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I. IN THE PRESS

May - CIFOR

[Forest Asia Summit 2014. Jakarta May 5-6](#)

For a summary of the summit please follow the link:

<http://www.cifor.org/forestsasia/publications/briefs/>

23 May 2014 - Voice of Africa

[Africa Developing Unified Climate Strategy](#)

While an international agreement on climate change remains elusive, African nations are moving closer to a unified strategy. Africa has experienced more extreme weather events in recent years as global temperatures rise.

21 May 2014 - Thomson Reuters Foundation

[UN climate fund sets November goal for first cash pledges](#)

The U.N. funding vehicle for helping developing nations tackle climate change has set a November goal to receive its first round of cash pledges, a move hailed as a major step towards a global pact in 2015.

21 May 2014 - IISD

[GCF Board Paves Way for Mobilizing Resources](#)

At its seventh meeting, the Green Climate Fund (GCF) Board took the final steps necessary to operationalize the Fund and begin mobilizing resources. The Board adopted decisions on results management, the initial process for approving proposals, accreditation of implementing entities and risk management.

21 May 2014 - Thomson Reuters Foundation

[Donors commit \\$215 million for Amazon conservation in Brazil](#)

Brazil's government, the World Wildlife Fund and various partners were expected to unveil an agreement on Wednesday that would establish a \$215 million fund for conservation of protected jungle in the Amazon rainforest. The fund, which seeks to ensure conservation of over 90 protected areas in the Amazon, comes as renewed developmental pressures mount in the region, resulting last year in an uptick in deforestation figures after years of record lows.

19 May 2014 - REDD Monitor

[REDD in the news: 12-18 May 2014](#)

REDD-Monitor's weekly round up of the news on REDD, organised by date with short extracts

15 May 2014 - IISD

[UN-REDD Announces Partnership for Community-based REDD+](#)

The UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) launched a partnership with the Global Environment Facility (GEF) small grants programme (SGP) in support of community based REDD+. The objective of the partnership is to enable indigenous peoples and local communities to effectively participate in the design, implementation and assessment of REDD+ projects and programmes.

8 May 2014 - Forest Climate Change

[Climate change should be seen as opportunity, not burden: IPCC chair](#)

The agriculture and forestry sectors play a crucial role in climate change mitigation, the world's top climate change expert said Tuesday, calling for action ahead of the next round of negotiations on a new agreement to replace the Kyoto Protocol. "The path we have to follow is very clear if the world wants to limit the temperature increase to two degrees Celsius," said Rajendra Pachauri, Chair of the Intergovernmental Panel on Climate Change (IPCC), speaking on the last day of the Forests Asia Summit in Jakarta. "And that, in a sense, should be seen as an opportunity rather than something that will add a burden to different societies across the globe."

7 May 2014 - Forest Climate Change

[Green growth capital locked down by lacklustre governments: Credit Suisse](#)

More than enough private capital is available for green growth initiatives, including forest projects, but a lack of political will has blocked investors from unleashing much-needed finances, Credit Suisse Managing Director and Vice Chairman Mark Burrows said at an international conference Tuesday. Lack of financing has been cited as a major setback in the Reducing Emissions From Deforestation and Forest Degradation (REDD+) scheme, aimed at conserving forests and preventing vast amounts of carbon from entering the atmosphere.

6 May 2014 - CIFOR

[Funds are 'enormous', will be weak to fuel low-carbon economy: Experts](#)

The world's top climate scientist told an international conference today that tackling climate change is an opportunity, not a burden, and a leading financier said there is plenty of money to fund sustainable development.

II. MULTILATERAL PROCESSES IN CLIMATE CHANGE

Bonn Climate Change Conference, 4-15 June 2014, Bonn, Germany

The fortieth sessions of the Subsidiary Body for Implementation (SBI 40) and the Subsidiary Body for Scientific and Technological Advice (SBSTA 40), as well as the June session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) was held from 4-15 June 2014 in Bonn, Germany. [More](#)

III. EVENTS & MEETINGS

COFO 22

23-27 June 2014, Rome, Italy

Forests provide many socioeconomic benefits, including food, energy and shelter: basic human needs. To sustain the products and services that help meet these and other needs, forests must be sustainably managed.

COFO 22 will review the state of the world's forests, focusing on their socioeconomic benefits and related questions, including income and employment; ownership and management rights; wood energy and forest products in housing. In this context, it will examine forest policy measures that promote sustainable production and consumption; access to resources, markets and financing; equitable benefit sharing; and valuation of forest products and services. [More](#)

Carbon - Land - Property

1-4 July 2014, Copenhagen, Denmark

Land is at the centre of international debates on how to reduce carbon emissions, but land and its resources - forests, biodiversity, water, and agriculture - are also highly complex systems. Not only are land-based carbon stocks and emission rates difficult to measure and monitor, they are often owned or claimed without clear definitions of rights. This conference takes a broad interdisciplinary approach to how we can obtain better knowledge on these complexities in developing countries and it will bring together social and natural scientists around the nexus of carbon storage, land management and property issues. While the conference has a specific focus on how 'Reducing Emissions from Deforestation and Forest Degradation' (REDD+) is evolving as an international mechanism for climate change mitigation, we hope to also attract researchers that do not work specifically on REDD+, but are engaged in theoretical or empirical work that is relevant for understanding the development and impacts of REDD+. [More](#)

