CLIM-FO Climate Change & Forestry

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I. IN THE PRESS

8 April 2014 – IISD

PEN Study Questions Forests' Role in Coping Strategies

The Poverty and Environment Network (PEN), a collaborative effort led by the Center for International Forestry Research (CIFOR), has released a study that suggests forests may play a less important role as safety nets following hardships than commonly thought. 'Safety Nets, Gap Filling and Forests: A Global-Comparative Perspective' reveals that, across 24 developing countries, only one in ten households surveyed identifies natural forests and other non-cultivated resources as first responses to disasters

7 April 2014 – World Agroforestry Centre

CGIAR and partners respond to climate change report

Identifying actions around the world that can help farmers adapt to climate change and help deliver a more food-secure and prosperous world has been the focus of a meeting in London in response to a recent report by the Intergovernmental Panel on Climate Change (IPCC).

6 April 2014 – redd-monitor.org

REDD+ in the news: 31 March – 6 April 2014

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

1 April 2014 - ScienceDaily

Amazon studied to predict impact of climate change

Three extreme weather events in the Amazon Basin in the last decade are giving scientists an opportunity to make observations that will allow them to predict the impacts of climate change and deforestation on some of the most important ecological processes and ecosystem services of the Amazon River wetlands

31 March 2014 – IISD

REDD+ Partners in Congo Basin to Enhance Coordination

The Congo Basin Forest Partnership (CBFP) has reported on the outcomes of the REDD+ partners platform meeting, which considered progress and next steps for REDD+ in the Congo Basin with a particular focus on Cameroon, the Democratic Republic of the Congo (DRC) and Gabon.

22 March 2014 – IISD

RRI Convenes Discussion on Challenges of Carbon Rights and Implementing the New Warsaw Agreement on REDD+

The Fifteenth Rights and Resources Initiative (RRI) Dialogue on Forests, Governance, and Climate

Change convened at the Newseum in Washington, DC, US, on 19 March 2014, under the theme of "Challenges of Carbon Rights and Implementing the New Warsaw Agreement on REDD+." Approximately 100 participants attended the event, with over 500 more (from 65 countries) engaging virtually through a live webcast.

21 March 2014 – FAO

FAO launches new satellite-based data on forest resources on the International Day of Forests

New data released on the occasion of the International Day of Forests confirm that forest areas continue to decline globally, with the biggest losses of tropical forests occurring in South America and Africa.

21 March 2014 – IISD

International Day of Forests Commemorated Worldwide

In celebration of the second International Day of Forests, UN Secretary-General Ban Ki-moon noted the important benefits of forests: habitat provision for 80 percent of all terrestrial biodiversity; support of an estimated 1.6 billion people; adaptation and mitigation to climate change; and the maintenance of a timber and wood industry that accounts for almost 1 percent of global gross domestic product (GDP).

March 2014 – FAO

Forest surveys provide baseline data for participation in REDD+

Forests have the capacity to sequester and store enormous amounts of carbon – in trees, ground litter and the soil. When forests are destroyed or degraded, or converted for another use, they emit sequestered carbon into the atmosphere as a greenhouse gas, contributing to climate change. Ensuring the sustainable management of forests is critical to global climate change adaptation and mitigation efforts.

7 March 2014 – IISD

African Countries Share Knowledge on GHG Inventories, Forest Monitoring Systems

The UN-REDD Programme and the UN Development Programme's (UNDP) Low Emission Capacity Building Programme (LECBP), in partnership with the Zambian Ministry of Lands, Natural Resources and Environmental Protection, convened a workshop to discuss building capacities for national forest monitoring systems for REDD+ and national greenhouse gas (GHG) inventory systems in African countries

March-April 2014

II. MULTILATERAL PROCESSES IN CLIMATE CHANGE

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

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

III. EVENTS & MEETINGS

Third International Climate Change Adaptation Conference

12 – 16 May 2014, Centro de Eventos do Ceará, Fortaleza, Brazil

The Third International Climate Change Adaptation Conference 2014 (Adaptation Futures 2014) will be the nexus between the research community and the users of climate change adaptation information at regional and global scale. This conference follows the successfull pioneer Climate Adaptation Futures Conference, co-hosted by Australia's National Climate Change Adaptation Research Facility and the CSIRO Climate Adaptation Flagship in Australia in 2010, and the Adaptation Futures 2012 International Conference on Climate Adaptation in Arizona in 2012. Inspired by these two conferences, the Third Conference will build on the community that comes together in Fortaleza and foster a connected, collaborative and creative international network of adaptation researchers, decision makers and interested citizens. The conference will bring together researchers, policy makers, and practitioners from developed and developing countries to share insights into the challenges and opportunities that adaptation presents, and to share strategies for decision making from international to local scales. **More**

