



## CONTENTS

<b>I. IN THE PRESS .....</b>	<b>3</b>
<b>II. MULTILATERAL PROCESSES IN CLIMATE CHANGE .....</b>	<b>4</b>
<b>III. EVENTS &amp; MEETINGS.....</b>	<b>4</b>
Upcoming events .....	4
World Forests Summit. Achieving sustainable forest management on a global scale .....	4
11th International Conference on Dryland Development: “Global Climate Change and its Impact on Food & Energy Security in the Dry lands” .....	4
International Conference on Forests for Food Security and Nutrition .....	4
International Conference on Climate Change and Tree Responses in Central European Forests .....	4
<b>IV. RESEARCH ARTICLES.....</b>	<b>5</b>
Benefit distribution across scales to reduce emissions from deforestation and forest degradation (REDD+) in Vietnam. ....	5
REDD+ and the agriculture frontier: understanding colonists' utilization of the land. ....	5
Afforestation and reforestation projects in South and South-East Asia under the Clean Development Mechanism: trends and development opportunities .....	5
Modeling the role of forests in a regional carbon mitigation plan.....	6
A meta-analysis of terrestrial aboveground biomass estimation using lidar remote sensing.....	6
Forest-fringe communities, JFPM and REDD+ in India .....	6
Long-term integrated studies show complex and surprising effects of climate change in the northern hardwood forest.....	7
Forest resources use, attitude, and perception of local residents towards community based forest management: case of the Makira Reducing Emissions from Deforestation and Forest Degradation (REDD) Project, Madagascar .....	7
Lessons from community-based payment for ecosystem service schemes: from forests to rangelands.....	7
An exploratory study on forest carbon markets in Asia .....	8
Plant functional diversity and carbon storage - an empirical test in semi-arid forest ecosystems .....	8
Species specific growth responses of black spruce and trembling aspen may enhance resilience of boreal forest to climate change .....	9
Spatio-temporal effects of forest canopy on understory microclimate in a long-term experiment in Switzerland ...	9
Carbon accounting for woody biomass from Massachusetts (USA) managed forests: a framework for determining the temporal impacts of wood biomass energy on atmospheric greenhouse gas levels. ....	9
A framework for assessing the life cycle greenhouse gas benefits of forest bioenergy and biofuel in an era of forest carbon management .....	10
Using expert judgments to explore robust alternatives for Forest management under climate change .....	10
<b>V. PUBLICATIONS, REPORTS AND OTHER MEDIA.....</b>	<b>10</b>
New report explains the concept of carbon neutrality.....	10
Release of Canadian Council of Forest Ministers (CCFM) Climate Change Reports .....	11
Managing Forests as Complex Adaptive Systems. Building Resilience to the Challenge of Global Change.....	11
The Climate Bonus. Co-benefits of Climate Policy.....	11
Managing Forest Resources for Sustainable Development .....	11
REDD+ and Business Sustainability.....	12

Economics of forest and forest carbon projects - Translating lessons learned into national REDD+ implementation	12
DRC Finalizes Series of Studies on Drivers of Deforestation .....	12
Governing the Forests: An Institutional Analysis of REDD+ and Community Forest Management in Asia.....	12
<b>V.I JOBS .....</b>	<b>13</b>
Programme Officer / Policy advisor, REDD+, Global Green Growth Institute .....	13
<i>Global Green Growth Institute - deadline for application is 25<sup>th</sup> of February 2013</i> .....	13
<b>VII. ANNOUNCEMENTS .....</b>	<b>13</b>
Launch of the portal on Knowledge x-change on Sustainable Development .....	13
<b>CLIM-FO INFORMATION .....</b>	<b>14</b>

## I. IN THE PRESS

14 February 2013 - Mongabay

### [Will Amazon species lose the climate change race?](#)

Deforestation could increase the risk of biodiversity loss in the Amazon by forcing species to migrate further in order to remain at equilibrium with changing climates, says new research.

14 February 2013 - IPS

### [Sahel Region Learning to Reap the Benefits of Shade](#)

In Africa's Sahel region, agroforestry techniques using traditional plantings known as "fertiliser trees" to increase soil fertility, as well as harvesting and grazing regulations, are offering new solutions to both food and human security.

Such approaches were nearly lost in recent decades following devastating droughts in the Sahel. Now they are making a belated but welcome comeback. According to a 2012 U.S. Geological Survey, "regeneration agroforestry" in the Sahel stands at over 5 million hectares of agricultural fields newly covered by trees - and growing.

13 February 2013 - CCAFS

### [Moving mitigation forward: Improving quantification of agricultural greenhouse gases](#)

A new focus issue of the journal Environmental Research Letters explores the current state and near-term potential for improved quantification of agricultural greenhouse gases. Together the articles in this issue provide a vision for an improved system for quantifying greenhouse gas (GHG) emissions in agriculture, with special attention to the needs of smallholder agriculture in developing countries.

12 February 2013 - UNFCCC

### [UNFCCC expands efforts to increase regional distribution of clean development mechanism projects](#)

The United Nations Framework Convention on Climate Change (UNFCCC) secretariat and the East African Development Bank (EADB) have signed a partnership agreement to establish a regional collaboration centre in Kampala, Uganda in an effort to increase participation in clean development mechanism (CDM) projects.

4 February 2013 - Adaptation Fund

### [Incoming Chair calls on donors to do more to support the most vulnerable to climate change](#)

Prices of carbon credits are at a record low. This has led to a bottleneck in the work of a new fund that would help poor countries adapt to climate change. Now the fund's incoming chairman asks Norwegian authorities for assistance to the most vulnerable. The Adaptation Fund was established to finance projects in developing countries that are particularly vulnerable to climate change. The fund has two main sources - an agreed percentage of the sales of carbon credits and voluntary contributions from countries that support climate change adaptation.