Future of Bioeconomy in Europe

11 September 2014, Bilbao, Spain

The European forest-based sector is going through the biggest structural changes in recent history. Many of these changes originate outside the sector itself, such as the need to transform societies towards more resource-efficient bioeconomy, the new economic role of Europe in globalized world, and impact of new technologies. In the seminar 'Future of Bioeconomy in Europe', the topic will be looked at from two perspectives: from outside and within the forest-based sector. The seminar organised in connection with the European Forest Institute's Annual Conference will bring together researchers and policy makers to Bilbao, the European Forest City 2014. Check out the latest. [More](#)

Climate Summit 2014. Catalyzing Action

23 September 2014, UN Headquarters, New York, United States of America

The UN Secretary General's Climate Summit will be held in New York on 23 September 2014. The Summit will serve as a public platform for leaders at the highest level to (1) catalyze ambitious action on the ground to reduce emissions and strengthen climate resilience and (2) mobilize political will for an ambitious global agreement under the United Nations Framework Convention on Climate Change (UNFCCC) by 2015. "Action Areas", or bold multi-partner initiatives, are expected to be launched at the Summit. These initiatives were presented and discussed at the Abu Dhabi Ascent meeting held on 4-5 May 2014 (see

<https://www.abudhabiascent2014.com/>) Among the initiatives to be launched is a Forest Action Area. This action area has two main thrusts: reducing deforestation and increasing forest restoration. These can make a key contribution to achievement of the goal of limiting global warming to 2o C. The Action Area promotes effective land-use policies implemented by countries, strong financial incentives created to reward emission reductions from tropical forests, sourcing of commodities from deforestation-free areas, and partnerships to achieve the Bonn Challenge of restoring 150 million hectares of degraded forest landscapes by 2020. [More](#)

2nd International Conference on Evaluating Climate Change and Development

4-6 November, 2014, Washington D.C., United States of America

Scheduled for November 4-6, 2014 in Washington D.C., this 2nd International Conference will tackle the difficulties linked to the evaluation of climate change and development, described by many as a major 21st century evaluation challenge. Participants for the conference are expected to be drawn equally from the global South and North to take stock of existing tools and methods but also reflect on and share experiences on emerging approaches in order to improve the practice of climate change evaluation. Efforts will also be made towards identify new and innovative ways to create an enabling environment for the demand and use of climate change and development evaluation in order to improve policy making. [More](#)

2014 Global Landscapes Forum

6-7 December, 2014, Lima Peru

The second Global Landscapes Forum will be held in Lima on the weekend in the middle of the 20th Conference of the Parties (COP20) to the UNFCCC. With this timing and location, this major event can draw on the presence in the city of world leaders, development experts and leading thinkers to create an influential space to position landscapes at the center of the emerging climate and development agreements. Countries are forging a successor to the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC) and, in parallel, designing a set of Sustainable Development Goals to replace the Millennium Development Goals. Connecting these two processes and multifunctional landscapes is vital if we are to overcome the complex challenges common to everyone on the planet. The two-day event will take place at the Westin Lima Hotel and Convention Center, a 20-minute drive from the COP20 venue and in the only venue in Lima outside the COP with the capacity to support an event of this size and diversity. [More](#)

IV. RESEARCH ARTICLES

Determination of tropical deforestation rates and related carbon losses from 1990-2010

Achard, F., Beuchle, R., Mayaux, P., Stibig, H.-J., Bodard, C., Brink, A., Carboni, S., Desclée, B., Donnay, F., Eva, H.D., Lupi, A., Raši, R., Seliger, R., Simonetti, D.

Global Change Biology Accepted 01 April 2014 DOI: 10.1111/gcb.12605

We estimate changes in forest cover (deforestation and forest regrowth) in the tropics for the two last decades (1990-2000 and 2000-2010) based on a sample of 4000 units of 10 ×10 km size. Forest cover is interpreted from satellite imagery at 30 × 30 m resolution. Forest cover changes are then combined with pan-tropical biomass maps to estimate carbon losses. We show that there was a gross loss of tropical forests of 8.0 million ha yr⁻¹ in the 1990s and 7.6 million ha yr⁻¹ in the 2000s (0.49% annual rate), with no statistically significant difference. Humid forests account for 64% of the total forest cover in 2010 and 54% of the net forest loss during second study decade. Losses of forest cover and Other Wooded Land (OWL) cover result in estimates of carbon losses which are similar for 1990s and 2000s at 887 MtC yr⁻¹ (range: 646-1238) and 880 MtC yr⁻¹ (range: 602-1237) respectively, with humid regions contributing two-thirds. The estimates of forest area changes have small statistical standard errors due to large sample size. We also reduce uncertainties of previous estimates of carbon losses and removals. Our estimates of forest area change are significantly lower as compared to national survey data. We reconcile recent low estimates of carbon emissions from tropical deforestation for early 2000s and show that carbon loss rates did not change between the two last decades. Carbon losses from deforestation represent circa 10% of Carbon emissions from fossil fuel combustion and cement production during the last decade (2000-2010). Our estimates of annual removals of carbon from forest regrowth at 115 MtC yr⁻¹ (range: 61-168) and 97 MtC yr⁻¹ (53-141) for the 1990s and 2000s respectively are five to fifteen times lower than earlier published estimates.

Assessment of motivation and attitudes of forest industry companies toward forest certification in northwestern Russia

Trishkin, M., Lopatin, E., Karjalainen, T.

