CLIM-FO Climate Change & Forestry

Electronic Journal and Newsletter July 2013
FAO, Forestry Department, Forest and Climate Change Team
Food and Agriculture Organization of the United Nations

CONTENTS

I. IN THE PRESS

11 July 2013 - The Wall Street Journal

Could Climate Change Worsen Southeast Asia's Forest Fires

Southeast Asia could have to brace for more forest fires and clouds of smoke if climate change takes hold, a World Bank expert suggests. As temperatures climb, some parts of Southeast Asia will likely flood with rising sea levels while others face drought and heat waves. Drier jungles and peatlands in Indonesia, Malaysia, Thailand and elsewhere could trigger more fires and spread more choking smoke across the region in the years to come.

8 July 2013 - IISD

FAO Assesses Tanzania's Forest Resources

The Food and Agriculture Organization of the UN (FAO) and the Government of Tanzania, with financial support from the Government of Finland, are carrying out a mapping exercise of Tanzania's forests to assess its resources, including the size of the carbon stock stored within its forests.

2 July 2013 - African Development Bank Group

AfDB and Global Environment Facility to Strengthen Climate Change Adaptation with USD 33.58 million

The Global Environment Facility Council has approved a grant of USD 11.3 million, to be channeled through the AfDB, for climate adaptation activities in Cameroon, Djibouti and Kenya. The Council's Least Developed Countries Fund (LDCF) and Special Climate Change Fund (SCCF) will finance the Rural Livelihoods' Adaptation to Climate Change Program in Djibouti and Kenya. For the first phase of the program, Kenya and Djibouti will receive grants of USD 2.5 million and USD 5.07 million, respectively. The program will increase the resilience of pastoralists to the effects of climate change effects on the region.

2 July 2013 - Silicon Angle

Big Data Goes Green: How Data Analytics Is Saving the World's Forests

Big Data's going mainstream and at the same time it's rewriting the rules of forestry management. Tree farmers, logging companies, plantations and conservation groups tasked with managing forestry assets can use Big Data analytics to dig up all kinds of insights that can help them achieve their goals of sustainability.

28 June 2013 - FAO

New tool to improve assessment of forest biomass and carbon stocks

A new online platform launched by FAO will allow countries to improve the assessment of forest volumes, biomass and carbon stocks. This data is crucial for climate change research and mitigation activities, such as increasing the carbon stock in forests through reforestation, and bioenergy development.

24 June 2013 - CIFOR

Bonn climate talks tackle emissions verification stumbling block

Negotiators at Bonn climate talks have whittled away at controversial policy details related to verifying carbon emissions, paving the way for major progress on REDD+ at the U.N. climate summit in Warsaw in November. Debates over verification under REDD+ – a U.N.-backed framework for reducing emissions caused by deforestation and forest degradation – in Doha, Qatar, last year.

24 June 2013 - IISD

UNDP Reports on Reforestation Achievements in Haiti

The UN Development Programme (UNDP) has reported on a series of reforestation projects in Haiti, where less than two percent of the land is forested. The projects are meant to reduce the country's vulnerability to climate change and natural disasters.

21 June 2013 - IISD

CIFOR Reports on Forest Community Views of REDD+ in Brazil

As part of its 'Global Comparative Study on REDD+,' the Center for International Forestry Research (CIFOR) conducted interviews based on research in four communities in the Brazilian Amazon, to ascertain their perceptions of and recommendations for implementation of REDD+.

II. MULTILATERAL PROCESSES IN CLIMATE CHANGE

Past events

3-14 June, Bonn, Germany

The thirty-eighth sessions of the Subsidiary Body for Implementation (SBI 38) and the Subsidiary Body for Scientific and Technological Advice (SBSTA 38), as well as the third session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP 3) was held in Bonn, Germany. See the link for a summary of the main outcomes. **More**

III. EVENTS & MEETINGS

Upcoming events

Paving the Way to Sustainable Forest and Carbon Management

19 - 21 August 2013, Faculty of Forestry, Universiti Putra Malaysia, Malaysia

Arbonaut Ltd. in Finland and the Faculty of Forestry, Universiti Putra Malaysia (UPM) are pleased to invite you to the workshop Arbonaut Users Days 2013 (AUD'13) from 19 to 21 August, 2013. The 3-days workshop will take place at Faculty of Forestry, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor Darul Ehsan, MALAYSIA. The workshop will focus on basic LiDAR processing and LiDAR Assisted Multi-source Programme (LAMP) for forest inventory and REDD+. **More**

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**

Forests Africa. Opportunities for a Green Economy

17 - 19 September, Nairobi, Kenya.

The United Nations Environment Programme (UNEP) and the Centre for International Forestry Research (CIFOR) will convene a three-day conference, Forests Africa: Opportunities for a Green Economy. The conference will be supported by the UN-REDD Programme, the World Agroforestry Centre and will be open for partnerships with other organizations. The event will provide a platform for key players from government, the private sector (formal and informal), civil society, media, as well as the research and development sectors, to openly discuss the challenges and opportunities that Africa's forests present for the development and comparative advantage of the continent and its transition to a Green Economy. The conference will aim to take a step toward repositioning forests within Africa's economic and political landscape. In transitioning to a Green Economy, Africa will require economic growth pathways that are diversified, generate greater employment, produce higher outputs with lower inputs, reduce environmental risks and enhance competitiveness for African economies. The conference will increase awareness of the challenges and opportunities for forests to contribute to green economies at the local, national and regional levels through sustainable management, REDD+, trade of forest products and services, and inclusive processes. It will also identify the range of enabling policies required. Delivering on such a goal will require coordinated collaboration among a broad range of policy and non-state stakeholders – especially those from outside the forestry sector. **More**

EFI 20 Years Science and Policy Forum

23 - 27 September, 2013, Nancy, France

European Forest Institute (EFI) celebrates its 20th anniversary in 2013. The commemoration is also an opportunity to develop an analysis of the future of our forests, and on how EFI and its partners can contribute to meet the challenges related to the various changes, risks and uncertainties to which the forests will be exposed. The EFI 20 Years Science and Policy Forum will stimulate balanced discussion between policy/decision makers, stakeholders and scientists on concrete issues related to the future of our forests, and the risks and opportunities their face. On 25 September, a high-level conference **"Our forests in the 21st century - ready for risks and opportunities?"** gathers both scientists and decision-makers. The follow-up of the conference on 26 September continues with a session "Risks to European Forests - What added value can a European Forest Risk Facility provide?" **More**

IV. RESEARCH ARTICLES

Vulnerability to coastal flooding and response strategies: the case of settlements in Cameroon mangrove forests

Munji, C. A.; Bele, M. Y.; Nkwatoh, A. F.; Idinoba, M. E.; Somorin, O. A.; Sonwa, D. J.
Environmental Development; 2013. 5: 54-72