30 January 2013 - Forest Carbon Asia

### [Whither REDD+ after Doha? New realities for forest advocates Observations from UNFCCC COP 18.](#)

*Is Doha the final stop for REDD+ negotiations? Where does REDD+ stand now and where does it go from here? What is its role in the proposed Landscape day? Andrea Tuttle, long-standing REDD observer at the COPs explores the fate and future of REDD+ including one critical unresolved issue...*

29 January 2013 - The Guardian

### [World Bank spending on forests fails to curb poverty, auditors claim](#)

The World Bank's \$4.1bn (£2.6bn) investments in forestry over the past 10 years have done little to reduce poverty, improve conservation, tackle climate change or benefit local communities in developing countries, a study by its own inspectors has found.

20 January 2013 - The Guardian

### [Can oil save the rainforest?](#)

When another new oil field was found beneath the Amazon jungle, campaigners feared the worst. But a radical and daring plan to ransom the drilling rights could save the planet's most biodiverse area.

## II. MULTILATERAL PROCESSES IN CLIMATE CHANGE

The next scheduled UNFCCC negotiations will take place from 3-14 June, Bonn, Germany.

## III. EVENTS & MEETINGS

### Upcoming events

#### **World Forests Summit. Achieving sustainable forest management on a global scale**

*5-6 March 2013, Stockholm, Sweden*

Forests play a crucial role in the world's environment, health and economy - yet they are under threat. Our World Forests Summit will assemble a leading group of experts from around the world to identify common ground and discuss mechanisms for forest stakeholders to work together differently. The summit will openly explore the tensions and compromises that are involved in creating a thriving global green economy, delivering fresh insight into solving critical challenges at both global and national levels. [More](#)

#### **11th International Conference on Dryland Development: “Global Climate Change and its Impact on Food & Energy Security in the Dry lands”**

*18-23 March 2013, Beijing, China*

It has now been well established that the global climate change is occurring and is having a wide impact on the environment and the livelihood of the people across the world. Dry areas of the world have highly fragile ecosystem, which is highly vulnerable to climate changes. For sustainable development of the drylands and other dry areas in the face of global climate and other changes, it is important to recognize the impacts of climate change and human activities on dryland ecosystem and understand the process and mechanism of dry lands ecosystem changes occurring because of these pressures. In addition, other global changes are also triggering challenges for food and energy security in the drylands. The Conference will provide an opportunity to exchange research results and experiences among colleagues from around the world and to promote international cooperation in developing strategies to meet the challenge of sustainable development of the drylands in the face of these changes. Emphasis will be specially laid on identifying adaptation and mitigation strategies using traditional knowledge as well as modern science and technology for different dryland ecologies. [More](#)

#### **International Conference on Forests for Food Security and Nutrition**

*13-15 May, Rome, Italy*

The International Conference on Forests for Food Security and Nutrition will increase understanding of the crucial role that forests, trees on farms and agroforestry systems can play in improving the food security and nutrition of rural people, especially in developing countries. It will propose ways to integrate this knowledge in policy decisions at the national and international levels. The conference objectives are to:

- i) highlight the ways in which forests, trees on farms and agroforestry systems contribute to food security and nutrition
- ii) explore policy options and innovative approaches for increasing the role of forests, trees on farms and agroforestry systems in food security and nutrition
- iii) identify key challenges and bottlenecks hindering that contribution

For more [details](#)

#### **International Conference on Climate Change and Tree Responses in Central European Forests**

*1-5 September 2013, Zürich, Switzerland*

The conference aims at exchanging the state of the art regarding direct (physical environment) and indirect effects (interspecific interactions) of climate change on the performance of trees and forest ecosystems. Topics to be discussed stretch from tree physiology and genetics to disturbances and community diversity, with a clear regional focus on Central Europe including the Alps and Carpathians. Keynotes on the response of trees/forest ecosystems to Climate Change (CC) in the focal region and in other regions of the world will frame the sessions, which are open for contributed talks. [More](#)

## IV. RESEARCH ARTICLES

### **Benefit distribution across scales to reduce emissions from deforestation and forest degradation (REDD+) in Vietnam.**

Minh Ha Hoang; Trong Hoan Do; Minh Thoa Pham; Noordwijk, M. van; Minang, P. A.;  
*Land Use Policy*; 2013. 31: 48-60

At very high policy levels, efforts to reduce emissions from deforestation and forest degradation (REDD+) are considered to be innovative and cost-effective ways to make forest more valuable standing than cut. In response to climate change, international funding to support reductions in emissions needs to balance conservation and development. The Government of Vietnam is currently coordinating the design of a comprehensive benefit-distribution system, with the ambition to convert certified net emissions reductions into REDD+ revenue and distribute it to local partners in a transparent, equitable and cost-effective manner. A pilot scheme is underway in Bac Kan province. With forest cover of 56.6% and a poverty rate of 36.6%, Bac Kan is among the most heavily forested and poorest provinces of Vietnam, making it a potential site for pioneering REDD+ schemes in the country. Research questions were how to incorporate international, national and local stakeholders' investments into any distribution scheme; and how to sustain and manage an efficient, effective and equitable funding scheme for environmental services, including REDD+ revenues. Multiple data collection and analytical methods (including participatory approaches) were used to answer both research questions. Additionally, for the second question, we employed cost-benefit, opportunity cost and economic analyses. Three key concepts formed the research frame for this paper: (1) benefit-distribution systems; (2) reducing emissions from deforestation and forest degradation plus conservation (REDD+); and (3) the broader concept of payments or rewards for ecosystem services; as well as lessons learned from existing, similar schemes. This results shows that an appropriate benefit-sharing system for REDD+ revenues can be developed in such a way that meets international regulations as well as national and sub-national circumstances, particularly for the environmental services' providers who directly protect forests. Vietnam's payments for forest environmental services' and integrated conservation schemes (where conservation and rural development are integrated) serve as a base for the development of a REDD+ benefit-distribution system. We discuss ways of bundling such schemes with REDD+ 'service' payments and income streams from forestry and agroforestry 'goods' to provide short-term food-security/economic return and long-term environmental benefits. This combination is expected to provide sustainable incentives, but further effort is needed in the use of participatory methods and a 'bottom-up' approach to provide a strong base for an effective and equitable REDD+ mechanism at landscape level. Experience drawn from Vietnam, in general, and in Bac Kan, in particular, can be replicated and directly contribute to reducing carbon emissions globally.