Scandinavian Journal of Forest Research Volume 29, Issue 3: 283-293

This study explores for the first time the attitudes and motivation associated with forest certification among forest industry companies in northwestern Russia. Interviews were carried out in the form of a structured questionnaire including 35 forest industry companies operating in northwestern Russia. Although development of certification in individual companies was initiated by general market demand, representatives of certified companies also emphasized the importance of internal corporate policy. Certified and noncertified groups of respondents identified market demand as a main driving force influencing development of forest certification. Ensuring the legality of wood origin, company's image and competitiveness of wood products were recognized as the most important benefits associated with forest certification. Absence of mandatory requirements from authorities and customers appeared to be the largest obstacle among both groups of respondents. Representatives of noncertified companies pointed out economic inaccessibility and low level of preparedness of management as of high importance, which is mainly associated with absence of quality management system. The results of the study indicated a general positive attitude on forest certification; it was noticed that respondents have gaps in understanding the principles and limited awareness with regards to forest certification, especially among noncertified forest industry companies.

Climate change impacts on species planting domains: a preliminary assessment for selected plantation forests in Fiji, Papua New Guinea and the Solomon Islands

Booth T.H., Jovanovic, T

International Forestry Review, 16(2), 191-198

A simple method is applied to provide a preliminary assessment of climate change impacts on the species planting domains for *Tectona grandis* (teak), *Swietenia macrophylla* (mahogany) and *Pinus caribaea* (Caribbean pine) in Fiji and *T. grandis* in Papua New Guinea and Solomon Islands. Climate values in a 10 minute grid (approximately 18 km spacing) are used to identify locations with climatically suitable conditions for the species. The impacts of climate change on plantations of all three target species in Fiji are considered to be low in 2030 and 2050. However, impacts may become medium for *S. macrophylla* and *P. caribaea* in 2080 using an A2 'business as usual' scenario, as some areas begin to fall outside climatically suitable limits for these species. The likely impacts of climate change on *T. grandis* sites in PNG and Solomon Islands are also assessed as low, as the main plantation areas remain largely in climatically suitable areas until at least 2050 under the A2 scenario. The implications for vulnerability of these plantations are discussed, along with strengths and weaknesses of the method, and possible further analyses.

Prospects for agroforestry in REDD+ landscapes in Africa

Minang, P.A., Duguma, L.A., Bernard, F., Mertz, O., Noordwijk, M.V.

Current Opinion in Environmental Sustainability. Volume 6: 72-82

Agroforests and agroforestry can be direct targets of Reduced Emissions from Deforestation and Forest Degradation (REDD+) programs, or indirect parts of the necessary conditions for success. Whether or not it becomes a core element of REDD+ depends on the country's forest definition. We review these dimensions of agroforestry in REDD+, with supporting examples, mostly from Africa, and highlight the implications and challenges for enhancing the contributions of agroforestry to REDD+ and corresponding sustainable benefits. Where carbon stocks in agroforestry cannot be directly targeted in REDD+, agroforestry still can be included in REDD+ strategies, as ways to (1) shift demand for land (land sparing) and (2) provide alternative sources of products otherwise derived from forest over-exploitation or conversion, thereby avoiding leakage from forest protection efforts.

System wide impacts of fuel usage patterns in the Ethiopian highlands: Potentials for breaking the negative reinforcing feedback cycles

Duguma, L.A., Minang, P.A., Freeman, O.E., Hager, H.

Energy for Sustainable Development

Due to scarcity of firewood, farmers in rural Ethiopia are forced to use cattle dung as a complementary energy source. By looking at patterns of firewood and cattle dung use for energy generation and their implications for food crop production, forest regeneration and community level emission reduction potentials, this study explores system interactions using a community living next to the Menagesha Suba state forest in Ethiopia as a case study. Mixed methods were used including household surveys, nutrient content analyses of firewood and cattle dung, and calculations of fuel and emission reductions for four cooking energy efficiency scenarios. It was found that the community and surrounding environment is stuck in a negative feedback cycle. Therefore shifts in current practices and systems are needed to break this cycle, for example by enhancing firewood supply, improving soil fertility, improving energy efficiency and enabling access to carbon financing for

emissions reduced.

Are REDD projects pro-poor in their spatial targeting? Evidence from Kenya

Atela J., Quinn, C.H, Minang, P

Applied Geography 52: 14-24.

Reducing emissions from deforestation and forest degradation (REDD) is globally supported as a cost effective programme that could achieve global mitigation and spur pro-poor socioeconomic development. Various actors are now actively lobbying and disbursing REDD demonstration funds on the premise of spurring pro-poor carbon investments in less developed areas that were otherwise excluded from the Clean Development Mechanism. In practice, little is known as to whether the REDD projects are actually pro-poor in their spatial targeting. This paper focuses on Kenya to analyse the distribution of REDD projects across quantified subnational vulnerability indices. A vulnerability index map for Kenya was first developed from long-term socioeconomic (crop yields, literacy rates and poverty rates) and climate (rainfall) data drawn from the 47 counties of Kenya. The number and types of REDD projects were located on the vulnerability map. Correlation tests were performed and experts consulted to clarify the socioeconomic features of vulnerability that significantly influence spatial choices for the projects. Results show that most projects are located in low-vulnerability counties and are mainly developed and managed by international private and consulting companies. Correlation tests revealed that the low-vulnerability counties, hosting more projects, are endowed with humid forest resources at .728; $p < 0.01$, land title deeds at .552; $p < 0.01$ and better access to water at .475; $p < 0.01$. Experts suggested that such conditions posit low transaction costs and higher carbon revenues for profit-seeking project developers that currently dominate the REDD demonstrations. Conversely, some project experiences indicate that medium to high-vulnerability areas e.g. dry-lands with mitigation potential, enable projects to have low opportunity costs and explicit livelihood impacts. By directing REDD funds to relatively vulnerable areas, projects and national REDD policies are likely to enhance synergies between mitigation and adaptation. More targeted field assessment of the interaction between projects and local socioeconomic conditions can be formulated from this study.

