

CFA Newsletter



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Are protected forests safe?



Forest lost in Cambodia due to deforestation (Photo: Timo A. Rasanen)

Global deforestation rates have remained alarmingly high, despite the well-known importance of forests for sustaining life on earth. In the recent decades considerable efforts have been put to the protection forests and currently 13.5% of all forests are protected under IUCN categories I-VI (Schmitt *et al.* 2009). In many countries, special attention has been directed to protect intact forests, due to their crucial role for ecological diversity but currently only 18.9% of large intact forest landscapes have some form of protection (Potapov *et al.* 2008).

The status and effectiveness of protected areas in preventing forest losses have been estimated in various local scale studies, but so far the understanding at the global scale has remained limited. One of the major hindrances has been the lack of global scale data that would allow a consistent and reliable analysis and comparison between countries and regions. However, recently

published remote sensing based Global Forest Change (GFC) (Hansen *et al.* 2013) data with 30-metrespatial resolution provide new opportunities for such analyses.

In our recently published research we aimed to fill the past knowledge gaps by estimating the forest losses in the world's protected areas and intact forests landscapes, and the impact of protected areas on the forest losses. We assessed these over the period of 2000-2013 using the GFC data. We combined that data with the World Database of Protected Areas (IUCN and UNEP-WCMC 2014) and the Intact Forest Landscape dataset (Potapov *et al.* 2008) to achieve our aims. The findings were originally reported in PLOS ONE (Heino *et al.* 2015)*.

We found that 3% of the world's protected forests and 2.5% of intact forests were lost during 2000-2012. These forest loss rates are relatively high compared to total forest loss of 5% for the same time period. The forest losses varied greatly between the regions and countries.

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The views expressed are not necessarily those of the CFA.

Highest absolute losses of protected forests were observed, not surprisingly, in Russia, United States, Brazil, Canada, Indonesia and Australia. In terms of relative losses (%), high losses of protected forest occurred in several countries in North and Central America and in Australia and Oceania regions, exceeding 5% in 25 countries (Figure 1). In case of intact forests, highest absolute losses were found in Canada, Russia, United States, Brazil and Australia, while highest relative losses occurred in North America, Australia and Mongolia.

Our findings indicate that the forest losses were smaller in protected areas than outside them in the majority of the assessed countries (146 of 191, i.e. 76%). The protection was found to be effective in several countries in Latin America, Sub-Saharan Africa, Central and Southeast Asia and in Nordic Countries. But in several countries protection did not have a positive effect on forest loss, or relatively more forest was lost inside the protected areas than outside of them. Interestingly, we found that some countries with well-established protection networks, including countries from Western Europe, belong to that group.

We also performed a country level statistical analysis to identify drivers of forest loss in protected areas and intact forest landscapes using common socio-economic indicators. The analysis suggested that on a global scale, the losses of protected forests were linked to large agricultural land extent and high gross domestic product. In the case of intact forests, the losses were linked to high gross domestic product and slow population growth. These statistical associations are not fully in line with our causal understanding of forest loss processes and call for more detailed studies.

Altogether, our findings indicate that worryingly large areas of protected and intact forest were lost during the period of

2000-2012, and large part of the losses occurred in countries with well-established protection. Our findings further highlight that protection of forested areas does not always guarantee a lower rate of forest loss. There is, however, a high geographical variation in the effectiveness of protection against forest loss, a variation that is probably at least to some extent explained by countries' different means and intensities to combat against forest loss. The recent development in the availability of global forest data, including our results, provides good opportunities for understanding these processes in further details.

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* Full details of our approach and results, including country level data, are available at PLOS ONE: <http://dx.plos.org/10.1371/journal.pone.0138918>.

Association news

The Queen's Commonwealth Canopy



What is it?

The Queen's Commonwealth Canopy (QCC) is an initiative designed to create a network of forest conservation initiatives throughout the 53 nations of the Commonwealth to mark Her Majesty's service and dedication to the Commonwealth.

The project, in The Queen's name, will link Commonwealth countries through the conservation of all types of natural forest and indigenous vegetation for future generations. The initiative, conceived by the NGO Cool Earth, will be led by The Royal Commonwealth Society in partnership with Cool Earth and the Commonwealth Forestry Association.

Why do we need it?

Currently, members of the Commonwealth are working individually to preserve forest and indigenous vegetation in their own countries, but there is no co-ordination across the Commonwealth. By linking projects in The Queen's name, there is an opportunity to:

- share best practice
- raise awareness globally of the value of saving forests and indigenous vegetation and the impact on climate change
- use the existing relationships of the Commonwealth to create new, collaborative conservation initiatives
- employ the concerted power of a major co-ordinated initiative to access international funding for forest protection.

The vision guiding the QCC is the establishment of a coherent and vibrant network of forest conservation initiatives that, individually and collectively, demonstrate the capacity of the Commonwealth to act together and to benefit from shared knowledge and experience. It is anticipated that participation in the QCC will bring credibility and integrity to individual initiatives and strengthen their sustainability and development, as well as raise the profile of the benefits of forest conservation.

The QCC will consist of examples of conservation best practice across the Commonwealth's 53 members and will demonstrate that Commonwealth citizens are leading the world in efforts to protect the forest, upon which their communities and the planet as a whole depend. The initiative will show that, irrespective of geography, economy, culture or tenure, solutions exist to the threats facing these most critical of ecosystems.

Who can participate?

Every Commonwealth country will be invited to participate in the QCC by nominating and dedicating existing or future conservation projects that meet with the broad objectives of the initiative. Those countries with limited forest cover, will be invited to participate through the planting of native trees, the conservation of other indigenous vegetation or by supporting QCC partnerships with other Commonwealth nations.

The QCC will seek to support countries to develop new community-led projects that promote sustainable forest management.

Cool Earth and the Commonwealth Forestry Association will be available to assist in the development of such projects and training initiatives will be introduced to develop standards of management.

What will it cost?

Participation in the QCC is free of charge and there will be no financial or regulatory obligations imposed by the initiative. The Royal Commonwealth Society and Cool Earth will fundraise to cover the administration of the QCC and the costs associated with monitoring and reporting on projects, and sharing experience.

Public announcement

The Queen's Commonwealth Canopy was launched by Her Majesty at the opening of the Commonwealth Heads of Government Meeting (CHOGM) in Malta in November 2015. A follow-up media event was held at CHOGM, unveiling founding projects and providing a Q&A session for media.

It is anticipated that all 53 Commonwealth countries will eventually participate in the project and that Commonwealth leadership in forest conservation can be show-cased at both the 2017 Commonwealth Forestry Conference, to be held in India, and the next CHOGM, providing lessons from which all governments can draw.

Criteria to join the QCC

The QCC is an inclusive endeavour to champion the best forest conservation practices of the Commonwealth. A submission process will be co-ordinated by The Royal Commonwealth Society, in consultation with Cool Earth and the Commonwealth Forestry Association, to ensure that proposed QCC partner projects meet the following criteria for inclusion in the initiative. Projects considered for inclusion in the QCC should:

- have the endorsement of the relevant government and forestry/conservation
- authority
- contain clear objectives that include sustainable natural forest conservation
- recognise the rights of indigenous and local people in forest management.

An interview with Douglas Sheil – Queen's Award for Forestry winner 2015

"As researchers, it is not our role to make the decisions or negotiate outcomes, but we can help people and their representatives make well-informed choices"

Doug Sheil

Since 1987, the CFA has awarded the Queen Award for Forestry to innovative mid-career professionals who have brought exceptional contributions to forestry. In addition to a scroll the award provides a cash prize and a travel allowance for future work.

The recipient of CFA Queen Award 2015 is Doug Sheil, a tropical forest ecologist, born in Belfast, Northern Ireland but

raised mostly in the Republic of Ireland. His academic path includes a Masters in *Natural Sciences* from Cambridge, a Masters in *Forestry and its relation to land use* from Oxford and a doctorate on *Long-term dynamics of Ugandan rainforests* also from Oxford. His career experience mostly undertaken at Center for International Forest Research (CIFOR) in Indonesia and the Institute of Tropical Forest Conservation (ITFC) in East Africa, has revolved mainly around tropical ecology and conservation. He is currently a Professor at Norwegian University of Life Sciences (NMBU).

He graciously agreed to give us some insight into his work and perspectives in this Q&A style interview:



Research can bring new interest and pride to local communities. Here, in Papua, Indonesia, a father explains to his son, what he has learned from visiting biologists; that many of the local bird species only occur in a small area of the world. (Photo credit: Doug Sheil).

It is fascinating to hear about how people chose to engage in a particular vocation. Can you briefly describe your career path including why you chose to specialize in tropical ecology?

The wet tropics fascinate me – they are so rich with weird and wonderful biology and the people are special too. How can we maintain this wonder for future generations? There is plenty for researchers to do.

I always found the natural world fascinating and, as a child, spent a lot of time looking for insects, tadpoles, shrimps and other wildlife. I was not too sure what I wanted to be, and went through various phases even as an undergraduate. I did manage to do interesting things during my holidays including some small research projects: ultimately I realised that with a little luck I might be able to do such things and actually get paid for it. It seems to have worked out okay.

In one of my first jobs with IUCN in East Africa I saw how conservation projects operated – I still work on that theme (Boissière *et al.* 2009, Sassen *et al.* 2013, Wood *et al.* 2014, Sheil *et al.* 2015). My PhD work was more narrowly ecological: I examined long-term changes in a rain forest in Uganda based on plots established in the 1930s and 1940s. It was a great opportunity: I had to find the plots I could, remeasure them and analyse the data. It was the longest running study of rain-forest dynamics at the time and provided insight into how to assess such change (Sheil 1995a, Sheil 1995b, Sheil 1996a, Sheil and May 1996, Sheil *et al.* 2000). There had previously been elephants in that forest and I also needed to examine what impacts they have in similar forests and how species diversity changes

as a forest ages (Sheil 1996b, Sheil and Ducey 2002, Sheil and Burslem 2003, Sheil and Salim 2004).

Later, I worked for CIFOR in Indonesia. I was one of their few ecologists on their staff and I got involved in various projects. These included a study of improved logging (Sist *et al.* 2002) and one on the impacts of drought and fire on rain forests (Van Nieuwstadt and Sheil 2005). A longer running theme was investigating how selectively logged forests can contribute to conservation (Meijaard *et al.* 2005, Sheil and Meijaard 2005, Meijaard and Sheil 2008, Sheil, Putz and Zagt 2010). But not all my work was solely biophysical.

A big early task at CIFOR was planning and coordinating a biological survey in a relatively remote part of Kalimantan (Borneo). I wanted the surveys to be useful, and to reflect the preferences and needs of the people whose lives and cultures depended on the forest. So we developed approaches to address that. These methods became popular and were applied and adapted in other parts of the world including in Indonesian Papua and in Vietnam. (Sheil and Boissière 2006, Boissière *et al.* 2009, Boissiere, Sheil and Basuki 2011). A significant theme in my work since then has been the implications of local people's preferences, needs and knowledge (Sheil and Lawrence 2004, Sheil and Liswanti 2006, Sheil *et al.* 2006).

After I left CIFOR I helped to manage a small research station in the Bwindi Impenetrable National Park in Uganda for four years. It was a great close-up opportunity to see and try and address the day-to-day challenges of forest management and protection (Olupot and Sheil 2011, Mugerwa *et al.* 2012, Sheil *et al.* 2012b, Sassen and Sheil 2013, Ssali, Sheil and



Research into local preferences and needs, can generate interest and enthusiasm. Here checking local language plant names, uses and values with a community in Kalimantan (Borneo) Indonesia. (Photo credit: Doug Sheil).



The sharp edge of the Bwindi Impenetrable National Park, Uganda, an island of high conservation value forest in a region of high human population densities, has been stable for over half a century. (Photo credit: Robert Bitaribo).