Worldwide, millions of people experience coastal flooding each year, with devastating effects especially in rural coastal settlements in tropical developing countries. This paper investigates the vulnerability of local settlements in the Cameroon mangrove forest zone to flooding, and improves understanding of perceptions and responses to past and current coastal flooding. Six communities in the coastal mangrove forest zone of the extreme SouthWest of Cameroon were investigated. A questionnaire was administered to a total of 200 individuals supplemented by other participatory rapid appraisal tools. The ground positions of the sampled sites as well as their altitudes were recorded for subsequent geospatial analysis. Statistical analysis was performed to show trends. The coordinates of the study sites were superimposed on base topographic maps of 1965, to investigate coastal changes over a period of 43 years. Results show that: (1) changes in coastal area have occurred in the past 43 years either through inland retreat or seaward shifts and accordingly, settlements are differentially vulnerable; (2) settlement submergence, house damage, and landscape deformation are the key impacts of flooding; (3) coastal flooding promotes the deforestation of mangrove forest for fuel wood; (4) current adaptive measures include retreat of settlement, abandonment, and house design modifications; and (5) most adaptive strategies are reactive individual actions which are likely inefficient and unsustainable from a longer term perspective given their limited scope of implementation. The paper recommends external support to improve adaptive capacity in mangrove settlements, review and improvement of existing policies, and development of integrated coastal management strategy for the region.

Quantifying the sampling error in tree census measurements by volunteers and its effect on carbon stock estimates

Butt, N.; Slade, E.; Thompson, J.; Malhi, Y.; Riutta, T

Ecological Applications; 2013. 23: 4, 936-943

A typical way to quantify aboveground carbon in forests is to measure tree diameters and use species-specific allometric equations to estimate biomass and carbon stocks. Using "citizen scientists" to collect data that are usually time-consuming and labor-intensive can play a valuable role in ecological research. However, data validation, such as establishing the sampling error in volunteer measurements, is a crucial, but little studied, part of utilizing citizen science data. The aims of this study were to (1) evaluate the quality of tree diameter and height measurements carried out by volunteers compared to expert scientists and (2) estimate how sensitive carbon stock estimates are to these measurement sampling errors. Using all diameter data measured with a diameter tape, the volunteer mean sampling error (difference between repeated measurements of the same stem) was 9.9 mm, and the expert sampling error was 1.8 mm. Excluding those sampling errors >1 cm, the mean sampling errors were 2.3 mm (volunteers) and 1.4 mm (experts) (this excluded 14% [volunteer] and 3% [expert] of the data). The sampling error in diameter measurements had a small effect on the biomass estimates of the plots: a volunteer (expert) diameter sampling error of 2.3 mm (1.4 mm) translated into 1.7% (0.9%) change in the biomass estimates calculated from species-specific allometric equations based upon diameter. Height sampling error had a dependent relationship with tree height. Including height measurements in biomass calculations compounded the sampling error markedly; the impact of volunteer sampling error on biomass estimates was +or-15%, and the expert range was +or-9%. Using dendrometer bands, used to measure growth rates, we calculated that the volunteer (vs. expert) sampling error was 0.6 mm (vs. 0.3 mm), which is

equivalent to a difference in carbon storage of +or-0.011 kg C/yr (vs.+or-0.002 kg C/yr) per stem. Using a citizen science model for monitoring carbon stocks not only has benefits in educating and engaging the public in science, but as demonstrated here, can also provide accurate estimates of biomass or forest carbon stocks.

Full polarimetric PALSAR-based land cover monitoring in Cambodia for implementation of REDD policies

Avtar, R.; Takeuchi, W.; Sawada, H

International Journal of Digital Earth; 2013. 6: 3, 255-275

Forest cover monitoring plays an important role in the implementation of climate change mitigation policies such as Kyoto protocol and Reducing Emissions from Deforestation and Forest Degradation (REDD). In this study, we have monitored land cover using the PALSAR (Phased Array type L-band Synthetic Aperture Radar) full polarimetric data based on incoherent target decomposition. Supervised classification technique has been applied on Cloude-Pottier decomposition, Freeman-Durden three component, and Yamaguchi four component decomposition for accurate mapping of different types of land cover classes. Based on confusion matrix derived from the predicted and defined pixels, the evergreen and sparsely deciduous forests have shown high producer's accuracy by Freeman-Durden three component and Yamaguchi four component classifications. The overall accuracy of Maximum Likelihood Classification by Yamaguchi four component is 94.1% with 0.93 kappa coefficient as compared to the 90.3% with 0.88 kappa coefficient by Freeman-Durden three component and 89.7% with 0.88 kappa coefficient by Cloude-Pottier decomposition. High accuracy of classification in a forested area using full polarimetric PALSAR data may have been because of high penetration of L-band SAR. The content of this study could be useful for the forest cover mapping during cloudy days needed for proper implementation of REDD policies in Cambodia.

Disentangling the effects of global climate and regional land-use change on the current and future distribution of mangroves in South Africa

Quisthoudt, K.; Adams, J.; Rajkaran, A.; Dahdouh-Guebas, F.; Koedam, N.; Randin, C. F.;

Biodiversity and Conservation; 2013. 22: 6/7, 1369-1390

The mangrove distribution in South Africa is fragmented and restricted to small forest patches occupying only 16% of the estuaries within the current range. In this study we used species distribution models to test (1) whether the absence of mangrove forest and its species (*Avicennia marina*, *Bruguiera gymnorrhiza* and *Rhizophora mucronata*) within their current range is driven by climate or by climate combined with human or geomorphic perturbation and (2) how climate change may potentially affect the latitudinal limit of the mangrove forests and its species in South Africa. We used three modelling techniques (generalized linear models, generalized additive models and gradient boosting machines) and a set of three climate-based predictive variables (minimum air temperature of the coldest month, waterbalance and growing-degree days) combined separately with an index of human or geomorphic perturbation. Climate variables for the future projections were derived from two general circulation models driven by two socio-economic scenarios (A2a and B2a). Within the range of the mangrove forest, the fragmented distribution of the mangroves in South Africa was not explained by our set of climate variables alone. The index of human perturbations slightly improved the predictions but the index of geomorphic perturbation did not. Climate change will create climatically suitable sites for the mangrove forest and the two species *A. marina* and *B. gymnorrhiza* beyond their current limits, but model outcomes did not agree on the future potential distribution of *R. mucronata*. We were able to successfully predict range limits and to detect future climatically suitable sites beyond the current limits. Factors controlling mangrove distribution within its range are still to be identified although absences were partly explained by human perturbations.

Projected future changes in vegetation in western North America in the twenty-first century.

Jiang, X. Y.; Rauscher, S. A.; Ringler, T. D.; Lawrence, D. M.; Williams, A. P.; Allen, C. D.; Steiner, A. L.; Cai, D. M.; McDowell, N. G.