Temperate and boreal forest mega-fires: characteristics and challenges

Stephens, S. L.; Burrows, N.; Buyantuyev, A.; Gray, R. W.; Keane, R. E.; Kubian, R.; Liu ShiRong; Seijo, F.; Shu Lifu; Tolhurst, K. G.; Wagtendonk, J. W. van;

Frontiers in Ecology and the Environment; 2014. 12(2):115-122.

Mega-fires are often defined according to their size and intensity but are more accurately described by their socioeconomic impacts. Three factors - climate change, fire exclusion, and antecedent disturbance, collectively referred to as the "mega-fire triangle" - likely contribute to today's mega-fires. Some characteristics of mega-fires may emulate historical fire regimes and can therefore sustain healthy fire-prone ecosystems, but other attributes decrease ecosystem resiliency. A good example of a program that seeks to mitigate mega-fires is located in Western Australia, where prescribed burning reduces wildfire intensity while conserving ecosystems. Crown-fire-adapted ecosystems are likely at higher risk of frequent mega-fires as a result of climate change, as compared with other ecosystems once subject to frequent less severe fires. Fire and forest managers should recognize that mega-fires will be a part of future wildland fire regimes and should develop strategies to reduce their undesired impacts.

Estimating carbon storage on teak (*Tectona grandis* Linn. F).

Chanan, M.; Iriany, A

Journal of Environment and Earth Science; 2014. 4(3):9-17

Most of the areas of production forest management in Java island spread among East Java, Central Java and West Java. On the other hand, the management of production forests is consequential to the changes in vegetation due to the process of planting and harvesting the plantation. Plantation potential changes will cause changes in carbon storage which is stored in the areas of production forest. Information about patterns of changes in carbon storage, in particular on teak forest, is vital and urgent so that it can be used to help governments to predict and identify deposit patterns or carbon storage and their changes as early as possible. Next, steps to be taken based on the information and the demands of Clean Development Mechanism (CDM) program can be determined. The results showed that there is a correlation between plantation age on biomass content and carbon of teak plantations; the higher the age of the plantation will be followed by an increase in the diameter of the tree, higher biomass storage and carbon content of teak plantations. The biggest biomass and carbon storage stored in research areas are at the tree level in class age IV, whose biomass average is 406.67 ton/ha and carbon average is 101.67 ton/ha.

Toward a more comprehensive greenhouse gas emissions assessment of biofuels: the case of forest-based Fischer-Tropsch diesel production in Finland

Soimakallio, S

Environmental Science & Technology; 2014. 48(5):3031-3038

Increasing the use of biofuels influences atmospheric greenhouse gas concentrations. Although widely recognized, uncertainties related to the particular impacts are typically ignored or only partly considered. In this paper, various sources of uncertainty related to the GHG emission savings of biofuels are considered comprehensively and transparently through scenario analysis and stochastic simulation. Technology and feedstock production chain-specific factors, market-mediated factors and climate policy time frame issues are reflected using as a case study Fischer-Tropsch diesel derived from boreal forest biomass in Finland. This case study shows that the GHG emission savings may be positive or negative in many of the cases studied, and are subject to significant uncertainties, which are mainly determined by market-mediated factors related to fossil diesel substitution. Regardless of the considerable uncertainties, some robust conclusions could be drawn; it was likely of achieving some sort of but unlikely of achieving significant savings in the GHG emissions within the 100 year time frame in many cases. Logging residues (branches) performed better than stumps and living stem wood in terms of the GHG emission savings, which could be increased mainly by blocking carbon leakage. Forest carbon stock changes also significantly contributed to the GHG emission savings.

A multi-method analysis of forest fragmentation and loss: the case of ward 11, Chiredzi District of Zimbabwe

Chapungu, L.; Takuba, N.; Zinhiva, H

African Journal of Environmental Science and Technology; 2014. 8(2):121-128

Forest fragmentation and loss seriously affect biodiversity. There is need to monitor and assess forest fragmentation and loss in communal areas for effective biodiversity management. In this study, we analysed the extent of forest fragmentation and loss in ward 11, Chiredzi district of Zimbabwe over a 14 year period (1989 to 2003). A multi-method design was adopted for triangulation and verification purposes. This involved the use of GIS and remote sensing techniques for analysis of satellite images of 1989 and 2003. Fragstats was used to compute the density, size and variation of patches between the two years. A patch area method for determining optimum quadrat size was proposed from for observations and measurements were done. Questionnaire surveys were used to complement data produced through GIS analysis. The non aligned block sampling design in which sample locations were randomly nested was used. Questionnaire surveys were used to collect qualitative data. Results show that there is ecologically significant fragmentation and loss of forest. Forest patches increased by 58.04% between 1989 and 2003. A loss of 32.47% of forest area was estimated. People's perceptions confirm the conclusion that the forest has been significantly fragmented and lost due to collaborative effects of climatic changes and human activities.

