered was contributed by observers in Nigeria during the project.

The list included four high priority species: endemic Nigerian kola *Cola nigerica* (Critically Endangered); Sapele *Entandrophragma cylindricum* (Vulnerable); Afrormosia *Pericopsis elata* (Endangered) and African cherry *Tieghemella heckelii* (Endangered). These species were reported in <5 *ex situ* collections globally and *Cola nigerica* had no reported collections. Propagation material was successfully collected from the four species – probably for the first time in the case of *Cola nigerica* – and all are now growing in the growing in the Tree Heritage Park.

Further funding was provided in 2017 by the Direct Aid Program of the Australian High Commission for various aspects of the Forest Unit's work, including upgrades to the nursery and a new website forestcenter.iita.org that features a free, downloadable *Manual of Propagation for Nigerian Trees*. The *Manual*, which received additionally support from the Stanley Smith Horticultural Trust, encourages planting of native trees

Nigerian kola (Cola nigerica) propagated for the first time by IITA Forest Unit. (Photo: D.Bown)

such as fast-growing African whitewood *Triplochiton scleroxylon*, Satinwood *Terminalia ivorensis*, and bush mango *Irvingia gabonensis/I. wombolu* in reforestation schemes, urban environments and watershed management to enhance biodiversity, provide employment, and improve livelihoods. Propagation protocols for 50 species have been uploaded.

In the course of the threatened trees project, propagation material for 37 species was collected, surplus seeds of 13 species were banked in the IITA Genetic Resources Center and 20 species have been planted in the IITA Tree Heritage Park. These *ex situ* collections act as an insurance policy against extinction and as a source of material for future reintroductions.

A workshop took place 21–23 June 2016 to train trainers and an Open Day was held on 26 October 2017 at the IITA campus in October 2017 to mark the formal opening of the Tree Heritage Park, to thank donors for their support and stress the need for more initiatives to save Nigeria's dwindling trees and forests. Both events were well attended by representatives from federal, state, academic, NGO, and private sectors, as well as forestry students and youngsters from School Conservation Clubs. A booklet *Rare and Endangered Nigerian Trees* was presented to Open Day attendees and made available as a PDF to all invitees. The PDF and further information about IITA's Forest Center and projects are available from Wale Awoyemi A.Awoyemi@cgiar.org.

REFERENCES

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Deni Bown

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Association news

Communique of the 4th Workshop of the NIGERIA CHAPTER (7th–9th November, 2017)

Cross Section of some participants at 4th CFA Workshop at Federal University of Agriculture Abeokuta (FUNAAB), Ogun State, Nigeria

The 4th Commonwealth Forestry Association (CFA) Workshop, Nigeria Chapter was held at the Federal University of Agriculture Abeokuta (FUNAAB), Ogun State, Nigeria from 07–09 November, 2017. The theme for the Workshop was '**FORESTRY AND HEALTH CARE DELIVERY IN THE TROPICS'**. The workshop was complemented with ***Training Workshop on Data Analysis & Quantum Geographic Information System'.***

The Workshop attracted scientists in forestry and allied renewable natural resource disciplines while invited papers were presented and a communiqué was reached. These papers hinged on *Forest and Human Health; Chemical Derivatives from the Forest; and Innovations and Entrepreneurship in Forestry.*

The workshop observed the following

1. Destructive harvesting of flora biodiversity in Nigerian forests.
2. Curricula Reviews in most Universities offering forestry disciplines and allied courses are deficient in forest and human health care courses.
3. Adulteration of honey, deforestation and bush fires are serious challenges facing honey production in Nigeria while archaic technology is still in use for the extraction of honey and its products in Nigeria.
4. Inadequate provision of equipment for teaching and research.

Recommendations

Against these backdrops, the workshop recommends the following:

- Local, State and Federal Governments in Nigeria should of necessity enunciate policies and enact laws for sustainable harvesting and replenishment of flora diversity in Nigerian forests for health care.
- The curricula of forestry courses in all the Universities and Colleges in Nigeria should be constantly reviewed to accommodate new courses for programme development and expansion of frontier of knowledge in forestry health care.
- Training and re-training of members of staff in the Department of Social and Environmental Forestry; Department of Forest Production and Products; Department of Forestry and Wildlife; Department of Forestry and Wood Technology in Nigerian Universities be accorded priority for sustainable extraction of honey and its products. The opportunity in turn would improve internal revenue generation, employment as well as apitherapeutic use of honeybee products.
- Federal Government should provide adequate funds at all times for acquiring modern equipment which would lead to accelerated forestry health care breakthroughs and innovations in Nigerian Universities.

We are pleased to announce that the National Geographic will feature the following article in their April issue (www.nationalgeographic.com)

The Commonwealth of Nations unites to nurture indigenous forests

To celebrate Queen Elizabeth II's service to the Commonwealth and Her Majesty's passion for nature, an innovative conservation initiative is linking together the efforts of member nations around the globe to plant and preserve indigenous forests for future generations.

Cattle graze lazily beneath ancient beech trees, their twisted branches shooting upwards from broad trunks that were long ago stunted by a traditional woodland practice called pollarding. This idyllic scene in Epping Forest has changed little in a thousand years, thanks to the area's careful conservation as Greater London developed around it. Some seven thousand miles away in Namibia, the dusty desert scrub is enlivened by dense rows of lush green saplings. Lovingly propagated with help from the local community, the saplings are part of the N/a'an ku sê Forest Conservation Revegetation Project that is actively working to reverse desertification and restore Namibia's magnificent indigenous forests.

However different these contrasting scenes appear, they are linked by a shared passion to preserve and promote native woodland. It is a bond strengthened by their mutual commitment to a worldwide conservation initiative—the Queen's Commonwealth Canopy or QCC. Conceived to celebrate Queen Elizabeth II's service to the Commonwealth of Nations, the QCC unites member countries in nurturing a unique network of conservation projects with the aim of helping to save indigenous forests around the world.

From the temperate woodlands of Europe to the rainforests of Papua New Guinea, trees are a vital

Below: Epping Forest, UK, **top right:** Orangerie Bay, Papua New Guinea, **bottom right:** The Great Bear Rain Forest, Canada.

habitat and indigenous trees play a special role in maintaining the native flora and fauna of a particular place. The QCC is committed to highlighting the importance of indigenous forests and to saving them for the future. Through voluntarily dedicating existing or upcoming forest conservation projects, the Commonwealth nations are acting together to address climate change and meet United Nations guidelines on sustainable ecosystems and biodiversity. Providing a focus for forest education, communities, and wildlife, the QCC encourages locals to take an active role while bringing collective credibility to individual initiatives and facilitating an invaluable exchange of knowledge.

Above: N/a'an ku sê desert scrub will benefit from QCC

What is extraordinary about the QCC is the sheer diversity of flora and fauna it protects. The Queen's Commonwealth Canopy spans the globe, with almost all of Britain's far-flung former territories taking part. The result is an exceptional variety of indigenous trees being conserved through a range of very different projects. In Singapore, locals help monitor rare species for seed production and collection, while the Saint Lucia project not only fosters ecotourism but is also researching how to sustainably harvest the aromatic resin of the indigenous lansan tree. With the support of UK based NGO Cool Earth, villages in Papua New Guinea are being empowered to independently protect four thousand acres of rainforest from encroaching palm oil plantations, while the project in Antigua and Barbuda provides a rare family-friendly green space in the heart of its bustling capital city.

The QCC is a partnership between The Royal Commonwealth Society, Cool Earth and the Commonwealth Forestry Association.

One of the extraordinary things about the QCC is the sheer diversity of flora and fauna it encapsulates.

The Queen's Commonwealth Canopy is being discussed at the Commonwealth Heads of Government Meeting in London this April. This will coincide with a major ITN television documentary that follows the initiative's progress and features an informal conversation between Her Majesty The Queen and Sir David Attenborough about their shared interest in nature and conservation. The documentary offers a unique insight into the passions that have helped to create an extraordinary global initiative that is set to preserve native landscapes as wonderfully distinct and diverse as Epping Forest in England and N/a'an ku sê in Namibia.

The Queen's Green Planet airs on ITV this month, learn more about the project at www.queenscommonwealthcanopy.org

Forest Scenes

Restoring mangroves with the help of drones in Myanmar

BioCarbon Engineering field team with the tree-planting drone on the ground in Thor Heyerdahl Climate park in Myanmar, February 2018.

In partnership with Worldview International Foundation and Worldview Impact Foundation, BioCarbon Engineering has launched a project to restore and regenerate the degraded mangrove ecosystems in Myanmar in order to protect the lives of highly vulnerable communities. Mangrove forests are the vital foundation for a complex marine food web, sustaining not only fisheries but many forms of bird and other wildlife. The project has been chosen as a winner of a Bridge Builder challenge on OpenIDEO and is supported by the GHR Foundation. The first phase of the project included mapping of the areas, planting mangrove trees, meeting local communities and designing an integrated plan for ecosystem restoration.

The second part of the project included scaling up mangrove planting at Thor Heyerdahl Climate Park, delivering maps to the head of the village and discussing with the community forest management group how they would envision the governance of their collectively owned forest. After the community consultation more mapping has been done and plans were develop for further ecosystem restoration. In total the team has mapped over 1 thousand hectares. This data will be analysed to create a 3 cm resolution map, 3D model of the terrain and to provide information on ecosystem health.

BioCarbon Engineering technology enables NGO partners and local communities to design data-driven forest management systems and to dramatically speed up mangrove planting with drones. While the technology allows to bring down the costs and speed up restoration, the villagers can focus on other areas of livelihood creation such as crab farming, education, textile production and eco-tourism development.

Community dialogue with women forest management group, BioCarbon Engineering, WorldView Impact and WorldView International Foundation.

The results of the first small trial – 2 months old mangrove tree planted by a drone.

Globally, mangroves deliver multiple benefits for the ecosystems and local communities. In Myanmar, it is estimated that 75% of the game fish and 90% of the commercial species in certain areas rely on mangrove systems as nurseries and as a source of nutrients to support the food cycle, yet only under 20% of the original mangrove cover remains. Mangroves provide a substantial cooling effect and have the ability to mitigate up to five times more CO2 than rainforest trees. They serve as physical coastal barriers that can absorb extreme wave and storm activity and oceanic surges. After the cyclone Nargis killed hundreds of thousands coastal villagers in 2008, the government and local communities of Myanmar have realised the urgency to restore vast areas of land in order to be safe from the storms, and to have a living shield, protecting from extreme weather events.