### **REDD+ and the agriculture frontier: understanding colonists' utilization of the land.**

St-Laurent, G. P.; Gelinas, N.; Potvin, C.;  
*Land Use Policy*; 2013. 31: 516-525

Given the importance of the agricultural frontier as an engine of deforestation, this paper focuses on how colonists (from the Spanish word for "colonists" that is used to describe migrants to the agricultural frontier), who are important and largely overlooked stakeholders, perceive the new climate mitigation mechanism known as Reducing Emissions from Deforestation and forest Degradation in developing countries (REDD+). We aimed (1) to document colonists' land use, perceptions, needs, and aspirations and (2) to understand if and how they could be taken into account under REDD+ policies. The study, including multiple data collection techniques (e.g., focus group, interviews, and participatory activities), was conducted in eastern Panama. Three areas that were adjacent to the Province of Darien border were chosen because of their similar forested landscapes and varying accessibility to a main road. Our results suggest that land use preferences, culture, forest scarcity and dependency, inequalities (e.g., land use, amount of forest, and land area), and lack of technical capacities are key elements to be considered when developing a REDD+ strategy with colonist communities. We propose that halting deforestation without both considering local communities' perceptions and giving effective alternatives could seriously undermine livelihoods.

### **Afforestation and reforestation projects in South and South-East Asia under the Clean Development Mechanism: trends and development opportunities**

Nijnik, M.; Halder, P.;

*Land Use Policy; 2013. 31: 504-515*

This paper contributes to identification of key trends, opportunities and constraints for development of afforestation/reforestation projects (AR) under the Clean Development Mechanism (CDM). It reports on analysis of survey results particularly addressing CDM-AR projects in South and South-East Asia (SSEA), and on knowledge obtained from both (i) experts in SSEA countries and (ii) developers, investors and consultants in the Annex I countries. Despite a wide variety of opinions, respondents from both groups expressed a number of similarities in their vision. For example, availability of land suitable for tree planting in host countries, and the development of community based forestry were considered by experts as major strengths of CDM-AR. There was a consensus between the two groups of experts regarding certification and developing standards for CDM-AR. Community participation, with a focus on local livelihoods and biodiversity conservation, were identified as the basic criteria for success. The similarities and differences revealed in the attitudes of experts make it possible to identify and explain areas of potential conflicts between the CDM-AR developers/investors and local communities, and therefore, to assist in managing conflicts that could arise, as well as to enable better targeting of CDM-AR within land use changes in host countries in order to provide more effectively the co-benefits to end-users, both at a local level and internationally.

### **Modeling the role of forests in a regional carbon mitigation plan**

**Fiorese, G.; Guariso, G**

*Renewable Energy; 2013. 52: 175-182*

Biomass from the forest sector can be an important source of renewable energy and can contribute to climate change mitigation and bioenergy development. However, the removal of biomass from forests has significant impacts on the forest ecosystem. For instance, it modifies soil litter which is particularly important to preserve soil characteristics and to sustain a diversity of organisms. Our aim is to analyze alternatives of sustainable forest management and compare how they perform in terms of carbon savings in order to assess the role of the sector in a regional emission reduction plan. The analysis is performed applying CO2FIX, a well-known carbon accounting model to the forests of the Italian region of Emilia-Romagna. The behavior of the most important forest macrocategories is investigated under common management alternatives: no harvest activities, maintenance of a constant stock, different rotation lengths, and maximization of harvested biomass. We evaluate their impact at landscape level on the regional carbon budget, thus estimating the maximum potential contribution from the forest sector.

### **A meta-analysis of terrestrial aboveground biomass estimation using lidar remote sensing**

**Zolkos, S. G.; Goetz, S. J.; Dubayah, R.**

*Remote Sensing of Environment; 2013. 128: 289-298*

Estimating biomass of terrestrial vegetation is not only a rapidly expanding research area, but also a subject of tremendous interest for reducing carbon emissions associated with deforestation and forest degradation (REDD). The accuracy of biomass estimates, and rate of biomass change, is not only important in the context of carbon markets emerging under REDD, but also for characterizing uncertainty in estimates of carbon cycling and the global carbon budget. There is particular interest in mapping biomass so that carbon stocks and stock changes can be monitored consistently across a range of scales - from relatively small projects (tens of hectares) to national or continental scales - but also so that other benefits of forest conservation can be factored into decision making (e.g. biodiversity and habitat corridors). We conducted an analysis of reported biomass accuracy estimates from more than 70 refereed articles using different remote sensing platforms (airborne and spaceborne) and sensor types (optical, radar, and lidar), with a particular focus on lidar since those papers reported the lowest errors when used in a synergistic manner with other coincident multi-sensor measurements. We show systematic differences in accuracy between different types of lidar systems flown on different platforms but, perhaps more importantly, differences between forest types (biomes) and plot sizes used for field calibration and assessment. We discuss these findings in relation to monitoring, reporting and verification under REDD, and also in the context of more systematic assessment of factors that influence accuracy and error estimation.