Multi-century reconstruction of fire activity in Northern European boreal forest suggests differences in regional fire regimes and their sensitivity to climate

Drobyshev, I.; Granstrom, A.; Linderholm, H. W.; Hellberg, E.; Bergeron, Y.; Niklasson, M

Journal of Ecology (Oxford); 2014. 102(3):738-748

Forest fires are one of the main disturbance agents in boreal and temperate ecosystems. To decipher large-scale temporal and spatial patterns of past fire activity in Scandinavia, we analysed the synchronicity of dendrochronologically reconstructed fire events in a large network of sites ($n=62$; 3296 samples, 392 individual fire years) covering a wide geographical gradient (56.5-67.0 degrees N and 9.3-20.5 degrees E) over AD 1400-1900. We identified large fire years (LFY) as years with regionally increased forest fire activity and located the geographical centres of climatic anomalies associated with synchronous LFY occurrence across the region, termed LFY centroids. The spatial pattern of LFY centroids indicated the presence of two regions with climatically mediated synchronicity of fire occurrence, located south and north from 60 degrees N. The return intervals of LFYs in Scandinavia followed a Weibull distribution in both regions. Intervals, however, differed: a period of 40 years would carry a 0.93 probability of LFY occurrence in the southern region, but only a 0.48 probability of LFY occurrence in the northern region. Over 1420-1759, the northern region was characterized by significantly higher temporal variability in LFY occurrence than the southern region. Temporal correlation of LFYs with reconstructed average summer temperature and total precipitation was evident mainly for the northern region. LFYs in this region were associated with positive temperature and negative precipitation anomalies over Scandinavia and with colder and wetter conditions in more southern parts of the European subcontinent. *Synthesis.* Historical patterns of the occurrence of large fire years (LFY) in Scandinavia point towards the presence of two well-defined zones with characteristic fire activity, with the geographical division at approximately 60 degrees N. The northern and mid-boreal forests, although exhibiting lower LFY frequencies, appeared to be more sensitive to past summer climate, as compared to the southern boreal forests. This would imply that fire regimes across Scandinavia may show an asynchronous response to future climate changes.

Impacts of frequent burning on live tree carbon biomass and demography in post-harvest regrowth forest

Collins, L.; Penman, T.; Ximenes, F. de A.; Binns, D.; York, A.; Bradstock, R

Forests; 2014. 5(4):802-821

The management of forest ecosystems to increase carbon storage is a global concern. Fire frequency has the potential to shift considerably in the future. These shifts may alter demographic processes and growth of tree species, and consequently carbon storage in forests. Examination of the sensitivity of forest carbon to the potential upper and lower extremes of fire frequency will provide crucial insight into the magnitude of possible change in carbon stocks associated with shifts in fire frequency. This study examines how tree biomass and demography of a eucalypt forest regenerating after harvest is affected by two experimentally manipulated extremes in fire frequency (*i.e.*, ~3 year fire intervals vs. unburnt) sustained over a 23 year period. The rate of post-harvest biomass recovery of overstorey tree species, which constituted ~90% of total living tree biomass, was lower within frequently burnt plots than unburnt plots, resulting in approximately 20% lower biomass in frequently burnt plots by the end of the study. Significant differences in carbon biomass between the two extremes in frequency were only evident after >15-20 years of sustained treatment. Reduced growth rates and survivorship of smaller trees on the frequently burnt plots compared to unburnt plots appeared to be driving these patterns. The biomass of understorey trees, which constituted ~10% of total living tree biomass, was not affected by frequent burning. These findings suggest that future shifts toward more frequent fire will potentially result in considerable reductions in carbon sequestration across temperate forest ecosystems in Australia.

Effects of agriculture and timber harvest on carbon sequestration in the eastern US forests

Dangal, S. R. S.; Felzer, B. S.; Hurteau, M. D

Journal of Geophysical Research: Biogeosciences; 2014. 119(1):35-54

Forest carbon (C) sequestration in the eastern US will largely be driven by the interactive effects of disturbance due to land use change or management, climate, elevated CO₂, and air pollution during the 21st century. In this study, we parameterized a process-based model (TEM-Hydro2) to quantify the effects of agriculture and timber harvest, climate, elevated CO₂, and ozone on C sequestration during the 20th and the 21st century. We have not included the effects of natural disturbance such as fire, insect outbreaks, hurricanes, and tropical storms during the course of this study. Our site-specific comparisons suggest that C recovery of forests after anthropogenic disturbance depends on the time since disturbance and amount of C in different pools, including wood product pools with residence times ranging from 1 to 100 years. Our 20th century regional simulations show that recovery following anthropogenic disturbance and elevated CO₂ increased net carbon exchange (NCE), or net gain in the sink strength, by 64 and 32%, respectively, while ozone decreased NCE by 18%. However, there was a net loss of C due to disturbance if accounting from 1700. The 21st century simulation using the SRES A2 emissions resulted in an increase in NCE by 79% following partial annual timber harvest and 31% due to CO₂ fertilization, whereas climate and ozone decreased NCE by 12 and 8%, respectively. Our modeling results indicate that anthropogenic disturbance is an important factor to include for improving model accuracy in simulating C stocks and fluxes of eastern temperate forests.

Carbon balance impacts of land use changes related to the life cycle of Malaysian palm oil-derived biodiesel

Hansen, S. B.; Olsen, S. I.; Ujang, Z

International Journal of Life Cycle Assessment; 2014. 19(3):558-566

Purpose: The area of oil palm plantations in Malaysia is expanding by approximately 0.14 million hectare per year, and with the increasing demand for palm oil worldwide, there is no sign of the expansions slowing down. This study aims to identify the greenhouse gas emissions associated with land conversion to oil palm, in a life cycle perspective. Methods: LCA methodology is applied to existing land use change data. The assessment includes the issue of temporary carbon storage in the plantations. Through quantification of emissions from state forest reserve and rubber plantation conversions, the average Malaysian palm oil-related land use changes are calculated. Results and discussion: The results show that there are high emissions associated with the conversion of Malaysian state forest reserve to oil palm, whereas the conversion of rubber leaves a less significant carbon debt when indirect land use change is not included. Looking at the average Malaysian land use changes associated with oil palm shows that land use change emissions are responsible for approximately half of the total conventional biodiesel production emissions. The sensitivity analysis shows that the results could be significantly influenced by data variations in indirect land use changes, peat soils, and state forest reserve carbon stock. Conclusions: The relatively extensive conversions of the state forest reserve must be reversed and preferably with a shift toward conversion of degraded land in order for the average Malaysian land use changes to have less impact on the production life cycle of palm oil and biodiesel.