While millions of people depend on mangroves for their survival, the government of Myanmar and WorldView International Foundation are putting a lot of efforts in ecosystem restoration. The urgency of this work, and the scale of the problem made BioCarbon technology a great fit for the long-term partnership in planting millions of trees.

Following this first phase of the project, plans are being laid out for a multi-year engagement in restoring 10,000 hectares as the next step in restoration of a 100,000 Ha commitment to benefit of people of Myanmar and global climate.

Irina Federenko
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Reactivation of the International Society of Tropical Foresters

The International Society of Tropical Foresters (ISTF) is being reactivated after a five-year hiatus. Founded in the 1950s and "in response to a worldwide concern for the fate of tropical and subtropical forests, ISTF is committed to the protection, wise management and rational use of the world's tropical forests". At its height in the 1990s, it had over 2000 members in over 110 countries. The organization went dormant in 2012 due to funding problems. We are looking again for that funding, but because we feel that ISTF has a role in addressing current tropical forest problems, we are proceeding with reactivation. As of January 2018, the new ISTF now has over 430 members from around the world and continues to grow. With its focus on being a communication network, ISTF is open to all those interested in tropical forests and forestry. ISTF must cooperate with like-minded organizations to have maximum impact on tropical forestry issues. Thus we are exploring how to collaborate with the Commonwealth Forestry Association.

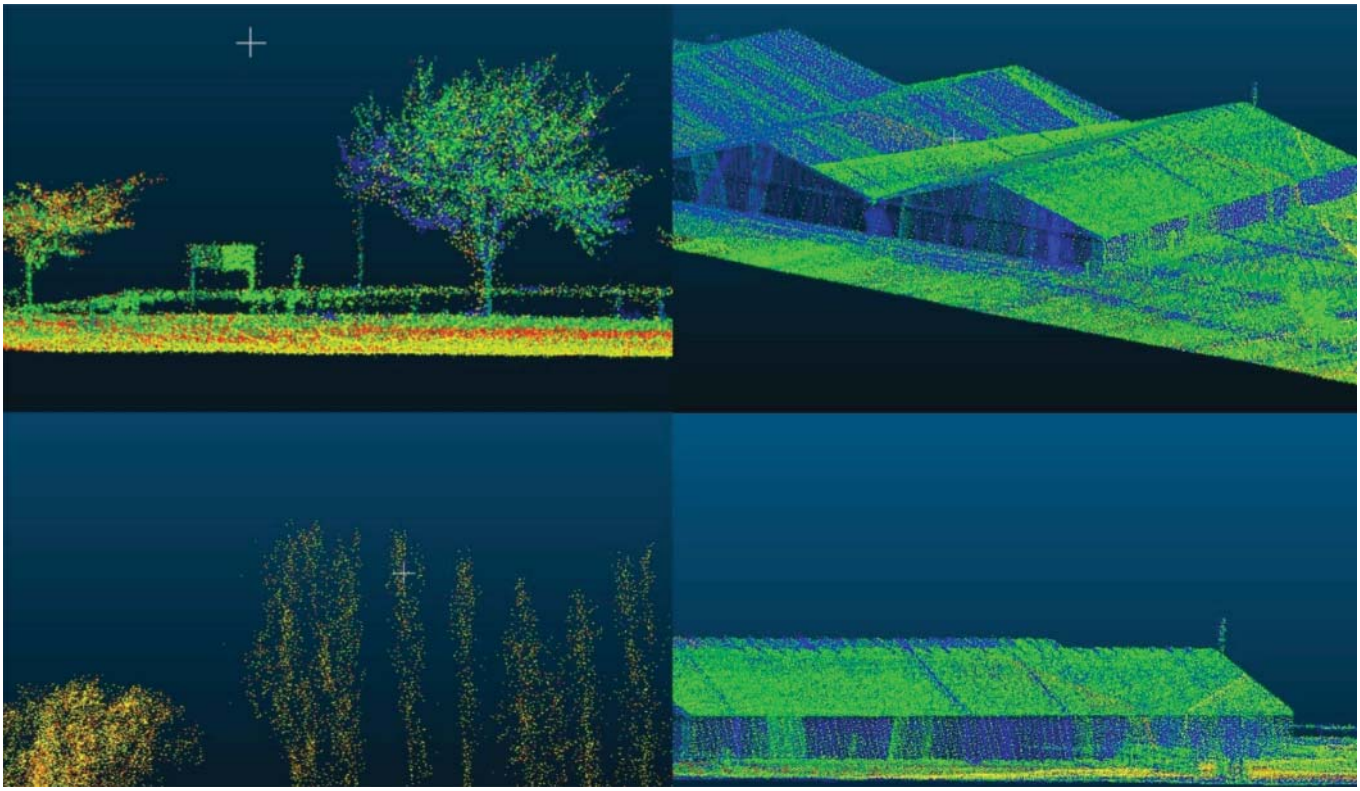
Remainders of the old ISTF include 1) Blair Orr's continuation of the former ISTF newsletter as a newsletter for the Society of American Foresters International Forestry Working Group (http://www.orrforest.net/saf/), 2) The old ISTF web page, (http://www.istf-bethesda.org/), 3) The ISTF facebook group page (https://www.facebook.com/groups/2262122534/); and 2 students chapters: 4) at Yale University, which sponsors the annual Yale ISTF conference (http://istf.yale.edu/, https://www.facebook.com/yalefesistf/); and 5) at North Carolina State University (https://research.cnr.ncsu.edu/sites/istf/, https://www.facebook.com/NCSUISTF/)

We have gathered input for the renewed ISTF in several sessions: at the 2017 Convention of the International Union of Forest Research Organizations in Freiburg, the 2017 Annual Convention of the Society of American Foresters, and the ISTF-Yale 2018 student chapter conference. Outcome of these meetings emphasized building ISTF into a real two-way communication network: TO the forester in the field, and BACK to policymakers, agencies, and academics. We hope this will yield better access in the field to up-to-date information on best forestry practices, and more concrete information to improve project design and research relevance. Students who participated in sessions especially want to see results on the ground from ISTF. Many people have also expressed a strong interest in forming local ISTF chapters, which had been part of the old ISTF.

The ISTF-Yale annual conference from the surviving chapter at Yale draws an international audience, with over 150 people participating in 2018. This year's theme was "Attending to Socio-ecological Complexity in Tropical Forest Landscapes". Keynote speakers, flash talks, and breakout sessions covered topics ranging from applying insights from landscape ecology to the complexities of human-modified tropical forests, to examining decision-making complexities in the oil palm industry using network analysis. This year's innovation first prize went to a community group in the Philippines and their researcher partners who are using traditional honey hunting to promote forest conservation. For more on the conference see https://yaledailynews.com/blog/2018/02/05/conference-explores-complexities-in-forestry/ and https://istf.yale.edu/2018-conference).

We are proceeding apace with revising the organizing documents for the new ISTF, based on those of the old ISTF, but updated for contemporary purposes. The records of the old ISTF are archived at the Forest History Society in Durham, North Carolina, USA have helped us revisit the intentions of the original organization. To form a global network, we especially need to focus on electronic communications. This last is important because we want to focus on becoming a communication/education/dissemination/collaborative network. We hope to have elections in October 2017, and officers assuming positions by January 2019. Further tasks include (re-) incorporation, application for tax-exempt status, seeking funding, and a new website. For more information on ISTF, please contact us at tropicalforesters@gmail.com.

Aberystwyth University (Wales) Invest in UAV LiDAR for World-leading Forestry Research



An example data acquired during testing of the Volant LiDAR.

The Earth Observation and Ecosystem Dynamics Group at Aberystwyth University has invested in a drone based LiDAR* and spectral imaging package in order to enhance their research across the globe.

The bespoke unit, configured by COPTRZ, is expected to significantly enhance the university's research into the monitoring of British forests, focusing primarily on the measurement of standing timber volumes, forest biomass and carbon content.

After an in-depth consultation, COPTRZ were able to recommend their Volant UAV LiDAR system which will enable survey grade point clouds to be captured using a sub 20Kg drone linked to spectral imaging data. The data captured will then be used to monitor the successful transition of plantation forests to Continuous Cover Forestry, a forest management approach that seeks to increase the ecological diversity of British forests.

Osian Roberts, PhD Student at Aberystwyth University, explains: *"Aberystwyth University owns several fixed-wing and multi-rotor UAVs and we have now added to the fleet with a LiDAR unit that will enable the direct measurement of forest attributes such as tree height, stocking density and canopy cover.*

Drone used for data collection

We anticipate that the proliferation of UAV technologies over forthcoming years will enhance opportunities for the collection and analysis of remotely sensed data, presenting our students and researchers with an opportunity to increase our knowledge of our environment."

James Pick, UAV Strategist at COPTRZ and leader of the Volant LiDAR project, commented, *"We are proud to be chosen by Aberystwyth University to enable their drone strategy. The team have been working tirelessly over the past 6 months to develop a UAV LiDAR solution that is both cost-effective and ready to use out of the box. We have managed to deliver this during the project and expect more research departments to consider similar UAV technology in the next 12 months. COPTRZ are looking forward continually working alongside Aberystwyth University in their quest to enhance their global research capabilities."*

***What is LiDAR?**

LiDAR (Light Detection and Ranging) is a sensing technology with allows for the remote capture of three-dimensional data. Light from a laser is pulsed at an object, the time it takes to return is recorded back to the sensor. A LiDAR sensor can record up to a million measurements per second, which when combined with an IMU (Inertial Measurement Unit – which provides positional accuracy) and GPS, creates an accurate 3D representation of almost any hard surface or structure such as a forest canopy.

Unlike other aerial data capture methods, UAV LiDAR can also 'see' through vegetation, making it ideal for applications where trees or undergrowth could get in the way of an accurate survey from the air.

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Youth

The Global Landscape Forum 2017: The Youth Perspective

During December 2017, the world gathered in Bonn, Germany to discuss five key themes: restoration, finance, rights, measuring progress, and food and livelihoods.

The Global Landscapes Forum (GLF), combined with the *Youth in Landscape Initiative*, provides youth with an ideal platform for individual and professional growth and development within an international context. Having learned about this opportunity through the International Forestry Students' Association, I was selected to be one of three pavilion coordinators, working within the restoration theme.