Nkurunungi 2013, Twongyirwe *et al.* 2013). And with the benefit of solar power and satellite internet I was still able to finish a co-authored book on rain forests started a couple of years before (Ghazoul and Sheil 2010).

We Irish enjoy debate, and various aspects of my work have been stimulated as a reaction to other people's studies (Sheil 1995b, Sheil and Wunder 2002, Sheil *et al.* 2013). Some of these are fun and not meant seriously (Sheil *et al.* 2008). I continue to have many fruitful collaborations on diverse topics too (Slik *et al.* 2008, Bongers *et al.* 2009, Makarieva *et al.* 2010, Boissiere, Sheil and Basuki 2011, Sheil *et al.* 2012a, Ramage *et al.* 2013, Alele *et al.* 2014, Gaveau *et al.* 2014, Ladd *et al.* 2014, Wood *et al.* 2014).

From your experience with forest projects, what are the ingredients for "success" and what has not worked?

Success is hard to assess. We need an agreed definition and appropriate data. Even if focusing on something relatively well defined such as conservation outcomes, we know remarkably little about the true effectiveness of most forest conservation measures (Brooks, Wright and Sheil 2009).

Perspective is important too. We are often willing to apply different standards to distant countries than we would accept as reasonable in our own neighbourhood. I once wrote a satirical article on that with Erik Meijaard (Meijaard and Sheil 2011). There we made fun of it, but of course the implications are often serious. For example, the gazettement of the Bwindi Impenetrable National Park in Uganda has clearly been good for the animals, but it was not good for the Batwa people who lost access to their forest with no compensation, nor is it good for the subsistence farmers around the park who lose their crops to the park's animals. Can anyone imagine that outcome in Europe or North America? Certainly the park is a success in terms of its stated conservation goals and it brings the country considerable tourist revenues. But is this really a "success" if the local people would, if given the opportunity, vote in favour of politicians offering to reverse the park's protection and return the land to the people? Even if we were to set the ethics aside, it seems that imposing and enforcing outcomes may work for

a while, but by creating "opponents" it sows the seeds of its ultimate failure.

In the long-term, we need conservation to be as just and as democratically accountable as any other process. If you want to help that process, then respectful engagement can get you a long way. We need to identify when goals align: this provides a foundation for collaboration. We also need to identify when they don't align: this provides a basis for negotiating the resulting trade-offs. As researchers, it is not our role to make the decisions or negotiate outcomes, but we can help people and their representatives make well-informed choices. We made a video about some of our efforts to achieve that in Kalimantan (see <https://www.youtube.com/watch?v=eVIsN5-C1AA>). I believe our work in Kalimantan and in Papua have contributed to more robust forest planning in which conservation outcomes arise from local needs and preferences and are not seen as an imposition by foreigners and other outsiders (Padmanaba and Sheil 2007). Of course, awareness and planning are easier to achieve than are sustained progress and lasting outcomes. When it is practical for communities to maintain or take control, this generally results in better outcomes. At larger scales, when it comes to balancing multiple interests and managing multiple goals, simple solutions are few. But even there, many of the key principles and ingredients have been identified (see, e.g., Sayer *et al.* 2013). The bottom line for me is that most people can be genuinely motivated by nature and environmental concerns, and it is much better to work with people than against them. That doesn't mean it will always work. Conservation is hard and sometimes there are no easy fixes.

Would you think that a gap exists between western conservation views and traditional knowledge from local communities or can both be fused in tropical conservation projects?

It may take time to build trust and effective communication but that effort is well worth investing and almost always brings improved understanding, valuable goodwill and a stronger basis for collaboration (Sheil and Lawrence 2004, Sheil and Boissière 2006). Even without big investment, you can gain a lot by just

asking and listening. Many of the methods that can be used to access to document and understand local preferences are not especially difficult (Sheil *et al.* 2002, Cunliffe *et al.* 2007, Lynam *et al.* 2007). They can be a lot of fun too.

Opportunities will vary. My own experience is that there is often considerable overlap between the goals of local people who want to protect an area or resource and what conservationists might want. We could achieve more by focusing on shared interests and seeking to build a sense of shared purpose and cooperation rather than focusing efforts on points of differences (Vermeulen and Sheil 2007).

What advice would you have for any student interested in pursuing tropical forest ecology and management as a career path?

When you start, opportunities may be scattered and unpredictable. While it is important you follow what interests and motivates you, you also need to be flexible. Develop useful skills, and work with people you can learn from. Enjoy it.

As a researcher, keep an open mind, seek evidence and welcome opportunities to change your mind. Ideally seek pragmatic solutions to real problems. Spend time to understand the day-to-day challenges and constraints of those you think might benefit from your work.

Interview conducted by Joanna Li Yung Lung, IFSA-CFA Liaison Officer 2013 – 2015

REFERENCES a full list of references cited in the text is available at www.cfa-international.org/cfa_newsletter.php

RELATED LINKS

- CFA Queen Award: <http://www.cfa-international.org/qa.php>
- Doug Sheil's academic and professional path: <http://no.linkedin.com/pub/douglas-sheil/9a/30a/553>
- Doug Sheil's publications: <http://scholar.google.com/citations?user=7cXBF9sAAA&hl=en>
- Mongabay interview with Doug Sheil: <http://news.mongabay.com/2014/07/next-big-idea-in-forest-conservation-the-double-edged-sword-of-democracy/>

CFA meeting in Nigeria

3rd Commonwealth Forestry Association Workshop on 'Research Proposal Writing and Use of Appropriate Analytical Tools for Analysis' 6-8 October 2015, Forestry Research Institute of Nigeria (FRIN), Ibadan, Oyo State, Nigeria



Professor J.C. Onyekwelu (Resource Person) presenting his paper at the 3rd Commonwealth Forestry Association Workshop

Background

The executive officers of Commonwealth Forestry Association (CFA), Nigeria Chapter met on the 27th of January, 2015 in the Department of Forest Resources Management, University of Ibadan, Nigeria. The issue of mentoring young forestry scientists at the Forestry Research

Institute of Nigeria (FRIN) was eloquently discussed. Salient and coherent points were made on the forestry profession in Nigeria. It was observed that the majority of our renewable natural resource scientists in Forestry, Wildlife and allied professions these days do not understand how to analyse field data on their own. This poses serious knowledge gap in Forestry which must be addressed before our generation drops the toga of mentorship.

Mentoring has been identified as a powerful development and empowerment tool for innovative application of research and development in Nigeria in particular and Africa in general. It is an effective way of helping scientists to progress in their careers. Mentoring is becoming increasingly popular around the world as its potential is widely recognised. Therefore, the executive officers agreed that mentoring in the forestry profession is about becoming more self-aware in Nigeria; taking responsibility for Nigerian life and directing Nigerian Forestry Scientists in the direction of Nigerian Forestry scientists decide, rather than leaving it to chance elsewhere in the universe.

Mentoring helps to:

- Build a solid personal foundation and demonstrate strong confidence in self and others;
- Develop personal vision and uncover value priorities;
- Think strategically and inspire shared vision, mission and values;
- Determine appropriate goals, strategies, tactics and action plans; and
- Elicit high commitment to personal change and development.

Mentoring young forestry scientists at the Forestry Research Institute of Nigeria and other universities where forestry is taught for the innovative application of research and development in Nigeria is a crucial issue in the 21st Century. Concerted efforts are needed for the capacity building of many young scientists in FRIN. This was the scenario that led to the 3rd CFA Workshop at the Forestry Research Institute of Nigeria.

Main Outcomes of the 3rd Commonwealth Forestry Association Workshop

Attendance The workshop was overwhelmingly attended by more than 400 young and established forestry scientists in Nigeria. Scientists from the following universities and Institutes in Nigeria attended and participated in a 3-day-workshop: University of Ibadan, Nigeria; Federal University of Technology, Akure; Federal University of Agriculture, Abeokuta; University of Maiduguri, Maiduguri; College of Education, Ikere; Federal University of Technology, Owerri; Delta State University, Asaba Campus; Forestry Research Institute of Nigeria, Ibadan; Federal College of Forestry, Ibadan; Cocoa Research Institute of Nigeria, Ibadan; University of Ilorin, Ilorin; and Federal University, Dutse.

Resource Persons The following Six resource persons presented papers with examples on the theme of the 3rd CFA workshop:

- Professor B.O. Agbeja** (Department of Forest Resources Management, University of Ibadan, Nigeria),
- Professor S.O. Akindele** (Department of Forestry and Wildlife, Federal University of Technology, Akure, Nigeria),
- Professor J.C. Onyekwelu** (Department of Forestry and Wildlife, Federal University of Technology, Akure, Nigeria),
- Professor B.T. Omonona** (Department of Agricultural Economics, University of Ibadan, Nigeria),



Cross-section of participants at 3rd Commonwealth Forestry Association Workshop

- Professor Stella Odebode** ably represented by **Mrs. Folake Adelakun** (Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria),
- Mr. Alfred Ossai Onefeli** (Department of Forest Resources Management, University of Ibadan, Nigeria),

Emerging Issues

The following emerging issues were discussed and deliberated upon after the workshop:

- Availability of Laboratories, Equipment and Logistics in Universities where Forestry is taught in Nigeria and Forestry Research Institute of Nigeria'
- Status and Trend of Institutions offering Forestry Programme at Undergraduate and Postgraduate Levels in Nigeria
- Research Outputs in Universities and Forestry Research Institute of Nigeria
- Government's Support (Financial, Technical, etc.) for Universities offering Forestry and Forestry Research Institute of Nigeria

COMMUNIQUE

We, members, participants and would-be future members of the Commonwealth Forestry Association (CFA), Nigeria Chapter submit this communiqué for information and action from the Workshop on 'Research Proposal Writing and Use of Appropriate Analytical Tools for Analysis' held from 6-8 October 2015 at Forestry Research Institute of Nigeria, Jericho Hills, Ibadan, Oyo State, Nigeria

We are convinced that Commonwealth Forestry Association Nigeria chapter is a unique association and will move forestry profession forward in Nigeria with the initiative of mentoring young and established forestry scientists to address the complex problems in Nigerian forest estate.

We appreciate the outcomes of the 3rd CFA Workshop as verifiable indicators of the following:

- Significant improvement in effectiveness, speed and accuracy of forestry stakeholders' communication and information networks
- Strengthening the Capacity of Commonwealth Forestry Association Executive Officers to mentor the Forestry Students, Mid-career Forestry Scientists and Established

Researchers/Lecturers in Nigerian Universities and at the Forestry Research Institute of Nigeria.

Future Thematic Areas of CFA Nigeria Chapter for the forthcoming conference of Commonwealth Forestry Association in Nigeria is slated for September 2016.

The CFA Nigeria Chapter in 2016 will focus its scientific activities on the following:

1. Environment, Climate Change and Bio-energy
2. Forest Ecosystems, Biodiversity and Invasive Species
3. Agroforestry and Community-Based Forest Management

4. Forest Socio-economics, Policy, Legislation and Governance Issues
5. Forest Products (timber and non-timber) Development and Value Addition
6. Rural Livelihood and protected areas development
7. Issues in Tropical Forest Measurements
8. Herbal Products for repertoire of medicine.

Professor B.O. Agbeja,

Ph.D. (Ibadan); Dip (Finland); Dip (Rotterdam)

President

Commonwealth Forestry Association, Nigeria Chapter

Forest Scenes

The end of BSc and MSc Forestry Degrees at Aberdeen University?

As part of a programme of financial cuts being made at University of Aberdeen, it has been approved that the forestry degree programmes are closed to new entrants from 2015. BSc Forestry (honours) and MSc Forestry are the last degree programmes of their type taught in Scotland, thus leaving the University of Bangor being the only place to obtain a BSc forestry (honours) degree in the U.K.