Dominant drivers of seedling establishment in a fire-dependent obligate seeder: climate or fire regimes?

Smith, A. L.; Blair, D.; McBurney, L.; Banks, S. C.; Barton, P. S.; Blanchard, W.; Driscoll, D. A.; Gill, A. M.; Lindenmayer, D. B.

Ecosystems; 2014. 17(2):258-270

Climate change is causing fire regime shifts in ecosystems worldwide. Plant species with regeneration strategies strongly linked to a fire regime, such as obligate seeders, may be particularly threatened by these changes. It is unclear whether changes in fire regimes or the direct effects of climate change will be the dominant threats to obligate seeders in future. We investigated the relative importance of fire-related variables (fire return interval and fire severity) and environmental factors (climate and topography) on seedling establishment in the world's tallest angiosperm, an obligate seeder, *Eucalyptus regnans*. Throughout its range, this species dominates the wet montane forests of south-eastern Australia and plays a keystone role in forest structure. Following major wildfires, we investigated seedling establishment in *E. regnans* within 1 year of fire as this is a critical stage in the regeneration niche of obligate seeders. Seedling presence and abundance were strongly related to the occurrence of fire but not to variation in fire severity (moderate vs. high severity). Seedling abundance increased with increasing fire return interval (range 26-300 years). First-year seedling establishment was also strongly associated with low temperatures and with high elevations, high precipitation and persistent soil water availability. Our results show that both climate and fire regimes are strong drivers of *E. regnans* seedling establishment. The predicted warming and drying of the climate might reduce the regeneration potential for some obligate seeders in future and these threats are likely to be compounded by changes in fire regimes, particularly increases in fire frequency.

Carbon balance assessments of harvested wood products in Japan taking account of inter-regional flows

Kayo, C.; Tsunetsugu, Y.; Noda, H.; Tonosaki, M
Environmental Science & Policy; 2014. 37:215-226

We constructed a model to assess the carbon balance of harvested wood products (HWP) used for building, furniture, paper/paperboard and energy, taking into account flows of wood between regions of Japan. We projected the carbon balance in each region until 2050 under two future scenarios, a BAU (business as usual) scenario and a wood use promotion scenario. We found the carbon stock in domestic harvested wood products became a carbon emission source, with Central Japan becoming the largest emission source, after 2020 in the BAU scenario but continued to function as a carbon sink in every region over the whole period in the wood promotion scenario. Therefore, unless future supply and demand amounts of domestic wood are increased by factors such as policies promoting the use of wood, the carbon stock of domestic wood may become an emission source rather than a sink. By promoting the use of domestic wood, the carbon stock acts as a carbon sink in every region. Carbon emissions from fossil fuel consumption with respect to HWP in the whole of Japan fell to 72% of the 2004 value in 2050 in the BAU scenario, but rose to 112% in the wood promotion scenario. Emissions from wood transport were greatest in Central Japan, emissions from sawn wood processing were highest in West Japan, and emissions from plywood processing and woodchip processing were greatest in East Japan. In carbon balances that included the annual changes in the carbon stock amounts of domestic harvested wood, only Central Japan in the wood promotion scenario had carbon removals greater than its carbon emissions from fossil fuel consumption in the years 2005-2045. In addition, when considering reductions in carbon emissions by substitution of fossil fuels with wood residues and waste wood in the carbon balances, the sum of the removals from carbon stock changes and the reductions of carbon emissions were greater than the carbon emissions associated with HWP over the entire period in all three regions in both scenarios.

Modeling the impact of carbon farming on land use in a New Zealand landscape

Funk, J. M.; Field, C. B.; Kerr, S.; Daigneault, A
Environmental Science & Policy; 2014. 37:1-10

The opportunity for private landowners to receive carbon credits from reforestation, or "carbon farming", will change the relative value of land uses for landowners, potentially having an impact on land-use decisions. We constructed a spatial model to evaluate the potential scale and location of carbon farming in a New Zealand landscape, the size of resulting carbon stocks, and the economic trade-offs for landowners considering carbon farming. We modeled the carbon accumulation, economic value, and potential uptake of a carbon farming management system that utilized native forest regeneration on set-aside land. For the study area, the Gisborne District of New Zealand, we found that regrowth of native forest species on estimated Kyoto-eligible marginal pasture has the technical potential to store 104.2 Mt CO₂-e over 70 years over 379,000 eligible hectares. We found 102,951 ha where the potential economic revenues from carbon in our most conservative scenario could generate NZ\$912 million in excess of expected grazing revenues over 70 years of forest regeneration. Our results suggest that reforestation could out-compete grazing on at least 27% of eligible land in the Gisborne District. Sensitivity analysis shows that uncertainty about the scale of carbon sequestration can have a sizeable effect on the estimated profitability of carbon farming, but estimated land conversion is strongly affected by the choice of discount rates among landowners and the utilization of compatible incentives for other environmental services. Potential profits from carbon farming are strongly affected by the uncertainty of the future value of carbon credits.