Throughout the two-day event, my knowledge not only within landscape restoration, but in all five themes expanded enormously. These lessons resulted in me considerably rethinking my own strategy for landscape management within the UK at a local and national level, developing working landscapes enabling the provision of sustainable resources. Improving not only species diversity, but genetic diversity within forests, means improving resilience which is imperative when facing the plethora of threats influencing landscapes. It is vital to make landscapes work for the individuals who live and work within them and use their resources. Moving away from traditional

Coordinators of the Restoration Pavilion and members of the visiting public at the Global Landscapes Forum in Bonn, Germany.

ways of thinking means creating multiple business and social opportunities for growth and development through the incorporation of youth. We can allow youth to build the road to a more sustainable future by providing them resources for their ideas to become reality.

Working and relaxing with other phenomenal members of our youth assemblage provided in-depth insight into common problems and solutions associated with youth engagement. Those of us able and willing to attend the GLF are a small proportion of those actively engaged and aware of the current environmental issues, and we are capable of developing solutions. Our capacity, as digital natives (youth, whom have lived with access to technology throughout their student and professional lifetime), facilitates the creation of a movement. This can enable us to reach wider audiences than previously possible with a constant stream of information through social media and our online presence. The collaborative thinking between youth and professionals throughout the GLF during workshops and discussions is precisely the kind of integration required for developing networks that allow youth to become involved with ongoing projects which directly influence our future.

The concept of forest landscape restoration (FLR) was a reccurring theme. We explored concepts such as the management of degraded environments through afforestation and the goal of providing a matrix of different ecosystem services. Within the restoration pavilion, discussion breakoffs allowed increased interdisciplinary and multidisciplinary thinking. Examples were provided of both good and bad cases of restoration from across the globe, which were linked back to the idea of thinking global yet acting local. Continual progress towards reaching targets such as the Bonn Challenge and the Sustainable Development Goals is achieved through events such as the GLF as it provides the prime platform for cooperation between a variety of organisations, governments and particularly youth.

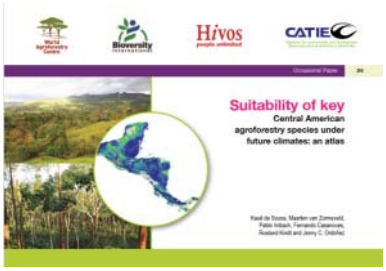
To conclude, my experiences at the GLF were extremely positive. As a youth delegate I found the event to be enriching and inclusive, allowing myself and others to discuss ideas and opportunities. The experiences filled me with enthusiasm and has aided the channelling of my energy into productive and meaningful projects.

George Dennison,
Student, Bangor University, UK

Publications

Suitability of key Central American agroforestry species under future climates

ICRAF



The World Agroforestry Centre (ICRAF) in collaboration with Bioversity International and The Tropical Agricultural Research and Higher Education Center (CATIE) has published an Atlas entitled '**Suitability of key Central American agroforestry species under future climates**'. The Atlas presents current and future suitability maps for 54 species that are commonly used as shade in agroforestry systems in Central America. The 54 species that were selected include 24 species of fruit trees, 24 timber trees and six species used to improve soil conditions.

"The main objective of the Atlas is to address a current knowledge gap in detailed information about suitable areas for key agroforestry species in Central America," said Kauê de Sousa of Bioversity International who is the main author of the study. "The agroforestry practice of integrating trees within cocoa or coffee, silvopastoral or smallholder timber systems is key to the development of strategies for climate-smart agriculture in the region. It is important to know where a species remains suitable under future climatic conditions to be able to give practical advice to farmers and tree growers."

The Atlas addresses this knowledge gap by providing detailed suitability maps for each species. Detailed mapping was possible by substantially expanding previously available data sets of known presence locations (locations where a species was documented to be suitable in Latin America and the Caribbean) and by applying powerful species distribution modelling methods. The future climates correspond to Representative Concentration Pathways RCP4.5 and RCP8.5 for the 2050s. Four RCPs (RCP 2.6, 4.5, 6.0 and 8.5) were introduced in the latest assessment report of the IPCC. These scenarios describe possible future climates that depend on potential changes in greenhouse gas emissions. RCP4.5 represents an intermediate emissions scenario, whereas RCP8.5 is a high emissions scenario.

Jenny Ordonez of the World Agroforestry Centre and a specialist in agroforestry systems and functional ecology emphasizes that "the atlas provides a first approximation of this kind in the region, to assess which species might be vulnerable or tolerant to expected climate change. Agroforestry practices are one of the main strategies for developing climate smart agriculture and as such are widely advocated by research and development organizations alike in this region. The results of the Atlas are therefore an important tool to support the design of agroforestry practices taking into account potential impacts of climate change. The maps provided should be used in combination with other information sources from technicians and farmers to fine-tune the selection of species for designing climate proof agroforestry systems."

Jonathan Cornelius, regional coordinator from ICRAF concludes that "many of the trees that farmers are planting and managing now will need to remain productive up to and beyond 2050. This important publication provides a firm foundation for building the climate-smart agroforestry that farmers need, based on the best currently available information about future climates and species' requirements."

GTTN
Global Timber
Tracking Network

Global Timber Tracking Network News issue 1 has been published, providing bimonthly news from the GTTN secretariat and from the international network of scientists, labs, timber operators, policy makers, NGO's and many more.

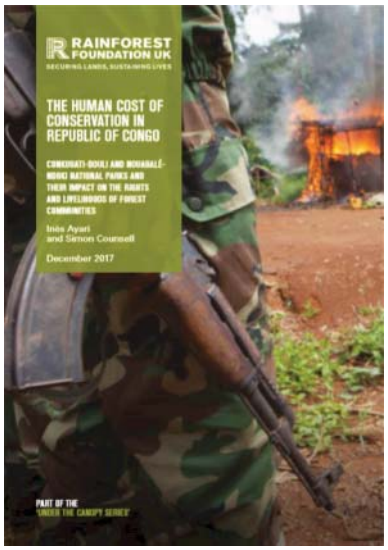
The Global Timber Tracking Network (GTTN) promotes the operationalisation of innovative tools for species identification and for determining the geographic origin of wood to verify trade claims.

GTTN is coordinated by the European Forest Institute and is financed by the German Federal Ministry of Food and Agriculture.

To subscribe contact Gesche Schifferdecker at gesche.schifferdecker@efi.int.

The Human Cost of Conservation in Republic of Congo: Conkouati-Douli and Nouabalé-Ndoki National Parks and their Impact on the Rights and Livelihoods of Forest Communities

The Rainforest Foundation UK



The extensive report finds that communities living in and around these two protected areas are subjected to heavy-handed policing by eco-guards, often resulting in serious harm and even death.

"Our investigation shows these parks have been established and run without the consent and engagement of local communities. Conservation restrictions prevent communities from accessing their traditional lands and resources, hampering their subsistence activities. This is totally unacceptable," said Simon Counsell, Executive Director of RFUK.

Conkouati-Douli and Nouabalé-Ndoki national parks are located in south-western and northern Republic of Congo, respectively, and together represent an area of nearly one million hectares. RFUK's report covers six villages across the two parks and features some often alarming testimonies from local residents about the threats facing them.

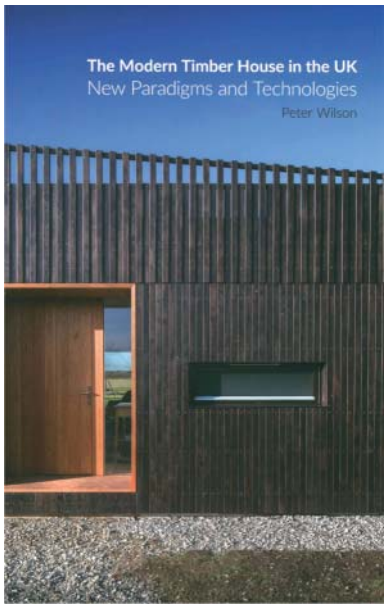
"We are calling for a zero tolerance approach to human rights abuses by conservation agencies and their eco-guards in Congo's protected areas. Actors involved in funding protected areas need to place the project managers under a legal obligation to respect national and international laws and to cause no harm to local and indigenous communities, who represent some of the poorest people on the planet," Mr Counsell concluded.

The full report is available to download at www.rainforestfoundationuk.org/media.ashx/the-human-impact-of-conservation-republic-of-congo-2017-english.pdf

Trees in England: Management and disease since 1600

By Tom Williamson, Gerry Barnes and Toby Pillatt

UH Press



There is currently much concern about trees and woodlands in England. The terrible toll taken by Dutch elm disease has been followed by a string of further epidemics, most worryingly ash chalara – and there are more threats on the horizon. There is also a widely shared belief that our woods have been steadily disappearing over recent decades, either replanted with alien conifers or destroyed entirely in order to make way for farmland or development. But the present state of our trees needs to be examined critically, and from an historical as much as from a scientific perspective. For English tree populations have long been highly unnatural in character, shaped by economic and social as much as by environmental factors.

In reality, the recent history of trees and woods in England is more complex and less negative than we often assume and any narrative of decline and loss is overly simplistic. The numbers of trees and the extent and character of woodland have been in a state of flux for centuries. Research leaves no doubt, moreover, that arboreal ill health is nothing new. Levels of disease are certainly increasing but this is as much a consequence of changes in the way we treat trees – especially the decline in intensive management which has occurred over the last century and a half – as it is of the arrival of new diseases. And man, not nature, has shaped the essential character of rural tree populations, ensuring their dominance by just a few indigenous species and thus rendering them peculiarly vulnerable to invasive pests and diseases. The messages from history are clear: we can and should plant our landscape with a wider palette, providing greater resilience in the face of future pathogens; and the most 'unnatural' and rigorously managed tree populations are also the healthiest.

The results of an ambitious research project are here shaped into a richly detailed survey of English arboriculture over the last four centuries. Trees in England will be essential reading not only for landscape historians but also for natural scientists, foresters and all those interested in the future of the countryside.

Around the World

Indonesia: Scientists join battle against devastating peatland infernos

An award-winning method for mapping Indonesia's vast peatlands, developed by Dutch, German and Indonesian scientists, will help Indonesia nation tackle annual fires that harm health in the region.