Journal of Climate; 2013. 26: 11, 3671-3687

Rapid and broad-scale forest mortality associated with recent droughts, rising temperature, and insect outbreaks has been observed over western North America (NA). Climate models project additional future warming and increasing drought and water stress for this region. To assess future potential changes in vegetation distributions in western NA, the Community Earth System Model (CESM) coupled with its Dynamic Global Vegetation Model (DGVM) was used under the future A2 emissions scenario. To better span uncertainties in future climate, eight sea surface temperature (SST) projections provided by phase 3 of the Coupled Model Intercomparison Project (CMIP3) were employed as boundary conditions. There is a broad consensus among the simulations, despite differences in the simulated climate trajectories across the ensemble, that about half of the needleleaf evergreen tree coverage (from 24% to 11%) will disappear, coincident with a 14% (from 11% to 25%) increase in shrubs and grasses by the end of the twenty-first century in western NA, with most of the change occurring over the latter half of the twenty-first century. The net impact is a ~6 GtC or about 50%

decrease in projected ecosystem carbon storage in this region. The findings suggest a potential for a widespread shift from tree-dominated landscapes to shrub and grass-dominated landscapes in western NA because of future warming and consequent increases in water deficits. These results highlight the need for improved process-based understanding of vegetation dynamics, particularly including mortality and the subsequent incorporation of these mechanisms into earth system models to better quantify the vulnerability of western NA forests under climate change.

The outcome is in the assumptions: analyzing the effects on atmospheric CO_2 levels of increased use of bioenergy from forest biomass

Holtsmark, B.

GCB Bioenergy; 2013. 5: 4, 467-473

Recently, several studies have quantified the effects on atmospheric CO_2 concentration of an increased harvest level in forests. Although these studies agreed in their estimates of forest productivity, their conclusions were contradictory. This study tested the effect of four assumptions by which those papers differed. These assumptions regard (1) whether a single or a set of repeated harvests were considered, (2) at what stage in stand growth harvest takes place, (3) how the baseline is constructed, and (4) whether a carbon-cycle model is applied. A main finding was that current and future increase in the use of bioenergy should be studied considering a series of repeated harvests. Moreover, the time of harvest should be determined based on economical principles, thus taking place before stand growth culminates, which has implications for the design of the baseline scenario. When the most realistic assumptions are used and a carbon-cycle model is applied, an increased harvest level in forests leads to a permanent increase in atmospheric CO_2 concentration.

The role of forest residues in the accounting for the global warming potential of bioenergy

Guest, G.; Cherubini, F.; Stromman, A. H

GCB Bioenergy; 2013. 5: 4, 459-466

Bioenergy makes up a significant portion of the global primary energy pie, and its production from modernized technology is foreseen to substantially increase. The climate neutrality of biogenic CO_2 emissions from bioenergy grown from sustainably managed biomass resource pools has recently been questioned. The temporary change caused in atmospheric CO_2 concentration from biogenic carbon fluxes was found to be largely dependent on the length of biomass rotation period. In this work, we also show the importance of accounting for the unutilized biomass that is left to decompose in the resource pool and how the characterization factor for the climate impact of biogenic CO_2 emissions changes whether residues are removed for bioenergy or not. With the case of Norwegian Spruce biomass grown in Norway, we found that significantly more biogenic CO_2 emissions should be accounted towards contributing to global warming potential when residues are left in the forest. For a 100-year time horizon, the global warming potential bio factors suggest that between 44 and 62% of carbon-flux, neutral biogenic CO_2 emissions at the energy conversion plant should be attributed to causing equivalent climate change potential as fossil-based CO_2 emissions. For a given forest residue extraction scenario, the same factor should be applied to the combustion of any combination of stem and forest residues. Life cycle analysis practitioners should take these impacts into account and similar region/species specific factors should be developed.

Estimating the above-ground biomass in Miombo savanna woodlands (Mozambique, East Africa) using L-band Synthetic Aperture Radar data

Carreiras, J. M. B.; Melo, J. B.; Vasconcelos, M. J

Remote Sensing; 2013. 5(4):1524-1548

The quantification of forest above-ground biomass (AGB) is important for such broader applications as decision making, forest management, carbon (C) stock change assessment and scientific applications, such as C cycle modeling. However, there is a great uncertainty related to the estimation of forest AGB, especially in the tropics. The main goal of this study was to test a combination of field data and Advanced Land Observing Satellite (ALOS) Phased Array L-band Synthetic Aperture Radar (PALSAR) backscatter intensity data to reduce the uncertainty in the estimation of forest AGB in the Miombo savanna woodlands of Mozambique (East Africa). A machine learning algorithm, based on bagging stochastic gradient boosting (BagSGB), was used to model forest AGB as a function of ALOS PALSAR Fine Beam Dual (FBD) backscatter intensity metrics. The application of this method resulted in a coefficient of correlation (R) between observed and predicted (10-fold cross-validation) forest AGB values of 0.95 and a root mean square error of 5.03 $Mg.ha^{-1}$. However, as a consequence of using bootstrap samples in combination with a cross validation procedure, some bias may have been introduced, and the reported cross validation statistics could be overoptimistic. Therefore and as a consequence of the BagSGB model, a measure of prediction variability (coefficient of variation) on a pixel-by-pixel basis was also produced, with values ranging from 10 to 119% (mean=25%) across the study area. It provides additional and complementary information regarding the spatial distribution of the error resulting from the application of the fitted model to new observations.

Soil carbon pools in Swiss forests show legacy effects from historic forest litter raking

Gimmi, U.; Poulter, B.; Wolf, A.; Portner, H.; Weber, P.; Burgi, M.;

Landscape Ecology; 2013. 28(5):835-846.

Globally, forest soils contain twice as much carbon as forest vegetation. Consequently, natural and anthropogenic disturbances affecting carbon accumulation in forest soils can alter regional to global carbon balance. In this study, we evaluate the effects of historic litter raking on soil carbon stocks, a former forest use which used to be widespread throughout Europe for centuries. We estimate, for Switzerland, the carbon sink potential in current forest soils due to recovery from past litter raking ('legacy effect'). The year 1650 was chosen as starting year for litter raking, with three different end years (1875/1925/1960) implemented for this forest use in the biogeochemical model LPJ-GUESS. The model was run for different agricultural and climatic zones separately. Number of cattle, grain production and the area of wet meadow have an impact on the specific demand for forest litter. The demand was consequently calculated based on historical statistical data on these factors. The results show soil carbon pools to be reduced by an average of 17% after 310 years of litter raking and legacy effects were still visible 130 years after abandonment of this forest use (2% average reduction). We estimate the remaining carbon sink potential in Swiss forest due to legacy effects from past litter raking to amount to 158,000 tC. Integrating historical data into biogeochemical models provides insight into the relevance of past land-use practices. Our study underlines the importance of considering potentially long-lasting effects of such land use practices for carbon accounting.