Size and frequency of natural forest disturbances and the Amazon forest carbon balance

Espirito-Santo, F. D. B.; Gloor, M.; Keller, M.; Malhi, Y.; Saatchi, S.; Nelson, B.; Oliveira Junior, R. C.; Pereira, C.; Lloyd, J.; Frohling, S.; Palace, M.; Shimabukuro, Y. E.; Duarte, V.; Mendoza, A. M.; Lopez-Gonzalez, G.; Baker, T. R.; Feldpausch, T. R.; Brienen, R. J. W.; Asner, G. P.; Boyd, D. S.; Phillips, O. L. *Nature Communications*; 2014. 5(3):3434

Forest inventory studies in the Amazon indicate a large terrestrial carbon sink. However, field plots may fail to represent forest mortality processes at landscape-scales of tropical forests. Here we characterize the frequency distribution of disturbance events in natural forests from 0.01 ha to 2,651 ha size throughout Amazonia using a novel combination of forest inventory, airborne lidar and satellite remote sensing data. We find that small-scale mortality events are responsible for aboveground biomass losses of -1.7 Pg Cy^{-1} over the entire Amazon region. We also find that intermediate-scale disturbances account for losses of -0.2 Pg Cy^{-1} , and that the largest-scale disturbances as a result of blow-downs only account for losses of $-0.004 \text{ Pg Cy}^{-1}$. Simulation of growth and mortality indicates that even when all carbon losses from intermediate and large-scale disturbances are considered, these are outweighed by the net biomass accumulation by tree growth, supporting the inference of an Amazon carbon sink.

Modelling the effects of climate change and management on the dead wood dynamics in boreal forest plantations

Mazziotta, A.; Monkkonen, M.; Strandman, H.; Routa, J.; Tikkanen, O. P.; Kellomaki, S. *European Journal of Forest Research*; 2014. 133(3):405-421

The present research examines the joint effects of climate change and management on the dead wood dynamics of the main tree species of the Finnish boreal forests via a forest ecosystem simulator. Tree processes are analyzed in stands subject to multiple biotic and abiotic environmental factors. A special focus is on the implications for biodiversity conservation thereof. Our results predict that in boreal forests, climate change will speed up tree growth and accumulation ending up in a higher stock of dead wood available as habitat for forest-dwelling species, but the accumulation processes will be much smaller in the working landscape than in set-asides. Increased decomposition rates driven by climate change for silver birch and Norway spruce will likely reduce the time the dead wood stock is available for dead wood-associated species. While for silver birch, the decomposition rate will be further increased in set-aside in relation to stands under ordinary management, for Norway spruce, set-asides can counterbalance the enhanced decomposition rate due to climate change thereby permitting a longer persistence of different decay stages of dead wood.

Comparative effects of desiccation, heat shock and high temperatures on seed germination of savanna and forest tree species

Ribeiro, L. C.; Borghetti, F. *Austral Ecology*; 2014. 39(3):267-278

Although forest and savanna biomes predominate in tropics regions, the factors that control their distribution remain unclear. South American savannas occur in regions that are considered warm and humid enough to support forests, indicating that agents other than climate determine the occurrence of one or the other physiognomy. Herbivory, fire and water deficit have been considered environmental filters that limit the forest species encroachment in savanna physiognomies, but the effects of these filters on the capability of these species to recruit from seeds remain poorly understood. In this study we investigated how stress factors characteristic of savanna environments, such as soil desiccation, heat shocks and high temperatures affect the survival and germination of seeds from savanna and forest tree species. We found that desiccation (to 5%) reduced the germination percentage of forest seeds, but had no effect on the germination of savanna seeds. Forest seeds were less tolerant to heat shocks of 140 degrees C and 200 degrees C, and showed lower germination percentage at temperatures of 35 and 40 degrees C, when compared with savanna seeds. Savanna seeds presented longer germination times and higher germination variance than forest seeds, indicating a risk-spreading germination strategy among savanna species. The low tolerance of forest seeds to desiccation, heat shock and high temperatures may explain the low recruitment of forest trees into savanna physiognomies. Climate change models predict lower soil moisture, higher temperatures and higher fires frequency for South America biomes. Our results suggest that savanna species are likely to be more capable of withstanding the effects of these changes than forest species.

Short communication. Forestry solutions for mitigating climate change in China

Gao GuangLei; Ding GuoDong; Zhao YuanYuan; Bao YanFeng; Yu MingHan. *Forest Systems*; 2014. 23(1):183-186

Aim of study: Forests have vital functions in global carbon cycle, and thus are of prime importance in efforts to curb climate change. This study intends to guide effective forestry solutions to combat climate change in China. Area of study: China, not only a major emitter of greenhouse gases, but also one of the five most-forest richest countries with the largest plantations in the world. Material and methods: We summarize and recommend carbon sequestration forestry by considering two Kyoto Protocol activities:

afforestation/reforestation and forest management. Main results: Afforestation has a top priority of carbon sequestration forestry in China. However, the tree-based solution will reach its limits to growth in a predictable near future. Forest management contributes to break the deadlock. When scientifically and sustainably managed, forests still have a central role in climate change mitigation. Research highlights: China's efforts on carbon sequestration forestry should shift the focus from afforestation to forest management.

Plant movements and climate warming: intraspecific variation in growth responses to nonlocal soils

Frenne, P. de; Coomes, D. A.; Schrijver, A. de; Staelens, J.; Alexander, J. M.; Bernhardt-Romermann, M.; Brunet, J.; Chabrerie, O.; Chiarucci, A.; Ouden, J. den; Eckstein, R. L.; Graae, B. J.; Gruwez, R.; Hedl, R.; Hermy, M.; Kolb, A.; Marell, A.; Mullender, S. M.; Olsen, S. L.; Orczewska, A.; Peterken, G.; Petrik, P.; Plue, J.; Simonson, W. D.; Tomescu, C. V.; Vangansbeke, P.; Verstraeten, G.; Versterdal, L.; Wulf, M.; Verheyen, K.