The International Peat Mapping Team (IPMT) was chosen as the winner of the USD$1 million (RM3.9mil) Indonesian Peat Prize, two-year competition funded by the David and Lucile Packard Foundation and managed by the US-based World Resources Institute (WRI).

"To be able to manage peat well, we needed to have a map, and the map we had before was not that comprehensive," said Nirarta Samadhi, director of WRI Indonesia. Indonesian government agencies, which helped organise the competition, will start using the new methodology as soon as possible, said Supiandi Sabiham, co-chair of the judges.

The IPMT's approach, which combines satellite imagery, Lidar technologies and on-the-ground measurement, won for its accuracy, speed and affordability, added Sabiham. Lidar, which stands for Light Detection and Ranging, is a system that uses a laser, a scanner, and a specialised GPS receiver to create 3D images of the earth from planes.

Peat soils contain huge quantities of carbon in the form of organic matter, which accumulates over thousands of years and provides nutrients for plant growth. Rainforests across Indonesia's sprawling archipelago contain more than 15 million hectares of peatland – an area twice the size of Ireland – mostly on the islands of Sumatra and Borneo, and in the easternmost province of Papua.

When peat lands are drained or cleared by fire, often to make way for oil palm plantations or farming, the carbon is released into the atmosphere where it traps heat, contributing to climate change.

Peat soil is particularly flammable when dry, often causing fires to spread beyond their intended areas. Each year smoke from fires used to clear land for agricultural expansion in Indonesia clouds the skies over large parts of South-East Asia, raising concerns about public health.

Peat fires in 2015 were estimated to have caused up to 100,000 premature deaths, according to the WRI, and cost the Indonesian economy US$16.5 billion (RM65bil), or nearly 2% of gross domestic product. Indonesian President Joko Widodo set up an agency in 2016 to restore about two million hectares of damaged peatland and imposed a moratorium on new concessions for oil palm.

The IPMT methodology will enable the Indonesian authorities to better manage peatlands, and help them create canals and wetting systems to protect peat in the dry season, WRI's Samadhi told the Thomson Reuters Foundation.

Open to students, engineers, consultants, scientists, companies and universities, the competition attracted 44 applicants from 10 countries. Bambang Setiadi, a scientist in the IPMT team, said the prize money would be used to fund further research into peatlands as well as scholarships for Indonesian students to attend German universities.

star2.com

India: More cameras for forests

The forest department has drawn up a long-term plan to install 500 cameras across the forests of north Bengal to get more information about the wildlife and tighten vigilance against poaching and illegal felling of trees.

Binay Krishna Burman, the state forest minister, said on Thursday that a year's deadline has been fixed to put up the trap cameras in the forests, mainly those spread over the districts of Jalpaiguri, Darjeeling, Alipurduar and Cooch Behar.

At present, the Neora Valley National Park and the Buxa Tiger Reserve have such cameras. These have helped foresters get information about the wildlife, with photos of Royal Bengal Tigers captured repeatedly in Neora.

"We now want to increase the coverage by installing hundreds of such cameras in other wildlife habitats and on the fringes. We can then have a clear idea about the animal species in these forests. Also, there have been incidents of poaching and illegal felling of trees. The cameras will intensify vigilance and poachers and timber smugglers can be caught," said Burman. In the Sunderbans, work has begun to install 300 cameras, the minister added.

In north Bengal, neighbouring countries of Bhutan and Nepal and Assam, which share contiguous forest patches with Bengal, will be informed about the exercise.

In Neora, after the department installed cameras, photos of animals like Clouded Leopard, Lesser Cat, Himalaya Civet, Dhole (wild dog), Serow and Himalayan Black Bear were clicked, along with photos of tigers.

"In recent times, tiger has been sighted only in Neora Valley. Once these new cameras are installed, we would be able to know whether there is any tiger at other wildlife habitats like Singalila, Jaldapara, Gorumara, Mahananda, Chapramari and at the Baikunthapur forest," a forest official said.

telegraphindia.com

Australian trees 'sweat' to survive extreme heatwaves, researchers reveal

Australian researchers growing trees in climate change conditions have found the leaves "sweat" to survive extreme heatwaves. The year-long experiment showed that trees continue to release water through their leaves as an evaporative cooling system during periods of extreme heat, despite the carbon-fixing process of photosynthesis grinding to a halt.

Previously, scientists believed that photosynthesis and transpiration – the process of releasing water – were linked, meaning one would not occur without the other.

Prof Mark Tjoelker from the University of Western Sydney's Hawkesbury Institute for the Environment is one of the authors of the study, which was published in Global Change Biology this month. Tjoelker said the findings had significant implications for climate change because they showed that trees stopped capturing carbon during extreme heatwaves, which are predicted to become more frequent and severe in the future.

"If heatwaves occur over a large surface area … clearly the trees and native forests in that area would take up less carbon," he said. "And if there is an increased frequency of heatwaves that obviously impacts their ability to serve as carbon sinks."

New South Wales and Queensland had their hottest year on record in 2017, while Australia as a whole recorded its third-hottest. Seven of the 10 hottest years recorded in Australia have occurred since 2005.

The study also showed that trees grown in conditions that mimic a predicted 3C average warming were not better able to cope with extreme heat.

The experiment was conducted at the Hawkesbury forest experiment and Yarramundi site at Richmond, near Sydney. It involved the use of 12 "whole-tree capsules". The nine-metre capsules are temperature and climate-controlled pods that look like a cross between a greenhouse and a spaceship, and are referred to by locals as "the Coke bottles". Each capsule was planted with a 60cm *Eucalyptus parramattensis* or Parramatta red gum seedling in December 2015. The species is endemic to the area and listed as vulnerable.

Six of the capsules were set to reflect the ambient temperature, while the other six were set to reflect a predicted 3C increase in mean annual temperatures, which is the modelled climate change outcome for Australia before the end of the century.

The trees in the warmer pods grew 30% faster and reached a height of six metres in two years. Twelve months in, researchers began inflicting artificially induced four-day heatwaves across all 12 capsules, bringing the afternoon temperature up to 43C. The trees were starved of water for a month leading up to each heatwave to mimic natural heatwave conditions.

"It didn't matter whether the trees were grown under current climate conditions or the 3C increase of the future, they responded equally well," Tjoelker said. "On each of those days when peak afternoon heatwave temperatures were high, we noticed the photosynthesis went to zero, so they weren't taking up any carbon any more but they maintained their water loss."

The effect was a cooling system "akin to humans sweating", he said. Tjoelker said the results would be fed back to the Intergovernmental Panel on Climate Change (IPCC) to help provide more accurate modelling. "We can just provide the nuts and bolts, the biology, that helps improve the reliability of these simulations," he said.

theguardian.com

USA: Trees for Trump – 1m plants pledged to offset U-turn on climate change

More than 1m trees have been pledged for Trump Forest, a bid by environmentalists to offset the US president's curtailing of Obama-era clean energy initiatives by planting 10bn trees around the globe.

"US president Donald Trump doesn't believe in the science of human-caused climate change," reads the website for the project, launched before Trump withdrew the US from the Paris climate accord. "So we're planting a forest to soak up the extra greenhouse gases Trump plans to put into our atmosphere. We're planting a global forest to offset Trump's monumental stupidity."

The project was launched last March and in less than a year over a million trees have been pledged from people around the world, but particularly in the US and Europe.

The donated trees are to go towards offsetting the 650m tonnes of CO2 that will be released into the atmosphere by 2025 if the president's plans to backtrack on US climate commitments go ahead, organisers say.

The figure of 650m tonnes – equivalent to the annual carbon footprint of 33 million Americans – is calculated from Trump's decision to roll back the US 2015 Paris agreement pledge to lower emissions by at least 26% below 2005 levels by 2025.

It would take 10bn trees – covering a landmass roughly the size of the state of Kentucky – to offset the full amount.

"We're really pleased at how quickly it happened," co-founder Adrien Taylor told Newshub.

"We're just pleased to see we're not the only people in the world who care about climate change, because sometimes it can feel like that."

The project's co-founder, British climate scientist Dr Dan Price, said: "In 30 years from now, when people look back on the Trump presidency as an attack on the planet and on rational thought, it would be pretty cool if the history books say his actions were negligible because the global community offset the administration's additional emissions.

"It's clearly a big challenge, but only recently the world record was broken when India put 66m trees in the ground in a day. If we all chip in, it is a completely realistic goal."

theguardian.com

Global: Zero-deforestation pledges need help, support to meet targets, new study finds

It's become a trend for big corporations to pledge that their products won't cause any more deforestation. And while many experts believe in the potential of these "zero-deforestation" commitments to slow or stop deforestation, a new study published Monday in the journal *Nature Climate Change* finds that a number of challenges hamstring the efforts.

"These companies stand poised to break the link between commodity production and deforestation," co-author and environmental scientist Holly Gibbs of the University of Wisconsin-Madison said in a statement. "To do that, more immediate action is needed to demonstrate commitment to change and to clear the haze surrounding these efforts."

Gibbs and a team of colleagues from nearly a dozen other institutions around the world looked at commitments to cut deforestation from company supply chains in recent years. Nearly 450 corporations made 760 such promises by March of 2017. Yet the early evidence seems to indicate that they may not be making as much of a difference as hoped, so the researchers set out to figure out why.

The team examined the different approaches, looking at whether they are announced by a single company on its own or as part of a group, for example, as well as whether they define a set of discrete actions aimed at tackling the deforestation in their supply chains, or they merely lay out a set of targets.

In the latter case, the commitment may predominantly serve a public relations function, leading consumers to believe that the company is focused on sustainability even though it may be falling short of that standard.

"The vague nature of many company commitments may lead to greenwashing, defined as poor environmental performance accompanied by positive communication about environmental performance," the authors write.

According to the study, one of the problems with zero-deforestation pledges is that they haven't been around for very long, so it's difficult to figure out if they're making a difference in many cases. Where it was possible, however, the researchers reviewed scientific studies on the effectiveness of pledges to stanch deforestation, coming up with mixed results.

In Colombia, for example, coffee farms that had obtained "eco-certification" boosted their level of tree cover compared to uncertified farms, based on one study referenced by the authors. In contrast, other studies showed that certification by the timber-certification organization Forest Stewardship Council wasn't very effective at slashing deforestation in Cameroon, Mexico or Peru, but it did make a difference in Chile and Indonesia.