Impacts of changing climate and land use on vegetation dynamics in a Mediterranean ecosystem: insights from paleoecology and dynamic modeling

Henne, P. D.; Elkin, C.; Colombaroli, D.; Samartin, S.; Bugmann, H.; Heiri, O.; Tinner, W

Landscape Ecology; 2013. 28(5):819-833

Forests near the Mediterranean coast have been shaped by millennia of human disturbance. Consequently, ecological studies relying on modern observations or historical records may have difficulty assessing natural vegetation dynamics under current and future climate. We combined a sedimentary pollen record from Lago di Massacciucoli, Tuscany, Italy with simulations from the LandClim dynamic vegetation model to determine what vegetation preceded intense human disturbance, how past changes in vegetation relate to fire and browsing, and the potential of an extinct vegetation type under present climate. We simulated vegetation dynamics near Lago di Massaciucoli for the last 7,000 years using a local chironomid-inferred temperature reconstruction with combinations of three fire regimes (small infrequent, large infrequent, small frequent) and three browsing intensities (no browsing, light browsing, and moderate browsing), and compared model output to pollen data. Simulations with low disturbance support pollen-inferred evidence for a mixed forest dominated by *Quercus ilex* (a Mediterranean species) and *Abies alba* (a montane species). Whereas pollen data record the collapse of *A. alba* after 6000 cal yr bp, simulated populations expanded with declining summer temperatures during the late Holocene. Simulations with increased fire and browsing are consistent with evidence for expansion by deciduous species after *A. alba* collapsed. According to our combined paleo-environmental and modeling evidence, mixed *Q. ilex* and *A. alba* forests remain possible with current climate and limited disturbance, and provide a viable management objective for ecosystems near the Mediterranean coast and in regions that are expected to experience a mediterranean-type climate in the future.

Dependence of hydropower energy generation on forests in the Amazon Basin at local and regional scales

Stickler, C. M.; Coe, M. T.; Costa, M. H.; Nepstad, D. C.; McGrath, D. G.; Dias, L. C. P.; Rodrigues, H. O.; Soares Filho, B. S

Proceedings of the National Academy of Sciences of the United States of America; 2013. 110(23):9601-9606.

Tropical rainforest regions have large hydropower generation potential that figures prominently in many nations' energy growth strategies. Feasibility studies of hydropower plants typically ignore the effect of future deforestation or assume that deforestation will have a positive effect on river discharge and energy generation resulting from declines in evapotranspiration (ET) associated with forest conversion. Forest loss can also reduce river discharge, however, by inhibiting rainfall. We used land use, hydrological, and climate models to examine the local "direct" effects (through changes in ET within the watershed) and the potential regional "indirect" effects (through changes in rainfall) of deforestation on river discharge and energy generation potential for the Belo Monte energy complex, one of the world's largest hydropower plants that is currently under construction on the Xingu River in the eastern Amazon. In the absence of indirect effects of deforestation, simulated deforestation of 20% and 40% within the Xingu River basin increased discharge by 4-8% and 10-12%, with similar increases in energy generation. When indirect effects were considered, deforestation of the Amazon region inhibited rainfall within the Xingu Basin, counterbalancing declines in ET and decreasing discharge by 6-36%. Under business-as-usual projections of forest loss for 2050 (40%), simulated power generation declined to only 25% of maximum plant output and 60% of the industry's own projections. Like other energy sources, hydropower plants present large social and environmental costs. Their reliability as energy sources, however, must take into account their dependence on forests.

Bundling ecosystem services in the Panama Canal watershed

Simonit, S.; Perrings, C

Proceedings of the National Academy of Sciences of the United States of America; 2013. 110(23):9326-9331

Land cover change in watersheds affects the supply of a number of ecosystem services, including water supply, the production of timber and nontimber forest products, the provision of habitat for forest species, and climate regulation through carbon sequestration. The Panama Canal watershed is currently being reforested to protect the dry-season flows needed for Canal operations. Whether reforestation of the watershed is desirable depends on its impacts on all services. We develop a spatially explicit model to evaluate the implications of reforestation both for water flows and for other services. We find that reforestation does not necessarily increase water supply, but does increase carbon sequestration and timber production.

Carbon fluxes and the carbon budget in agroecosystems on agro-gray soils of the forest-steppe in the Baikal region

Pomazkina, L. V.; Sokolova, L. G.; Zvyagintseva, E. N.

Eurasian Soil Science; 2013. 46(6):704-713

Field studies devoted to the transformation of the carbon cycle in agroecosystems on agro-gray soils (including soils contaminated with fluorides from aluminum smelters) in dependence on the changes in the hydrothermic conditions were performed for the first time within the framework of the long-term (1996–2010) soil monitoring in the forest-steppe zone of the Baikal region. The major attention was paid to the impact of the environmental factors on the synthesis and microbial destruction of organic carbon compounds. Certain differences in the fluxes and budget of carbon were found for the plots with cereal and row crops and for the permanent and annual fallow plots. The adverse effect of fluorides manifested itself in the enhanced $C\text{-}CO_2$ emission under unfavorable water and temperature conditions. The long-term average $C\text{-}CO_2$ emission from the soils contaminated with fluorides in agroecosystems with wheat after fallow was higher than that from the uncontaminated soil (179 and 198 g of C/m^2, respectively) and higher than that in the agroecosystems with a potato monoculture (129 and 141 g of C/m^2, respectively). At the same time, no significant variations in the content of the carbon of the microbial biomass (C_{micr}) in dependence on the environmental factors were found. The utilization of carbon for respiration and for growth of the soil microorganisms on the contaminated soil were unbalanced in particular years and for the entire period of the observations. The ratio between the fluxes of the net mineralized and re-immobilized carbon was used for the integral assessment of the functioning regime of the agroecosystems and the loads on them. Independently from the soil contamination with fluorides, the loads on the agroecosystems with wheat were close to the maximum permissible value, and the loads on the agroecosystems with potatoes were permissible. It was shown that the carbon deficit in the uncontaminated soils was similar under the wheat and potatoes (−30 and −28 g of C/m^2, respectively). In the contaminated soils, it was higher under the potato monoculture and reached −41 g of C/m^2

Long-term intensive management effects on soil organic carbon pools and chemical composition in moso bamboo (*Phyllostachys pubescens*) forests in subtropical China

Li YongFu; Zhang JiaoJiao; Chang, S. X.; Jiang PeiKun; Zhou GuoMo; Fu ShengLei; Yan EnRong; Wu JiaSen; Lin Lin

