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I. IN THE PRESS

01 June 2016 - ScienceDaily

Water yields from southern Appalachian watersheds in decline since the 1970s

Water yields from unmanaged forested watersheds in the southern Appalachian Mountains declining by up to 22 percent a year since the 1970s. Changes in water yield were largely related to changes in climate, but disturbance-related shifts in forest species composition and structure over time also played a role. These findings have implications for managing the forest composition of watersheds to ensure water supply under future climate change…

02 June 2016 - The American Bazaar

Climate change could poison your food in addition to melting glaciers

As if the impacts of climate change were not devastating enough, a new study just released by the UNEP found that it makes crop poisonous and results into the rise in zoonotic diseases around the world. The UNEP report examines how drought and high temperatures can trigger the accumulation of chemical compounds that are toxic to animals and humans in staple crops like wheat, barley, maize and millet and poisoning in animals can lead to miscarriage, asphyxiation and death, ruining the lives of smallholder farmers and herders...

02 June 2016 - Capital News

Greater Horn of Africa region to experience above normal rainfall

There will be above normal rainfall over most of the northern parts of the Greater Horn of Africa (GHA). Local and month-to-month variations might occur as the June to September 2016 season progresses. This overview was communicated during the 43rd Greater Horn of Africa Climate Outlook Forum...

02 June 2016 - Reuters

Lack of water limits Madagascar's climate-smart agriculture

Madagascar's dry south is where the worst drought in 35 years has wiped out the maize crop. Drought for a third year running has left more than 1.1 million Malagasy unable to feed themselves, including 665,000 who face severe hunger. Climate change combined with environmental degradation has caused more than 80 percent of Madagascar's unique forests to disappear....

30 June 2016 - NASA

Why a half-degree temperature rise is a big deal

The Paris Agreement, which delegates from 196 countries hammered out in December 2015, calls for holding the ongoing rise in global average temperature to "well below 2 °C above pre-industrial levels," while "pursuing efforts to limit the temperature increase to 1.5 °C." How much difference could that half-degree of wiggle room (or 0.9 degree on the Fahrenheit scale) possibly make in the real world? Quite a bit, it appears…

06 July 2016 - FAO

UN seeks to boost response to El Niño's dire impact in Africa and Asia/Pacific, urges La Niña preparedness

Combined efforts to prevent further human suffering, strengthen resilience and safeguard livelihoods in the wake of El Niño's devastating effects worldwide must be rapidly ramped-up by governments and the international community, United Nations (UN) leaders said today. More than 60 million people worldwide, about 40 million in East and Southern Africa alone, are projected to be food insecure due to the impact of the El Niño climate event. The heads of the three Rome-based UN agencies urged greater preparedness to deal with the possible occurrence later this year of a La Niña climate event…

12 July 2016 - BBC

Climate change: Advisers warn of climate change domino effect

Climate change could have a domino effect on key infrastructure in the UK, government advisers have warned. In a 2,000-page report, the Climate Change Committee says flooding will destroy bridges - wrecking electricity, gas and IT connections carried on them. The committee also warns that poor farming means the most fertile soils will be badly degraded by mid-century.

II. MULTILATERAL PROCESSES IN CLIMATE CHANGE

There are no UNFCCC meetings to report on since last Clim-FO issue.

III. EVENTS & MEETINGS

Recent events

Genomics and Forest Tree Genetics Conference

30 May - 3 June, 2016 - Arcachon, France
Genomics will undoubtedly play a major role over the next decade and beyond, not only to further understand the mechanisms underlying the adaptation and evolution of these organisms, but also to develop and implement innovative management and policy actions to preserve the adaptability of natural forests and intensively managed plantations. Knowledge gained through the use of 'omics' technologies can thus have a huge potential impact when helping forests adapt to the main challenges they will face in the future (e.g. increasing wood demand, pressure to conserve forest areas, climate changes and associated threats). Therefore, the objective of this conference - bringing together researchers from the four working parties of IUFRO subdivision 2.4 (Forest Genetics) - was to present and discuss new scientific findings in the area of population, quantitative and evolutionary genetics and how they can be applied in genetic resource conservation and breeding. **More**

FAO Celebration of the World Day to Combat Desertification

17 June 2016 - Rome, Italy
"Protect Earth. Restore Land. Engage People". June 17th was the celebration of the World Day to Combat Desertification. The day called "for urgent action to reverse land degradation" and achieve a "land degradation neutral world in the context of sustainable development". Innovative action facing the challenges of dryland areas were showcased in the celebration. The ambassador of the Republic of Cape Verde shared the country's options against land degradation and statements were made by the Managing Director of the Global Mechanism of the UNCCD and FAO Deputy Director General-Natural Resources. **More**

Scoping Dialogue on Sustainable Woody Biomass for Energy

21 - 22 June - Montpellier, France
Using wood as fuel for heating and cooking is one of humankind's oldest practices. An estimated one-half of the world's population relies on wood-based biomass in the form of fuelwood and charcoal to meet their daily energy needs. Wood fuel production accounts for more than half of the annual global forest harvest. While traditional woody biomass use continues to be the dominant form of biomass energy, woody biomass is increasingly used on an industrial scale for heat and power, especially as developed countries seek to increase renewable energy's share of the energy mix. The Scoping Dialogue was the first of The Forests Dialogue's new initiative that explored how to more sustainably source woody biomass in a way that benefits the climate and forests. **More**

UN-REDD Programme (2016-2020) first Executive Board meeting

28-29 June 2016 - Rome, Italy
Since its launch in 2008, the UN-REDD Programme has partnered with 64 developing countries to support their REDD+ efforts, and has advocated for and facilitated broad stakeholder engagement in REDD+. As the Programme is transitioning into its second phase (2016-2020), the Programme's new governance arrangements will centre on a simpler structure that can accommodate the unique needs of REDD+ countries, donors and other stakeholders, specifically including indigenous peoples and civil society. The UN-REDD Programme Executive Board is the new main body of oversight, operational guidance and decision-making for the Programme. The first meeting of the UN-REDD Programme Executive Board explored the Programme's proposed multi-year work plan in support of the UN-REDD Programme 2016-2020 Strategic Framework. Also under discussion were options for strengthening coordination and complementarity with other global initiatives supporting REDD+ and forest countries. **More**

Green Climate Fund's Thirteenth Meeting of the Board

28 - 30 June 2016 - Songdo, Republic of Korea
Constituency meetings, as well as meetings of Board committees, panels and groups were planned on Sunday 26 June, and Informal Consultations by Co-Chairs with Board members, alternate members, and active observers

took place on Monday 27 June. All documents and decisions pertinent to this meeting are available at the GCF website. More

Africa Carbon Forum 2016: Promoting Collaborative Climate Action in Africa

28-30 June 2016 - Kigali, Rwanda
The international community achieved a resounding success crafting a new, universal climate change agreement at COP21 in Paris in December 2015. The agreement marked the start of a historic new era for Africa, one that holds great challenges but also exciting, transformational opportunities driven by ambitious national action and increased international cooperation on policies and action for low-carbon development, climate finance, market-driven approaches, technology transfer and capacity-building. More