Large-scale moves to reduce deforestation have had important impacts, as became apparent after Brazil established a moratorium on clearing new land for soybean agriculture in 2004. Similarly, beef companies operating in Brazil agreed to a no-deforestation agreement in 2009. Scientists credit enforcement of the bans with aiding the country in substantially cutting deforestation through 2012.

But unintended effects appear to have accompanied these benefits. The soy moratorium may have pushed farmers to clear land for other uses, such as cattle ranching. And ranchers appear to have found new areas to raise their cattle without such stringent restrictions on deforestation, like the Gran Chaco in Argentina, Bolivia and Paraguay. Ecologists worry that the Chaco's unique, yet poorly understood, ecosystem is vanishing more rapidly than anywhere else on Earth — in part because of surging agriculture activity.

These "leakages" can result from the problems that these policies and commitments create for small-scale producers. Often they can't cope with the expense of meeting the new standard. The authors suggest that governments can help included smallholders in these initiatives by covering the added costs of compliance.

More broadly, officials can ensure public support of these private initiatives by passing "supportive" laws that are in line with zero-deforestation commitments, the authors write. They also call on governments to share information with corporations that will help them meet their goals.

"The time is ripe to increase the scope and impact of zero-deforestation commitments by transnational companies," Eric Lambin, a geographer at Stanford University, said in the statement. "They align with a growing availability of monitoring data from satellites and other sources as well as a proliferation of national and international public policies aimed at conserving forests to reduce greenhouse gas emissions."

mongabay.com

Solomon Islands: New initiative to protect forests

A new conservation initiative in Solomon Islands is hoping to show Malaitan villagers there are alternatives to logging.

Academics and conservation groups have set up the Ma'asina Greenbelt Initiative in the province's Are Are and Kwaio regions.

One of the project's founders, Edgar Pollard, said he was approached by community leaders while undertaking research on Malaita. He said the communities wanted to develop without destroying their forests.

"There are a few people who want to break out from this mould of logging but it is really difficult I mean we are fighting against companies or people that use money. And we don't really have much money for our work. We get a little bit of support from different sources that fund environmental work but it is a real challenge," said Edgar Pollard.

Mr Pollard said the project's attracting a lot of interest from other communities around the island and it's hoped to expand it to the rest of Malaita.

radionz.co.nz

Norway to build world's tallest timber building

"Mjøstårnet" will be more than 80 metres tall and stand 30 metres higher than what is today considered the world's tallest timber building.

"Mjøstårnet sets new standards for timber constructions. The building is the closest we come to a skyscraper in timber," says investor and contracting client, Arthur Buchardt.

Mjøstårnet, named after its neighbour and Norway's largest lake, Mjøsa. The record-breaking construction will sit on the edge of the north-eastern tip of the lake in the small town of Brumunddal, an hour and a half's drive north of Oslo.

Spanning over 18 floors, the building will reach 80 metres high, and include apartments, an indoor swimming pool, hotel, offices, restaurant and communal areas. Construction is scheduled to be completed in December 2018. Moelven, a Mjøsa-local Scandinavian industrial group, will supply the timber constructions from local spruce forests required to construct the tower and the swimming pool area.

"The assembly and construction of the Mjøstårnet is nothing short of world-class engineering, and will be managed without external scaffolding, despite the complexity of working at heights. We are primarily using cranes and supplementing with lifts as needed. We have reached 33 metres to date, meaning we have 48 metres to go," says Buchardt.

Climate-friendly

Arthur Buchardt states that he can evidence the climate friendliness of building with wood.

"A project group established by Norwegian road authorities investigated the possibility of building the world's longest timber bridge across Lake Mjøsa. Their studies show that building with wood instead of concrete can reduce CO2 emissions by up to 30 percent," says Buchardt.

International standards

Buchardt believes that the construction sector will evolve in the footsteps of the automotive industry.

"In 15 years' time I believe it will be illegal to produce and sell cars that run on fossil fuels. Similarly, I expect that climate-friendly materials will become an international statutory standard," says Buchardt.

Importance of the Paris climate accord

Arthur Buchardt draws inspiration from the Paris climate agreement.

"You could say that I have had my eureka moment. I want to help convey an important message with this project. To build with wood is to contribute to the world breathing better," says Buchardt.

Wants to inspire

Buchardt hopes that his ambitions to build the world's tallest timber building may inspire others.

"Through Mjøstårnet we demonstrate that it is possible to construct large, complex wooden buildings. The planned construction of the Norwegian Government quarter can become a wooden landmark internationally," says Buchardt.

moelven.com/mjostarnet

Global: A eureka moment for the planet – we're finally planting trees again

China plans to plant forests the size of Ireland. Latin American countries have pledged to restore 20m hectares of degraded forest and African countries more than 100m hectares. India is to plant 13m hectares, and on a single day last year 1.5 million people planted 66m trees in Madhya Pradesh alone.

Much of Europe is physically greener than it was just a few years ago. England is to plant 50m trees in a new coast-to-coast forest and newly planted saplings now cover tens of thousands of hectares of former farmland in Ireland, Norway and France. From Costa Rica to Nepal and Peru to Mongolia, tree planting has become a political, economic and ecological cause, and a universal symbol of restoration, regrowth and faith in the future. More than 120 countries promised in 2015 to plant and restore large areas of forest as a response to the climate crisis, and the UN has set a target to restore 350m hectares by 2030 – an area bigger than India.

This enthusiasm for a greener world, expressed in trees, is inspiring and overdue. For 200 years forested countries barely knew what to do with their trees. They were treated as expendable and a waste of space. But in a great cultural shift, they have changed from being dark and fearsome places to semi-sacred and untouchable.

And why not? In this new ecological age, we have learned that trees have far more value than providing timber: they keep soils moist, prevent floods and provide shelter, store carbon, beautify landscapes, protect water sources, increase biodiversity, improve conservation and induce human wellbeing. So woe betide councils such as Sheffield that want to cut down trees. From the Newbury bypass protests 20 years ago to today's battles to save the ancient woodlands along the route of the HS2 rail link, there are few surer ways of angering people than cutting down their trees.

We are seeing a great global attempt to plant and restore forest land but paradoxically we are still losing tree cover. The rate of global deforestation has slowed by more than half in 25 years but tree loss jumped 50% in 2016, and 2017 is likely to have been worse.

The greatest threat to trees used to be loggers and the expansion of farming. These are still a threat, but human-caused deforestation and degradation make forests more fire-prone, and disease, droughts linked to climate change and harmful beetles are likely to kill trees in greater numbers.

In two years, many millions of hectares of forest have burned across North America, South America, Australia and Europe. Some of the wild fires were deliberately set, but the spike reflects the warming of the land and is just one of the many consequences of climate change. Equally, tree diseases are now rampant and forests are succumbing to drought, disease and insects – much of it driven by climate change.

We must keep planting trees but think differently. Mass, state-sponsored tree-planting has a reputation for being expensive and badly managed. When forests are planted on an industrial scale, up to 20% of the trees may die within a few years. It costs around £720 a hectare to plant a forest, so it would cost around £250bn to plant the 350m hectares that countries have signed up to. That money is just not available to developing countries.

But there is a solution. Increasingly a system known as agro-forestry is proving itself. Here, trees and shrubs are being grown around or among crops, often on degraded forest land. There are around 2bn hectares of this land around the world and restoring it with agro-forestry can not only put food on tables, but create hundreds of thousands of jobs and address climate change.

There have been remarkable successes. Just 30 years ago Niger was an impoverished, drought-prone country. It had been persuaded by development experts from rich countries to intensify its farming by clearing large areas of land and planting huge fields of wheat and maize. It largely failed and the soil blew away. The story, recounted by the author Fred Pearce, goes that, to save time, young men returning from working abroad in the 1980s planted their crops without first clearing the land. To their surprise, their grain yields were much better than in neighbouring fields that had been cleared of all woody plants. When the same thing happened the next year, the villages got the message: trees were good for their crops.

Since then, something like 200m trees in Niger have been planted or encouraged to naturally regenerate on 5m hectares. Food production has increased by 600,000 tonnes a year in the places where the trees have returned.

The government's part in this success story has been minimal. Agro-forestry spreads spontaneously as farmers and landowners see the benefit of combining crops with trees. The trees provide fodder for livestock, fuel, medicines, fruits and cooking oil and regenerating the land has cost perhaps $20 a hectare. The Niger government helped mainly by changing the law to allow farmers who plant trees to profit more.

Pakistan, too, has shown spectacularly how to combat climate change and reduce instances of flooding and natural disasters. Thousands of nurseries have been set up in the past three years in Khyber Pakhtunkhwa province, communities have distributed for free more than 150m trees from the nurseries, existing forests have been densely planted and expanded, and large areas of degraded land have been allowed to regenerate naturally. The result will not be seen for many years, but more than one billion trees have been planted, and 350,000 hectares of forest and farmland regenerated for not much more than £100m – roughly what it would cost to build two miles of dual carriageway road in Britain.

Similarly, in Malawi, Mali, Ethiopia and elsewhere, farmers are now planting, protecting and managing many more trees on their farms. The Seno plains of Mali are unrecognisable from 30 years ago and in the Tigray region of Ethiopia, nearly 1m hectares of unused land have been regreened and transformed. Crop yields are increasing, and fewer young people are leaving their villages.

And in India, the Araku project has seen local communities plant millions of fruit trees and coffee bushes. Nearly 15,000 acres have been revitalised.

Agro-forestry is changing farming and addressing climate change in many countries as surely as the "green revolution" swept through the world promising higher yields with chemicals in the 1960s and 70s. It depends for its success on changes in attitudes, shifts in behaviour and improved management practices. It requires communities to work together, local knowledge and governments to reform land laws and help to educate. But it does not need large amounts of money.

Great areas of Indonesian, Congolese and Latin American forests are still being lost to the loggers and the palm oil companies, but we are seeing a heartening response to the linked climate and food crises. It is too early to think that we are ecologically more literate, but there is a real sense that governments are beginning to understand that change best comes from the grassroots and is both needed and possible.

theguardian.com

UK: The Prime Minister has announced plans for a new Northern Forest as part of the Government's 25 Year Environment Plan

Ambitious plans to create a new 'Northern Forest' along the M62 corridor have been kick-started following an announcement by the Prime Minister Theresa May. Following backing from the Environment Secretary Michael Gove, over the next 25 years the Woodland Trust and Community Forest Trust are aiming to plant more than 50 million trees from Liverpool to Hull, with the government today providing almost £6 million to launch the first project of its kind for more than a quarter of a century.