Forest Ecology and Management; 2013. 303:121-130

Intensive forest management practices, such as fertilization, tillage, and understory removal, could markedly change the soil organic carbon (SOC) stock and labile organic carbon (C) pools. However, the combined effects of such intensive management practices on the quantity and quality of soil SOC in bamboo forests are poorly understood. The objectives of this study were to investigate the impact of long-term intensive management practices, including inorganic fertilizer application, tillage, and understory removal, on total and labile SOC pools and chemical composition of SOC in Moso bamboo (*Phyllostachys pubescens*) forests and to explore relationships between different soil organic C forms. We used a chronosequence approach (consisting of Moso bamboo forests with 0, 5, 10, 20, 30 years of intensive management) to examine the effects of long-term intensive management on SOC storage, water soluble organic C (WSOC), hot-water soluble organic C (HWSOC), microbial biomass C (MBC), readily oxidizable C (ROC), and SOC chemistry. Our results showed that SOC stock and concentrations of WSOC, HWSOC, MBC, and ROC decreased with increasing duration under intensive management. For the chemical composition of SOC, the contents of alkyl C and carbonyl C and the alkyl C to *O*-alkyl C (A/*O*-A) ratio increased, while the contents of *O*-alkyl C and aromatic C and aromaticity decreased as duration under intensive management increased, suggesting that long-term intensive management changed the SOC chemical composition. Soil MBC was negatively correlated with both alkyl C content and the A/*O*-A ratio ($P < 0.01$ for both), and was positively correlated with *O*-alkyl content ($P < 0.01$), indicating that soil microbial population size may be partly dependent on the chemical composition of SOC. In addition, *O*-alkyl C content was correlated with concentrations of WSOC ($P < 0.05$), HWSOC ($P < 0.01$), and ROC ($P < 0.01$), which implied that *O*-alkyl C might be the main C component of WSOC, HWSOC, and ROC. We conclude that long-term intensive management reduced the total and labile SOC stocks in bamboo forests and alternative management regimes should be developed to increase C sequestration of soils in intensively managed Moso bamboo forests

in subtropical China.

Wildfire and fuel treatment effects on forest carbon dynamics in the western United States

Restaino, J. C.; Peterson, D. L

Forest Ecology and Management; 2013. 303:46-60

Sequestration of carbon (C) in forests has the potential to mitigate the effects of climate change by offsetting future emissions of greenhouse gases. However, in dry temperate forests, wildfire is a natural disturbance agent with the potential to release large fluxes of C into the atmosphere. Climate-driven increases in wildfire extent and severity are expected to increase the risks of reversal to C stores and affect the potential of dry forests to sequester C. In the western United States, fuel treatments that successfully reduce surface fuels in dry forests can mitigate the spread and severity of wildfire, while reducing both tree mortality and emissions from wildfire. However, heterogeneous burn environments, site-specific variability in post-fire ecosystem response, and uncertainty in future fire frequency and extent complicate assessments of long-term (decades to centuries) C dynamics across large landscapes. Results of studies on the effects of fuel treatments and wildfires on long-term C retention across large landscapes are limited and equivocal. Stand-scale studies, empirical and modeled, describe a wide range of total treatment costs (12–116 Mg C ha^{-1}) and reductions in wildfire emissions between treated and untreated stands (1–40 Mg C ha^{-1}). Conclusions suggest the direction (source, sink) and magnitude of net C effects from fuel treatments are similarly variable (−33 Mg C ha^{-1} to +3 Mg C ha^{-1}). Studies at large spatial and temporal scales suggest that there is a low likelihood of high-severity wildfire events interacting with treated forests, negating any expected C benefit from fuels reduction. The frequency, extent, and severity of wildfire are expected to increase as a result of changing climate, and additional information on C response to management and disturbance scenarios is needed improve the accuracy and usefulness of assessments of fuel treatment and wildfire effects on C dynamics.

Organic layer and clay content control soil organic carbon stocks in density fractions of differently managed German beech forests

Gruneberg, E.; Schoning, I.; Hessenmoller, D.; Schulze, E. D.; Weisser, W. W

Forest Ecology and Management; 2013. 303:1-10.

Forest management and associated litter inputs and decomposition rates are thought to affect the carbon storage in mineral soils. Here, we studied the effects of forest management on soil organic carbon (OC) stocks in density fractions of Ah-horizons in soils that developed on loess. We used 82 beech (*Fagus sylvatica* L.) dominated forest plots in Thuringia, Germany that differed in their management (unmanaged forest, forests under age-class management and forests under selection cutting forest). After density fractionation of the mineral soil with a 1.6 g cm^{-3} polytungstate solution we determined OC concentrations and stocks as well as CN-ratios in the free (f-LF) light fraction, the occluded (o-LF) light fraction and in the mineral associated organic matter (MOM) fraction. In our study, Ah-horizons of beech forests stored on average 2.6 ± 0.2 kg m^{-2} (38.7 ± 1.3 kg m^{-3}) OC. The results showed that 37% of the bulk soil OC was stored in the light fractions. We could show that OC stocks in the light fraction were significantly affected by the amount of C stored in organic layers (p = 0.011). The OC stocks in the organic layers, in turn, were higher in unmanaged forests and in forests under selection cutting. This suggests a sensitivity of unprotected OC in the f-LF of beech forests against forest management. In contrast to the f-LF, the OC stocks in the MOM fraction are mainly controlled by pedogenic properties such as clay and iron oxide content. Even after several decades of forest management and with large sample size, an effect of forest management on the stable MOM fraction could not be detected.

Exploring tree species colonization potentials using a spatially explicit simulation model: implications for four oaks under climate change.

Prasad, A. M.; Gardiner, J. D.; Iverson, L. R.; Matthews, S. N.; Peters, M.;

Global Change Biology; 2013. 19(7):2196-2208

Climate change impacts tree species differentially by exerting unique pressures and altering their suitable habitats. We previously predicted these changes in suitable habitat for current and future climates using a species habitat model (DISTRIB) in the eastern United States. Based on the accuracy of the model, the species assemblages should eventually reflect the new quasi-equilibrium suitable habitats (~2100) after accounting for the lag in colonization. However, it is an open question if and when these newly suitable habitats will be colonized under current fragmented landscapes and realistic migration rates. To evaluate this, we used a spatially explicit cell-based model (SHIFT) that estimates colonization potentials under current fragmented habitats and several estimates of historical migration rates at a 1 km resolution. Computation time, which was previously the biggest constraint, was overcome by a novel application of convolution and Fast Fourier Transforms. SHIFT outputs, when intersected with future suitable habitats predicted by DISTRIB, allow assessment of colonization potential under future climates. In this article, we show how our approach can be used to screen multiple tree species for their colonization potentials under climate change. In particular, we use the DISTRIB and SHIFT models in combination to assess if the future dominant forest types in the north will really be dominated by oaks, as modelled via DISTRIB. Even under optimistic scenarios, we conclude that only a

small fraction of the suitable habitats of oaks predicted by DISTRIB is likely to be occupied within 100 years, and this will be concentrated in the first 10-20 km from the current boundary. We also show how DISTRIB and SHIFT can be used to evaluate the potential for assisted migration of vulnerable tree species, and discuss the dynamics of colonization at range limits.