International Conference. Ecosystems, Economy and Society: How large-scale restoration can stimulate sustainable development

29 - 30 MAY 2014, U.S. National Academy of Sciences, Washington DC, USA

For the 7th edition of its Future Environmental Trends Conference Programme, the Veolia Environment Institute organizes jointly with Agence Française de Développement, International Union for Conservation of Nature and US National Research Council Water Science and Technology Board an international event on "Ecosystems, Economy and Society: how large-scale restoration can stimulate sustainable development". It will provide an international platform for scientists, practitioners, NGOs, business leaders and policymakers to discuss remarkable case studies, best practices and share better insights on the potential of large-scale ecosystem restoration for the improvement of people's livelihoods, jobs creation and socio-economic development, together with the recovery of ecosystems functionalities, continuity and biodiversity. **More**

IV. RESEARCH ARTICLES

Changes in tropical forest cover of Southeast Asia from 1990 to 2010

Stibig, H.-J., Achard, F., Carboni, S., Raši, R., Miettinen J.
Biogeosciences. 11, 247-258, 2014. doi:10.5194/bg-11-247-2014

The study assesses the extent and trends of forest cover in Southeast Asia for the periods 1990–2000 and 2000–2010 and provides an overview on the main causes of forest cover change. A systematic sample of 418 sites (10 km×10 km size) located at the one-degree geographical confluence points and covered with satellite imagery of 30m resolution is used for the assessment. Techniques of image segmentation and automated classification are combined with visual satellite image interpretation and quality control, involving forestry experts from Southeast Asian countries. The accuracy of our results is assessed through an independent consistency assessment, performed from a subsample of 1572 mapping units and resulting in an overall agreement of > 85% for the general differentiation of forest cover versus non-forest cover. The total forest cover of Southeast Asia is estimated at 268Mha in 1990, dropping to 236 Mha in 2010, with annual change rates of 1.75 Mha (_0.67 %) and 1.45 Mha (_0.59 %) for the periods 1990–2000 and 2000– 2010, respectively. The vast majority of forest cover loss (_2 / 3 for 2000–2010) occurred in insular Southeast Asia. Complementing our quantitative results by

indicative information on patterns and on processes of forest change, obtained from the screening of satellite imagery and through expert consultation, respectively, confirms the conversion of forest to cash crops plantations (including oil palm) as the main cause of forest loss in Southeast Asia. Logging and the replacement of natural forests by forest plantations are two further important change processes in the region.

'Solid–fluid–gas': the state of knowledge on carbon-sequestration potential of agroforestry systems in Africa

Ramachandran Nair, P.K. & Nari, V.D.

Current Opinion in Environmental Sustainability. 2014. Volume 6: 22-27.

The perception that agroforestry systems have higher potential to sequester carbon than comparable single-species crop systems or pasture systems is based on solid scientific foundation. However, the estimates of carbon stock of agroforestry systems in Africa — reported to range from 1.0 to 18.0 Mg C ha−1 in aboveground biomass and up to 200 Mg C ha−1 in soils, and their C sequestration potential from 0.4 to 3.5 Mg C ha−1 yr−1— are based on generalizations and vague or faulty assumptions and therefore are of poor scientific value. Although agroforestry initiatives are promising pathways for climate-change mitigation, rigorous scientific procedures of carbon sequestration estimations are needed for realizing their full potential.

An uncertainty assessment framework for forest planning adaptation to climate change

Petr, M., Boerboom, L., Ray, D., van der Veen, A.
Forest Policy and Economics. 2014. Volume 41: 1-11.