Spanning more than 120 miles between the cities of Bradford, Leeds, Manchester and Liverpool, the proposed Northern Forest will help boost habitats for woodland birds and bats and protect iconic species such as the red squirrel – alongside providing a tranquil space to be enjoyed by millions of people living in the area.

The announcement forms part of the government's upcoming 25 Year Environment Plan, which will set out how we can be the first generation to leave the environment in a better state than we inherited it.

Prime Minister Theresa May said: "It is vital that we leave our planet in a better state than we found it, with cleaner air, stronger protections for animal welfare and greener spaces for everyone to enjoy. Progress is being made. We're investing over £3billion in improving air quality, tackling marine pollution by banning harmful microbeads and increasing sentences for animal cruelty to five years. But to create an environment fit for the future we can't stop there, and that is why we are supporting the creation of this new Northern Forest and will shortly be setting out our ambitious vision to further support the environment and protect its good health for generations to come."

Environment Secretary Michael Gove said: "Trees are some of our most cherished natural assets and living evidence of our investment for future generations. Not only are they a source of beauty and wonder, but a way to manage flood risk, protect precious species, and create healthier places for us to work and live.

"This new Northern Forest is an ambitious and exciting project that will create a vast ribbon of woodland cover in northern England stretching from coast to coast, providing a rich habitat for wildlife to thrive, and a natural environment for millions of people to enjoy. This new forest will help us deliver a Green Brexit and help to deliver on our pledge to leave the environment in a better state than we found it."

Austin Brady, Director of Conservation at the Woodland Trust, said: "The Northern Forest will accelerate the creation of new woodland and support sustainable management of existing woods right across the area. Planting many more trees, woods and forests will deliver a better environment for all – locking up carbon on a large scale, boosting wildlife habitat and greening our towns and cities. The Woodland Trust and Community Forests will use new and innovative mechanisms to engage communities and a wide range of partners in delivering the forest."

With the Government backing growth, investment and jobs across the Northern Powerhouse as part of efforts to create an economy that works for everyone, the Woodland Trust and Community Forest Trust estimate this new forest will generate more than £2 billion for the country's economy. The area's breath-taking scenery and landscape is famous across the world, and this scheme will help bolster it for future generations.

The first planting will begin in March this year, supported by funding from the Heritage Lottery Fund, at the Woodland Trust's 680-hectare Northern Forest flagship site at Smithills, Bolton. The Woodland Trust is already committed to investing over £10 million in this project and several others over the wider forest area.

The Northern Forest will connect the five Community Forests in the north of England – the Mersey Forest, Manchester City of Trees, South Yorkshire Community Forest, the Leeds White Rose Forest and the HEYwoods Project – with green infrastructure and woodland created in and around major urban centres such as Chester, Liverpool, Leeds, and Manchester.

It will follow on from the successful National Forest, which transformed 200 square miles of industrial site in the heart of England. The forest now attracts over eight million visitors a year and has seen wildlife like otters, water voles and dragonflies flourish.

CharteredForesters.org

Zambia: Boost financing to the forestry department, WWF urges Government

The World Wide Fund for Nature (WWF) in Zambia says the country's forest resources and services require a financial boost to ensure sustainable management for the benefit of millions of stakeholders and increase of government revenue. WWF Zambia has since recommended that government should boost financing to the forest department to ensure sustainable management and use of natural capital.

WWF Zambia country Director Nachilala Nkombo said this when she made a presentation to the committee on Agriculture, Lands and Natural resources on how the weaknesses and challenges raised in the report of the auditor general on sustainable forest management could be addressed.

"The Auditor General's report observes serious under investment and poor governance of the forest sector, consequently the state continues to lose millions of potential revenue from strategic revenue resource. As WWF Zambia, we therefore recommend that government should put in the mechanism to support the coordination of players whose economic activity depends on the forest sector," she said.

Ms Nkombo said the main challenge currently was that forest resources are unsustainably utilised due to inadequate human resource and financial capacity to manage them.

Other recommendations by the organization included proposal for the development of a national green economy strategy that fully accounts for and secures Zambia's natural capital, especially the forest ecosystems.

This is according to a statement released by WWF Zambia Head of Communications and Marketing Eneya Phiri. "The forest ecosystem is a bedrock for the development of other economic sectors especially the energy, agriculture and tourism sectors," she said.

WWF Zambia also recommended that government develops a 100-year vision for strategic management of forest resources. "An indaba should be convened to articulate a 100-year vision on sustainable management of forest resources, mobilize investment, develop strategies for sustainable use to support growth and conservation objectives as a strategy for long term sustainable development," she said.

Ms. Nkombo also called for the regulation of domestic and transboundary timber trade to ensure transparency in the timber trade so that no Government revenue is lost.

According to a 2015 report from the United Nations Environment Programme (UNEP) in partnership with government, the nation's forest resources and services were valued at over US$1 billion per annum or 6.3% of GDP, creating 1.4 million jobs.

lusakatimes.com

Indonesia: Is a plantation a forest? Indonesia says yes, as it touts a drop in deforestation

The Indonesian government has reported a second straight annual decline in the country's deforestation rate, but continues to confound with its definition of what constitutes a forest.

The Ministry of Environment and Forestry recorded 4,790 square kilometers (1,850 square miles) of deforestation in 2017. That's down 24 percent from the 2016 figure, which in turn represented a 42 percent reduction from 2015, when record-breaking fires contributed to a total of 10,900 square kilometers (4,210 square miles) of deforestation across the archipelago.

Of the total deforestation that occurred last year, 3,080 square kilometers (1,190 square miles) were recorded in forest areas, while the rest were in "other-use areas," known as APL and which include oil palm plantations and infrastructure development sites.

Intact forest cover was recorded at 936,000 square kilometers, or about 361,400 square miles — an area nearly the size of California's land mass.

Plantations as forests

Environment and Forestry Minister Siti Nurbaya Bakar credited the decline to "efforts from multiple policies" being put in place. In particular she pointed to so-called production forests, which are typically leased for pulpwood and timber plantations.

"There has been a decline in deforestation in production forests, from 63 percent [of total deforestation] in 2014 to 44 percent in 2017," she said.

However, the role of production forests, and the industrial plantations they cover, in deforestation assessments has always been a contentious issue in Indonesia.

Researchers and conservation think tanks, such as the World Resources Institute (WRI), define deforestation as the conversion of natural forest cover to other land-cover categories. That means the clearing of forest for the cultivation of industrial plantations — acacia and eucalyptus for pulpwood, for instance — automatically counts as deforestation.

The Indonesian government, on the other hand, doesn't take that view. It counts forest loss in primary forest, secondary forest and man-made plantations, including industrial plantations that are established to produce a high volume of timber in a short period of time.

"In the ministry's classification, there's only one class of plantations, and that includes all man-made forests," Belinda Margono, a researcher at the University of Maryland (UMD) and the Ministry of Environment and Forestry, said in an interview. "So trees in industrial plantations are included [in the calculation]."

That means industrial plantations are not perceived as non-forested areas once the areas are replanted with acacia and eucalyptus trees, according to the ministry's official in charge of gathering forest-cover data, Ruandha Agung Suhardiman.

"Planting in industrial forest areas is considered reforestation," he said.

It's a distinction heavy on semantics: the government defines deforestation as the "permanent alteration from forested area into a non-forested area as a result of human activities," per a 2009 decree from the forestry minister. Industrial plantations, because of their cycles of planting and harvesting, are seen as not causing "permanent alteration" to the forest cover.

Disparities in reporting

That difference in definitions has led to stark disparities in how deforestation is reported in Indonesia. A 2014 study led by researchers at UMD found that Indonesia's deforestation rate had surpassed that of Brazil, giving the archipelago the dubious distinction of having the highest deforestation rate in the world.

According to the study, Indonesia lost 8,400 square kilometers (3,240 square miles) of natural, or primary, forest in 2012, while Brazil's deforestation rate at the time stood at 4,600 square kilometers (1,780 square miles). However, the official deforestation figure from Indonesia's forestry ministry that year was significantly smaller, at 6,100 square kilometers (2,360 square miles).

The WRI, whose Global Forest Watch is the first tool of its kind to monitor global forests on a monthly basis, says it's important to address this difference. "As far as I know, industrial forest plantations are included in the [ministry's] calculation," said WRI Indonesia country director Tjokorda Nirarta Samadhi. "Meanwhile, internationally, at least [in the system] used by Global Forest Watch, industrial forest plantations aren't counted. Instead, we see deforestation as loss of intact natural forests."

The WRI, a Washington-based think tank with an office in Indonesia, has cautioned that the disparity may hamper Indonesia's bid to seek foreign funding to support its initiatives to reduce emissions from deforestation and forest degradation under a scheme called REDD+: without a universally agreed-on definition of deforestation, it might be difficult for Indonesia to cite its own data to claim funding.

"Using your own definition isn't wrong, and every country has the right to do that," Nirarta said. "But is the definition agreed on by other global actors?" He cited the example of Norway, which has pledged $1 billion in REDD+ funding for Indonesia, and said that if Norway deemed industrial plantations as contributing to deforestation, "then it's no use having your own definition."

Minister Siti, though, dismissed the controversy over the definition as part of a conspiracy to paint Indonesia's forestry sector in a negative light. "The word 'deforestation' implies international 'pressure' in judging Indonesia for its performances related to sustainability," she said. "And among other things, [the word can] be restrictive [for Indonesia]."

She said deforestation did not always have to have a negative connotation, for instance when it leads to economic development.

"Let's say there are 60 villages in a forest, and they can't be accessed because all they have are gravel roads," she said. "We just have to pave the roads. Should we call that deforestation? We still need to clear the land, but in a controlled manner."

Siti added that the concept of "zero deforestation" should not apply to a developing country such as Indonesia.

Palm oil expanding

Beyond the disagreement over the definition, the latest data highlight a sustained decline in the rate of deforestation, which averaged more than 10,000 square kilometers (3,860 square miles) a year throughout the 1990s and 2000s. (The highest rates were recorded in 1996 and 2000, topping out at more than 35,000 square kilometers, or 13,500 square miles.)