The 23rd Committee on Forestry (COFO 23), World Forest Week

18-22 July 2016 - Rome, Italy
The Committee on Forestry (COFO) is the highest FAO Forestry statutory body. The biennial sessions of COFO bring together heads of forest services and other senior government officials to identify emerging policy and technical issues, to seek solutions and to advise FAO and others on appropriate action. Other international organizations and, increasingly, non-governmental groups participate in COFO. Participation in COFO is open to all FAO member countries. For the fifth time, COFO will be held in conjunction with World Forest Week - a series of meetings and events sponsored by FAO and its partner organizations and institutions. The World Forest Week is an opportunity for sharing state-of-the-art knowledge and major accomplishments and achievements. More

IV. RESEARCH ARTICLES

Progressive forest canopy water loss during the 2012-2015 California drought

G. P. Asner, P. G. Brodrick, C. B. Anderson, N. Vaughn, D. E. Knapp, R. E. Martin

Proceedings of the National Academy of Sciences of the United States of America (2016), Volume 113, Issue 02, doi: 10.1073/pnas.1523397113

The 2012–2015 drought has left California with severely reduced snowpack, soil moisture, ground water, and reservoir stocks, but the impact of this estimated millennial-scale event on forest health is unknown. We used airborne laser-guided spectroscopy and satellite-based models to assess losses in canopy water content of California's forests between 2011 and 2015. Approximately 10.6 million ha of forest containing up to 888 million large trees experienced measurable loss in canopy water content during this drought period. Severe canopy water losses of greater than 30% occurred over 1 million ha, affecting up to 58 million large trees. Our measurements exclude forests affected by fire between 2011 and 2015. If drought conditions continue or reoccur, even with temporary reprieves such as El Niño, we predict substantial future forest change.

Drought tolerance and growth in populations of a wide-ranging tree species indicate climate change risks for the boreal north

D. Montwé, M. Isaac-Renton, A. Hamann, H. Spiecker

Global Change Biology (2016), Volume 22, Issue 2, pages 806-815. DOI: 10.1111/gcb.13123

Choosing drought-tolerant planting stock in reforestation programs may help adapt forests to climate change. To inform such reforestation strategies, we test lodgepole pine (*Pinus contorta* Doug. ex Loud. var latifolia Englm.) population response to drought and infer potential benefits of a northward transfer of seeds from drier, southern environments. The objective is addressed by combining dendroecological growth analysis with long-term genetic field trials. Over 500 trees originating from 23 populations across western North America were destructively sampled in three experimental sites in southern British Columbia, representing a climate warming scenario. Growth after 32 years from provenances transferred southward or northward over long distances was significantly lower than growth of local populations. All populations were affected by a severe natural drought event in 2002. The provenances from the most southern locations showed the highest drought tolerance but low productivity. Local provenances were productive and drought tolerant. Provenances from the boreal north showed lower productivity and less drought tolerance on southern test sites than all other sources, implying that maladaptation to drought may prevent boreal populations from taking full advantage of more favourable growing conditions under projected climate change.

Forest-Stream Links, Anthropogenic Stressors, and Climate Change: Implications for Restoration Planning

J. Hjältén, C. Nilsson, D. Jørgensen and D. Bell

BioScience (2016). doi: 10.1093/biosci/biw072

The global extraction of forest and water resources has led to habitat degradation, biodiversity loss, and declines in ecosystem services. As a consequence, ecological restoration has become a global priority. Restoration efforts to offset this trend, however, are not always effective. One reason is that many restoration projects target single ecosystems and fail to acknowledge functional links between ecosystems. We synthesized current knowledge on links between forest and stream ecosystems, the effect of anthropogenic stressors on these links, and their implications for restoration planning. Many examples show that lateral subsidies, such as invertebrate prey and nutrients, are important in both terrestrial and aquatic environments. Stressors such as commercial forestry, flow regulation, stream channelization, and climate change affect these links and should be considered in restoration planning. Restoration practitioners are encouraged to view adjacent forest and stream ecosystems as one entity.

Forest Owners' Response to Climate Change: University Education Trumps Value Profile

K. Blennow, J. Persson, E. Persson, M. Hanewinkel

PLoS ONE (2016), Volume 11, Issue 5. doi:10.1371/journal.pone.0155137

Do forest owners' levels of education or value profiles explain their responses to climate change? The cultural cognition thesis (CCT) has cast serious doubt on the familiar and often criticized "knowledge deficit" model, which says that laypeople are less concerned about climate change because they lack scientific knowledge. Advocates of CCT maintain that citizens with the highest degrees of scientific literacy and numeracy are not the most concerned about climate change. Rather, this is the group in which cultural polarization is greatest, and thus individuals with more limited scientific literacy and numeracy are more concerned about climate change under certain circumstances than those with higher scientific literacy and numeracy. The CCT predicts that cultural and other values will trump the positive effects of education on some forest owners' attitudes to climate change. Here, using survey data collected in 2010 from 766 private forest owners in Sweden and Germany, we provide the first evidence that perceptions of climate change risk are uncorrelated with, or sometimes positively correlated with, education level and can be explained without reference to cultural or other values. We conclude that the recent claim that advanced scientific literacy and numeracy polarizes perceptions of climate change risk is unsupported by the forest owner data. In neither of the two countries was university education found to reduce the perception of risk from climate change. Indeed in most cases university education increased the perception of risk. Even more importantly, the effect of university education was not dependent on the individuals' value profile.

The uncertain impact of climate change on forest ecosystems – How qualitative modelling can guide future research for quantitative model development

A. Herr, J. M. Dambacher, E. Pinkard, M. Glen, C. Mohammed, T. Wardlaw

Environmental Modelling & Software (2016), Volume 76, Pages 95-107

Climate change could significantly alter forest productivity and climax states. Hence modelling productivity under climate change will need to account for many alternative ecosystem states. We apply qualitative modelling to identify the most likely ecosystem representations for a well-researched Tasmanian forest. Its main ecosystem is a tiered forest with rainforest, wet sclerophyll and myrtaceae components. Interactions between these components are uncertain, especially under additional pressures from climate change. Qualitative modelling is a structured method to analyse these uncertainties. We identify the most appropriate models and research efforts for model development. Further, we identify research needs for interactions between root pathogens and forest components, with research on some impacts of system components on fire being ruled out. The qualitative modelling approach applied here was useful in identifying research priorities for modelling complex ecosystems, even under uncertain system understanding or deficiencies in quantitative data.