### **Forest-fringe communities, JFPM and REDD+ in India**

**Jagmohan Sharma; Singh, M. P**

*Indian Forester; 2012. 138: 11, 991-998*

Forest-fringe communities usually depend on forest to meet their day-to-day sustenance and biomass needs. More than a third of notified forests in India are being managed under joint forest planning and management (JFPM) programme involving forest-fringe communities and state forest departments. These jointly managed forests have degraded due to over-use in the past. At present the focus of management in such jointly managed forests is on their rejuvenation and rationalized use. By implication, in the long term JFPM is carbon positive approach, and biodiversity conservation and livelihoods strengthening are its by-products. REDD+

(Reducing Emissions from Deforestation and forest Degradation plus) envisions the same with added incentives from tradable carbon units that would improve the flow of revenue benefits for forest-fringe communities. Under the emerging REDD+ scenario, JFPM is likely to provide a ready foundation to initiate REDD+ that is likely to enhance the resilience of forests as well as communities in face of climate change. Forest management under REDD+ regime is not likely to be much different from that under JFPM at the ground level however its administration is expected to involve several anticipated issues and other completely new issues. The present study looks at the present forest management regime under JFPM to assess the opportunity for forest-fringe communities to participate in REDD+ programme.

### **Long-term integrated studies show complex and surprising effects of climate change in the northern hardwood forest**

Groffman, P. M.; Rustad, L. E.; Templer, P. H.; Campbell, J. L.; Christenson, L. M.; Lany, N. K.; Socci, A. M.; Vadeboncoeur, M. A.; Schaberg, P. G.; Wilson, G. F.; Driscoll, C. T.; Fahey, T. J.; Fisk, M. C.; Goodale, C. L.; Green, M. B.; Hamburg, S. P.; Johnson, C. E.; Mitchell, M. J.; Morse, J. L.; Pardo, L. H.; Rodenhouse, N. L.;  
*BioScience*; 2012. 62: 12, 1056-1066

Evaluations of the local effects of global change are often confounded by the interactions of natural and anthropogenic factors that overshadow the effects of climate changes on ecosystems. Longterm watershed and natural elevation gradient studies at the Hubbard Brook Experimental Forest and in the surrounding region show surprising results demonstrating the effects of climate change on hydrologic variables (e.g., evapotranspiration, streamflow, soil moisture); the importance of changes in phenology on water, carbon, and nitrogen fluxes during critical seasonal transition periods; winter climate change effects on plant and animal community composition and ecosystem services; and the effects of anthropogenic disturbances and land-use history on plant community composition. These studies highlight the value of long-term integrated research for assessments of the subtle effects of changing climate on complex ecosystems.

### **Forest resources use, attitude, and perception of local residents towards community based forest management: case of the Makira Reducing Emissions from Deforestation and Forest Degradation (REDD) Project, Madagascar**

Ratsimbazafy, C. L.; Harada, K.; Yamamura, M.  
*Journal of Ecology and the Natural Environment*; 2012. 4: 13, 321-332

Community participation is seen to be the building block for the efficiency of the Reducing Emissions from Deforestation and Forest Degradation (REDD) project. In order for local residents to cooperate with a reduction of deforestation and forest degradation, they must have a positive perception toward the forest conservation system and positive attitude toward the forest conservation project. This study examined the attitude and perception of the local community toward conservation of the Makira forest, from where carbon credits are intended to be sequestered under the REDD schema. The perception and attitude of the local people were studied in three dimensions: the perception toward the conservation of Makira, the perception of the forest and forest resources, and the perception of the community forestry including cost and benefit. It was assumed that regardless of the dependency of local residents on the forest, the reception of an incentive and participation in the local meetings or participation within the forest conservation and development activities would provide a positive perception toward the forest conservation project. Data were obtained from a random sample of 188 households living within the vicinity of the protected forest. Sixty percent of respondents were found to agree with the idea of Makira forest conservation; however, statistically significant differences were found between the villages in terms of supportive attitudes toward the forest conservation system ( $p=0.03$ ) and toward the conservation project ( $p=0.04$ ). Nearly half of the respondents held a positive attitude toward the conservation project. However, those highly dependent on the forest to generate income remained reluctant and unsupportive, suggesting that high levels of support toward a conservation project by sections of the community may not translate into conservation success, because the drivers of the deforestation and forest degradation are not supportive. A perception of direct benefits from the project was found to be the main factor of the respondents' attitudes and perceptions. This study then suggests that to change the perception and attitudes of indigenous people around protected areas, environmental education through sensitization should be encouraged, and then addressing local development needs, encourage broader participation in community forestry if the conservation project wants to win the support of local communities for long-term emission reduction through forest conservation goals.

### **Lessons from community-based payment for ecosystem service schemes: from forests to rangelands**

Dougill, A. J.; Stringer, L. C.; Leventon, J.; Riddell, M.; Rueff, H.; Spracklen, D. V.; Butt, E.;  
*Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*; 2012. 367: 1606, 3178-3190.

Climate finance investments and international policy are driving new community-based projects incorporating payments for ecosystem services (PES) to simultaneously store carbon and generate livelihood benefits. Most community-based PES (CB-PES) research focuses on forest areas. Rangelands, which store globally significant quantities of carbon and support many of the world's poor, have seen little CB-PES research attention, despite benefitting from several decades of community-based natural resource management (CBNRM) projects. Lessons from CBNRM suggest institutional considerations are vital in underpinning the design and implementation of successful community projects. This study uses documentary analysis to explore the institutional characteristics of three African community-based forest projects that seek to deliver carbon-storage and poverty reduction benefits. Strong existing local institutions, clear land tenure, community control over land management decision-making and up-front, flexible payment schemes are found to be vital. Additionally, we undertake a global review of rangeland CBNRM literature and identify that alongside the lessons learned from forest projects, rangeland CB-PES project design requires specific consideration of project boundaries, benefit distribution, capacity building for community monitoring of carbon storage together with awareness-raising using decision-support tools to display the benefits of carbon-friendly land management. We highlight that institutional analyses must be undertaken alongside improved scientific studies of the carbon cycle to enable links to payment schemes, and for them to contribute to poverty alleviation in rangelands.