Uncertainty in forest planning is a prevailing problem affecting decision-making processes, especially those relating to climate change adaptation. Limited knowledge about uncertainty has prompted this empirical investigation of forest planners' understanding of uncertainty related to its recognition, its management and risk perception. We used a comprehensive uncertainty framework to address and test these uncertainties, with data from an online survey, to identify the views of 33 forest planners through Britain. Responses were analysed using non-parametric tests. The results showed that planners have significantly different views on uncertainty among economic, social and climatic categories. Uncertainty in the climatic category was more acutely perceived than in the economic and social categories. Planners preferred to practice active uncertainty management, as the results suggest they feel more able to manage uncertainty in forest models and their outcomes. Forest planners also indicated diverse perceptions of salient risks of change over the next 30 years. The results show they may take action only to pests, drought and wind risks posing a threat to forests even though they perceived these risks potentially to be highly regulated and controlled by forestry policies. The findings provide a better understanding of uncertainty as a source of inertia to climate change adaptation in forestry, identify new research objectives and support the development of forestry policies for climate change adaptation.

Wildland fire emissions, carbon, and climate: Seeing the forest and the trees – A cross-scale assessment of wildfire and carbon dynamics in fire-prone, forested ecosystems

Loehman, R.A., Reinhardt, E., Riley, K.L.
Forest Ecology and Management. 2014. Volume 317: 9-19.

Wildfires are an important component of the terrestrial carbon cycle and one of the main pathways for movement of carbon from the land surface to the atmosphere. Fires have received much attention in recent years as potential catalysts for shifting landscapes from carbon sinks to carbon sources. Unless structural or functional ecosystem shifts occur, net carbon balance in fire-adapted systems at steady state is zero when assessed over the entire post-fire successional sequence and at landscape scales. When evaluated at fine spatial scales and over short periods of time, however, wildfires may seem to release more carbon to the atmosphere than remains on site. Measurements of wildfire carbon emissions are thus highly biased by the spatial and temporal scales that bound them, and may over- or under-estimate carbon source-sink dynamics that provide critical feedbacks to the climate system. This synthesis paper provides a description of the ecological drivers of wildfires and carbon in forested ecosystems across the spatial and temporal scales at which system drivers (e.g., climate, weather), behaviors (e.g., wildfire occurrence, spread, intensity), and resulting patterns (e.g., vegetation composition and structure, carbon emissions) occur and interact. Improved understanding of these relationships is critical if we are to anticipate and respond to major changes in the global earth system expected in the coming decades and centuries.

Framing REDD+ in India: Carbonizing and centralizing Indian forest governance?

Vijge, M.J. & Gupta, A.

This article analyzes the interaction of newly articulated climate governance goals with long-standing forest policies and practices in India. We focus on India's REDD+ (reducing emissions from deforestation and forest degradation and related forest activities) strategy, with a particular focus on the Green India Mission (GIM). The GIM calls for a doubling of the area for afforestation and reforestation in India in the next decade as a dominant climate mitigation strategy. We analyze how the GIM policy document frames carbon versus non-carbon benefits to be derived from forest-related activities; and how the GIM envisages division of authority (between national, regional and local levels) in its implementation. We are interested in assessing (a) whether the GIM promotes a "carbonization" of Indian forest governance, i.e. an increased focus on forest carbon at the expense of other ecosystem services; and (b) whether it promotes an increased centralization of forest governance in India through retaining or transferring authority and control over forest resources to national and state-level authorities, at the expense of local communities. We argue that the GIM frames the climate-forest interaction as an opportunity to synergistically enhance both carbon and non-carbon benefits to be derived from forests; while simultaneously promoting further decentralization of Indian forest governance. However, based on past experiences and developments to date, we conclude that without significant investments in community-based carbon and biodiversity monitoring, as well as institutionalized benefit-sharing mechanisms that reach down to the local level, the posited REDD+-induced move toward more holistic and decentralized Indian forest governance is unlikely to take place.

Simulating the impacts of reduced rainfall on carbon stocks and net ecosystem exchange in a tropical forest

Fischer, R., Armstrong, A., Shugart, H.H., Huth, A.