Spatial distribution of dry forest orchids in the Cauca River Valley and Dagua Canyon: Towards a conservation strategy to climate change

G. A. Reina-Rodríguez, J. E. Rubiano, F. A. C. Llanos, J. T. Otero

Journal for Nature Conservation (2016), Volume 30, May 2016, Pages 32-43

Epiphytic orchids are fundamental elements of the dynamics and composition of tropical ecosystems; there are an estimated 19,000 species worldwide, of which 85 occur in the dry forests of the basins of the Cauca and Dagua rivers in the Valle del Cauca Department in southwestern Colombia. These plants form the interface between the forest and the atmosphere and depend on aerial nutrient sources, rain, and water vapour for survival. This

physiological dependence on the climate makes them especially sensitive to changes in the atmosphere and temperature, so they are ideal models for the study of climate change (CC). The objective of this study was to detect changes in the spatial distribution of seven orchid species in the tropical dry forest in the department of Valle del Cauca and their significance in terms of conservation planning for CC. A maximum entropy algorithm was used for modelling, and nine variables were analysed. Presence data for 30 municipalities came from 31 field trips, herbarium data, and the literature, and the current potential distribution was compared against the SRES-A2 scenario developed by the Intergovernmental Panel on Climate Change (IPCC) and modelled for the 2080–2100 time horizon. For the set of seven species, the results show an altitudinal increase under the future CC scenario compared to the present, but the responses vary amongst taxa, elevation, and location, depending on the degree of thermal specialization. Under the future CC scenario, the suitability of mid-mountain areas will increase at the expense of the basal areas where dry forest orchids are currently found, and the Cordillera Occidental will have a greater concentration of suitable areas than the Cordillera Central. Variables such as accessibility, land coverage, temperature, and water availability explain 88.6% of the model. A strategy to combat the impending loss of biodiversity due to CC is the establishment of Altitudinal Migration Corridors (AMCs) that connect the forest relics of the alluvial plain with the mid-mountain areas. Areas with a probability of species occurrence greater than P = 0.75 have been identified with MaxEnt software, and these areas constitute “thermal refugia”, which, together with existing protected areas, form the backbone of this conservation strategy. Protection of xeric shrublands and the appropriate management of phorophytes would not only facilitate the dispersion processes of these orchids but also the survival of other flora and fauna in the dry forest of the Valle del Cauca River against CC.

Gradual expansion of moisture sensitive Abies spectabilis forest in the Trans-Himalayan zone of central Nepal associated with climate change

A. Tiwari, Z.-X. Fana, A. S. Jump, S.-F. Li, Z.-K. Zhou

Dendrochronologia (2016), Available online 4 February 2016, In Press. doi:10.1016/j.dendro.2016.01.006

Population structure and tree recruitment dynamics in the natural treeline ecotone of high mountains are strong indicators of vegetation responses to climate. Here, we examined recruitment dynamics of *Abies spectabilis* across the treeline ecotone (3439–3638 m asl) of Chimang Lekh of Annapurna Conservation Area in the Trans-Himalayan zone of central Nepal. Dendrochronological techniques were used to establish stand age structure by ring counts of adults, and by terminal bud scar count for seedlings and saplings. The results showed abundant seedling recruitment, higher regenerative inertia and colonization with a consistent range shift of the *A. spectabilis* treeline. The upward expansion of this sub-alpine treeline was found to be driven by a strong dependence of seedling recruitment and radial growth on snowmelt and precipitation as temperatures rise. The radial growth of *A. spectabilis* at the alpine timberline ecotone (ATE) and closed timberline forest (CTF) showed sensitivity to spring season (March–May) climate. Tree ring indices of CTF showed a strong positive correlation with spring and annual precipitation, and a significant negative correlation with spring and annual temperature, however, moisture sensitivity was less strong at ATE than CTF.

Fuel moisture sensitivity to temperature and precipitation: climate change implications

M. D. Flannigan, B. M. Wotton, G. A. Marshall, W. J. de Groot, J. Johnston, N. Jurko, A. S. Cantin

Climatic Change (2016), Volume 134, Issue 1, pp. 59-71

The objective of this paper is to examine the sensitivity of fuel moisture to changes in temperature and precipitation and explore the implications under a future climate. We use the Canadian Forest Fire Weather Index System components to represent the moisture content of fine surface fuels (Fine Fuel Moisture Code, FFMC), upper forest floor (duff) layers (Duff Moisture Code, DMC) and deep organic soils (Drought Code, DC). We obtained weather data from 12 stations across Canada for the fire season during the 1971–2000 period and with these data we created a set of modified weather streams from the original data by varying the daily temperatures by 0 to +5°C in increments of 1°C and the daily precipitation from −40 to 40% in increments of 10%. The fuel moistures were calculated for all the temperature and precipitation combinations. When temperature increases we find that for every degree of warming, precipitation has to increase by more than 15 % for FFMC, about 10% for DMC and about 5% for DC to compensate for the drying caused by warmer temperatures. Also, we find in terms of the number of days equal to or above an FFMC of 91, a critical value for fire spread, that no increase in precipitation amount alone could compensate for a temperature increase of 1°C. Results from three General Circulation Models (GCMs) and three emission scenarios suggest that this sensitivity to temperature increases will result in a future with drier fuels and a higher frequency of extreme fire weather days.

Physiological and ecological factors influencing recent trends in United States forest health responses to climate change

C. Loehle, C. Idso, T. B. Wigley

Forest Ecology and Management (2016), Volume 363, Pages 179-189

The health of United States forests is of concern for biodiversity conservation, ecosystem services, forest commercial values, and other reasons. Climate change, rising concentrations of CO_2 and some pollutants could plausibly have affected forest health and growth rates over the past 150 years and may affect forests in the future. Multiple factors must be considered when assessing present and future forest health. Factors undergoing change include temperature, precipitation (including flood and drought), CO_2 concentration, N deposition, and air pollutants. Secondary effects include alteration of pest and pathogen dynamics by climate change. We provide a review of these factors as they relate to forest health and climate change. We find that plants can shift their optimum temperature for photosynthesis, especially in the presence of elevated CO_2, which also increases plant productivity. No clear national trend to date has been reported for flood or drought or their effects on forests except for a current drought in the US Southwest. Additionally, elevated CO_2 increases water use efficiency and protects plants from drought. Pollutants can reduce plant growth but concentrations of major pollutants such as ozone have declined modestly. Ozone damage in particular is lessened by rising CO_2. No clear trend has been reported for pathogen or insect damage but experiments suggest that in many cases rising CO_2 enhances plant resistance to both agents. There is strong evidence from the United States and globally that forest growth has been increasing over recent decades to the past 100+ years. Future prospects for forests are not clear because different models produce divergent forecasts. However, forest growth models that incorporate more realistic physiological responses to rising CO_2 are more likely to show future enhanced growth. Overall, our review suggests that United States forest health has improved over recent decades and is not likely to be impaired in at least the next few decades.