While it is the intention at the University of Aberdeen to 'embed' forestry into the environmental degree programmes, all the forestry specific subject will close with only a skeleton of specific forestry content remaining to cover the transition period to allow current students to complete their degrees. The commercial and business side of forestry is almost certainly gone with the emphasis now on ecology and environmental studies. The latter are seen as popular subjects that attract more students with obvious financial advantages to the University. Sadly, the University of Aberdeen along with most other higher education institutions is now run primarily as businesses rather than places of learning.

Part of the argument to close the forestry degree programmes is the relatively low student numbers (average 10 over the last 5 years), although the demand for graduates by employers greatly exceed supply. Forestry graduates from Aberdeen have had a positively disproportionate impact on forestry domestically and internationally. Undoubtedly, the loss of these degree programmes will have a negative impact on forestry and forest industries.

Scotland is the most forested part of the UK with over 1.4 million ha producing over half of the UK's softwood production and employs more than 40,000 people. The Scottish Strategic Forestry Plan is to increase the area of forests to 2.0 million ha by 2100 and during the period to 2020 funds are available to plant another 49,000 ha. In addition another 150,000 ha will have to be replanted by 2020. Annually, the industry is worth \$1.6 billion (£1.7 billion) gross value added to the Scottish economy and drives an annual investment of around \$76 million (£50 million).

In view of the importance of forestry, not only in Scotland, but worldwide, it seems extremely short-sighted to close the 'traditional' forestry programmes at Aberdeen. Climate talks were

held in Paris in December 2015 to map out a strategy to keep the increase in the global temperature from rising 2°C above the pre-industrial level. Trees do and could play an even more important part in tempering temperature increase. Wood is also the largest source of renewable energy providing about 10% of the World's energy needs (International Energy Agency). Much is said about Carbon Capture and Storage (CCS), but most emphasis is placed on sequestering CO₂ from power stacks etc. in the ground or under the sea. The cost of such sequestration ranges from \$60 to \$250 per tonne of CO₂ (Climate Interventions – CO₂ removals and reliable sequestration. US National Research Council of the National Academy of Sciences, Oct. 2015). However, CCS with trees is usually well below \$10 per tCO₂. What is more, it provides an annual offtake, which amongst other things can be and is used as renewable energy. The need for educated graduates of forestry has never been greater to take on these new challenges.

If people would like to complain or comment on the closure of the traditional forestry programmes at Aberdeen, you could contact the Principal and Vice Chancellor, Prof. Sir Ian C Diamond, C/o his Personal Assistant, Lois Brown Kings College, Aberdeen AB24 3FX. Tel. (0)1224 272135 lois.brown@abdn.ac.uk.

Another person to contact is Prof. Michelle Pinard, Director of Teaching, School of Environmental Sciences, Zoological Buildings, Tillydrone Avenue, Aberdeen, AB24 2TZ. Tel. (0) 1224 27 4110 m.a.pinard@abdn.ac.uk

Interested people and/or businesses may like to contribute to financing a lectureship in Forestry at Aberdeen in order to keep the teaching of traditional forestry viable. I personally contribute to the Aberdeen University Trust Fund. If sufficient members are interested, they could contact me and we could establish such a fund.

Keith Openshaw,

2430 Shenandoah St. Vienna, Virginia 22180,

USA. Tel (1) 703 876 5306.

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World Forestry Congress: the good news is that there is less bad news, possibly

The statements by Jose Graziano da Silva, Director General of the Food and Agriculture Organization of the United Nations, in an opinion piece reported in the *Bangkok Post* say it all. “Good news is being delivered this week at the World Forestry Congress in Durban, South Africa: the rate of net global deforestation has slowed down by more than 50% since 1990”. “In another positive development, the net loss of natural forest declined from 8.5 million hectares per year between 1990 and 2000 to 6.6 million hectares per year between 2010 and 2015”.

Mr. Graziano da Silva seems to have a ‘glass half full’ philosophy, reflected by many of the speakers at the World Forestry Congress in Durban. According to the Global Forest Resources Assessment 2015 (GFRA), released during the Congress, between 2010 and 2015, there was an annual loss of 7.6 million ha of natural and planted forest, and an annual gain of 4.3 million ha. Such figures are very dependent on the data submitted by countries, and it is encouraging that there has been an increase in the forest area covered by recent or ongoing national inventories: 80% of the world’s forests are now included. That means that about 800 million ha of forest are not covered by inventories, but there is still sufficient confidence to report changes in forest area with an accuracy of 100,000 ha. In fairness, the GFRA does state that it “does not report deforestation directly due to the complexity of collecting deforestation statistics”. The primary output of the Congress is the Durban Declaration, which contains the rather mystifying statement that “the Congress took stock of the state of the world’s forests” – which appears to be all it could say about the GFRA report.

What is the true situation? Anyone attending the World Forestry Congress would be hard pressed to work this out. Individual countries have changed the way they classify forests, or particular types of forests. A good example is Australia, which in 2008 reported major differences in the area of forests as calculated for forestry purposes and as calculated for carbon budgeting purposes. In their *Australia’s State of the Forests Report 2013*, they corrected this, but at the cost of making changes over time difficult to determine. As the GFRA reports, some countries (including Costa Rica, Japan, Malaysia, Russian Federation and the United States of America) have reported increases in their areas of primary forest, but this reflects changes in the ways that such forests are classified rather than real changes in the area of such forests. Such problems means that there is a great deal of uncertainty surrounding many forestry statistics, and one could argue that these uncertainties are behind many of the difficulties facing the development of coherent international forest policy.

The Durban Declaration contains what it describes as a vision for forests and forestry:

- “Forests are more than trees and are fundamental for food security and improved livelihoods. The forests of

the future will increase the resilience of communities by providing food, wood energy, shelter, fodder and fibre; generating income and employment to allow communities and societies to prosper; harbouring biodiversity; and supporting sustainable agriculture and human wellbeing by stabilizing soils and climate and regulating water flows.

- Integrated approaches to land use provide a way forward for improving policies and practices to: address the drivers of deforestation; address conflicts over land use; capitalize on the full range of economic, social and environmental benefits from integrating forests with agriculture; and maintain multiple forest services in the landscape context.
- Forests are an essential solution to climate change adaptation and mitigation. Sustainably managed forests will increase the resilience of ecosystems and societies and optimize the role of forests and trees in absorbing and storing carbon while also providing other environmental services.”

The Congress issued other statements: one on climate change and another to the United Nations General Assembly Summit for the adoption of the 2030 Agenda for Sustainable Development. The latter statement contained the curious suggestion that “Forestry leaders and practitioners around the world are prepared to step up their efforts to manage forests sustainably...”. One can only wonder what this is supposed to mean.

As a participant at the Congress, I had a number of challenges. Many of the main sessions contained little of consequence. On several occasions, I seriously wondered about the competence of some of the speakers and panelists. What, for example, should we make of the allegation by one ‘distinguished’ panelist that criteria and indicators of sustainable forest management fail to address either soils or water?

As with many such Congresses there were numerous side sessions and parallel events, making it difficult to attend all sessions of possible interest. Unfortunately, many sessions were scheduled late in the evening and had very small audiences, despite excellent speakers.

Four thousand people are reported to have participated in the Congress, from 142 countries. Many were part of the ‘professional conference circuit’ – they would move on to the United Nations General Assembly Summit and the United Nations Framework Convention on Climate Change Conference of the Parties in Paris (where 40,000 people are expected to attend). If all participants were to offset the carbon emissions they generate attending these meetings by planting trees, perhaps the next GFRA would report a net increase in global forest area.

John Innes
CFA Chair

River Mirna Basin Model Forest develops Sustainable Truffle Strategy



Truffles are the most valuable non-timber forest product (NTFP) in Croatia's River Mirna Basin Model Forest, providing a living income for approximately 1000 families in the area. Their highly prized taste makes them a sought after ingredient for experienced chefs all over the world. Their complicated and unpredictable reproduction makes them difficult to find. They are usually found in close association with the roots of several tree species and can be found buried between the leaf litter and the soil. Collecting truffles requires a well-trained dog with a keen sense of smell.

Historically, NTFPs have been gathered with little or no attempt at deliberate management. In the River Mirna Basin Model Forest, the exploitation of truffles is no exception. The increasing number of illegal truffle hunters, inadequate legislation and unsustainable collection practices has led to the devastation of this precious mushroom. Truffles support a multi-million dollar industry in Istria. The Model Forest has developed a Sustainable Truffle Strategy that will enable the continued growth of truffles in this region while protecting its habitat and raising its commercial value.

The Strategy outlines the following goals:

1. To preserve and increase the productivity of natural truffle habitats
2. To establish a truffle plantation
3. To strengthen and regulate the truffle market in Istria
4. To nurture sustainable rural development

NTFPs are an attractive resource in many Model Forests as they can contribute to the sustainable development of an area and provide an often needed alternative source of employment in forest-dependent communities. The Sustainable Truffle Strategy will challenge decision makers to adjust the legislation in favour of sustainable rural development. Ana Fornažar, General Manager of the River Mirna Basin Model Forest, explains:

Right now, truffle hunting is only legal from September to January. That's great for harvesting the white truffle, but



River Mirna Basin truffle hunting

under current regulation, it is illegal to harvest the black (summer) truffle. Such legislation has a negative impact on the rural economy and moves the truffle harvest, and subsequently, the market, into an illegal zone.

By joining forces with experts, local communities and regional policy makers interested in the protection and use of NTFPs, the Model Forest will encourage the adoption of new decisions, regulations and projects, all based on recent practices and analysis of existing problems.

The River Mirna Basin Model Forest developed the Sustainable Truffle Strategy in partnership with the Istrian Region and the Croatian Forest Research Institute within the framework of MEDLAND 2020 – a project funded by the European Union to design a common integrated land management scheme.

For More Information visit <http://www.rivermirnabasin.org/en>

Danielle Cantin and Brian Bonnell

IMFN Secretariat

Fire management in a sunburnt country



Wildfire in the Victorian High Country

A vast area, a small, highly urbanised population, droughts, and flammable, fire-dependent ecosystems. Fire management on the world's biggest island; on the planet's smallest continent – is there any room for optimism in the face of global warming?

Over a few generations we have experienced global, climate-related changes that, science tells us will increasingly, in Australia, see hotter, windier, drier and more flammable environments. Concurrently, Australian fire suppression costs are ballooning while new 'area burnt' records are set and broken in rapid succession. Are fire managers and Australia's political systems coping - and what of land managers? Should 'at risk' communities feel ever more vulnerable?

Occupying an entire continent of some 769 million hectares, Australia straddles a latitudinal range of 11°S to 44°S. Beyond the cities and towns that house most of its 23 million people are vast rangelands and some 149 million hectares of forest. Of these forests¹, 147 million hectares are 'native'; being dominated by the genera *Eucalyptus* (78%), *Acacia* (7%), and *Melaleuca* (5%), and 2 million hectares comprise plantations. Grasslands cover around 440 million hectares.

Indigenous people were integral to the development of most fire regimes. Their use of fire over millennia helped shaped the landscape and its flora and fauna. Following the movement of non-aboriginal people into the area now known as Australia, changes in land tenure and the creation of built assets on a significant scale led to bush(wild)fires coming to be seen as Australia's most ubiquitous natural hazard.

Between 30 million and 70 million hectares of Australia are burnt annually. The majority of this burnt area is in the north, above the Tropic of Capricorn. These fires generally have a comparatively low economic impact due to the limited population density and the dispersed nature of the areas' built assets. The potential environmental impacts from poorly planned or executed fire regimes are however, significant (negative impacts can include the loss of natural biodiversity; increases in pest plants and animals; and greenhouse implications).