### **An exploratory study on forest carbon markets in Asia**

Cao XiaoZhi; Seol MiHyun; Yeo-Chang Youn

*Forest Science and Technology*; 2012. 8: 1, 34-37

Based on expert interviews and a structured survey with over 50 experts and industry leaders, this research provides a snapshot of forest carbon market development in Asia and offers future perspectives of challenges and opportunities. This study suggests that the carbon market is in the first generation of rigorous forest carbon standards programs. Those surveyed reflected a guardedly optimistic view that these markets will continue to be one of the solutions to address climate change. Interest in forest carbon projects was highest for "Reducing Emissions from Deforestation and Degradation" (REDD) and for afforestation/reforestation project types. The resonance of biodiversity conservation and community development associated with forest carbon offset projects remains attractive. Compared with other types of carbon credits, those from forest carbon are generally considered rich in co-benefits. The higher social and biodiversity benefits should therefore continue to be favored by companies (e.g. those with corporate social responsibility programs) and individuals in the voluntary market. With respect to quality of carbon credits, the quality brought about through co-benefits from the projects were the highest-rated concern factors, although the project developer experience with carbon projects was also close to the top. Additionality, leakage, permanence, baselines, monitoring and verification are all cornerstones of the quality of forest carbon credits and should have direct impacts on the market price of carbon credits.

### **Plant functional diversity and carbon storage - an empirical test in semi-arid forest ecosystems**

Conti, G.; Diaz, S

*Journal of Ecology (Oxford)*; 2013. 101: 1, 18-28.

Carbon storage in vegetation and soil underpins climate regulation through carbon sequestration. Because plant species differ in their ability to capture, store and release carbon, the collective functional characteristics of plant communities (functional diversity) should be a major driver of carbon accumulation in terrestrial ecosystems. Three major components of plant functional diversity could be put forward as drivers of carbon storage in ecosystems: the most abundant functional trait values, the variety of functional trait values and the abundance of particular species that could have additional effects not incorporated in the first two components. We tested for associations between these components and carbon storage across 16 sites in the Chaco forest of Argentina under the same climate and on highly similar parental material. The sites differed in their plant functional diversity caused by different long-term land-use regimes. We measured six plant functional traits in 27 species and weighted them by the species abundance at each site to calculate the community weighted mean (CWM) and the functional divergence (FDvar) of each single trait and of multiple traits (FDiv). We also measured plant and soil carbon storage. Using a stepwise multiple regression analysis, we assessed which of the functional diversity components best explained carbon storage. Both CWM and FDvar of plant height and wood-specific gravity, but no leaf traits, were retained as predictors of carbon storage in multiple models. Relationships of FDvar of stem traits and FDiv with carbon storage were all negative. The abundance of five species improved the predictive power of some of the carbon storage models. *Synthesis.* All three major components of plant functional diversity contributed to explain carbon storage. What matters the most to carbon storage in these ecosystems is the relative abundance of plants with tall, and to a lesser extent dense, stems with a narrow range of variation around these values. No consistent link was found between carbon storage and the leaf traits usually associated with plant resource use strategy. The negative association of trait divergence with carbon storage provided no evidence in support to niche complementarity promoting carbon storage in these forest ecosystems.



## **Species specific growth responses of black spruce and trembling aspen may enhance resilience of boreal forest to climate change**

Drobyshev, I.; Gewehr, S.; Berninger, F.; Bergeron, Y

*Journal of Ecology (Oxford)*; 2013. 101: 1, 231-242

To understand how the future climate will affect the boreal forest, we studied growth responses to climate variability in black spruce (*Picea mariana* [Mill.] B.S.P.) and trembling aspen (*Populus tremuloides* Michx.), two major co-occurring boreal tree species of the eastern Canadian boreal forest. We analysed climate-growth interaction during (i) periods of non-anomalous growth and (ii) in years with strong growth anomalies. We utilized paired tree-level data for both growth and soil variables, which helped ensure that the studied growth variability was a function of species-specific biology, and not of within stand variation in soil conditions. Redundancy analysis conducted on spruce and aspen tree ring chronologies showed that their growth was affected differently by climate. During non-anomalous years, growth of spruce was favoured by cooler temperatures and wetter conditions, while aspen growth was favoured by higher temperatures and drier conditions. Black spruce and trembling aspen also showed an inverse pattern in respect to expression of growth anomalies (pointer years). A negative growth anomaly in spruce tended to be associated with positive ones in aspen and vice versa. This suggested that spruce and aspen had largely contrasting species-specific responses to both 'average' weather conditions and extreme weather events. *Synthesis*. Species-specific responses to environmental variability imply that tree responses to future climate will likely be *not* synchronized among species, which may translate into changes in structure and composition of future forest communities. In particular, we speculate that outcome of climate change in respect to relative abundance of black spruce and trembling aspen at the regional levels will be highly dependent on the balance between increasing temperatures and precipitation. Further, species-specific responses of trees to annual climate variability may enhance the resilience of mixed forests by constraining variability in their annual biomass accumulation, as compared with pure stands, under periods with high frequency of climatically extreme conditions.

## **Spatio-temporal effects of forest canopy on understory microclimate in a long-term experiment in Switzerland**

Arx, G. von; Dobbertin, M.; Rebetez, M.