Optimal forest species mixture with carbon storage and albedo effect for climate change mitigation

B. D. Matthies, L. T. Valsta

Ecological Economics (2016), Volume 123, Pages 95-105, doi:10.1016/j.ecolecon.2016.01.004

Accounting for carbon storage and the albedo effect through Payments for Ecosystem Services (PES) or mandatory offset permits aims to internalize the environmental externalities of forest management. This can shift the economically optimal rotation age, and incorporate rents for a wider range of ecosystem service offerings. A mixed stand economic optimization model was used to determine the optimal stand mixture and inter-species climate regulation trade-offs. Mixed forest dynamics between deciduous silver birch (*Betula pendula* Roth.) and coniferous Norway spruce (*Picea abies* Karst.) were evaluated. The sensitivity of our results to the absolute species-specific differences in albedo parameter values was also conducted. Results indicated that a synergistic climate regulation trade-off between the two species exists. The optimal rotation for the combined carbon storage and albedo effect was equivalent to that of the carbon storage only case. Differences in absolute albedo impacts were most sensitive at high discount rates, for 'climate only' management, and over increasing offset prices. These results demonstrate the importance of parameter certainty in the promotion of PES in forestry. They also show that mixed stands can promote more efficient trade-offs between forest ecosystem service offerings and provide a basis for diversifying between ecosystem functions.

Predicting the responses of forest distribution and aboveground biomass to climate change under RCP scenarios in southern China

E. Dai, Z. Wu, Q. Ge, W. Xi, X. Wang

Global Change Biology (2016), DOI: 10.1111/gcb.13307

In the past three decades, our global climate has been experiencing unprecedented warming. This warming has and will continue to significantly influence the structure and function of forest ecosystems. While studies have been conducted to explore the possible responses of forest landscapes to future climate change, the representative concentration pathways (RCPs) scenarios under the framework of the Coupled Model Intercomparison Project Phase 5 (CMIP5) have not been widely used in quantitative modeling research of forest landscapes. We used LANDIS-II, a forest dynamic landscape model, coupled with a forest ecosystem process model (PnET-II), to simulate spatial interactions and ecological succession processes under RCP scenarios, RCP2.6, RCP4.5 and RCP8.5, respectively. We also modeled a control scenario of extrapolating current climate conditions to examine changes in distribution and aboveground biomass (AGB) among five different forest types for the period of 2010–2100 in Taihe County in southern China, where subtropical coniferous plantations dominate. The results of the simulation show that climate change will significantly influence forest distribution and AGB. (i) Evergreen broad-leaved forests will expand into Chinese fir and Chinese weeping cypress forests.

The area percentages of evergreen broad-leaved forests under RCP2.6, RCP4.5, RCP8.5 and the control scenarios account for 18.25%, 18.71%, 18.85% and 17.46% of total forest area, respectively. (ii) The total AGB under RCP4.5 will reach its highest level by the year 2100. Compared with the control scenarios, the total AGB under RCP2.6, RCP4.5 and RCP8.5 increases by 24.1%, 64.2% and 29.8%, respectively. (iii) The forest total AGB increases rapidly at first and then decreases slowly on the temporal dimension. (iv) Even though the fluctuation patterns of total AGB will remain consistent under various future climatic scenarios, there will be certain responsive differences among various forest types.

Fire, climate and vegetation linkages in the Bolivian Chiquitano seasonally dry tropical forest

M. J. Power, B. S. Whitney, F. E. Mayle, D. M. Neves, E. J. de Boer, K. S. Maclean

Philosophical Transactions of the Royal Society B (2016), Volume 371, Issue 1696, DOI: 10.1098/rstb.2015.0165

South American seasonally dry tropical forests (SDTFs) are critically endangered, with only a small proportion of their original distribution remaining. This paper presents a 12 000 year reconstruction of climate change, fire and vegetation dynamics in the Bolivian Chiquitano SDTF, based upon pollen and charcoal analysis, to examine the resilience of this ecosystem to drought and fire. Our analysis demonstrates a complex relationship between climate, fire and floristic composition over multi-millennial time scales, and reveals that moisture variability is the dominant control upon community turnover in this ecosystem. Maximum drought during the Early Holocene, consistent with regional drought reconstructions, correlates with a period of significant fire activity between 8000 and 7000 cal yr BP which resulted in a decrease in SDTF diversity. As fire activity declined but severe regional droughts persisted through the Middle Holocene, SDTFs, including Anadenanthera and Astronium, became firmly established in the Bolivian lowlands. The trend of decreasing fire activity during the last two millennia promotes the idea among forest ecologists that SDTFs are threatened by fire. Our analysis shows that the Chiquitano seasonally dry biome has been more resilient to Holocene changes in climate and fire regime than previously assumed, but raises questions over whether this resilience will continue in the future under increased temperatures and drought coupled with a higher frequency anthropogenic fire regime.

Ecosystem heterogeneity determines the ecological resilience of the Amazon to climate change

N. M. Levine, K. Zhang, M. Longo, A. Baccini, O. L. Phillips, S. L. Lewis, E. Alvarez-Dávila, A. C. Segalin de Andrade, R. J. W. Brienen, T. L. Erwin, T. R. Feldpausch, A. L. M. Mendoza, P. N. Vargas, A. Prieto, J. E. Silva-Espejo, Y. Malhi, P. R. Moorcroft

Proceedings of the National Academy of Sciences of the United States of America (2016), Volume 113, Issue 3, pages 793-797, doi: 10.1073/pnas.1511344112

Amazon forests, which store ~50% of tropical forest carbon and play a vital role in global water, energy, and carbon cycling, are predicted to experience both longer and more intense dry seasons by the end of the 21st century. However, the climate sensitivity of this ecosystem remains uncertain: several studies have predicted large-scale die-back of the Amazon, whereas several more recent studies predict that the biome will remain largely intact. Combining remote-sensing and ground-based observations with a size- and age-structured terrestrial ecosystem model, we explore the sensitivity and ecological resilience of these forests to changes in climate. We demonstrate that water stress operating at the scale of individual plants, combined with spatial variation in soil texture, explains observed patterns of variation in ecosystem biomass, composition, and dynamics across the region, and strongly influences the ecosystem's resilience to changes in dry season length. Specifically, our analysis suggests that in contrast to existing predictions of either stability or catastrophic biomass loss, the Amazon forest's response to a drying regional climate is likely to be an immediate, graded, heterogeneous transition from high-biomass moist forests to transitional dry forests and woody savannah-like states. Fire, logging, and other anthropogenic disturbances may, however, exacerbate these climate change-induced ecosystem transitions.

Drought stress and carbon uptake in an Amazon forest measured with spaceborne imaging spectroscopy

G. P. Asner, D. Nepstad, G. Cardinot, D. Ray

Proceedings of the National Academy of Sciences of the United States of America (2016), Volume 101, Issue 16, pages 6039-6044, doi: 10.1073/pnas.0400168101

Amazônia contains vast stores of carbon in high-diversity ecosystems, yet this region undergoes major changes in precipitation affecting land use, carbon dynamics, and climate. The extent and structural complexity of Amazon forests impedes ground studies of ecosystem functions such as net primary production (NPP), water cycling, and carbon sequestration. Traditional modeling and remote-sensing approaches are not well suited to tropical forest studies, because (i) biophysical mechanisms determining drought effects on canopy water and carbon dynamics are poorly known, and (ii) remote-sensing metrics of canopy greenness may be insensitive to small changes in leaf area accompanying drought. New space borne imaging spectroscopy may detect drought stress in tropical

forests, helping to monitor forest physiology and constrain carbon models. We combined a forest drought experiment in Amazônia with space borne imaging spectrometer measurements of this area. With field data on rainfall, soil water, and leaf and canopy responses, we tested whether space borne hyperspectral observations quantify differences in canopy water and NPP resulting from drought stress. We found that hyperspectral metrics of canopy water content and light-use efficiency are highly sensitive to drought. Using these observations, forest NPP was estimated with greater sensitivity to drought conditions than with traditional combinations of modeling, remote-sensing, and field measurements. Space borne imaging spectroscopy will increase the accuracy of ecological studies in humid tropical forests.