In more recent decades, south-eastern Australia has come to be viewed as one of the three highest wildfire risk regions on Earth. In this area, large fires often have significant economic and social impacts. The 2002-03 and 2006-07 fire seasons in south-eastern Australia, and most particularly the 2008/09 season were very significant. Lives and major assets were lost and suppression costs reached exorbitant levels.

More recently Tasmanian, New South Wales and Victoria fire events in 2013; and Western Australia fires in 2011, 2014 and 2015 in the lower southwest, further highlighted the negative economic, social and environmental impacts that wildfires can have in Australia.

Each month, of every year, wildfires burn in some part of Australia. Lives and assets are threatened annually. Nature often provides conditions that are very conducive for catastrophic wildfires. History reveals massive dry lightning storms igniting many wildfires across the landscape. Gale force winds can cause power-line ignited fires, on days of high temperatures and low relative humidity's. Such fires can result in heart-rending loss of lives, destruction of assets and environmental degradation. Across the nation land and fire managers know they



Tragedy in Victoria (Photo courtesy of Herald and Weekly Times)

need to address the immediate issues of wildfire response while investing in collaborative research to find longer-term solutions to the ever increasing threat of wildfire.

Increasingly also it is realised that no individual fire agency has sufficient resources to combat every wildfire situation it may encounter. Resource assistance is required for the worst case scenarios.

Beyond national resources, and since 2000, Australasia and North America have successfully shared expertise between the northern and southern hemisphere through their respective forest fire management coordinating bodies. The impetus, and its success, of utilising firefighters from half-way around the world is rooted in the long-standing practice of periodic, reciprocal fire management study tour exchanges between North America (Canada, United States and Mexico) and Australasia (Australia and New Zealand). These forest fire management study tours, which began in 1951, demonstrated that similar wildland fire-fighting skills, abilities and knowledge are present across the participating countries.

Trust was found to be the major consideration when formalising the resource sharing arrangements. This confidence between organisations was considerably advanced through the endeavours of the participants in the 1997 *Australasian Forest Fire Management* (FFMG) study tour to North America and the subsequent *North American Forests Commission* study tour to Australia and New Zealand. Following these exchanges, and from 2000 onwards, there have been regular two-way flows of firefighters across the Pacific Ocean, in support of the jurisdiction requiring assistance.

In further international developments, and following the 3rd *International Wildland Fire Conference*² which was held in Sydney in 2003, the 1st *International Wildland Fire Summit* was held between representatives from all regions of the globe. The Summit, which included 34 countries and 12 organisations, developed a *Global Strategy for the Improvement of Wildland Fire Management*.

Included in the strategy was consideration of guiding principles for wildland fire management which, in accord with the recommendations of the 17th *Session of the United Nations' Food*

¹ www.daff.gov.au/ABARES

² <http://www.fire.uni-freiburg.de/summit-2003/introduction.htm>



Devastation in Kilmore East (Photo courtesy of Herald and Weekly Times)

and Agriculture's (FAO) Committee on Forestry in 2005, were developed by FAO into *Fire Management Voluntary Guidelines*³. These were subsequently endorsed during 2007, at the 18th Session of COFO, and at the 4th International Wildland Fire Conference, in Spain.

Consistent with the U.N. *Fire Management Voluntary Guidelines* FFMG, the long-running committee of Australian and New Zealand land management agencies with responsibility for forest fire management was tasked to develop a national fire policy for the Council of Australia Governments (COAG). As a result FFMG developed the *National Bushfire Management Policy Statement for Forests and Rangelands*. This COAG endorsed document sets the high level strategic direction for all agency fire plans across Australia and New Zealand. It helps underpin sound management of forests across the landscape.

To meet the identified medium and long-term land management needs however, it was recognised that a commitment to ongoing fire research was required. Consequently, FFMG detailed its agreed priority research areas in a document titled *National Research Priorities to 2020 and beyond*. These priorities then informed the development of the current (2013/20) research program for the *Bushfire and Natural Hazards Cooperative Research Centre*⁴, the successor to Australasia's original (2003/14) *Bushfire Cooperative Research Centre*⁵.

Since 2003 this industry inspired, independently conducted research initiative, and its related research utilisation programs, have made significant impacts in fields that include fire behaviour, ecosystem impacts, and firefighter and community safety.

The complexities associated with landscape fire in Australia remain considerable. However, a path has been set. Now there is some cause for optimism. Through national and international collaborative scientific research and related learning, in sharing experiences from the strategic to the operational, improved land and fire management seems possible.

Gary Morgan and Mike Leonard

Mike Leonard

Mike Leonard joined the then Forests Commission, Victoria in 1970 as a trainee, and subsequently completed a Diploma of Forestry (Creswick) in 1972; and a Bachelor of Science (Forestry) at Melbourne University in 1975. He worked in both regional and Melbourne-based roles for the Forests Commission and its successors gaining much practical, scientific and political knowledge in land and fire management.

Mike's final position before retirement, in 2005 from full-time work, was as Manager – Strategic Planning within the central Fire Management Group of the government agency. During the mid-1990s Mike chaired the Technical Working Group that assisted in the development of Victoria's first Code of Practice for Fire Management on Public Land.

Between late 2005 and July 2014, he worked in a part-time capacity at the Bushfire Cooperative Research Centre as the company's Strategic Adviser.

Mike is a member of the Institute of Foresters of Australia and Vice-President of the Forest Commission Retired Personnel Association.

Gary Morgan AFSM

Gary Morgan AFSM has spent over 20 years in senior executive land and fire management roles.

He is a graduate of Forest Science from the Victorian School of Forestry, Creswick and Melbourne University and is a member of the Australian Institute of Foresters. He began his career in fire research before going to work as a land manager across the disciplines of forestry, fisheries, recreation management, fire management, pest plants and animal control, and the private use of Crown land. After a range of regional positions up to the role of acting Regional Manager of Victoria's public land agency.

Moving into head office, Gary acted for nine months in the central position of Manager of Commercial Forestry for the State of Victoria. He was then appointed the role of Victoria's Chief Fire Officer which he held for nine years.

In 2006, he resigned from this government position of Chief Fire Officer and also stepped down from the Boards of both the Bushfire CRC Ltd. and the peak fire industry body within Australasia - the Australasian Fire and Emergency Service Authorities Council Ltd. (AFAC) to become more fully involved in operational aspects of the Bushfire CRC company. This led him to becoming the CEO in 2007, a position he held until his retirement, in September 2014.

In June 2002, Gary was awarded an Australian Fire Service Medal by Her Majesty, Queen Elizabeth the second, Queen of Australia, for his national services in fire management.

In April 2013, Gary was awarded a Commonwealth Forestry Association, Regional Award of Excellence, for the South East Asia and Pacific Region. This was in recognition of his outstanding work in the Forestry sector at a national and international level.

³ <http://www.fao.org/sustainable-forest-management/toolbox/tools/tool-detail/en/c/217934/>

⁴ www.bnhrcc.com.au

⁵ www.bushfirecrc.com

Is the new government in Canada good for forestry?

In October 2015, a significant change of government occurred in Canada. The Conservatives, led by Stephen Harper, were replaced in a surprise majority victory by the Liberal party, led by Justin Trudeau, the son of a former prime minister of Canada, Pierre Trudeau. What does this mean for forestry and forest science in Canada? It is still very early, but there is already evidence of a change in style. The strictly controlled communication by government departments under Trudeau's predecessor has been eased, and many government scientists have been informed that they are now able to speak to the press more freely.

A major change in the Canadian government's approach to environmental policy is likely underway, although it is too early to be clear on details. An election promise of the Liberals was to halt the Northern Gateway pipeline project, which would take bitumen from Alberta's oil sands (aka tar sands) to the British Columbia coast. This may or may not happen. However, a moratorium on oil tankers in northern BC waters has been confirmed. Changes in Canada's approach to climate change mitigation and adaptation are also likely, and the statements made by Trudeau at the Paris Climate Change Conference are encouraging. Perhaps more encouraging was his attempt to bring all Canada's provincial premiers to Paris to see for themselves how the world views climate change. Having them on board will greatly ease any attempt by Canada to adopt a more enlightened approach to the problem.

Canada's forests and forest sector did not feature strongly in the election campaign. This is confirmed by the Ministerial Mandate letter sent by the Prime Minister to the new Minister of Natural Resources which makes little mention of forests. Amongst a variety of tasks primarily related to clean energy, the Minister is required to:

- "Work with the Minister of Innovation, Science and Economic Development and other responsible ministers to support innovation and the use of clean technologies in our natural resource sectors, including the forestry, fisheries, mining, energy, and agricultural sectors".

- "Work with the Minister of Environment and Climate Change, the Minister of Fisheries, Oceans and the Canadian Coast Guard, and the Minister of Indigenous and Northern Affairs to immediately review Canada's environmental assessment processes to regain public trust and introduce new, fair processes that will:
 - restore robust oversight and thorough environmental assessments of areas under federal jurisdiction, while also working with provinces and territories to avoid duplication;
 - ensure that decisions are based on science, facts, and evidence, and serve the public's interest;
 - provide ways for Canadians to express their views and opportunities for experts to meaningfully participate, including provisions to enhance the engagement of Indigenous groups in reviewing and monitoring major resource development projects; and
 - require project proponents to choose the best technologies available to reduce environmental impacts".
- "Work in partnership with the United States and Mexico and the Minister of Environment and Climate Change and the Minister of Foreign Affairs to develop an ambitious North American clean energy and environmental agreement."

The mention of forestry in the first bullet is the only reference to forests in the mandate letter, which suggests that forestry will not receive a high priority from the new government. Conversely, it seems likely that major initiatives related to Indigenous issues will receive greater attention, consistent with recent decisions by the Supreme Court of Canada. This could have major implications for forestry because of the current tenure system for forests in many provinces.

John Innes
CFA Chair

El Niño 2015-16

The newspapers and magazines that I read have carried several items recently on El Niño, related to the forthcoming weather. Consider:

1. **July was Earth's hottest month on record, NOAA says** (The *i*, 20th August 2015) relates that July 2015 was the hottest month on Earth since records began in 1880; the average temperature world-wide was 16.6°C, or 0.08°C higher than the previous record, which was set in 1998. Now the US-based National Oceanic and Atmospheric Administration (NOAA) says that since the first seven months of 2015 were the warmest on record for the period then the whole year is likely to be a record too – and that while the effects of increased CO₂ is a major

cause of rising temperatures, there is also the effect of El Niño in pushing up temperatures even further.

2. **Warming slowdown is ending, says [UK] Met Office** (The *i*, 14 September 2015) tells us that the slowdown in global warming is likely to end within the next two years as there is a radical change in the earth's climatic system that could increase temperatures to record highs this year and next. All related to a predicted strong El Niño, which could push global temperatures to another record high in 2016 (see item 1. above)
3. **UK could be set for another Big Freeze** (The *i*, 15 September 2015) deals with the possibility that Britain could be heading for another very cold winter, similar to those of 2009/10, when air and train services were severely disrupted or even 1950, when the UK had one

of its snowiest winters ever. The cause of this predicted cold weather is a forecast powerful El Niño, which can affect the weather as far from its source as the UK.

4. **El Niño: bringing up baby** (The Economist, 22nd August 2015) This article forms the basis of my account.

El Niño is defined as a Pacific-wide weather phenomenon – with global impacts. It happens when warm water accumulates in the western Pacific and floods to the east when the trade winds drop, and the warmer water flows eastwards, causing heavy rain in the south-east of South America, western North America and eastern Africa, and droughts in Australia, India and Indonesia. Another consequence of El Niño is the disappearance of the food supply of the Pacific *anchoveta*, and with the absence of the fish the disappearance of the livelihoods of Peruvian fishermen, who gave the weather phenomenon its name of the Boy in English, referring to the birth of Jesus Christ at the time of year when it generally occurs.