Forest models can be useful tools to improve our understanding of forest dynamics and to evaluate potential impacts of climate change. There is an ongoing debate how drought events influence the dynamics of tropical forests. In this study, we explored the role of changes in precipitation on tropical forests in Madagascar. Therefore, we derived a new parameterization of the process-based forest model FORMIND using local forest inventory measurements. This model was extended by a drought sensitivity module based on a water use efficiency concept. The objective of this study is to evaluate how different levels of water availability modify forest productivity, and net ecosystem exchange as a function of mean annual precipitation. Our simulation results indicate that a moderate precipitation decline (0%–30% of current precipitation conditions) has only minor impact on forest carbon stocks and exchange. A rainfall decline below 30% of current precipitation conditions would change forest structure considerably.

Local Participation in REDD+: Lessons from the Eastern Brazilian Amazon

Cromberg, M., Duchelle, A.E., Oliverira Rocha, I.d.

There are concerns that local people will not be genuinely involved in initiatives to Reduce Emissions from Deforestation and Forest Degradation (REDD+). We analyzed local participation in the design of one REDD+ project in the eastern Brazilian Amazon, and assessed local hopes, worries and recommendations for the project through four community focus groups and interviews with 137 households at the site. Our results showed that only one-third of households interviewed (31%) had enough information about the project to describe it accurately. Of those, the majority (60%) hoped that the project would improve their incomes, followed by improving their agricultural production (33%) and helping protect forests (26%). While increasing household incomes was the dominant hope, people's recommendations revealed that they favored non-monetary forms of compensation over the direct cash payments included in the proponents' package of incentives. Their main recommendation was that the project should help improve their production systems through access to technical assistance, machinery and training, while valuing local production systems (46%). Our study highlights the need for participation that goes beyond passive consultation with local people to develop REDD+ interventions that best reflect local knowledge, land use practices and aspirations.

Assessing and comparing risk to climate changes among forested locations: implications for ecosystem services

Matthews, S.N., Iverson, L.R., Peters, M.T., Prasad, A.M., Subburayalu, S.

Forests provide key ecosystem services (ES) and the extent to which the ES are realized varies spatially, with forest composition and cultural context, and in breadth, depending on the dominant tree species inhabiting an area. We address the question of how climate change may impact ES within the temperate and diverse forests

of the eastern United States. We quantify the vulnerability to changes in forest habitat by 2100, based on the overall pressures of community change from an aggregation of current and potential future habitats for 134 tree species at each of 149 US Department of Defense installations. To do so, we derive an index, Forest-Related Index of Climate Vulnerability, composed of several indicators of vulnerability for each site. Further, a risk matrix (likelihood x consequences) provides a visual cue to compare vulnerabilities among species (example from Pennsylvania) or among sites [example for Acer saccharum (sugar maple) in Vermont vs. Kentucky]. Potential changes in specific ES can then be qualitatively examined. For example in Pennsylvania, the loss of the provisioning services (wood products) of Prunus serotina (black cherry) and Fraxinus americana (white ash) habitat projected for the future will not likely be compensated for by concomitant increases in Juniperus virginiana (redcedar) and Pinus echinata (shortleaf pine) habitat. Taken together, this approach provides a conceptual framework that allows for consideration of how potential changes in tree species habitats, as impacted by climate change, can be combined to explore relative changes in important ES that forests provide.

Achieving mitigation and adaptation to climate change through sustainable agroforestry practices in Africa

Mbow, C., Smith, P., Skole, D., Duguma, L., Bustamante, M.

Current Opinion in Environmental Sustainability. 2014. Volume 6: 8-14

Agroforestry is one of the most conspicuous land use systems across landscapes and agroecological zones in Africa. With food shortages and increased threats of climate change, interest in agroforestry is gathering for its potential to address various on-farm adaptation needs, and fulfill many roles in AFOLU-related mitigation pathways. Agroforestry provides assets and income from carbon, wood energy, improved soil fertility and enhancement of local climate conditions; it provides ecosystem services and reduces human impacts on natural forests. Most of these benefits have direct benefits for local adaptation while contributing to global efforts to control atmospheric greenhouse gas concentrations. This paper presents recent findings on how agroforestry as a sustainable practice helps to achieve both mitigation and adaptation objectives while remaining relevant to the livelihoods of the poor smallholder farmers in Africa

Above ground biomass estimation in an African tropical forest with lidar and hyperspectral data

Laurin, G.V., Chen, Q., LIndsell, J.A., Coomes, D.A., Del Frate, F., Guerriero, L., Pirotti, F., Valentini, R.