Assessing the potential for forest management practitioner participation in climate change adaptation

H. W. Nelson, T. B. Williamson, C. Macaulay, C. Mahony

Forest Ecology and Management (2016), Volume 360, Pages 388-399, doi:10.1016/j.foreco.2015.09.038

The sensitivity of forests to local climate and the long time periods involved in forest management combine to result in conditions where forests and forest management are vulnerable to climate change. Minimizing the risks and impacts of climate change on forest management outcomes and reducing the vulnerability of forest management systems requires adaptation. Forest management system adaptation is a multi-scale incremental process that involves diverse actors collaborating to define issues, develop options, and implement solutions. Enabling adaptation may require revising assumptions (e.g., assumptions about stationary climate), upgrading formal and informal institutions (including mandates), re-engineering governance, addressing knowledge gaps and information management issues, and changing practices. Given the heightened uncertainty associated with climate change, adaptation also includes enhancing capacities, reducing risks through diversification, increasing flexibility, and enhancing resiliency by creating decision environments conducive to learning, foresight, knowledge integration, and adaptive management. Forest management practitioners have a fundamental role in identifying, evaluating, and implementing climate change adaptation measures. This study develops and applies a framework (derived from recent scholarship on adaptation) for assessing the perceptions of forest management practitioners about issues, challenges, and factors that they consider important relative to their potential to contribute to climate change adaptation. The framework draws from, and ties together various aspects of adaptation process including psychological factors, knowledge management, forest management capacity, institutions and governance, and the state of information methods that support forest management (i.e., planning, monitoring, and assessment). The framework is applied utilizing the results of surveys of forest practitioners in British Columbia, Canada. The application provides an opportunity to test concepts and to identify key barriers from a practitioner perspective. Proof of concept is tested by evaluating the extent to which respondents were able and willing to provide answers to survey questions. In general, responses were robust suggesting some understanding and recognition of the importance and validity of the underlying adaptation concepts by forest professionals. The results suggest that forest professionals have diverse viewpoints about climate change. The majority is concerned and support adaptation. However, a significant minority do not support modification of current forest management. Discourse, education, and engagement are called for. Other key factors that from the perspective of professionals may reduce participation potential include knowledge deficits, lack of mandate to adapt, limited resources for adaptation, institutional barriers, inadequate assessment, and persistence of planning and monitoring approaches that do not account for climate change.

Cloud forest trees with higher foliar water uptake capacity and anisohydric behaviour are more vulnerable to drought and climate change

C. B. Eller, A. L. Lima, R. S. Oliveira

New Physiologist (2016), DOI: 10.1111/nph.13952

Many tropical montane cloud forest (TMCF) trees are capable of foliar water uptake (FWU) during leaf-wetting events. In this study, we tested the hypothesis that maintenance of leaf turgor during periods of fog exposure and soil drought is related to species' FWU capacity. We conducted several experiments using apoplastic tracers, deuterium labeling and leaf immersion in water to evaluate differences in FWU among three common TMCF tree species. We also measured the effect of regular fog exposure on the leaf water potential of plants subjected to soil drought and used these data to model species' response to long-term drought. All species were able to absorb water through their leaf cuticles and/or trichomes, although the capacity to do so differed between species. During the drought experiment, the species with higher FWU capacity maintained leaf turgor for a longer period when exposed to fog, whereas the species with lower FWU exerted tighter stomatal regulation to maintain leaf turgor. Model results suggest that without fog, species with high FWU are more likely to lose turgor during seasonal droughts. We show that leaf-wetting events are essential for trees with high FWU, which tend to be more anisohydric, maintaining leaf turgor during seasonal droughts.

Biophysical climate impacts of recent changes in global forest cover

R. Alkama, A. Cescatti

Science (2016), Volume 351, Issue 6273, pages 600-604, DOI: 10.1126/science.aac8083

Changes in forest cover affect the local climate by modulating the land-atmosphere fluxes of energy and water. The magnitude of this biophysical effect is still debated in the scientific community and currently ignored in climate treaties. Here we present an observation-driven assessment of the climate impacts of recent forest losses and gains, based on Earth observations of global forest cover and land surface temperatures. Our results show that forest losses amplify the diurnal temperature variation and increase the mean and maximum air temperature, with the largest signal in arid zones, followed by temperate, tropical, and boreal zones. In the decade 2003–2012, variations of forest cover generated a mean biophysical warming on land corresponding to about 18% of the global biogeochemical signal due to CO2 emission from land-use change.

Forest managers' response to climate change science: Evaluating the constructs of boundary objects and organizations

J. J. Blades, P. Z. Klos, K. B. Kemp, T. E. Hall, J. E. Force, P. Morgan, W. T. Tinkham

Forest Ecology and Management (2016), Volume 360, Pages 376-387. doi:10.1016/j.foreco.2015.07.020

Land managers lack locally relevant climate change science and are urgently calling for research to inform management. We conducted four climate change workshops in the U.S. northern Rocky Mountains and applied multiple methods of inquiry to understand whether the boundary organization (workshops) and objects (climate change science products) were perceived as credible and useful. Perceived credibility and usefulness increased overall, and regional-scale hydrologic information was deemed most useful. Regression models found that intention to use climate change science was predicted by usefulness, credibility, and organizational barriers. We discuss the importance of uncertainty, visualization, and best practices for effective climate change deliberation using boundary objects and organizations at the research–management interface.

Predicting the future effectiveness of protected areas for bird conservation in Mediterranean ecosystems under climate change and novel fire regime scenarios

A. Regos, M. D'Amen, N. Titeux, S. Herrando, A. Guisan, L. Brotons

Biodiversity Research (2016), Volume 22, Issue 1, pages 83-96. DOI: 10.1111/ddi.12375

Global environmental changes challenge traditional conservation approaches based on the selection of static protected areas due to their limited ability to deal with the dynamic nature of driving forces relevant to biodiversity. The Natura 2000 network (N2000) constitutes a major milestone in biodiversity conservation in Europe, but the degree to which this static network will be able to reach its long-term conservation objectives raises concern. We assessed the changes in the effectiveness of N2000 in a Mediterranean ecosystem between 2000 and 2050 under different combinations of climate and land cover change scenarios. Potential distribution changes of several terrestrial bird species of conservation interest included in the European Union's Birds Directive were predicted within an ensemble-forecasting framework that hierarchically integrated climate change and land cover change scenarios. Land cover changes were simulated using a spatially explicit fire-succession model that integrates fire management strategies and vegetation encroachment after the abandonment of cultivated areas as the main drivers of landscape dynamics in Mediterranean ecosystems. Our results suggest that the amount of suitable habitats for the target species will strongly decrease both inside and outside N2000. However, the effectiveness of N2000 is expected to increase in the next decades because the amount of suitable habitats is predicted to decrease less inside than outside this network. Such predictions shed light on the key role that the current N2000 may play in the near future and emphasize the need for an integrative conservation perspective wherein agricultural, forest and fire management policies should be considered to effectively preserve key habitats for threatened birds in fire-prone, highly dynamic Mediterranean ecosystems. Results also show the importance of considering landscape dynamics and the synergies between different driving forces when assessing the long-term effectiveness of protected areas for biodiversity conservation.