*Agricultural and Forest Meteorology*; 2012. 166/167: 144-155

Forest canopy generally moderates below-canopy air temperature and relative humidity and thus creates a specific microclimate for tree seedling growth. Climate change will alter the moderating capacity, which may render the below-canopy conditions unsuitable for recruitment of the hitherto dominant tree species. We assigned long-term meteorological data (1997-2010) recorded inside and outside of 14 different forest ecosystems in Switzerland to three forest types (broadleaved, non-pine conifer, pine), two altitudinal levels (low, high), the four seasons and general weather situations (normal, hot/dry, cold/wet) to compare moderating capacity of each of these classifiers. Our results confirmed a general moderating effect of canopy on below-canopy microclimate with a decrease of daily maximum air temperature of up to 5.1 degrees C (overall average: 1.8 degrees C) and an increase of daily minimum relative humidity of up to 12.4% (overall average: 5.1%) in the longterm average, respectively. Broadleaved and non-pine conifer forests moderated daytime microclimate about twice as much as pine forests, while at nighttime considerably less cooling down and even negative effects on levels of relative humidity compared to the open area were recorded at the pine forest sites. Moderating capacity was stronger at low altitude than at high altitude. It was strongest during the growing season, particularly in summer, and depended in a complex way on the general weather situation. Deviations from the general seasonal and weather condition patterns most likely occurred when soil moisture pools were depleted. Despite the moderating capacity, below-canopy microclimate did not lag behind open area microclimate. Based on our results we conclude that natural recruitment in pine forests and high-altitude forests may respond most sensitively to climate change.

## **Carbon accounting for woody biomass from Massachusetts (USA) managed forests: a framework for determining the temporal impacts of wood biomass energy on atmospheric greenhouse gas levels.**

Walker, T.; Cardellicchio, P.; Gunn, J. S.; Saah, D. S.; Hagan, J. M

*Journal of Sustainable Forestry*; 2013. 32: 1/2, 130-158

Policies based on assumed carbon neutrality fail to address the timing and magnitude of the net greenhouse gas (GHG) changes from using wood for energy. We present a "debt-then-dividend" framework for evaluating the temporal GHG impacts of burning wood for energy. We also present a case study conducted in Massachusetts, USA to demonstrate the framework. Four key inputs are required to calculate the specific shape of the debt-then-dividend curve for a given region or individual biomass facility. First, the biomass feedstock source: the GHG implications of feedstocks differ depending on what would have happened to the material in the absence of biomass energy generation. Second, the form of energy generated: energy technologies have different

generation efficiencies and thus different life cycle GHG emissions profiles. Third, the fossil fuel displaced: coal, oil, and natural gas each have different emissions per unit of energy produced. Fourth, the management of the forest: forest management decisions affect recovery rates of carbon from the atmosphere. This framework has broad application for informing the development of renewable energy and climate policies. Most importantly, this debt-then-dividend framework explicitly recognizes that GHG benefits of wood biomass energy will be specific to the forest and technology context of the region or biomass energy projects.

### **A framework for assessing the life cycle greenhouse gas benefits of forest bioenergy and biofuel in an era of forest carbon management**

Tittmann, P.; Yeh, S.

*Journal of Sustainable Forestry*; 2013. 32: 1/2, 108-129

The use of forest wastes for the production of bioenergy and liquid biofuels has the potential to offset the use of fossil energy sources. Some studies suggest biofuel and bioenergy produced from the removal of forest waste - products considered to be uneconomical to harvest - generates significant well-to-tank greenhouse gas (GHG) emission savings by displacing energy produced from fossil resources. In parallel, an increase in the frequency and intensity of wildfire both empirically observed and predicted by climate change models has highlighted the need to actively manage forests to increase the resilience of forests to wildfire. Integrated analysis that takes into account the dynamic interactions between carbon (C) pools resulting from forest management practices; forest fire behavior; and the fate of forest biomass in debris, forest products, and energy production will provide a consistent framework for policy planning that maximize the overall benefits of GHG policy. This integrated approach will have a better chance of balancing the trade-offs and maximizing synergies between C management and sustainability goals. This article outlines a life cycle accounting framework for evaluating the GHG benefits of utilizing forest biomass for bioenergy production under various forest management strategies

### **Using expert judgments to explore robust alternatives for Forest management under climate change**

McDaniels, T.; Mills, T.; Gregory, R.; Ohlson, D

*Risk Analysis*; 2012. 32: 12, 2098-2112

We develop and apply a judgment-based approach to selecting *robust* alternatives, which are defined here as *reasonably likely to achieve objectives, over a range of uncertainties*. The intent is to develop an approach that is more practical in terms of data and analysis requirements than current approaches, informed by the literature and experience with probability elicitation and judgmental forecasting. The context involves decisions about managing forest lands that have been severely affected by mountain pine beetles in British Columbia, a pest infestation that is climate-exacerbated. A forest management decision was developed as the basis for the context, objectives, and alternatives for land management actions, to frame and condition the judgments. A wide range of climate forecasts, taken to represent the 10-90% levels on cumulative distributions for future climate, were developed to condition judgments. An elicitation instrument was developed, tested, and revised to serve as the basis for eliciting probabilistic three-point distributions regarding the performance of selected alternatives, over a set of relevant objectives, in the short and long term. The elicitations were conducted in a workshop comprising 14 regional forest management specialists. We employed the concept of *stochastic dominance* to help identify robust alternatives. We used extensive sensitivity analysis to explore the patterns in the judgments, and also considered the preferred alternatives for each individual expert. The results show that two alternatives that are more flexible than the current policies are judged more likely to perform better than the current alternatives on average in terms of stochastic dominance. The results suggest judgmental approaches to robust decision making deserve greater attention and testing.