Altered dynamics of forest recovery under a changing climate

Anderson-Teixeira, K. J.; Miller, A. D.; Mohan, J. E.; Hudiburg, T. W.; Duval, B. D.; Delucia, E. H

Global Change Biology; 2013. 19(7):2001-2021.

Forest regeneration following disturbance is a key ecological process, influencing forest structure and function, species assemblages, and ecosystem-climate interactions. Climate change may alter forest recovery dynamics or even prevent recovery, triggering feedbacks to the climate system, altering regional biodiversity, and affecting the ecosystem services provided by forests. Multiple lines of evidence - including global-scale patterns in forest recovery dynamics; forest responses to experimental manipulation of CO_2, temperature, and precipitation; forest responses to the climate change that has already occurred; ecological theory; and ecosystem and earth system models - all indicate that the dynamics of forest recovery are sensitive to climate. However, synthetic understanding of how atmospheric CO_2 and climate shape trajectories of forest recovery is lacking. Here, we review these separate lines of evidence, which together demonstrate that the dynamics of forest recovery are being impacted by increasing atmospheric CO_2 and changing climate. Rates of forest recovery generally increase with CO_2, temperature, and water availability. Drought reduces growth and live biomass in forests of all ages, having a particularly strong effect on seedling recruitment and survival. Responses of individual trees and whole-forest ecosystems to CO_2 and climate manipulations often vary by age, implying that forests of different ages will respond differently to climate change. Furthermore, species within a community typically exhibit differential responses to CO_2 and climate, and altered community dynamics can have important consequences for ecosystem function. Age- and species-dependent responses provide a mechanism by which climate change may push some forests past critical thresholds such that they fail to recover to their previous state following disturbance. Altered dynamics of forest recovery will result in positive and negative feedbacks to climate change. Future research on this topic and corresponding improvements to earth system models will be a key to understanding the future of forests and their feedbacks to the climate system.

Eucalypt plantations and climate change

Booth, T.H.

Forest Ecology and Management; 2013. 301, 28-34

Eucalypts are grown in more than 90 countries and constitute about 15% of the area of global plantation forests, so it is important to assess their vulnerability to climate change. This paper assesses the vulnerability as a function of potential impact, which is related to exposure and sensitivity, and adaptive capacity. It is concluded that sharing information about where particular eucalypt genotypes are grown, identifying potentially marginal climatic areas and recommending genotypes suitable for changing conditions would be help to minimise potential vulnerability. The development of a eucalypt database and mapping system is proposed as a major collaborative project to help to protect one of global forestry's most valuable resources.

Thermal tolerance, net CO2 exchange and growth of a tropical tree species, Ficus insipida, cultivated at elevated daytime and nighttime temperatures

Krause, G. H.; Cheesman, A. W.; Winter, K.; Krause, B.; Virgo, A

Journal of Plant Physiology; 2013. 170(9):822-827

Global warming and associated increases in the frequency and amplitude of extreme weather events, such as heat waves, may adversely affect tropical rainforest plants via significantly increased tissue temperatures. In this study, the response to two temperature regimes was assessed in seedlings of the neotropical pioneer tree species, Ficus insipida. Plants were cultivated in growth chambers at strongly elevated daytime temperature (39 °C), combined with either close to natural (22 °C) or elevated (32 °C) nighttime temperatures. Under both growth regimes, the critical temperature for irreversible leaf damage, determined by changes in chlorophyll a fluorescence, was approximately 51 °C. This is comparable to values found in F. insipida growing under natural ambient conditions and indicates a limited potential for heat tolerance acclimation of this tropical forest tree species. Yet, under high nighttime temperature, growth was strongly enhanced, accompanied by increased rates of net photosynthetic CO2 uptake and diminished temperature dependence of leaf-level dark respiration, consistent with thermal acclimation of these key physiological parameters.

Extinction risk in cloud forest fragments under climate change and habitat loss.

Ponce-Reyes, R.; Nicholson, E.; Baxter, P. W. J.; Fuller, R. A.; Possingham, H.;

Diversity and Distributions; 2013. 19: 5/6, 518-529

Aim: To quantify the consequences of major threats to biodiversity, such as climate and land-use change, it is

important to use explicit measures of species persistence, such as extinction risk. The extinction risk of metapopulations can be approximated through simple models, providing a regional snapshot of the extinction probability of a species. We evaluated the extinction risk of three species under different climate change scenarios in three different regions of the Mexican cloud forest, a highly fragmented habitat that is particularly vulnerable to climate change. Location: Cloud forests in Mexico. Methods: Using Maxent, we estimated the potential distribution of cloud forest for three different time horizons (2030, 2050 and 2080) and their overlap with protected areas. Then, we calculated the extinction risk of three contrasting vertebrate species for two scenarios: (1) climate change only (all suitable areas of cloud forest through time) and (2) climate and land-use change (only suitable areas within a currently protected area), using an explicit patch-occupancy approximation model and calculating the joint probability of all populations becoming extinct when the number of remaining patches was less than five. Results: Our results show that the extent of environmentally suitable areas for cloud forest in Mexico will sharply decline in the next 70 years. We discovered that if all habitat outside protected areas is transformed, then only species with small area requirements are likely to persist. With habitat loss through climate change only, high dispersal rates are sufficient for persistence, but this requires protection of all remaining cloud forest areas. Main conclusions: Even if high dispersal rates mitigate the extinction risk of species due to climate change, the synergistic impacts of changing climate and land use further threaten the persistence of species with higher area requirements. Our approach for assessing the impacts of threats on biodiversity is particularly useful when there is little time or data for detailed population viability analyses.

Reducing Emissions from Deforestation and Forest Degradation (REDD+): transaction costs of six Peruvian projects

Thompson, O. R. R.; Paavola, J.; Healey, J. R.; Jones, J. P. G.; Baker, T. R.; Torres, J

Ecology and Society; 2013. 18: 1, Article 17.

Reduced Emissions from Deforestation and Forest Degradation (REDD+) has received strong support as a major component of future global climate change policy. The financial mechanism of REDD+ is payment for the ecosystem service of carbon sequestration in tropical forests that is expected to create incentives for conservation of forest cover and condition. However, the costs of achieving emissions reduction by these means remain largely unknown. We assess the set-up, implementation, and monitoring costs, i.e., collectively the transaction costs, of six of the first seven REDD+ project designs from the Peruvian Amazon and compare them with established projects in Brazil and Bolivia. The estimated costs vary greatly among the assessed projects from US$0.16 to 1.44 ha-1 yr-1, with an average of US$0.73 ha-1 yr-1, though they are comparable to earlier published estimates. The results indicate that the costs of implementing REDD+ are highly uncertain for participating developing countries because of issues such as inadequate project design and how additionality is determined. Furthermore, some insight is obtained into how different activities to reduce deforestation and forest degradation, the type of implementer, and project location affect implementation costs of REDD+ projects. Even with these first estimates, the cost of preserving existing intact forests in the Peruvian Amazon may have been underestimated.