Combining satellite data for better tropical forest monitoring

J. Reiche, R. Lucas, A. L. Mitchell, J. Verbesselt, D. H. Hoekman, J. Haarpaintner, J. M. Kellndorfer, A. Rosenqvist, E. A. Lehmann, C. E. Woodcock, F. M. Seifert, M. Herold

Nature Climate Change (2016), Volume 6, pages 120-122. doi:10.1038/nclimate2919

Implementation of policies to reduce forest loss challenges the Earth observation community to improve forest monitoring. An important avenue for progress is the use of new satellite missions and the combining of optical and synthetic aperture radar sensor data.

Capturing subregional variability in regional-scale climate change vulnerability assessments of natural resources

P.C. Buotte, D.L. Peterson, K.S. McKelvey, J.A Hicke

Journal of Environmental Management (2016), Volume 169, pages 313-318. DOI: 10.1016/j.jenvman.2015.12.017

Natural resource vulnerability to climate change can depend on the climatology and ecological conditions at a particular site. Here we present a conceptual framework for incorporating spatial variability in natural resource vulnerability to climate change in a regional-scale assessment. The framework was implemented in the first regional-scale vulnerability assessment conducted by the US Forest Service. During this assessment, five subregional workshops were held to capture variability in vulnerability and to develop adaptation tactics. At each workshop, participants answered a questionnaire to: 1) identify species, resources, or other information missing from the regional assessment, and 2) describe subregional vulnerability to climate change. Workshop participants divided into six resource groups; here we focus on wildlife resources. Participants identified information missing from the regional assessment and multiple instances of subregional variability in climate change vulnerability. We provide recommendations for improving the process of capturing subregional variability in a regional vulnerability assessment. We propose a revised conceptual framework structured around pathways of climate influence, each with separate rankings for exposure, sensitivity, and adaptive capacity. These revisions allow for a quantitative ranking of species, pathways, exposure, sensitivity, and adaptive capacity across subregions. Rankings can be used to direct the development and implementation of future regional research and monitoring programs. The revised conceptual framework is equally applicable as a stand-alone model for assessing climate change vulnerability and as a nested model within a regional assessment for capturing subregional variability in vulnerability.

Leaf phenological shifts and plant-microbe-soil interactions can determine forest productivity and nutrient cycling under climate change in an ecosystem model

T. Miki, H. Doi

Ecological Research (2016), Volume 31, Issue 2, pages 263-274

Climate change is expected to affect tree leaf phenology by extending the length of the growing season (LGS), which will affect the productivity and nutrient cycling of forests. Interactions between plants and microbes will mediate the ecosystem processes further through microbe-mediated plant–soil feedback (PSF). To investigate the possible consequences of interactions between the extension of the growing season (GS) and PSF under various conditions, we developed a simple theoretical model (LGS-PSF model). The LGS-PSF model predicts that microbe-mediated PSF will intensify the negative effects of increasing temperature on the size of soil carbon stock when compared with simulations without the PSF effect. The combined effects of increasing temperature and PSF on the size of soil carbon stock occurs through enhanced activity of individual microbes and increased microbial population size. More importantly, the model also demonstrated that a longer GS mitigates this negative effect on carbon accumulation in soil, not through increased net primary production, but through intensified competition for nutrients between plants and microbes, thus suppressing microbial population growth. Our model suggested that the interactive effects of the LGS and PSF on carbon and nitrogen dynamics in forests should be incorporated into larger scale quantitative models for better forecasting of future forest functions under climate change.

Climate Change Vulnerabilities and Adaptation Options for Forest Vegetation Management in the Northwestern USA

J. E. Halofsky, D. L. Peterson

Atmosphere (2016), Volume 7, Issue 3, doi:10.3390/atmos7030046

Recent vulnerability assessments, conducted in diverse regions in the northwestern United States, indicate that many commonalities exist with respect to projected vulnerabilities to climate change. Dry forests are projected to have significant changes in distribution and abundance of species, partially in response to higher temperature and lower soil moisture, but mostly in response to projected increases in extreme events and disturbances—drought, wildfire, and insect outbreaks. Wildfire and mountain pine beetles have caused extensive mortality across millions of hectares in this region during the past decade, and wildfire area burned is projected to increase 200%–300% by mid-21st century. Science–management partnerships associated with recent assessments have identified an extensive list of adaptation options, including both strategies (general planning) and tactics (on-the-ground projects). Most of the options focus on increasing resilience to disturbances and on reducing current stressors to resource conditions. Adaptation options are generally similar across the biogeographically diverse region covered by assessments, suggesting that there may be a limit on the number of feasible responses to climate change. Federal agencies in the northwestern United States are now using these assessments and

adaptation approaches to inform sustainable resource management and planning, mostly through fine tuning of existing practices and policies.

Modelling forest carbon stock changes as affected by harvest and natural disturbances: Comparison with countries' estimates for forest management

R. Pilli, G. Grassi, W. A. Kurz, R. A. Viñas and N. H. Guerrero

Carbon Balance and Management (2016), Volume 11, Issue 5. DOI: 10.1186/s13021-016-0047-8

According to the post-2012 rules under the Kyoto protocol, developed countries that are signatories to the protocol have to estimate and report the greenhouse gas (GHG) emissions and removals from forest management (FM), with the option to exclude the emissions associated to natural disturbances, following the Intergovernmental Panel on Climate Change (IPCC) guidelines. To increase confidence in GHG estimates, the IPCC recommends performing verification activities, i.e. comparing country data with independent estimates. However, countries currently conduct relatively few verification efforts. The aim of this study is to implement a consistent methodological approach using the Carbon Budget Model (CBM) to estimate the net CO2 emissions from FM in 26 European Union (EU) countries for the period 2000–2012, including the impacts of natural disturbances. We validated our results against a totally independent case study and then we compared the CBM results with the data reported by countries in their 2014 Greenhouse Gas Inventories (GHGIs) submitted to the United Nations Framework Convention on Climate Change (UNFCCC). The match between the CBM results and the GHGIs was good in nine countries (i.e. the average of our results is within ±25 % compared to the GHGI and the correlation between CBM and GHGI is significant at $P < 0.05$) and partially good in ten countries. When the comparison was not satisfactory, in most cases we were able to identify possible reasons for these discrepancies, including: (1) a different representation of the interannual variability, e.g. where the GHGIs used the stock-change approach; (2) different assumptions for non-biomass pools, and for CO2 emissions from fires and harvest residues. In few cases, further analysis will be needed to identify any possible inappropriate data used by the CBM or problems in the GHGI. Finally, the frequent updates to data and methods used by countries to prepare GHGI makes the implementation of a consistent modeling methodology challenging. This study indicates opportunities to use the CBM as tool to assist countries in estimating forest carbon dynamics, including the impact of natural disturbances, and to verify the country GHGIs at the EU level, consistent with the IPCC guidelines. A systematic comparison of the CBM with the GHGIs will certainly require additional efforts—including close cooperation between modelers and country experts. This approach should be seen as a necessary step in the process of continuous improvement of GHGIs, because it may help in identifying possible errors and ultimately in building confidence in the estimates reported by the countries.