## **V. PUBLICATIONS, REPORTS AND OTHER MEDIA**

### **New report explains the concept of carbon neutrality**

*World Business Council for Sustainable Development*

In January 2013, the WBCSD Forest Solutions Group released a report providing a framework for understanding carbon neutrality. The Issue Brief: Biomass Carbon Neutrality distills and synthesizes the complexity of the debate and underlines the importance of carbon neutrality in public policy.

Using biomass-derived fuels and materials instead of more fossil fuel-intensive alternatives is one approach to mitigating increases in atmospheric CO<sub>2</sub>. However, the benefits of using biomass are under question, with the debate often centered on whether biomass is “carbon neutral”. There is no widely accepted definition for “carbon neutrality” and different people understand it to have different meanings. The concept of carbon

neutrality is important in public policy efforts to address climate change and potentially affects the forest-based industry. Depending on how carbon neutrality is understood and applied, policies may favor or disfavor the use and development of forest products and may affect traditional as well as emerging uses of forest products and biomass. To help understand the debate, this issue brief explains the biomass carbon cycle, illustrates the benefits of using forest products within that cycle, and introduces the basics of carbon accounting. With this report, the Forest Solutions Group outlines a framework of how biomass carbon neutrality should be understood. The report is available [here](#).

## **Release of Canadian Council of Forest Ministers (CCFM) Climate Change Reports**

*Canadian Council of Forest Ministers (CCFM)*

The CCFM has released four new reports on adapting sustainable forest management to climate change. The new CCFM reports respond directly to a key CCFM objective that "consideration of climate change and future climatic variability is needed in all aspects of sustainable forest management" (as described in *A Vision for Canada's Forests: 2008 and Beyond*). The primary goal is to provide members of Canada's forest sector with state-of-the-art tools and new knowledge that will allow them to assess the vulnerabilities, risks, and opportunities associated with climate change. These reports have been produced through collaboration of the provincial, territorial, and federal governments of Canada and have been strongly supported by all members of the CCFM. The reports are intended to catalyze and accelerate the transformation of sustainable forest management policies, planning, and practices in accordance with the needs of various forest management organizations across Canada. The first four reports, listed below, are now available. Additional reports are targeted for release in 2013. The reports can be downloaded [here](#)

## **Managing Forests as Complex Adaptive Systems. Building Resilience to the Challenge of Global Change.**

*The Earthscan forest library*

This book links the emerging concepts of complexity, complex adaptive system (CAS) and resilience to forest ecology and management. It explores how these concepts can be applied in various forest biomes of the world with their different ecological, economic and social settings, and history. Individual chapters stress different elements of these concepts based on the specific setting and expertise of the authors. Regions and authors have been selected to cover a diversity of viewpoints and emphases, from silviculture and natural forests to forest restoration, and from boreal to tropical forests. The chapters show that there is no single generally applicable approach to forest management that applies to all settings. The first set of chapters provides a global overview of how complexity, CAS and resilience theory can benefit researchers who study forest ecosystems. A second set of chapters provides guidance for managers in understanding how these concepts can help them to facilitate forest ecosystem change and renewal (adapt or self-organize) in the face of global change while still delivering the goods and services desired by humans. The book takes a broad approach by covering a variety of forest biomes and the full range of management goals from timber production to forest restoration to promote the maintenance of biodiversity, quality of water, or carbon storage. The book can be purchased [here](#)

## **The Climate Bonus. Co-benefits of Climate Policy.**

**Alison Smith**

We urgently need to transform to a low carbon society, yet our progress is painfully slow, in part because there is widespread public concern that this will require sacrifice and high costs. But this need not be the case. Many carbon reduction policies provide a range of additional benefits, from reduced air pollution and increased energy security to financial savings and healthier lifestyles that can offset the costs of climate action. This book maps out the links between low carbon policies and their co-benefits, and shows how low carbon policies can lead to cleaner air and water, conservation of forests, more sustainable agriculture, less waste, safer and more secure energy, cost savings for households and businesses and a stronger and more stable economy. The book discusses the ways in which joined-up policies can help to maximise the synergies and minimise the conflicts between climate policy and other aspects of sustainability. Through rigorous analysis of the facts, the author presents well-reasoned and evidenced recommendations for policy-makers and all those with an interest in making a healthier and happier society. This book shows us how, instead of being paralysed by the threat of climate change, we can use it as a stimulus to escape from our dependence on polluting fossil fuels, and make the transition to a cleaner, safer and more sustainable future. The book can be purchased [here](#)

## **Managing Forest Resources for Sustainable Development**

*World Bank*

A decade ago, the World Bank Group shifted its approach in the forest sector by putting poverty alleviation and

sustainable economic development on equal footing with conservation. It was a bold move given the risks and trade-offs involved in balancing these three aims. A decade into its implementation IEG evaluated the progress made and results of this approach. The evaluation involved a review of the Bank Group strategy and the complete portfolio of nearly 350 operations during the decade. Field-based case studies were conducted in Brazil, Chile, China, the Democratic Republic of Congo, India, Indonesia, Lao People's Democratic Republic, Liberia, Mexico, Peru, the Russian Federation, South Sudan, Uruguay and a desk study of small island states. Extensive interviews were carried out through various forums. A literature review complemented and informed the analysis and the desk and field studies, including IEG's 2000 Forest Evaluation and the World Bank's Mid-Term Review of Implementation. [The publication](#)