Changing climates, changing forests: a western North American perspective

Fettig, C. J.; Reid, M. L.; Bentz, B. J.; Sevanto, S.; Spittlehouse, D. L.; Wang TongLi

Journal of Forestry; 2013. 111: 3, 214-228

The Earth's mean surface air temperature has warmed by 1 degrees C over the last 100 years and is projected to increase at a faster rate in the future, accompanied by changes in precipitation patterns and increases in the occurrence of extreme weather events. In western North America, projected increases in mean annual temperatures range from 1 to 3.5 degrees C by the 2050s, and although projected changes in precipitation patterns are more complex to model, more frequent and severe droughts are expected in many areas. For long-lived tree species, because of their relatively slow rates of migration, climate change will likely result in a mismatch between the climate that trees are currently adapted to and the climate that trees will experience in the future. Individual trees or populations exposed to climate conditions outside their climatic niches may be maladapted, resulting in compromised productivity and increased vulnerability to disturbance, specifically insects and pathogens. In western North America, as elsewhere, several recent assessments have concluded that forests are being affected by climate change and will become increasingly vulnerable to mortality as a result of the direct and indirect effects of climate change. Droughts associated with higher temperatures may accelerate levels of tree mortality, for example, because elevated temperatures increase metabolic rates without increasing photosynthesis rates, thus compromising a tree's ability to create defenses against insects and pathogens. Distributions of the climatic niches of some tree species in western North America are predicted to change by up to 200% during this century based on bioclimate envelope modeling. We discuss the science of climate change, the implications of projected climatic changes to forest ecosystems in western North America, and the essential roles of forest managers, policymakers, and scientists in addressing climate change.

Extending a model system to predict biomass in mixed-species southern Appalachian hardwood forests

Sabatia, C. O.; Fox, T. R.; Burkhart, H. E

Southern Journal of Applied Forestry; 2013. 37: 2, 122-126

Functions for estimating foliage, branches and nonmerchantable stem tops, merchantable stem, and total aboveground biomass for Appalachian hardwood trees were assembled and incorporated into an existing growth-and-yield simulator for mixed-species Appalachian hardwood forests. With these functions and user-defined stand table and stand characteristics, current estimates of biomass in the different aboveground tree components can be obtained by species and diameter class for a thinned or unthinned stand. In addition, future biomass estimates for a thinned stand can be obtained for a projection period of 1 to 10 years. These estimates can be used to assess forest ecosystem services of carbon sequestration and provide information that can be used to evaluate effects of different harvesting strategies on forest carbon and other nutrient pools. A comparison of these estimates to those obtained by the forest inventory and analysis (FIA) procedure, using data from eight FIA sample plots in the southern Appalachian region, indicated that estimating biomass directly from locally developed biomass equations may give biomass estimates for the tree bole and for tops and branches, that are different from those obtained by the FIA procedure.

V. PUBLICATIONS, REPORTS AND OTHER MEDIA

A Way Forward for REDD+ Benefit Sharing in Uganda

IUCN

The International Union for Conservation of Nature (IUCN) "Towards Pro-Poor REDD+" project in Uganda has produced a study on REDD+ benefit sharing that provides concrete recommendations to guide Uganda, as well as other developing countries, when designing and implementing REDD+ strategies. With support from the Royal Danish Ministry of Foreign Affairs (Danida), the IUCN study entitled "Benefit Sharing in Uganda's Forestry Sector", reviews existing literature and analyzes various benefit sharing mechanisms, including models from other REDD+ countries such as Costa Rica, and makes 17 specific recommendations related to land and forest tenure, benefit sharing mechanisms, beneficiaries, equitable participation and conflict management. To address some of the mistrust around channeling REDD+ benefits through existing government budgeting processes, the study recommends that an autonomous REDD+ Unit be set up and eventually replaced by a national REDD+ agency within the Ministry of Water and Environment. Modeled after **Costa Rica's FONAFIFO** organization, this unit could help to ensure current governance problems are addressed and do not affect equitable REDD+ benefit sharing. It is recommended that a nationwide participatory assessment of stakeholders be carried out in Uganda to identify those who are eligible for REDD+ benefits. Once this is done, it is suggested that REDD+ payments and other benefits to forest owners and communities be established with a reasonable level of certainty and clarity so local communities can go into the arrangement with free, prior and informed consent. On the issue of land and forest tenure, the study suggests that Uganda assist poorer people and local communities to develop into legal entities with titled/registered ownership of land and forest holdings. To properly manage conflicts that may arise, the study encourages Uganda to expeditiously start up the Conflict and Grievance Mechanism committed to in the country's REDD+ Readiness Preparation Plan (R-PP). In assessing Uganda's current laws on benefit sharing, it is observed that while there are clear procedures for distribution of benefits, there are examples, such as in the National Park area, when most community members did not effectively benefit from shared revenues. As such, intermediaries or frameworks are needed to help community members enhance their bargaining power and capacity to negotiate with government institutions. In terms of approaches to actual payments, the study suggests that REDD+ payments could be made to participating community groups through *village savings and loan associations*, which have the potential to provide equitable benefits to all eligible members of the group. In this way, REDD+ benefits can help build the savings and investment capacities of poorer members of local communities. All recommendations in the study were informed by a series of consultations with stakeholders, which took place in the Mount Elgon Landscape area during 2012. The recommendations were discussed and synthesized by national stakeholders from key government institutions and civil society groups.

Download a briefing paper on the full study

Download the full study

Read more about the IUCN-Danida "Toward Pro-Poor" REDD+ project

For more on IUCN's REDD+ work: Website: **www.iucn.org/redd**

Twitter: @IUCN_redd and IUCN **REDD+ Roundup** newsletter: Subscribe **here**

The Role of the Private Sector in REDD+: the Case for Engagement and Options for Intervention

UN-REDD Programme

The UN-REDD Programme would like to announce the launch of the Policy Brief on 'The Role of the Private Sector in REDD+: the Case for Engagement and Options for Intervention.' The Policy Brief aims to encourage public sector REDD+ planners and practitioners to engage with and mobilize the private sector through a range of possible interventions. It identifies relevant private sector actors, and outlines their potential role, in the context of REDD+. The brief makes the case for stronger engagement and considers various interventions that can alter the private sector's impact on land use. It also outlines the forms of support that the UN-REDD Programme can provide to countries. The brief concludes with a series of case studies examining the potential of engaging with financial intermediaries to slow, halt and reverse forest loss and forest degradation. **The policy brief**