Forests on drained agricultural peatland are potentially large sources of greenhouse gases – insights from a full rotation period simulation

H. He, P.-E. Jansson, M. Svensson, J. Björklund, L. Tarvainen, L. Klemedtsson, Å. Kasimir

Biogeosciences (2016), Volume 13, pages 2305-2318. doi:10.5194/bg-13-2305-2016

The CoupModel was used to simulate a Norway spruce forest on fertile drained peat over 60 years, from planting in 1951 until 2011, describing abiotic, biotic and greenhouse gas (GHG) emissions (CO_2 and N_2O). By calibrating the model against tree ring data a "vegetation fitted" model was obtained by which we were able to describe the fluxes and controlling factors over the 60 years. We discuss some conceptual issues relevant to improving the model in order to better understand peat soil simulations. However, the present model was able to describe the most important ecosystem dynamics such as the plant biomass development and GHG emissions. The GHG fluxes are composed of two important quantities, the spruce forest carbon (C) uptake, 413 g C m^{-2} yr^{-1} and the decomposition of peat soil, 399 g C m^{-2} yr^{-1}. N_2O emissions contribute to the GHG emissions by up to 0.7 g N m^{-2} yr^{-1}, corresponding to 76 g C m^{-2} yr^{-1}. The 60-year old spruce forest has an accumulated biomass of 16.0 kg C m^{-2} (corresponding to 60 kg CO_2 m^{-2}). However, over this period, 26.4 kg C m^{-2} (97 kg CO_2eq m^{-2}) has been added to the atmosphere, as both CO_2 and N_2O originating from the peat soil and, indirectly, from forest thinning products, which we assume have a short lifetime. We conclude that after harvest at an age of 80 years, most of the stored biomass carbon is liable to be released, the system having captured C only temporarily and with a cost of disappeared peat, adding CO_2 to the atmosphere.

V. PUBLICATIONS, REPORTS AND OTHER MEDIA

The Agriculture Sectors in the Intended Nationally Determined Contributions: Analysis

FAO – 2016 / 80 pages

The Intended Nationally Determined Contributions (INDCs) served as the basis for negotiations at COP21 and helped produce the Paris Agreement on climate change. The INDCs will guide country-level climate action for the coming years. INDCs include not only targets, but also concrete strategies for addressing the causes of climate change and responding to its effects. As at 31 March 2016, 188 countries had submitted their INDCs to the UNFCCC. FAO has analyzed the INDCs and found that the agriculture sectors (crops, livestock, fisheries and aquaculture, as well as forestry) feature prominently in meeting national mitigation and adaptation goals. The document is a **draft working paper that was open for comments until 16 July**.

"Planning, implementing and evaluating Climate-Smart Agriculture in Smallholder Farming Systems": The experience of the MICCA pilot projects in Kenya and the United Republic of Tanzania

FAO – 2016 / 112 pages

Within the pilot projects, key steps were taken to develop integrated portfolios of Climate-smart agriculture (CSA) practices and technologies and build the capacity of farmers to implement them; test CSA outcomes on sustainable agricultural production and climate change adaptation and mitigation using models (EX-ACT carbon balance analysis) and field measurements (GHG emissions, carbon stocks, rainfall efficiency and yield); and assess barriers and opportunities for the adoption and scaling up of CSA at the local and national level. Important lessons have been learned through the pilot projects undertaken by MICCA and its partners, and these lessons have provided the basis for a number of recommendations.

Simply RED: CIFOR's guide to forests, climate change and REDD

CIFOR – 2016 / 16 pages

When people debate climate change they often use scientific and technical language. The terms and acronyms we hear can cloud the issues if we don't know what they mean. The Center for International Forestry Research (CIFOR) has prepared this simple guide to help journalists, policy makers, NGOs and interested global citizens better understand the importance of forests in combating climate change. It also highlights issues that CIFOR's research has identified as crucial if the global climate agenda is to progress in a way that is effective, efficient and equitable.

Forests and climate change adaptation: What policymakers should know

CIFOR – 2016 / 16 pages

When people debate climate change they often use scientific and technical language. The terms and acronyms we hear can cloud the issues if we don't know what they mean. The Center for International Forestry Research (CIFOR) has prepared this simple guide to help journalists, policy makers, NGOs and interested global citizens better understand the importance of forests in combating climate change. It also highlights issues that CIFOR's research has identified as crucial if the global climate agenda is to progress in a way that is effective, efficient and equitable.

Global Forest Watch Climate: Summary of Methods and Data

WRI – 2016 / 16 pages

The Global Forest Watch (GFW) Climate online platform catalyzes action on climate change by providing timely and credible answers to questions about the impacts of tropical deforestation on global climate change. Its wealth of data and analytical tools allow researchers, governments, donors, businesses, journalists, and civil society to access information on carbon dioxide emissions from tropical deforestation. This technical note outlines the initial scope of the GFW Climate platform and provides a brief summary of the data available on the site.

World Heritage and Tourism in a Changing Climate

UNESCO, UNEP and the Union of Concerned Scientists – 2016 / 108 pages

This report provides an overview of the increasing vulnerability of World Heritage sites to climate change impacts and the potential implications for and of global tourism. It also examines the close relationship between World Heritage and tourism, and how climate change is likely to exacerbate problems caused by unplanned tourism development and uncontrolled or poorly managed visitor access, as well as other threats and stresses. Tourism can also play a positive role in helping to secure the future of many World Heritage sites in a changing climate.

UNEP Frontiers 2016 Report: Emerging Issues of Environmental Concern

UNEP – 2016 / 77 pages

This report highlights six frontiers: (1) the Financial Sector, a Linchpin to Advance Sustainable Development, (2) Zoonoses, as Blurred Lines of Emergent Disease and Ecosystem Health, (3) Microplastics, as Trouble in the Food Chain, (4) Loss and Damage, the Unavoidable Impacts of Climate Change on Ecosystems, (5) Poisoned chalice, Toxin accumulation in crops in the era of climate change, and (6) Exotic Consumerism: Illegal Trade in Live Animals.