The trade winds, and their decrease or reversal are part of a cycle known as the El Niño Southern Oscillation or ENSO and scientists at the NOAA had already noted changes in sea temperature and atmospheric pressure related to ENSO at the beginning of 2015, leading them originally to predict a return of the phenomenon in March. Their forecast proved not to be correct, but it was noted that by July the surface temperature of the central-equatorial ocean was almost 1°C higher than normal, while in the eastern Pacific it was more than 2°C higher than average. These conditions put the sea temperatures well above the 26.5°C minimum required for tropical storm formation.

The El Niño that occurred between 1997 and 1998 was evidently the strongest recorded since records began in 1950; it is believed to have killed 21,000 people and caused \$36 billion-worth of damage to houses and infrastructure. Now the deputy director of NOAA's Climate Prediction Centre, basing his forecast on the warming of the ocean's surface temperature noted above, says that the current El Niño could be even more destructive; already there have been six cyclones on one day in July and higher rainfall than normal in Buenos Aires (Argentina).

Some areas might appear to benefit from a strong El Niño, such as California, which would welcome rainfall to break the four-year drought that has affected the State, and douse the wildfires that have affected it so much recently. But in fact the fires have destroyed the vegetation and left the soil exposed, so that heavy precipitation could cause severe erosion, even landslides

and flooding; what California needs is snow in the Sierras, which will slowly melt - but this is unlikely, because of the higher temperatures associated with the stronger El Niño. Generally, however, the USA seems to be one of the few countries that benefits from the phenomenon, with increased storm activity on the Pacific coast being matched by decreased numbers of hurricanes on the east coast and higher agricultural yields in the Midwest thanks to the milder weather; as much as \$15 billion may have been added to the economy of the USA by the 1997-98 event.

But the USA is the exception: many other countries can be affected by drought caused by El Niño, leading to decreased yields of agricultural crops such as soybeans in India, rice in China and wheat in Australia and even of plantation crops such as palm oil and coffee, for example in Indonesia, as well as reduced water in reservoirs leading to decreases in hydro-electric power generation, and wildfires. Nor would the effects be only drought-related: in 1997-98 heavy rain in East Africa led to higher populations of mosquitoes and hence more malaria – but also because the rains damaged the roads, greater difficulty in distributing drugs and insecticide.

For many foresters therefore it looks as if there will be increased fire hazard and reduced plantation growth rates in the year ahead, but other places may have heavy rains with possible flooding. The heavy rain may be in the south-east of South America, western North America and eastern Africa, while the droughts may be in Australia, India and Indonesia, from experience – but precisely where and when those effects will be is not yet known, and may not be until after the event!

Finally, a strong upcoming El Niño event could help explain the recent slowdown in global warming, with the increase in the Earth's surface temperature increasing at only 0.04°C between 1999 and 2013 compared with 0.18°C in the 1990s (see item (2) above). There are several websites offering updates on El Niño – I recommend the NOAA Climate Prediction Centre website, www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf which today (25th September 2015) stated that *There is an approximately 95% chance that El Niño will continue through Northern Hemisphere winter 2015-16, gradually weakening through spring 2016*. This website is updated monthly, on the second Thursday.

Jim Ball
CFA President

CFA in Kenya recognises the 4th Anniversary of the passing of Prof. Wangari Maathai



Nguriunditu primary school pupils plant a tree in memory of the late Prof. Maathai (Photo: Simon Kamonde)

Muguga Ecosystem Research Community Forest Association (MERCFA) members were on 25th September 2015 joined by other stakeholders of Muguga forest in marking 4th Anniversary since the late Prof. Maathai passed on. The ceremony took place in Muguga Forest - Gachuthi natural forest site where the MERCFA and other stakeholders planted 71 trees in September 2011 in memory of late Prof. Wangari Maathai environmental conservation work. More trees have been added at the site and to date, there are over 300 trees of eight indigenous species. This site was officially launched and named Prof. Wangari Maathai memorial site by the Director KEFRI on 16th April 2013.

Among stakeholders present at the 4th Anniversary ceremony were Kenya Forestry Research Institute (KEFRI), Kenya Forest Service (KFS), Provincial administration (Chief Kerwa

location), Nguriunditu primary school, Human Rights and Information Forum (HRIF), Muguga Ecosystem Research Community Forest Association (MERCFA) and other members of public living adjacent Muguga forest.

To mark the ceremony, the team started by cleaning the site (slashing and weeding for the existing trees) after which they planted four indigenous ceremonial trees that included *Olea africana/europaea* (*mutamiyu in Kikuyu*) planted by area Ag. Chief J. Ributhu, *Warburgia ugandensis* (*mutbiga*) by KEFRI staff, *Teclea simplicifolia* (*munderendu*) by Nguriunditu primary school and *Juniperus procera* (*mutarakwa*) by KFS-Muguga forest manager J. Muriuki.

Address the gathering, the Ag. Chief Mr. J. Ributhu thanked all stakeholders present for availing time for this important function and particularly appreciated commitment by Muguga CFA members in conserving Muguga forest. The administrator urged for Gachuthi forest block conservation noting that the forest has served the adjacent area community with wood

and non-wood forest products over the last forty years. KEFRI scientist who is the Principal investigator (PI) in charge of forest rehabilitation research Simon Wairungu talked of the importance of the forest as a home to animals, important bird species and high value tree species giving example of *Osyris lanceolata* (*mutbithii*). The scientist advised that conservation of the facility would be of benefit to the current and future generations.

Muguga CFA Chairman, Simon Kamonde thanked all the stakeholders for the good collaboration that has resulted to the well being of Muguga forest ecosystem which he said is the best way to honor and continue with the late Prof. Maathai environmental work.

Simon Kamonde - Chairman Muguga CFA

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Publications

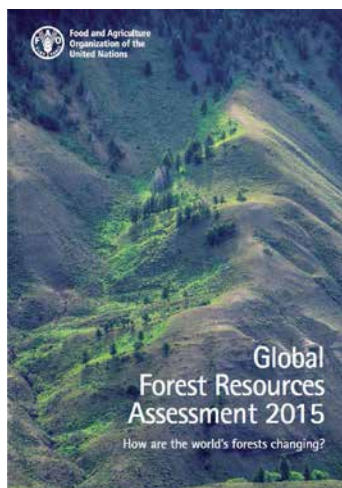
Global Forest Resources Assessment 2015: how are the world's forests changing?

Food and Agriculture Organization of the United Nations, Rome, 2015

The latest Global Forest Resources Assessment (Global FRA) was presented by the Food and Agriculture Organization of the United Nations (FAO) at the World Forestry Congress (WFC) in Durban, South Africa in September 2015. It is, as usual, an impressive piece of work, covering 234 countries and territories with several new chapters.

Your reviewer should declare his personal interest in the study, since I was an FAO staff member responsible for the preparation of inputs on planted forests, later as the Director under whose responsibility the publication of the Global FRA was carried out, and later still as a member of the Global FRA Advisory Group.

The Global FRA 2015 reports a global forest area of 3,999M ha and annual deforestation loss since 2010 of 3.3M ha. Global FRA 2015 provides reports on 234 countries and territories, of which 155 come from Country Reports prepared by national correspondents nominated by government agencies responsible for forestry. The remainder come from desk studies, prepared by the Global FRA team. The desk studies in total represent only 1.2 percent of global forest area meaning that for FRA 2015, 98.8 percent of global forest area has been reported by the countries themselves.



A major quibble I have therefore is the lack of recognition of the need for an indication of the reliability of these results –except for a note in the Foreword to the 2015 assessment that ... *The reliability of the information collected has also improved enormously – presently national forest inventories apply to some 81 percent of global forest area, a substantial increase over the past 10 years.* Now the reader may well ask why I did nothing about this when I had responsibility for the production of the Global FRA, to which I can only respond that it was extremely difficult to obtain from FAO member countries an admission that their work was anything but 100 percent accurate!

But in fact, although there is no estimate of reliability in the report of the Global FRA 2015 the question of reliability was dealt with in one of the papers that was published before the WFC, in 2015 in *Forest Ecology and Management* 352⁶ which divides the data into Tiers, with Tier 1 being lowest quality and

⁶ Keenan, R.J. *et al.* Dynamics of global forest area: results from the FAO Global Forest Area 2015 See <http://www.fao.org/3/a-i4895e/i4895e02.pdf>

Tier 3 the highest. There are, for example, 12 countries of Tier 1 with forest areas of more than 5M ha each.

It is not until we look at the actual numbers that we realise the importance of having some estimate of reliability. Ken MacDicken, FAO's Team Leader for Global FRA 2015 admits that he has in fact attempted to put a figure on reliability, by assigning estimates to the various national inventories, and came up with a figure of $\pm 20\%$. If a reliable minimum estimate (RME) is one standard error about the mean, then the RME for the 2015 global forest area would be around 2,600M ha and of deforestation of 3M ha.

Over the past 25 years since 1990 the global forest area has decreased by 3.1 percent, from 4,128M ha to just under 4,000M ha. The rate of annual global forest area loss has slowed by more than 50 percent between 1990 and 2015 from 0.18 percent to 0.08 percent. This results from a reduced forest loss in some countries and increased planted forest area expansion and natural colonisation in others and it appears that net forest area change has stabilized over the past decade. This is an important development given the fact that wood removals in 2011 are about 200 M m³ higher per year than in 1990, while human populations have grown during this period by about 37 percent.

The ten countries with the most forest area in 2015 have a total of nearly 2,700M ha or 67 percent of the global forest area. In first place is the Russian Federation which has over 800M ha, or 48 percent of the country's area (20 percent of the global total), followed by Brazil with nearly 500M ha, or 12 percent of the country's area, then Canada with nearly 350M ha (9 percent) the United States of America (310M ha and 8 percent), China (208M ha, 5 percent) Democratic Republic of the Congo (150M ha 4 percent) Australia, Indonesia Peru, and India. This ranking has stayed the same since 2005. and the same countries, more or less, feature in the ten countries with the greatest area designated for the conservation of biological diversity – except for the addition of Mexico (in third place) and Venezuela (in seventh), and the omission of China and India.

Trees occurring outside defined forest areas are not technically considered as forest but they are an important source of many products and services related to forests. In some countries they provide critical supplies of wood, fruits and other non-wood forest products. For the Global FRA 2015 the area of trees outside forests was reported to be 284Mha in 2015, which is an increase from the 274Mha reported for 1990. This is partially due to a larger number of countries reporting (87 reported for 1990 whereas 98 reported for 2015). While substantially more difficult and costly to measure than forest at a national scale, it is clear that trees outside forests are a most valuable natural resource.

Besides global and regional forest areas and deforestation, the Global FRA 2015 provides information on Other Wooded Land (OWL), that is land with trees on, but below defined forest, covers 1.2M ha or over one third of the area that meets the definition of forest as land covering more than 0.5 ha, trees higher than 5 m and canopy cover of more than 10 percent. Each chapter gives sustainability indicators and an explanation of why the indicators are important. There are also chapters and information on:

- Areas of natural (93 percent) and planted forests (7 percent, but output from planted forests provides over 70% of industrial roundwood)
- Forest biomass and absorption of CO₂

- The consumption of forest-derived bio-energy (wood-fuel) has even increased between 1990, and 2011, from 2.8Bor 44 percent of the global total wood used to 3.0Band 48percent of the global total.
- Contribution of the forest sector to global GDP and to employment, are quoted as \$600B and \$50M respectively in 2015.
- Sustainability indicators, for (a) ecosystem condition and productivity, (b) sustainable forest management, (c) ecological integrity and biodiversity, and (d) economic and social benefits
- Forests in Small Island Developing States (SIDS), which represent less than 1 percent of the world's forest area and are insignificant in global terms. But in many SIDS forests and trees play a more crucial role in social and economic development than in many larger countries and many island habitats also have global significance for conservation of biological diversity and particular endemic species
- Looking to the future of forest area change. Although the Global FRA 2015 reports that the rate of deforestation has slowed in the last ten years, the area of natural forest will probably continue to decline, particularly in the tropics, primarily due to conversion of forest to agriculture. On the other hand, due to a growing demand for forest products and environmental services, the area of planted forests is likely to continue to increase in coming years.