Siti acknowledged the decline in recent years, but cautioned that the trend "is not a given." Indeed, deforestation in APL areas — driven largely by oil palm plantations — rose to nearly 36 percent of total deforestation, up from 24 percent in 2014.

One of the consequences of this proliferation of oil palm plantations has been the destruction of forests that are home to critically endangered species such as orangutans. The problem came into gruesome focus earlier this year with the discovery in Central Kalimantan province of an orangutan that had been decapitated and shot multiple times, in an area bordered by five oil palm plantations.

Siti said she was aware of the case and was particularly concerned, noting that more than 200 oil palm plantations were currently operating in orangutan habitat, accounting for a fifth of the 20,000 square kilometers (7,720 square miles) of palm plantation area in Central Kalimantan.

Operators of oil palm plantations often consider orangutans a pest because they are known to eat the palm fruit. A 2005 study by the conservation NGO Friends of the Earth found that one such company in Central Kalimantan province would pay local people 150,000 rupiah (about $10) for every orangutan killed.

Fires down

Another trend highlighted in the 2017 data is the increase in deforestation in protected and conservation areas, amounting to 20 percent of the total, up from 12 percent in 2014.

For Siti, that's a move "in the right direction," because it means policies aimed at agrarian reform and empowerment are working. Those policies, under the government's "social forestry" program, entail moving people out of production forests and into protected and conservation areas, where deforestation can be more stringently controlled.

Another government program also yielded good results last year — namely, the packet of policies aimed at preventing forest and land fires, particularly in peat areas.

The devastating fires of 2015 scorched 26,100 square kilometers (10,080 square miles) of land; blanketed vast swaths of the country in a haze that sickened half a million Indonesians; sparked a diplomatic row with Singapore and Malaysia; and, at its peak, generated daily carbon dioxide emissions that exceeded those from all U.S. economic activity.

In 2016, a string of regulations to better protect peatlands was rolled out, and the incidence of fires decreased. In 2017, the area burned was down to 1,654 square kilometers (640 square miles).

"What's important is to keep mitigating fires and preventing fires on peatlands," Siti said.

mongabay.com

Kenyan innovation takes plastic bags out of forestry

Plastic bags are known for their environmental impact. They slowly release toxic chemicals once in the soil, for instance, and find their way into the guts of animals that often choke and die as a result.

Kenya banned the use of plastic bags in 2017. And thanks to a 43-year old Kenyan, Teddy Kinyanjui, an innovative afforestation and reforestation method for developing seedlings without using plastic bags is in place.

A resident of Nairobi and founder of Cookswell Jikos Limited, Kinyanjui has invented small, portable seed balls to grow and easily disperse seedlings. He is working in partnership with Kenya Forestry Research Institute (KEFRI), which certifies seeds.

When tree seedlings are grown in plastic bags in a nursery, he explains, the roots get squeezed and this limits their ability to grow fast. The seed ball method enables roots to adapt easily, with less disturbance.

Kinyanjui says he has engineered a method of coating each seed with charcoal dust, and corn or cassava starch, to bind each ball so the seeds are protected from prey, pests and diseases.

He says he has the capacity to make one tonne of the seed balls per day. So far, since the project's initiation in 2016, about one million seeds of different species of certified indigenous trees have been dispersed throughout Kenya through partnerships with locals and with a germination rate of 60 per cent.

"People use charcoal every day, necessitating for more trees. Climate change has also caused community conflicts, especially among pastoralists in Northern Kenya who fight over pasture for their animals," says Kinyajui. "Good environmental management is, therefore, crucial for peace among these communities."

He hopes to partner with like-minded organisations and youth who herd livestock with slings to disperse more seeds in arid lands.

"We would [also] like people to see the value of this simple technology as a contributing factor in combating and adapting to effects of climate change, as this is the cheapest way to encourage tree planting, especially in arid and semi-arid areas," adds Kinyanjui.

scidev.net

Kenya: Indigenous Sengwer man shot and killed by EU-funded guards

On 16th January, 41-year-old Robert Kirotich was shot by EU-funded guards working for the Kenya Forestry Service. Another wounded man, David Kipkosgei Kiptilkesi was taken away by the guards and his condition unknown. He was herding cattle in Kapkok Glade, in the Embobut Forest area of the Cherangany Hills in west Kenya when he was attacked by a group of around 40 guards working for the Kenya Forestry Service (KFS). He was shot and killed and his body was retrieved by community members at 6.30pm today.

On Christmas Day, guards employed by the KFS entered Sengwer lands and forcibly evicted them, supposedly in the name of conservation. After evicting them, they set fire to their homes. The violence was one of many forced evictions that the community has endured and they have continued, on 29 December, 1 January, and right up to today. On January 4, the Sengwer held a press conference, calling for change for the new year.

Three UN Special Rapporteurs this week wrote to the EU urging them to suspend funding to the asking them to the WaTER Project. John H. Knox, Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment; Michel Forst, Special Rapporteur on the situation of human rights defenders; and Victoria Tauli-Corpuz, Special Rapporteur on the rights of indigenous peoples, jointly said: "We call on the Kenyan authorities to urgently halt the evictions of Sengwer community and undertake impartial investigations of these attacks. Furthermore, we urge the European Union to suspend funding for the project until measures have been taken to uphold international standards on indigenous peoples' rights."

The guards are working for the EU-funded Water Towers Protection and Climate Change Mitigation and Adaption (WaTER) project, a 31 million Euro programme which states its aim as being to help eradicate poverty through improving the productivity of ecosystem services in two of Kenya's five water towers.

Another Sengwer man Paul Kitum Kiptuga was shot at while at home a week ago. He said: "At around 12.30 noon, about 10 KFS guards arrived at my home. At that time there was a community member who was living nearby who saw the KFS rangers coming towards my home and called loudly that KFS are coming, you must run as fast as possible. I left everything and ran.

"At 300 metres from my home, the KFS guards saw me. As I was escaping I looked back to see how near they were. At that moment I saw them about to shoot and heard the gun shot and the bullet fly past me.

"After the first shot, they were shouting at me to stop and others were shouting 'kill him, kill him, kill him'. Another live bullet came past me and then I managed to enter the forest. I heard the last shot as I disappeared into the forest and crossed the stream which slowed them down as they tried to chase me.

"Then the KFS guards went back to my homestead and I climbed to a higher place to be able to see what they were going to do next. I could see them clearly collecting some paper and blankets and other things to put into my house before setting fire to it."

The Sengwer are calling for the EU WaTER project to be stopped. They applaud its aim of seeking to protect the forests but they state that funding a government agency – KFS – that acts so inhumanely, with no interest in human rights or conservation, is a way of destroying the very community that depends on and cares for their ancestral lands, Embobut forest.

Milka Chepkorir Kuto, a Sengwer woman, said: "How many of us will have to die for the EU to listen?" Yator Kiptum, a Sengwer leader, said: "The EU must act now by cancelling the WaTER Project. How many Sengwer must be killed by the KFS guards before the EU listen to the voiceless members of the Sengwer indigenous peoples, who are trying to live peacefully on their ancestral lands?"

forestpeoples.org

S. America: Amazon trees are major source of methane emissions

Trees growing in floodplains surrounding the Amazon river emit up to 20 million tonnes of methane gas (CH_4) to the atmosphere every year, a study in *Nature* has estimated. Methane is one of the three most potent greenhouse gases and traps up to 34 times more heat compared with carbon dioxide.

The amount calculated in the study is similar to emissions from the Arctic tundra, or emissions from all oceans combined, or the total volume of methane emitted from wild animals and termites globally, the authors point out.

Still, the amount of methane emitted from Amazon trees is just half that emitted by humans, according to the authors — whether in the form of emissions from landfills, the meat industry, or burning fossil fuels.

The researchers argue that although they result from a natural process, these emissions may also be responding to environmental change, such as the building of dams across the Amazon basin. A separate study has reported that 140 hydroelectric dams are in operation or under construction along the Amazon basin, and another 288 are planned for the coming years.

"We do not know the consequences for emissions of such [construction] activity", stresses Vincent Gauci, from the Open University and the study's main author. "However, any changes to the dynamic hydrology of these systems could alter the function of these trees in unpredictable ways."

Geographer Evlyn Moraes Novo, from Inpe's Remote Sensing Division, says the findings are surprising and give a more complete picture of the sources of greenhouse gas emissions in the Amazon region.

"This could be used in global models designed to predict how environmental change can have a knock-on effect on the tropical wetland methane source," says Evlyn, who was not involved in the study.

The findings are based on measurements of methane emissions taken from 2,300 trees spread across a number of locations surrounding the rivers Negro, Solimões, Amazonas and Tapajós — where the water level can flood trees by up to 10 metres.

The research was carried out in 2013 and 2014 by scientists from the Open University in the UK, in collaboration with atmospheric scientists from the Nuclear and Energy Research Institute (Ipen) in Brazil, and other institutions including the universities of Leeds in the UK, Linköping in Sweden and British Columbia in Canada.

The researchers used gas chambers placed around tree trunks to estimate fluctuations in emissions at a small scale. They also measured methane with an aircraft flying across the entire Amazon basin in order to also calculate emissions at a large scale.

By analysing the measurements collectively, they found that trees growing in wetland areas of the Amazon subject to seasonal flooding emit 21.2 million tonnes of methane gas to the atmosphere every year.

"These trees act as chimneys, funnelling the methane produced in the submerged soil into the atmosphere," chemist Luciana Vanni Gatti, from the National Institute for Space Research's Laboratory of Greenhouse Gases (Inpe) and one of the study's authors, tells *SciDev.Net*. "They are the source of the largest diffusive emissions ever recorded in wetlands."

scidev.net

Uganda: Uprooted refugees plant trees to rebuild Uganda's forests

Under a searing midday sun, Olany Mario wipes his brow as he bends to water a bed of tiny green neem seedlings in the fertile soil of a tree nursery in Palabek refugee settlement, northern Uganda. "We are growing these indigenous seedlings to help bring back all the trees that were cut down to make way for us, when we came here," he says.

Last spring, the 36-year-old fled fighting in neighbouring South Sudan, with his two wives and eight children**.** When they crossed the border into Uganda, the family was transferred to Palabek, where they were given their own plot of land. UNHCR, the UN Refugee Agency, has provided Olany and 11,000 other South Sudanese refugees who live in the settlement with food, mats and household items. They have also received tools to build shelters and seedlings to grow tree borders around their plots.