The Adaptation Finance Gap Report 2016

UNEP – 2016 / 72 pages

The adoption of the Paris Agreement at the twenty-first session of the Conference of the Parties (CoP21) to the UN Framework Convention on Climate Change in 2015 was a landmark achievement, with 195 countries endorsing an ambitious climate change agreement that includes a global goal on adaptation. More robust information on adaptation needs, costs, and finance is needed to guide and inform the successful implementation of the Paris Agreement. To support the provision of such information, the 2016 Adaptation Finance Gap Report presents an indicative assessment of the current knowledge on global adaptation costs, the finance available to meet these costs, and the anticipated difference between these two figures – the adaptation finance gap.

World Bank Group Climate Change Action 2016-2020

The World Bank – 2016 / 83 pages

Climate change is a threat to the core mission of the World Bank Group (WBG). Current weather extremes already affect millions of people, putting food and water security at risk, and threatening agricultural supply chains and many coastal cities. Without further action to reduce extreme poverty, provide access to basic services, and strengthen resilience, climate impacts could push an additional 100 million people into poverty by 2030. Climate change presents enormous challenges and opportunities for development, making it essential that climate and development be tackled in an integrated way. The world needs to feed nine billion people by 2050, provide affordable energy access to all, and extend housing and services to two billion new urban dwellers—and to do so while minimizing emissions and boosting resilience. Recent global developments favor bold climate action by the WBG. At the most recent Conference of the Parties (COP21) in Paris, 140 World Bank client countries committed to implement their Nationally Determined Contributions (NDCs) as part of an agreement to limit global warming to less than 2°C by 2100, and make best efforts to limit warming to 1.5°C. At the same time, public and private actors have renewed their global commitments to increase investments and research and development, boost carbon pricing, and end wasteful energy subsidies. This Climate Change Action Plan (for short: "the Action Plan") demonstrates how the WBG intends to meet these challenges and opportunities, by scaling up climate action, integrating climate change across its operations, and working more closely with others.

Feeding Climate Change: What the Paris Agreement means for food and beverage companies

OXFAM – 2016 / 36 pages

The Paris Agreement marked a major breakthrough in support for climate action from many parts of the business community, including from key actors in the food and beverage sector. But despite significant progress, much work remains both to cut greenhouse gas emissions and to support the millions of people already hit by climate change. As one of the sectors that is at highest risk of being affected by climate change, responsible for a giant emissions footprint and reliant on millions of small-scale farmers and agricultural workers in the regions most vulnerable to climate change, the food and beverage sector should lead the next generation of post-Paris corporate climate commitments. This paper presents new data commissioned from the research on the greenhouse gas emissions footprints and water scarcity footprints of major food commodities. The data demonstrate the vital role the food and beverage industry can and must play in turning the Paris Agreement into a springboard for the stronger climate action needed.

Conserving Forests to Combat Climate Change: What is REDD+, how was it created and where is it going?

WWF – 2016 / 25 pages

In December 2015, with the signing of the Paris Agreement, the nations of the world reached agreement on a historic, collective and comprehensive approach to combat climate change. Within that agreement is a recognition of the critical role of forests, including actions to halt and reverse the rate of deforestation and forest degradation in developing countries, which have contributed up to 20 percent of annual greenhouse gas emissions. To assist countries in these actions, the agreement includes a framework of policies and incentives for reducing deforestation and forest degradation and increasing carbon storage in forests through conservation and sustainable management. This is known as REDD+. REDD+ has evolved over a decade of discussions…

V.I JOBS

Consultant Renewable Energy Policy / Finance Analyst (100%)

South Pole Group – Deadline is Until suitable candidate is found

As Consultant Renewable Energy (RE) Policy / Finance Analyst you will be part of the Consultancy & Services unit in Asia. You will support one or several Senior Consultants in conducting research, analytical studies and other tasks for the implementation of clean energy policy and finance projects in the Southeast Asia.

MRV and Capacity Building Coordinator

Winrock International – Deadline is 31 August 2016

The MRV and Capacity Building Coordinator will be the representative of Winrock International in the USAID Páramos and Forests Program in Colombia. The purpose of the Páramos and Forests Program is to support Colombia in the implementation of its Agriculture, Forestry and Other Land Uses (AFOLU) related climate change mitigation goals, while strengthening community based sustainable development initiatives in the context of a post peace agreement scenario. This person will assist in the effective implementation of this program.

Faculty Position: Forests & Governance

Ashoka Trust for Research in Ecology and the Environment (ATREE)

Ashoka Trust for Research in Ecology and the Environment (ATREE) is seeking to fill one faculty position in its programme on Forests & Governance. The programme seeks to recruit a social scientist with an interdisciplinary inclination to pursue applied research on questions of forest-based livelihoods, rural development, and/or forest institutions and governance.

Carbon Project Manager

Nexus – Deadline is 22 August 2016

The Carbon Project Manager's primary aim is to provide high-quality, expert carbon and technology advisory services to Nexus members, corporate partners, and debt financing funds. In addition, the position will contribute to sourcing projects and consultancies in climate mitigation and adaptation – as well as improving monitoring and evaluation of projects for social and environmental outcomes.

Senior Programme Specialist, Climate Change Cluster

Asian Institute of Technology, Pathumthani, Thailand – Deadline is as soon as suitable candidate is found

The successful candidate will head the Adaptation Component of the RRC.AP Climate Change Cluster by leading its strategy and portfolio development and overseeing the implementation of its programmes and activities, including management and development of staff. He/she will also provide technical inputs to the climate change adaptation-related initiatives implemented by RRC.AP and AIT. In addition, the successful candidate will assist the Head of the Climate Change Cluster in defining the Climate Change Cluster's portfolio and strategic partnerships, resource mobilisation and resource management. He/she will report directly to the Head of the Climate Change Cluster.

Call for Resumes – Climate Change Adaptation Experts

427ClimateSolutions – Deadline is 31 August 2016

Four Twenty Seven, a climate risk and resilience research and advisory firm, is currently soliciting resumes of experts for anticipated work on climate change adaptation in developing countries. Applicants should be individuals with expertise in adaptation issues in developing countries and sectors of interest.

Climate Change Scientist

Forest Research - Forestry Commission UK – Deadline is 04 September 2016

The post holder will be expected to collaborate and communicate with other groups in the ClimateXChange project and with a range of forestry stakeholders, for example through workshops, meetings and a range of media, researching and analysing the links between forestry adaptation and mitigation actions…

VII. ANNOUNCEMENTS

Four technical documents showcased at the FAO Celebration of the World Day to Combat Desertification

Food and Agriculture Organization of the United Nations (FAO)

As part of the celebration, FAO showcased four technical publications that are relevant for dryland and combating desertification, land degradation and droughts. The four documents were:

- **Informing Future Interventions for Scaling-up Sustainable Land Management**
- **Fisheries in the drylands of Sub-Saharan Africa: "Fish come with the rains"**
- **Improving Governance of Pastoral Lands: Implementing the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security**
- **Drought characteristics and management in the Caribbean region**

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 each month.

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 Patrick Bahal'okwibale, Susan Braatz and Simmone Rose.

We appreciate any comments or feedback.

How to subscribe/unsubscribe

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