Global FRA 2015 has some more optimistic data to report, mainly under the headings of forest management, policy, administration and peoples' involvement. For instance, the legal frameworks, stakeholder inputs, data availability, national inventories and management plans now cover about 1.1Bha of forest land and the permanent forest estate increased slightly between 1990 and 2015. The area under forest management plans has increased greatly since 1953, when only 27 percent of the world's production forests were covered plans but in 2010, 70 percent of production forest had management plans, divided evenly between production and conservation forests, while forest management plan monitoring is said even to take place every three years in the tropical countries.

Global FRA 2015 is also upbeat on the subject of forest certification, an important indicator of sustainable management since certification includes the definition of forest management practices that meet requirements for best practice in virtually all regions. They include: the conservation of biodiversity, sustainable production of goods and environmental services, minimal chemical use, protection of workers' rights and welfare, local employment, respect for indigenous peoples' rights and forest operations undertaken within the national legal framework following best practices. Although certification is not a perfect tool for describing sustainable forest management it is an important proxy that can be monitored and, most importantly, verified independently by a third party to a known standard. As Global FRA 2015 puts it: *Certification may be the best single means of evaluating progress towards sustainable forest management, as it is relatively easy to document.* The area covered by forest management certification has grown dramatically from 18 million ha in 2000 to over 430 million ha in 2014, an increase of over twenty times. However, the expectation was that certification

would be most helpful in the tropics where practices are less sustainable than in other climatic zones such as the temperate and boreal zones where the most rapid, sustained growth in international certification continues. While growth has been relatively constant for both of the major certification schemes (the Forest Stewardship Council and the Programme for Endorsement of Forest Certification (PEFC)), it has declined for reported domestic certification schemes primarily due to changes in reporting for the major domestic schemes in North America. But the present data do not fully reflect the emergence of domestic schemes in Indonesia and elsewhere. Watch this space!

My review is of the electronic version of Global FRA 2015, available at <http://www.fao.org/3/a-i4793e.pdf> but the hard copy version is also available from FAO – although it should be noted that the hard copy no longer contains the tables of figures, which are now available either on-line, at <http://www.fao.org/3/a-i4808e.pdf> or on a CD, which should be requested separately. Both are known as the Desk Reference. Papers dis-

cussing the Global FRA 2015 were published in hard copy in Vol 352 of a Special Issue of the Journal *Forest Ecology and Management* earlier in 2015. It contains thirteen peer-reviewed papers with more detailed analysis based on both FRA 2015 data and other data sources.

In sum, Global FRA 2015 is, in my opinion the best yet, in terms of coverage, reliability (albeit without an estimate of it!) and presentation. I strongly recommend it to all foresters, whatever their responsibilities, for the international forestry sector affects and is very relevant to the national scene in every country.

Download at <http://www.fao.org/forest-resources-assessment/en/>

Jim Ball
CFA President

What would happen if we cut down all the trees?

A systematic mapping of the literature on interactions between socio-economic traits, forest traits and human well-being

Report by Nele Schmitz

“**W**hat would happen if we cut down all the trees?” Deforestation is always presented as a big drama, while plantation actions get all the plaudits. We know forests are important for a whole list of things. If all trees were cut down, people’s lives would be affected in many ways. But which forests should be kept in case we had to choose? What is the effect of the type of forest on human well-being? Is there an effect of how the forest is used? Does it matter if the forest is big or small or how healthy the forest is? How can socio-economy interact with these forest characteristics to optimize well-being?

From here my vision developed: “**How to balance the management of socio-economy and forests for the well-being of all?**” For ten months I worked on the project, which started with identifying the knowledge gaps and currently known interactions between defined socio-economic traits, forest traits and well-being. To this end I undertook a systematic mapping of the literature limited by a set of inclusion criteria. I used the Web of Science Core Collection from which I filtered only English articles, published worldwide since 1992, using a pre-defined set of key-words. The review was done on abstracts only using a pre-defined set of sub-categories for data extraction, requesting an explicit mentioning in the abstract of a relation between (i) socio-economy and forests or (ii) forests & well-being.

The main finding of the study is that there is a serious bias of the topic towards English language literature, indexed in Web of Science, leading to a dispersed knowledge base.



- Current research is happening haphazardly, which means that there is no systematic increase of our knowledge.
- Research on the interactions between socio-economy, forests and wellbeing is biased towards moist forests in the sub-tropical and temperate zones, studying effects of different forest uses, focusing on developing countries in Asia.
- There is a gap in our understanding of dry forests and forests in polar and mountain regions.
- Europe is surprisingly little studied relative to its forest area, which is most likely due to the language gap. We have to be aware that

when concentrating on English literature we might miss a whole lot of significant information.

- Interest in the effects of forest type (on well-being and in interaction with socio-economy) remains especially meager and while forest health got a bit more attention, knowledge on this topic is nearly exclusive of North American forests.

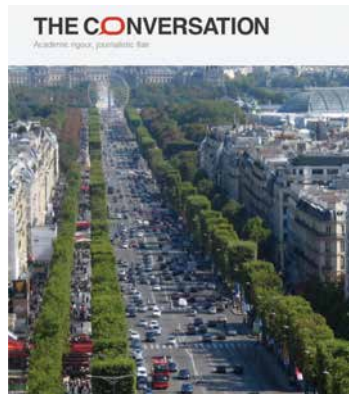
To end on a positive note: the future looks promising. Research on forests in relation to socio-economy and well-being steadily rose during the study period and the potential to transform negative impacts of land use and income on forests into positive ones was shown to be high.

The report can be downloaded from *ResearchGate* under DOI: 10.13140/RG.2.1.3551.7600 (Part I) and DOI: 10.13140/RG.2.1.3289.6162 (Part II) or requested by mail to: nschmitz2282@gmail.com

Do trees really help clear the air in our cities?

Rob MacKenzie- Professor of Atmospheric Science, University of Birmingham

It may sound like a no-brainer to say that trees improve air quality. After all, we know that trees absorb the greenhouse gas carbon dioxide (CO₂), and that their leaves can trap the toxic pollutants nitrogen dioxide (NO₂), ozone, and harmful microscopic particles produced by diesel vehicles, cooking and wood burning.



Yet some recent studies have suggested that trees may in fact worsen urban air quality by trapping pollutants at street level. A closer look at the evidence – and how it was collected – reveals the root of this dispute, and can help us come to a more nuanced understanding of the impacts of trees on our urban environment. To read the full article visit <http://theconversation.com/do-trees-really-help-clear-the-air-in-our-cities-48202>

Why are we waiting?

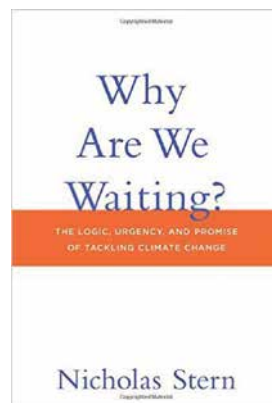
Nicholas Stern

Why are we waiting?: *The logic, urgency and promise of talking climate change* is the new book by Nicholas Stern, the guru of global climate change policy who advised the British government on climate change in his report *The Stern Review on the Economics of Climate Change in 2005-06*. Lord Stern is a distinguished economist who was formerly Chief Economist at the World Bank, and is now Professor of Economics and Government at the London School of Economics as well as Chair of the Grantham Research Institute of the British Academy, and as such his views carry significant weight.

In examining the opportunities for economic growth and thus for poverty reduction, as well as their ethics, he defines the need for equitable access to sustainable development and states that in considering the outcome of COP21 we should look for a range of targets, of which the following relate most closely to forestry. (My own comments are in [square brackets]).

For all countries

1. A shared recognition of the magnitude of the risks from climate change, the 2°C goal for temperature increase, the scale of reductions necessary to achieve the goal and the need for emissions to be in the region of 2 tonnes CO₂ per head by 2050 for zero energy emissions (including electricity) from the second half of the 21st century. [if we achieve this, we've done the lot!]
2. Accelerating the shift from fossil fuel power, especially coal. [I don't think that these are prioritised, but even if they are not it must be an important goal – see also the same thing addressed to developing countries]
3. Halting the deforestation of natural forests, and the strong restoration of lost and degraded forests. [no target attached to this one! How far back does he think we should go in restoring lost forests?]



4. A recognition that the next two decades are vital in determining if the 2°C goal is possible. [linked to the need for R&D, see 11) below]
5. A shared commitment in promoting simultaneously economic development, the overcoming of poverty and the management of climate change.

For developed economies

6. Investing strongly (i.e. at least triple current levels) in energy and other relevant public research and development [R&D seems to me to be fundamental – and not just be the developed economies!] Fostering innovation in energy and agriculture [the term “agriculture” presumably including livestock, forestry and, to a degree, fisheries]. Sharing technologies and know-how [with all countries, presumably?]. Making innovations in energy-efficient and low-carbon technologies.
7. Working to reduce the capital cost of long-term projects in developing economies, especially infrastructure, by overseas development assistance, multilateral institutions and regulatory and other reforms to promote the investment of long-term private capital. This should include measures to implement the Copenhagen/Cancún promises of flows of \$100 billion yearly to developing countries by 2020.

For developing economies

8. Recognizing, discovering and investing in methods and technologies that exploit the great potential in combining development, adaptation and mitigation.
9. Ensuring that the potential for inclusiveness and poverty reduction in new technologies is realised.
10. Sharing ideas, examples and technologies especially with other developing countries.

There appears to be one provision lacking to my mind; the collection and analysis of data. I don't think that data collection is as accurate or complete as it could be, and we still lack information needed for several aspects of climate change, especially regarding the contribution of forests.

In the sub-chapter of Chapter 8 on *A brief comment on Paris* Lord Stern highlights the effectiveness of the pressure that activist groups can exert on politicians – at least in democratic countries with a free press. He mentions the social pressures on policy-making that arose from the *Make Poverty History Campaign* and the G8 Summit in Gleneagles in Scotland as well as the negative impacts of the 1999 protests at the Seattle World Trade Organization meeting. He goes on to identify the following broad criteria for success in Paris 2015:

- General recognition of the scale of the challenge of climate change, and the setting of a shared goal of net zero global emissions;
- Recognition of the opportunities for growth, poverty reduction and structural change associated with the reduction of emissions – the last-named tied to credible contributions to emissions reduction by individual countries;

- Mechanisms to ensure regular interaction among countries, linked to the raising of contributions over time;
- Sector-specific collaboration and commitment, especially in the reduction of the use of coal, and the reduction of emissions especially in deforestation and forest degradation;
- Recognition of the importance of equity in achieving long-term mitigation of emissions.

Despite some of the shortcomings that I mention above I strongly recommend *Why are we waiting?* as an excellent source of historical facts on climate change, as well as a good indicator of future developments.