New Phytologist; 2014. 202(2):431-441

Most range shift predictions focus on the dispersal phase of the colonization process. Because moving populations experience increasingly dissimilar nonclimatic environmental conditions as they track climate warming, it is also critical to test how individuals originating from contrasting thermal environments can establish in nonlocal sites. We assess the intraspecific variation in growth responses to nonlocal soils by planting a widespread grass of deciduous forests (*Milium effusum*) into an experimental common garden using combinations of seeds and soil sampled in 22 sites across its distributional range, and reflecting movement scenarios of up to 1600 km. Furthermore, to determine temperature and forest-structural effects, the plants and soils were experimentally warmed and shaded. We found significantly positive effects of the difference between the temperature of the sites of seed and soil collection on growth and seedling emergence rates. Migrant plants might thus encounter increasingly favourable soil conditions while tracking the isotherms towards currently 'colder' soils. These effects persisted under experimental warming. Rising temperatures and light availability generally enhanced plant performance. Our results suggest that abiotic and biotic soil characteristics can shape climate change-driven plant movements by affecting growth of nonlocal migrants, a mechanism which should be integrated into predictions of future range shifts.

Predicting climate change impacts to the Canadian boreal forest

Nelson, T. A.; Coops, N. C.; Wulder, M. A.; Perez, L.; Fitterer, J.; Powers, R.; Fontana, F

Diversity; 2014. 6(1):133-157

Climate change is expected to alter temperature, precipitation, and seasonality with potentially acute impacts on Canada's boreal. In this research we predicted future spatial distributions of biodiversity in Canada's boreal for 2020, 2050, and 2080 using indirect indicators derived from remote sensing and based on vegetation productivity. Vegetation productivity indices, representing annual amounts and variability of greenness, have been shown to relate to tree and wildlife richness in Canada's boreal. Relationships between historical satellite-derived productivity and climate data were applied to modelled scenarios of future climate to predict and map potential future vegetation productivity for 592 regions across Canada. Results indicated that the pattern of vegetation productivity will become more homogenous, particularly west of Hudson Bay. We expect climate change to impact biodiversity along north/south gradients and by 2080 vegetation distributions will be dominated by processes of seasonality in the north and a combination of cumulative greenness and minimum cover in the south. The Hudson Plains, which host the world's largest and most contiguous wetland, are predicted to experience less seasonality and more greenness. The spatial distribution of predicted trends in vegetation productivity was emphasized over absolute values, in order to support regional biodiversity assessments and conservation planning.

V. PUBLICATIONS, REPORTS AND OTHER MEDIA

Monitoring & evaluation for climate change adaptation and resilience: A synthesis of tools, frameworks and approaches, 2nd edition

Sea Change and UKCIP

This report represents a synthesis and summary of frameworks for the monitoring and evaluation (M&E) of climate change adaptation and resilience (CCAR) interventions, with a specific focus on international development projects and programmes.

The objective of this report is to:

- Provide an easy-to-read synthesis of current adaptation and resilience M&E resources, frameworks, and approaches so that practitioners are able to more easily identify the information and tools that are most relevant to their needs
- Provide a short analysis of the 'state of play' of adaptation and resilience M&E guidance, identifying key themes and reflecting upon gaps and future priorities. [The publication](#)

International Institute for Environment and Development climate change publications

IIED

A number of new publications on climate change are available online. Click [here](#) for more information.

Compilation of Submissions on NCBs Resulting from REDD+ Implementation

UNFCCC

The UN Framework Convention on Climate Change (UNFCCC) Secretariat has published a compilation of submissions by parties on methodological issues related to non-carbon benefits (NCBs) resulting from the implementation of REDD+ activities, in advance of the 40th session of the Subsidiary Body for Scientific and Technological Advice (SBSTA 40). [More](#)

CIFOR 2013 Annual Report. Forestry in the global landscape

CIFOR

CIFOR's annual report. [Download](#)

The challenge of establishing REDD+ on the ground. Insights from 23 subnational initiatives in six countries

CIFOR

Since 2007, there have been high hopes that REDD+ would deliver on the 3E+ criteria (effectiveness, efficiency, equity, social and environmental co-benefits) for strategies to reduce greenhouse gas emissions. The original concept was to offer performance-based conditional incentives for forest conservation, thereby reducing deforestation and forest degradation. [Download](#)

V.I JOBS

International REDD+ Advisor

UN-REDD Programme - deadline for application is 15th of June 2014

The Forestry Commission of Cross River State, with the Nigeria REDD+ Secretariat, is recruiting an International REDD+ Advisor to support the implementation of the Nigeria REDD+ programme, with a strong focus on Cross River State as the pioneer and demonstration state for REDD+ in Nigeria. [More](#)

VII. ANNOUNCEMENTS

T20Q

CIFOR

Top twenty questions for forestry and landscapes is a project within the broader Evidence-Based Forestry (EBF) initiative, led by CIFOR and its partners. [More](#)

CLIM-FO INFORMATION

The objective of CLIM-FO-L is to compile and distribute recent information about climate change and forestry. CLIM-FO-L is issued monthly.

Past issues of CLIM-FO-L are available on the website of *FAO Forest and Climate Change*:

<http://www.fao.org/forestry/climatechange/en/>

For technical help or questions contact CLIM-FO-Owner@fao.org

The Newsletter is compiled by Marc Dumas-Johansen and Susan Braatz.

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