Uganda is now sheltering some 1.4 million refugees, most of them from South Sudan. That number is expected to grow in 2018, and so, too, is concern over the impact such a large number is having on the environment. In the past 20 years, Uganda has lost one third of its forest and green cover due to tree cutting by the local population, for farming and cooking fuel. In the Adjumani district alone, local officials estimate that 11 million trees have been felled since December 2013 to make way for settlements to house refugees.

"Instead of rehabilitating the environment after refugees return home, we need to prevent the damage being done at the very beginning of the emergency phase," says John Paul Magezi, the Ugandan government's environment officer. "The influx of refugees is being viewed as having a negative impact on the environment. But, we believe refugees can be a driving force for environmental protection and conservation if they are involved in the campaign to protect the environment from the moment they arrive."

In line with the New York Declaration adopted by 193 UN Member States in September 2016, the Ugandan government is taking a comprehensive approach to the refugee situation in the country. It is working with UNHCR and its partners in the private sector to raise awareness and change energy practices. This means exploring more sustainable use of wood for shelter, cooking and lighting, in settlements and the surrounding host communities which have donated land to refugees.

"We need an urgent and immediate response to limit the massive destruction of the environment in Uganda," says Mohamed Abdel-Al, UNHCR's senior technical coordinator. "We are rolling out a new energy and environment strategy in 2018, where we aim to provide every refugee family with an energy efficient stove to reduce their dependency on wood and charcoal. To help rebuild forests, we are investing in tree planting and tree marking, and creating tree nurseries to provide seedlings to refugees and the host community."

In Palabek, UNHCR partner the Lutheran World Federation (LWF) is taking a holistic approach, hiring refugees to plant trees throughout the settlement and mark others with red paint to show they should not be cut down. The LWF is also employing refugees and members of the host community to manage tree nurseries inside and outside the settlement. Inside Palabek, Olany and 10 other refugees have received training in how to plant seedlings to re-establish tree species, such as neem and teak. "Once the seedlings are ready for sale, these men will have gained a skill they can make a living from," says Kennedy Orach, LWF livelihood and environment officer.

In Palabek and other refugee settlements across Uganda, UNHCR, its partners and local businesses are donating or selling energy-saving stoves to refugees, which can reduce their need for wood by up to 50 per cent.

Agnes Alur, 24, who arrived in Palabek last April with her two small sons, received a free energy saving stove. "This stove is better than the traditional three stone stove, as I don't need as

much wood and can cook food, like peas, beans and fish, much faster," she says.

Because the stoves require less fuel, it also means young girls and women like Agnes are at less risk of sexual and gender-based violence, with less time spent walking through remote areas to find wood.

The introduction of solar energy to replace firewood for lighting is also helping to keep girls and women safe. UNHCR, with the help of partners, is providing refugees with solar lamps on arrival. Solar street lights are also being installed on roads and at water collection sites.

The main purpose of UNHCR's environment strategy is to meet the needs of refugees, while protecting Uganda's environment in a strategic and sustainable way. In 2018, UNHCR hopes to plant 1.4 million trees to represent each refugee in the country. This depends on overall funding for the refugee response in Uganda, which is critically low at just 37 per cent in 2017.

Meanwhile, Olany Mario and his team are making their mark in Palabek, working to rebuild the forests of Uganda. When the day comes when he can return home to South Sudan, he is ready. "I will use the skills I learned here to start a tree nursery in my own village, so I can rebuild my life and the life of my family."

unhcr.org

UK: Lasers revolutionise mapping of forests

New laser scanning technologies developed at the University of Salford, UK, are being used to map forests in more detail than ever before. The technology could help give earlier and better data on the impacts of climate change on nature.

In two new papers published this week by the Royal Society, researchers at Salford, UK Forest Research and the Universities of York St John, University College London, Newcastle and Tampere, Finland, described the impacts of terrestrial laser scanners on mapping plant life. Mark Danson, professor of geography at the University of Salford said: "Climate change has led to earlier spring growth in forests in many part of the world but measuring the amount of leaves present in a forest canopy through time is currently almost impossible. "Our research is testing new methods to map three-dimensional leaf growth in forests, so that rather than rely on an 'observer' spotting growth in a forest on a given day, we can map the spatial and temporal changes in leaf development remotely."

Prof Danson has developed the Salford Advanced Laser Canopy Analyser (SALCA), the first operational scanner capable of distinguishing between leaf and wood and also capable of creating three-dimensional maps of leaf distribution for both single trees and complete forest stands. The approach promises to revolutionise the measurement of leaf dynamics in forests providing key information that can be related to climate change.

To check the accuracy of leaf maps, the team counted the leaves on three large oak trees in Hampshire, and estimated their weight and total area. In this paper, three dimensional models of the same three trees were then derived from scans acquired in 'leaf-off' condition and 'virtual' leaves added to these trees in the same proportions as the measured leaves. The virtual 'leaf-on' tree was then compared with the distribution of leaves derived from manual sampling and found to correspond very well.

Measuring the leaf area manually took fifteen volunteers three whole days; the laser scanner reconstruction took just a few hours. Prof Danson added: "Rapid and accurate measurements of the spring growth of leaves in forests will be key to understanding the link between climate change and vegetation growth, and these Royal Society papers confirm the vital role that laser scanners will play in understanding and monitoring these environmental changes."

The two papers are part of a special issue of the Royal Society's interdisciplinary journal *Interface Focus*. The issue "The terrestrial laser scanning revolution in forest ecology" was the result of a Royal Society Theo Murphy Scientific meeting held last year and organised by Professor Danson and colleagues. The issue has eleven papers from a stellar line-up of world-leading researchers in the field and the work described is likely to have a deep impact of the developing applications of laser scanning in forest ecology.

phys.org

USA: Beech booming as climate changes, and that's bad for forests

Beech trees are dominating the woodlands of the northeastern United States as the climate changes, and that could be bad news for the forests and people who work in them, according to a group of scientists.

The scientists say the move toward beech-heavy forests is associated with higher temperatures and precipitation. They say their 30-year study, published in the peer-reviewed Journal of Applied Ecology, is one of the first to look at such broad changes over a long time period in the northeastern U.S. and southeastern Canada.

The changes could have major negative ramifications for forest ecosystems and industries that rely on them, said Dr. Aaron Weiskittel, a University of Maine associate professor of forest biometrics and modeling and one of the authors.

Beech, often used for firewood, is of much less commercial value than some species of birch and maple trees that can be used to make furniture and flooring. "There's no easy answer to this one. It has a lot of people scratching their heads," Weiskittel said. "Future conditions seem to be favoring the beech, and managers are going to have to find a good solution to fix it."

The authors of the study, who are from the University of Maine and Purdue University, used U.S. Forest Service data from 1983 to 2014 from the states of Maine, New Hampshire, New York and Vermont to track trends in forest composition. They found that abundance of American beech increased substantially, while species including sugar maple, red maple and birch all decreased.

That's a problem not only because of beech's lower value, but because of the spread of beech bark disease, which causes the trees to die young and be replaced by newer trees that succumb to the same disease.

The authors found that the rise of beech and the decline of other species is associated with "higher temperature and precipitation" in the forests. The dominance of beech was also especially notable in some key tourist areas — the White Mountains of New Hampshire, the Adirondack Mountains of New York and the Green Mountains of Vermont.

And beech has the possibility to grow even more because it's not a favorite food of deer, which will eat more seedlings of other trees, Weiskittel said.

The paper echoes other work that shows environmental changes are squeezing out important tree species, said Dr. Martin Dovciak, an associate professor in the Department of Environmental and Forest Biology at the State University of New York College of Environmental Science and Forestry who was not involved with the study.

"It's important to realize that the species composition that we are used to, in terms of forest management, might be different in the future," he said.

The changing forests will also pose challenges for loggers and timberland owners in the Northeast. More beech trees could mean less access to quality lumber for the timber industry, said Jasen Stock, executive director of the New Hampshire Timberland Owners Association.

"We're really dealing with the fallout from climate change, and how do we manage to accommodate for that," he said.

washingtonpost.com

N. America: Iconic tree from Twin Peaks threatened by climate change

In the Pacific Northwest, no tree is as crucial as the Douglas fir. The conifer dominates the region's rainforests. It was the basis of the traditional economy and is still an important source of timber in plantations around the world. But research now suggests the iconic tree – famous for its prominence in *Twin Peaks* – may face a future rife with disease and decline, fuelled by a warming climate.

The culprit is Swiss needle cast (SNC), a fungus that grows only on Douglas firs. SNC can live on the tree benignly. Under certain environmental conditions, however, its activity intensifies, causing a yellowing and shedding of needles that slows growth. In severe cases, it kills the tree.

Because our understanding of infection patterns is limited, researchers from the US Environmental Protection Agency and Oregon State University came together to reconstruct the conditions leading to outbreaks. In doing so, they found that the increasingly mild conditions expected with climate change will drive an increase in SNC disease.

The team took tree core samples from mature Douglas firs in different forests in Oregon's Coast and Cascade mountain ranges that were growing at various elevations and in a range of precipitation conditions.

The growth rings in each core provided years of information, with sharp reductions in growth rate indicating SNC impacts. By combining the tree chronologies with information on climatic fluctuations, the team found ties between climatic events and the intensity of outbreaks.

Periods with mild winters and more summer rain led to some of the most extreme SNC impacts. Similar climatic conditions are expected to become more frequent due to climate change.

Traditionally, SNC outbreaks have been more common in the mild, coastal fog zone than in the high Cascade peaks, but warming of these inland elevations will invite major outbreaks (*Ecology and Evolution*, doi.org/ch2j).

The effects of climate change are likely to extend beyond the trees, as they are vital to many organisms, such as spotted owls, says David Shaw, a forest biologist at Oregon State University and director of the Swiss Needle Cast Cooperative. These threatened birds nest in cavities in bigger mature trees like Douglas firs. Slow growth from SNC may reduce nesting opportunities.

The owls also prey on red tree voles, a rodent endemic to the region that feeds solely on conifer needles and is similarly threatened. "The bottom line is that lots of biota could be negatively influenced by widespread disease and decline of Douglas fir," says Shaw.

If, as feared, SNC outbreaks worsen and Douglas fir growth declines, Shaw expects broad and fundamental changes to Pacific Northwest forests, including declining carbon fixation and lower timber harvests.

newscientist.com