I will finish with a quote, not from Lord Stern but from Pope Francis speaking on the need for action on climate change and environmental protection in 2014: *if we destroy creation, creation will destroy us.*

Jim Ball
CFA President

Around the World

Europe failing to clamp down on illegal logging, report warns

A European bid to clamp down on the \$100bn-a-year global trade in illegal timber has been poorly designed, badly managed and largely ineffective, according to a damning report by the EU's court of auditors. Illegal logging is thought to be responsible for around one-fifth of man-made greenhouse gas emissions – more than from all the world's ships, planes, trains and cars combined. It is also an existential threat to forest-dependent indigenous people, and to biodiversity. But 12 years after launching an action plan to end the trade, results from the EU's €300m aid programme to 35 partner countries have been "meagre" according to the auditors' report, with problems at the demand and supply ends of the trade chain.

Four EU countries - Greece, Spain, Hungary and Romania - have still not implemented an EU timber regulation proposed five years ago, allowing an easy passage to market for the fruits of deforestation. "As the chain of control is only as strong as its weakest link in the single market, illegal timber could still be imported into the EU via these four countries," Karel Pinxten, one of the auditors of the report, said. "The EU should put its house in order. The EU cannot continue to allow illegal wood in its market while pushing other countries to thoroughly address the problem," added WWF's senior forestry policy officer, Anke-Schulmeister.

Interpol estimates that illegal logging is responsible for up to 30% of all global forestry production. Penalties for wood

trafficking across the EU vary though, from €7,500 in Bulgaria to €5m in the Czech Republic and an unlimited sum in the UK. On the supply side, part of the problem rests with a poor prioritisation of aid, the auditors say. Liberia received €11.9m to tackle illegal logging, when its yearly wood exports to the EU only averaged €5m. The Commission says the funding was needed as illegal logging has been used to fund Liberian militias. The Central African Republic similarly received €6.8m, when it exported just €18m of timber to the EU. "If you compare these amounts there is something surreal about it," Pinxten said. "The imbalance between the amounts spent and imported from these countries is amazing."

Despite the sums of money involved, the commission did not develop criteria to assess the scale of illegal logging in partner countries, their commitment and potential to act, or their trade importance. Poor monitoring, licencing and delivery procedures led to the failure of a number of projects, including a €2.27m timber tracking system in Cameroon.

A European commission reply in the report says: "The commission recognises the need to develop more specific objectives, milestones and a common roadmap as well as the need to more systematically monitor ... implementation. The recommendations of the ongoing evaluation will certainly help in this effort."

theguardian.com

Global: Genetically modified trees are being 'strangled' by red tape

US researchers say it has become "virtually impossible" to plant genetically modified trees in any part of the world. They argue that the GM trees are desperately needed to deal with an upsurge in forest diseases and pests. What they term "misguided" concerns about genetic engineering have slowed progress to a crawl. But environmental campaigners say the technology is risky and the long-term safety unproven.

Genetically modified trees were developed in the 1980s amid hopes that the technology could tackle persistent problems such as pest infestations. It was also hoped that new fast-growing strains would be developed that would be attractive for commercial companies. Earlier this year a rapidly growing variety of eucalyptus was approved for use in Brazil - these trees can sprout five metres per year and they produce 20% more wood than conventional varieties. But approval to grow only came after almost 10 years of field trials.

Researchers say that these types of delays are paralysing the technology at a time of increased threat to forests. They argue that there is too much concern over methods of genetic engineering and not enough focus on the potential problems that it solves. "With global climate change and the spreading of pests, it's rather urgent we have all the tools we can bring to bear," lead author Dr Steven Strauss from the Oregon State University told BBC News. "It's just a pity that this tool is off the table and is locked in some vault."

Part of the problem the researchers say is that GM regulations were developed for short-cycle crops like maize and soybeans. Trees take decades to grow and can live for centuries, and during trials they must be kept isolated from other species while the areas around them must be constantly monitored. All this adds hugely to the expense.

Behind the tough regulations, the authors argue, are concerted efforts by green groups to limit the technology. "I'm an environmentalist," said Dr Strauss. "I used to belong to a lot of these groups, and I question what they are doing. "Like the vaccine situation, you need horrible things happening to forests to get people to wake up that we need these powerful tools." But green groups say that there is a far bigger threat to the global environment from the advocates of GM trees.

"You simply cannot focus on the product without the process as it is precisely the process that imparts the danger," said Anne Petermann with the Global Justice Ecology project. "The genetic changes forced into the genome of the tree carry with them impacts - and these impacts are extremely difficult, and in cases, impossible, to identify or assess." In the case of genetically modified poplar, pine or other trees with native wild relatives, the threat of irreversible genetic contamination from these genetically modified trees into native forests is impossible to control, if these trees are produced in large numbers and released into the environment," she said.

In addition to the Brazilian eucalyptus, only two types of pest-resistant poplars have been authorised for commercial use, in regions of China. Dr Strauss worries that the level of red tape and opposition could shut down research in this field completely. "People have stopped doing research, because the signals from the marketplace and regulators are so extraordinarily hostile. It's almost completely shut down," he said. "Even in China, it's just a trickle. It's essentially a non-option."

bbc.co.uk

Global: Earth's trees number 'three trillion'

There are just over three trillion trees on Earth, according to a new assessment. The figure is eight times as big as the previous best estimate, which counted perhaps 400 billion at most. It has been produced by Thomas Crowther from Yale University, and colleagues, who combined a mass of ground survey data with satellite pictures. The team tells the journal *Nature* that the new total represents upwards of 420 trees for every person on the planet.

The more refined number will now form a baseline for a wide range of research applications - everything from studies that consider animal and plant habitats for biodiversity reasons, to new models of the climate, because it is trees of course that play an important role in removing the greenhouse gas carbon dioxide from the atmosphere.

But Dr Crowther cautioned that the higher number did not of itself change anything. He told the BBC's Science In Action programme: "It's not like we've discovered a load of new trees; it's not like we've discovered a load of new carbon. "So, it's not

good news for the world or bad news that we've produced this new number." "We're simply describing the state of the global forest system in numbers that people can understand and that scientists can use, and that environmental practitioners or policymakers can understand and use."

Key to the new estimate is the greater use of ground-truth data. The team collected tree density information from over 400,000 forest plots around the world. This included many national forest inventories and a host of peer-reviewed studies where workers had actually gone out and counted the number of trunks in a given area and in a given forest type. This then enabled Dr Crowther and his group to build a model that better characterised what they were seeing in satellite pictures, which are very good at showing forest extent but are not so good at revealing just how many individual trees are standing below the canopy.

Of their approximately 3,040,000,000,000 trees, the scientists put most (1.39 trillion) in the tropics and sub-tropics, 0.61 tril-

lion in temperate regions, and 0.74 trillion in the boreal forests - that great band of conifers that circles the globe just below the Arctic. Indeed, it is in the boreal forests that they say the greatest densities are seen.

What is abundantly clear from the study is the influence humans now have on the number of trees on Earth. The team estimates we are removing about 15 billion a year, with perhaps only five billion being planted back. "The net loss is about a third of a percent of the current number of trees globally," said co-author Dr Henry Glick. "That doesn't seem to be an insignificant portion and should probably give us cause for considering the role that deforestation is playing in changing ecosystems." And where tree losses are often tied to timber supplies and land-use conversion for agriculture, as the global human population grows, we may see the net loss increase as well."

And as if to emphasise this point, a comparison with estimates of ancient forest cover suggests that humanity could have already removed almost three trillion trees since the last ice age, some 11,000 years ago." Europe used to be almost covered by one giant forest and now it's almost entirely fields and grasslands. Humans are absolutely controlling tree densities," Dr Crowther told BBC News.

Commenting, Dr Nathalie Pettorelli from the Zoological Society of London said the study was unlikely to be the last effort to do a global tree count. She told the UK Science Media Centre: "It may be important to acknowledge that these first estimates produced by Crowther and colleagues are derived from data primarily collected in Europe and North America, with [for example] very little information collected in the Congo basin, China, Australia or India. "As more information becomes available for these countries, it might be interesting to refine the estimates and check that key processes shaping spatial variability in tree density have not been overlooked."

And Dr Martin Lukac from the University of Reading was still not sure we were near an accurate count."The previous estimate of trees in the world was 400 billion. The new estimate is three trillion large trees. There are so many margins of error in this study that the real number could be anything between the two - or even 10 times higher," he said.

bbc.co.uk

Malawi's battle to hold on to forests

You'd be pushed to find a more uplifting display of the transformative power of renewable energy. In a one-room house in rural Malawi, the little face of six-year-old Rachel is framed in a soft white halo. On a bamboo mat lies a maths book alongside a bundle of fine twigs that she shuffles to help her arithmetic. The rest of the village is in total darkness but thanks to the lamp - bought with the help of UK government aid - Rachel's school grades are improving now she can study at home.

In a nearby village, solar panels on a school roof - donated by the Scottish government - have improved results, as well as providing an extra income source from charging phones and car batteries. But these are rare examples of electricity in rural Malawi. This is one of the world's poorest countries. Just 10% of people are on the grid. And around 90% of power is produced by hydro-electric stations, which are beset by erratic rains caused - Malawian meteorologists say - by climate change.

Malawi's own greenhouse gas emissions from fossil fuels are minuscule. But the nation has one of the highest deforestation rates in the world as people desperate for fuelwood hack into the once-rich forests. Deforestation reduces the ability of forests to soak up CO2. It also loosens soil, which then releases carbon dioxide. What's more, in heavy rains, the loosened soil cascades down the hills. This means aquifers don't get replenished, rivers burst their banks, and silt and branches clog up the hydropower plants.

Escom, the body that owns the hydro dams, says reservoir capacity has been reduced by two thirds as a result of siltation from forest felling. There are constant black-outs for the few people and businesses who have grid electricity at all.

So what's Malawi's answer to its climate and energy crisis? Well, it is bidding to build two coal-fired power stations. Its pol-

iticians realise these will swell the global emissions which are already cranking up temperatures, but they say Malawi needs the power for development. Its emissions up to 2040 are projected to increase by 38%. Coal, they say, is the least bad option because it offers the opportunity for the country to address deforestation.

Malawi, like most other nations has submitted its pledge on energy and climate (known as an INDC) to the United Nations. It has offered to reforest its hills, expand the use of clean cookstoves and get more solar energy - conditional on help from rich nations as part of the Paris deal. But no-one should underestimate the scale of Malawi's challenge. The water catchment above the capital Lilongwe is under such severe assault from wood-cutters that the Army is on stand-by. The authorities accept that they can't punish the poor charcoal sellers but their efforts to catch the masterminds of the trade are said to have been bedevilled by corruption.

Part of Malawi's solution is to have two million efficient cookstoves in operation by 2020. The population is booming and this won't fulfil national demand. But each stove, made at low cost of clay by local women, is said to use less than half as much wood as a traditional three-stone open fire.

Lord Stern's team of international experts on climate economics have concluded that climate change can't be tackled in countries like Malawi where the population is still 80% rural and where people degrade the land to meet their needs. The only solution, the team says, is for developing countries to plan densely-packed cities with excellent public transport, powered by renewables - Malawi has an excellent solar resource.

Experts in Malawi say the government, undermined by corruption scandals, is in no state to fulfill that mission. And the same shortcomings are disbaring the country from attracting

large-scale investments in renewables. Paddy Padmanathan, a businessman installing solar thermal power on an epic scale **in North Africa**, told us Malawi's development was not sufficiently advanced for that sort of project.

"It's the institutional capacity in many of these countries. There are not enough people who can manage these things in the government structures, who know how to put in place the right policies and procedures and procurement programmes," he said.