## **REDD+ and Business Sustainability**

Brian McFarland

This book provides a detailed look at REDD+ business case studies and best practice and highlights the future of REDD+ in providing a promising mechanism for financing forest conservation while increasing the sustainability and profitability of forward-thinking companies. How can sustainability leaders reverse tropical deforestation? What exactly are payment for ecosystem service forest conservation projects, otherwise known as Reducing Emissions from Deforestation and Degradation (REDD+), and how can these projects contribute to business sustainability and profitability? Tropical forests are quickly disappearing - at a rate of nearly one football or soccer field every few seconds. REDD+ simultaneously offers a scalable conservation finance mechanism and a platform for business sustainability. This DōShort focuses on the nexus between tropical forest conservation projects and the sustainability practices of major global businesses. The book contextualizes the issues, defines REDD+ and focuses on its significance to business sustainability including:

- The role of REDD+ in mitigating global greenhouse gas emissions while reducing business risk to a changing climate;
- as part of a firm's philanthropic work; a mechanism to increase consumer loyalty;
- benefiting upstream local communities and ecosystem services;
- enhancing corporate social responsibility image and upholding corporate principles;
- and providing unique marketing opportunities and product positioning through private-sector support of charismatic REDD+ projects.

The book can be purchased [here](#)

## **Economics of forest and forest carbon projects - Translating lessons learned into national REDD+ implementation**

UNEP

The 'Economics of forest and forest carbon projects - Translating lessons learned into national REDD+ implementation' report draws lessons on finance options and barriers related to project activities from the forest sector. It investigates the economics of implementing forest and REDD+ projects through a number of case studies from Africa, Latin America and Asia, by analyzing real forest and REDD+ investments. The report sets out to advise policymakers, financial sector stakeholders and project developers on how to structure REDD+ initiatives and implement national REDD+ strategies, especially in relation to attracting private and/or public investments. [The publication](#)

## **DRC Finalizes Series of Studies on Drivers of Deforestation**

The Democratic Republic of the Congo (DRC) recently finalized a series of five studies undertaken on the causes of deforestation and forest degradation, as part of the country's REDD+ preparation process. These studies, conducted in 2011-2012, have enabled the DRC to reach a national consensus on the main drivers of deforestation in the country. Previous to this, various stakeholders had very different understandings about what these drivers were. The studies are therefore a very important step in advancing REDD+ efforts in the country. The studies were done by various actors, including civil society from the DRC, FAO, Catholic University of Louvain and UNEP. Various tools and methodologies were used to conduct these studies, including focus groups, remote sensing and statistical analysis. Their results have been compared in order to insure the reliability of the final conclusion. To download the studies, please click [here](#)

## **Governing the Forests: An Institutional Analysis of REDD+ and Community Forest Management in Asia**

ITTO

This joint report of UNU-IAS and ITTO will serve as a useful reference for policymakers, professionals and

practitioners as they work to promote REDD+ in ways that tackle climate change and biodiversity loss but also respect concerns and listen to the voice of local stakeholders. The report has been prepared by ITTO in cooperation with United Nations University - Institute of Advance Studies (UNU-IAS), and features a case study of ITTO funded project PD 519/08 Rev.1 (F) "REDD in Meru Betiri National Park, Indonesia". [The report](#)

## V.I JOBS

### **Programme Officer / Policy advisor, REDD+, Global Green Growth Institute**

*Global Green Growth Institute - deadline for application is 25<sup>th</sup> of February 2013*

The Global Green Growth Institute is looking to hire an outstanding natural resource and policy expert to support their program in Indonesia. Reporting to the Team Leader of the REDD+ workstream, and part of the global Green Growth Planning and Implementation (GGP& Indonesia) team, you will be responsible for providing strategic and targeted technical support to the REDD+ Team in assisting the Indonesian Government to improve and develop REDD+ funding disbursement mechanisms, and to support pilot programs which will test these mechanisms. [More](#)

## VII. ANNOUNCEMENTS

### **Launch of the portal on Knowledge x-change on Sustainable Development**

*The Energy and Resources Institute (TERI)*

Knowledge x-change on Sustainable Development (KxSD) is an initiative by TERI supported by UK Department for International Development (DFID). The key objectives of the portal are to:

- Facilitate knowledge sharing across the facets of sustainable development;
- Showcase new research and innovative practices, share knowledge and success stories from diverse regions and sectors targeted at policy makers and the wider research community;
- Focus on three main dimensions of sustainable development -- policy imperatives, technology & innovations, and community partnership -- along with their interlinked components in the identified themes

The portal covers the sectors on energy, climate change, natural resources, poverty & livelihoods, waste management, sustainable infrastructure, and health. The portal includes Information bank, Statistical data, Success stories, Innovation practices, Knowledge café, and information about policies and policy instruments. This portal is an effort to work towards synergizing experiences and knowledge exchange among various stakeholders. It provides a platform for users to share knowledge resources and comments. [The portal](#)

## **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](mailto:CLIM-FO-Owner@fao.org)

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

**We appreciate any comments or feedback.**

### **How to subscribe/unsubscribe**

- To join the list, please send an e-mail to [listserv@listserv.fao.org](mailto:listserv@listserv.fao.org) containing the message "Subscribe CLIM-FO-L followed by your name. Leave the subject line blank.
- To unsubscribe, please send an e-mail to [listserv@listserv.fao.org](mailto:listserv@listserv.fao.org), leaving the subject line blank and containing the following message: Unsubscribe CLIM-FO-L followed by your name

Your information is secure - we will never sell, give or distribute your address or subscription information to any third party.

### **How to contribute**

We welcome subscribers' contributions of news, articles, publications and announcements of events. Once on the list, to make a contribution please contact the following address: [CLIM-FO-Owner@fao.org](mailto:CLIM-FO-Owner@fao.org)

**We thank everyone for their contribution.**

### **Disclaimer**

The author does not guarantee the accuracy or quality of the content of the compiled information.

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention or omission of specific companies, their products or brand names does not imply any endorsement or judgement by the Food and Agriculture Organization of the United Nations.