Integrating REDD+ into a green economy transition: opportunities and challenges

ODI

The concept of a green economy that 'results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities' is gathering support, and the role of forests and land use in the context of natural capital is included in growing discussions of a transition to a green economy. However, the full potential of REDD+ – reducing emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks – is rarely elaborated. As REDD+ aims to address market, policy, and institutional failures that undervalue the climate change mitigation service provided by the forest ecosystem, while protecting the rights of those who rely on the forests, there are clear links between REDD+ objectives and green economy objectives, both of which call for a change in the business-as-usual economic development in order to slow the loss of natural capital. This paper brings together the existing literature to consolidate conceptual issues, presents key examples of progress, and highlights the potential challenges and opportunities of including REDD+ in the transition to a green economy. Intended to support the discussions of the Global Symposium on REDD+ in a Green Economy, held in Indonesia in June 2013, the target audience of this paper is the communities of practice both in REDD+ and green economy; this includes policy-makers, civil-society organisations and academia. **The publication**

Profile of Emissions Reduction Potentials in Developing Countries. Summary of 15 Country Studies

UNEP

A second commitment period of the Kyoto Protocol has just started. International climate negotiations consistently keep new market based approaches on the agenda. Nationally Appropriate Mitigation Actions are rapidly rising as a new signature concept for a future climate treaty. In response to this momentum, many countries still find themselves in search of concrete emissions reduction options. UNEP Risoe, with the support of the UNFCCC Secretariat and the ACP-MEA Programme (www.acp-cd4cdm.org), has decided to assess the emissions reduction potential in 15 diverse countries. While most of these countries are not seen as obvious targets for emissions reduction activities, they are nevertheless likely to be involved in some form of future emissions reduction. Consequently, 15 country reports have been developed, from which this synthesis report gathers the main messages. **The publication**

REDD+ Scorecard UNFCCC. SBSTA 38, Bonn – June 2013

WWF

WWF has now released its scorecard for the outcome of the UNFCCC Bonn climate meeting. **The scorecard**

Whose Forest Land Is It? Trends in Tropical Forest Land Tenure.

Union of Concerned Scientists

Who owns the world's tropical forests, and how is this changing? A white paper by Doug Boucher, Director of the Tropical Forest and Climate Initiative, shows contradictory trends. On the one hand, there is the well-known phenomenon of "land-grabbing" — the transfer of agricultural land from peasants and indigenous communities to corporations and large landowners, often from foreign countries. In the forest sector, on the other hand, the recent tendency has been for land to be transferred TO local communities.

- Trends in tropical land tenure vary by continent

The white paper shows that these trends in tropical land tenure — the ownership and control of land — have differed greatly between continents, with the most land-grabbing and least transfer of forest land from governments to communities in Africa.

In Latin America, land-grabbing has been limited and large areas of tropical forest have been put in the hands of communities. In the Brazilian Amazon, for example, over 20 percent of the forest is now in reserves

controlled by Indigenous Peoples.

- Land tenure trends have important implications for the future of tropical forests

Community control of forest land has been shown to be an effective way to reduce deforestation, and the transfer of forests in Brazil to indigenous communities has been one element of the country's success in reducing deforestation by more than 75 percent over the past 8 years.

Such transfers could be an effective strategy for tropical forest countries to receive funding for reducing deforestation (as Brazil has, from Norway), since international payments for reducing deforestation have been based on the national deforestation rate, irrespective of who owns the land. Thus, ironically, governments could benefit financially from giving land away to communities rather than retaining control of it themselves. **The publication**

V.I JOBS

Communications Officer

UNEP - deadline for application is the 18th of July 2013

The United Nations Environment Programme (UNEP) is the United Nations systems designated entity for addressing environmental issues at the global and regional level. Its mandate is to coordinate the development of environmental policy consensus by keeping the global environment under review and bringing emerging issues to the attention of governments and the international community for action. UNEP's Division of Environmental Policy Implementation (DEPI) works with international and national partners, providing technical assistance and advisory services for the implementation of environmental policy, and strengthening the environmental management capacity of developing countries and countries with economies in transition. The post is located in UNEP/DEPI, in the Freshwater & Terrestrial Ecosystems Branch, in the United Nations Reducing Emissions from Deforestation and Degradation (UN-REDD), stationed and programmatically located with the UN-REDD Programme Secretariat at the Geneva duty station. Under the supervision of the Head of the UN-REDD Programme Secretariat the incumbent will play a key role in improving the visibility of the UN-REDD Programme by raising awareness of the UN-REDD Programme internally and externally. **More**

Junior REDD+ Policy Consultant

Lowering Emissions in Asia's Forests (LEAF) - USAID - the deadline for application is 31th of July 2013

A junior climate change and forestry consultant is sought to support senior staff working on REDD+ policy. A significant proportion of the consultant's time will be spent on the USAID funded "Lowering Emissions in Asia's Forests" (LEAF) project where Climate Focus is tasked with leading the policy component. The LEAF work will focus on REDD+ policy in Cambodia, Lao PDR, Malaysia, PNG, Thailand and Vietnam where the consultant will be required to help coordinate work and prepare advice and input on issues affecting REDD+ policy design and implementation. This may include legal and regulatory issues, economics, drivers of deforestation and degradation amongst others. In addition to supporting senior staff working on LEAF, the consultant will be expected to support Climate Focus staff working in the US and Europe which may include conducting research, contributing to proposals and tenders, and drafting advice for clients under the direction of senior staff. Travel within S.E. Asia and elsewhere may be required. **More**

VII. ANNOUNCEMENTS

1st Call for NAMA Support Project Outlines

The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the UK Department of Energy and Climate Change (DECC)

The International NAMA Facility is pleased to announce the launch of its 1st Call for NAMA Support Project Outlines and invites you to email your submissions to enter a bidding process for funding to contact@nama-facility.org. The deadline for the submission of outlines is 2 September 2013. The NAMA Facility was jointly established by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the UK Department of Energy and Climate Change (DECC) to support developing countries that show leadership on tackling climate change and that want to implement transformational country-led NAMAs within

the existing global mitigation architecture in the short term. **More**

Knowledge Navigator

IDS Knowledge Services and Climate Development Knowledge Network (CDKN)

The ever-growing number of knowledge sharing platforms on climate change and development has meant that users of climate knowledge are often unsure which services are most appropriate to their needs. A new interactive tool has been developed by the Institute of Development Studies Knowledge Services in partnership with multiple organisations, which aims to help users tackle this problem. The new tool, called the Knowledge Navigator, guides users through to appropriate climate change websites helping them to access knowledge that best suits their needs or share their own experiences and resources. The tool can be embedded into any website to help users to access other related climate change information. **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.

We appreciate any comments or feedback.

How to subscribe/unsubscribe

- To join the list, please send an e-mail to **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**, 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**

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.