Meanwhile despite the campaign against coal by environmentalists in the West, the pressure to burn coal in Malawi is growing. We visited the Kukoma cooking oil factory which burns huge quantities of wood for its boilers. The owner Mohamed AmeenNathanie is considering whether to install coal-fired boilers for a more consistent burn. He asks me: "Do you want me to burn the wood from the countryside – or the coal... you choose!"

bbc.co.uk

UK: Plans to build the world's largest wood-burning power plant

The United Kingdom has announced plans to build the world's largest biomass powerplant. The Tees Renewable Energy Plant (REP) will be located in the Port of Teesside, Middlesbrough and it will have a capacity of 299 MW. While the plant is designed to be able to function on a wide range of biofuels, its main intended power sources are wood pellets and chips, of which the plant is expected to use more than 2.4mt a year. The feedstock will be sourced from certified sustainable forestry projects developed by the MGT team and partners in North and South America, and the Baltic States, and supplied to the project site by means of ships.

A biomass power plant of this type is referred to as a combined heat and power (or CHP) plant. It will generate enough renewable energy to supply its own operations and commercial and residential utility customers in the area.

Investment in the renewable project is estimated to reach £650m (\$1bn), which will be partly funded through aids from the European Commission, and construction works would create around 1,100 jobs. Environmental technology firm Abengoa, based in Spain, along with Japanese industry giant Toshiba will be leading the project for their client, MGT Teesside, subsidiary to the British utility MGT Power.

The feedstock will be burned to generate steam at 565°C that will drive a steam turbine, which will rotate the genera-

tor to produce electricity. The generated power will be conveyed to the National Grid. The exhaust steam generated by the steam turbine plant will be condensed by the ACCs and re-used, whereas the flue gases from the CFB boiler will be discharged via the exhaust stack.

Nitrogen dioxide (NO₂) emissions will be minimized by using capture technology, fabric filters will reduce emission of particulate matter or dust and check the sulphur content of the fuel feed, while sulphur dioxide (SO₂) emissions will be reduced through limestone injection into the boiler.

The energy output of the plant is anticipated to be equivalent to the power consumed by 600,000 households in the UK. MGT's website says the plant will help meet the UK's nationwide renewable energy goal of 15 percent of all energy consumed by 2020 by accounting for around 1 percent of the target. Further, the company projects that the plant will save approximately 1.2 million tonnes of CO₂ each year.

MGT reports the project is expected to break ground as soon as funding is secured, hopefully by early 2016, and the plant will be operational by 2019 – just in time to help offset coal and gas usage and contribute to the UK's 2020 energy goals.

zmescience.com

USA: America in flames - The future of the country's north-west is hot and smoky

So bad are the seasonal wildfires sweeping America's tinder-dry north-west that Alex Thomason, a public-spirited lawyer in Washington state, bought himself a second-hand fire engine to fight them. "We can operate hoses, we can understand water," he told reporters. "We're going to at least save one or two houses." But this is not a problem American can-do-ishness can fix. In fact, overzealous firefighting is partly to blame for the fires that have so far consumed over 8.5m acres of forest in Washington, California, Idaho, Oregon, Montana and Alaska and which, with the desiccated Santa Ana winds yet to reach southern California,

could exceed the record devastation of 2006, when nearly 10m burned.

Forest fires, started by lightning strikes, are part of the natural cycle in temperate woods. They thin trees and remove debris, clearing space for a diversity of new seedlings, often of species adapted to survive a scorching. The thick bark of the ponderosa pine makes it almost fireproof. The jack pine depends on fire to melt the hard resin that encases its seeds. Yet climate change and decades of fire suppression have disrupted this pattern, turning what might once have been small, low-intensity and potentially regenerative fires into tearing infernos.

A recent run of hot, dry summers, including a four-year drought in California, is a likely indicator of global warming; July was America's hottest month since 1880. So, in a related blight, is a surge in pests, such as bark beetles, which are surviving the mild winters in record numbers, and have turned thousands of acres of sappy conifer forest into dead wood, ready to burn. The average wildfire season is now 78 days longer than it was 40 years ago, according to a recent report by the US Forest Service (USFS). No surprise, then, that the six worst fire seasons since 1960 all occurred this century.

But assiduous firefighting is also to blame. Between 1998 and 2007 about 80,000 wildfires a year were suppressed and only around 300 a year left to burn. This has led to a vast build-up of dry brush which, once ignited, can act as a "fire ladder", lifting the flames into the forest boughs where, in the current arid conditions, they may become uncontrollable "mega-fires". These ravage more than 100,000 acres apiece, burning at an intensity that leaves little life behind.

Such infernos are now common. Over the past decade America has seen on average ten mega-fires a year. Since June this year, five mega-fires have razed more than 5m acres of central Alaska, while five large fires in Washington state, where Barack Obama declared a state of emergency last month, burned over a thousand-mile front, and laid waste to almost a quarter of a million acres.

The costs of the conflagration are enormous. In the last week of August alone the USFS spent \$243m on a firefighting effort involving around 30,000 American firefighters, with reinforcements from Canada, Australia, New Zealand and the national guard. The longer-term costs, in terms of ecosystem damage

and respiratory problems caused by the thick black clouds currently blotting out the western horizon, will be greater.

The outlook is grim. The National Research Council estimates that the amount of land burned in western North America could quadruple with every degree of warming—of which there are expected to be at least a couple by the end of this century. The feared effect of this and other warming-related changes is that America's forests could, as early as 2030, start to emit more carbon into the atmosphere, including in smoke from wildfires and methane from disturbed ground, than they absorb through photosynthesis.

More judicious firefighting might slow the damage a bit. But that would mean leaving houses to burn, which is a long-standing political problem urban sprawl is making even tougher; between 1940 and 2000 the number of houses within half a mile of a national forest more than tripled, to 1.8m. Smart wildfire management can also be expensive. And because wildfires are not eligible for the dollops of federal money earmarked for other sorts of natural disaster, the USFS's budget is another thing going up in smoke.

In 1995, the forest service spent 16% of its budget on fire suppression, and the rest on other important activities, including clearing brush and managing watersheds. This year the agency will spend a little over half its budget on firefighting, and by 2025, it predicts, that could rise to around 67%. This, says the agriculture secretary, Tom Vilsack, who oversees the USFS, will leave "much fewer resources for the very restoration projects that have been proven to reduce the risk of wildfire."

economist.com

Vietnam: Forest management group strips Vietnamese rubber company of certification

A global forest management organization has stripped a Vietnamese rubber company of its certification after finding that the state-owned entity committed human rights violations and illegally destroyed thousands of acres of forest for rubber plantations in Cambodia. The U.S.-based Forest Stewardship Council (FSC), an international non-profit organization that promotes responsible management of the world's forests, publicly announced the decision Monday after finding evidence that Vietnam Rubber Group (VRG) had illegally seized land from local villagers in Cambodia and decimated at least 50,000 hectares (123,600 acres) of forest, including wildlife sanctuaries and protected areas, for its plantations.

"The FSC investigation provides further evidence that VRG has destroyed some of South East Asia's most important remaining forests, with indigenous communities forcibly displaced in the process, and is forcibly taking land from its rightful owners and destroying livelihoods — with untold and irreversible effects," said Patrick Alley, a founding director of Global Witness, in a news release. He added that the FSC had "done the right thing" by dropping VRG, whose land concessions in Cambodia cover about 100,000 hectares (247,100 acres), from its

certification scheme, and urged the state-owned company to take action to address the damage it had caused.

The FSC conducted a five-month investigation of VRG after the London-based environmental advocacy group Global Witness filed a complaint last year, alleging that the company's rubber plantations in Cambodia and Laos had detrimentally affected the environment and livelihoods of local communities. The FSC complaints panel, which was set up on Dec. 8, 2014, found evidence that VRG's subsidiaries in Cambodia were taking indigenous peoples' land without their consent and illegally clearing intact forest containing internationally protected wood species, such as rosewood, inside and outside their concession boundaries.

The panel decided to repeal the company's certification two months ago, after concluding that VRG and its Cambodian subsidiaries ignored indigenous land claims, let illegal loggers inside concession areas, and allowed government-backed military police to threaten protesters. The company also destroyed thousands to tens of thousands of resin trees without providing adequate compensation to locals, it said. The panel also accused the Cambodian government of failing to implement and enforce its own laws on community land rights and forest

protection. As evidence, it said that the government had handed over more than 2 million hectares (4.9 million acres) of land without the knowledge or consent of those living on it, creating land conflicts.

“The Cambodian land sector operates behind a wall of secrecy,” Alley said, with high levels of corruption in the form of bribes paid by investors to access land. The result of this is not just environmental destruction and human rights abuses, but ongoing and often violent conflicts over land,” he said.

Sao Sopheap, spokesman of Cambodia’s Ministry of Environment, rejected the FSC’s findings, saying that the government had resolved the land concessions issues and correctly implemented the relevant law. “In general, we implement the laws and regulations stated in Cambodia to manage land concessions [here], so regardless of whether it’s a Vietnamese, European or

Chinese land concession company, we will enforce the same laws,” he told RFA’s Khmer Service. “If any company does not comply with the law or provokes problems with villagers, communities or indigenous villagers, we will take the same measures against them,” he said.

To regain certification, VRG must compensate communities in Cambodia for the land and resin trees it took, conduct thorough environmental impact assessments, and restore forest areas, the FSC’s complaints panel said. Last August, two months after the panel shared its findings and recommendations with the parties involved, VRG announced that would accept and review complaints from people affected by its plantations. But so far, VRG has not adequately addressed specific complaints through its grievance mechanism, the FSC said.

rfa.org

Argentina: Forgotten forests

With all eyes set on the inflation rate and the price of the dollar expected for next year, there was another figure in the 2016 Budget that didn’t grab any headlines despite it being a trend in recent years. The government earmarked 246 million pesos to be used next year to protect the country’s forests, 23 times less than the actual 4.7 billion pesos that should have been assigned according to the Forest Law.

Passed in 2007 to prevent deforestation, the Forest Law never received the funds it was supposed to, a trend that has only worsened due to inflation. In 2008 and 2009 no funds were allocated as the law hadn’t been confirmed by the executive yet, followed by low amounts between 300 and 260 million pesos since then.

“A lot could be done if those funds are made available. We could increase the amount of protected areas, which would lead to lower deforestation. There are still some illegal loggings going on in the country,” Hernán Giardini, head of Greenpeace Argentina forest campaign, told the Herald. “Provinces don’t complain enough. Their legislators passed the budget without saying anything about this.”

The government recently agreed to fulfill the Forest Law as part of a list of commitments towards fighting climate change, considering that 22 percent of the country’s emissions are due to deforestation. The fact that Argentina has only pledged to abide by the law, something it should already be doing, was questioned by NGOs, which said the amount of land protected should be increased.

The Intergovernmental Panel on Climate Change (IPCC), the world’s leading group of experts on climate change, said 4.3 percent of the planet’s deforestation is happening in Argentina.

They specially warned about the increasing deforestation in Chaco, which is the main source of greenhouse gas emissions in the north of Argentina.

“Not getting the funds doesn’t mean land owners have the right not to respect the law. But it can lead to them not paying attention any more to illegal logging or to poachers,” Manuel Jaramillo, head of Conservation at Vida Silvestre Foundation, told the Herald. “Governors are always complaining about the lack of funds but their legislators are the ones who passed the budget.”

Only 27 percent of the country’s native forests are still standing after long years of intensive deforestation before the law was passed. The Food and Agriculture Organization for the United Nations (FAO) recently said Argentina was the ninth country to have registered the most deforestation over the last 25 years, with 300,000 hectares deforested per year.

But, thanks to the law, deforestation has dropped 60 percent since 2007, according to government figures, which said 2,107,208 hectares of forest were taken down between 2007 and 2014. Santiago del Estero, Salta, Formosa and Chaco are always the most affected provinces, accounting for 80 percent of the deforestation.

“Deforestation rates have been dropping as the provinces are controlling illegal loggings better. There aren’t that many irregular situations now but it would be better if the funds were available,” Giardini said. “You also have to take into account the context. Farmers aren’t harvesting that much because of the drop in prices of commodities so the forest doesn’t have to face that much pressure.”

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