ISPRS Journal of Pthogrammetry and Remote Sensing. Volume 89: 49-58

The estimation of above ground biomass in forests is critical for carbon cycle modeling and climate change mitigation programs. Small footprint lidar provides accurate biomass estimates, but its application in tropical forests has been limited, particularly in Africa. Hyperspectral data record canopy spectral information that is potentially related to forest biomass. To assess lidar ability to retrieve biomass in an African forest and the usefulness of including hyperspectral information, we modeled biomass using small footprint lidar metrics as well as airborne hyperspectral bands and derived vegetation indexes. Partial Least Square Regression (PLSR) was adopted to cope with multiple inputs and multicollinearity issues; the Variable of Importance in the Projection was calculated to evaluate importance of individual predictors for biomass. Our findings showed that the integration of hyperspectral bands ($R^2 = 0.70$) improved the model based on lidar alone ($R^2 = 0.64$), this encouraging result call for additional research to clarify the possible role of hyperspectral data in tropical regions. Replacing the hyperspectral bands with vegetation indexes resulted in a smaller improvement ($R^2 = 0.67$). Hyperspectral bands had limited predictive power ($R^2 = 0.36$) when used alone. This analysis proves the efficiency of using PLSR with small-footprint lidar and high resolution hyperspectral data in tropical forests for biomass estimation. Results also suggest that high quality ground truth data is crucial for lidar-based AGB estimates in tropical African forests, especially if airborne lidar is used as an intermediate step of upscaling field-measured AGB to a larger area.

The evolution of REDD+: An analysis of discursive-institutional dynamics

den Besten, J.W., Arts, B., Verkooijen, P.

Environmental Science and Policy. 2014. Volume 35: 40-48.

Reducing Emissions from Deforestation and Forest Degradation (REDD+1) is a policy that developed under the United Nations Framework Convention on Climate Change (UNFCCC) and is based on the idea that climate funds and carbon markets can be used to incentivise developing countries to reduce tropical deforestation. This paper analyses the development of REDD+ from 2004 to 2011 through Discursive Institutional Analysis (DIA). DIA seeks to analyse how new discourses become institutionalised in plans, regulations and guidelines, while including and excluding issues, (re)defining topics, and (re)shaping human interactions. The analysis of policy documents and 32 in depth interviews with actors involved in the climate negotiations illustrates how discursive and institutional dynamics influenced each other. Competing discourse coalitions struggled over the definition and scope of REDD+, the use of markets and funds, and the issue of social and environmental

safeguards. The rapid development of the REDD+ discourse has nonetheless culminated in new institutional arrangements. The working of a 'discursive-institutional spiral' is revealed where discourse coalitions respond to the inclusion and exclusion of ideas in institutions and practices. The institutional contexts at the same time shape the boundaries within which actors can bring in new ideas and concepts.

REDDuced: From sustainability to legality to units of carbon—The search for common interests in international forest governance

McDermott, C.L.
Environmental Science and Policy. 2014. Volume 35: 12-19

This paper examines the institutional history of international forest governance, from the emergence of global intergovernmental forestry forums, to non-state market-based certification schemes, to regional illegal logging initiatives, to Reducing Emissions from Deforestation and Degradation and forest enhancement (REDD+) under the UNFCCC. It observes how the early initiatives were criticised for their failure to achieve coordinated and widespread action on forest conservation due to a lack of economic incentives and conflict over environmental and social priorities. This failure has been proceeded by a narrowing of core focus across each successive institution—from sustainability to legality to units of carbon—thereby transforming forest conservation into an increasingly legible and tradable commodity. Indeed, a wide range of environmental, economic and social actors appear to share the goal of making forest management more globally legible. This narrowing of focus, however, has served to displace rather than resolve a large array of environmental and social conflicts. The issues have been displaced across both space and time, generating a growing plethora of institutions involved in defining REDD+ modalities and "safeguards", including various UN bodies and programmes, international development banks, private certification schemes and national and subnational governments. Meanwhile there is little evidence of whether, where and how these efforts might affect forest change. In fact, the largest impact of REDD+ may ultimately be the production of information to facilitate exchange among states, investors and other actors rather than achievement of shared global forest goals.

An assessment of the impacts of the REDD+ pilot project on community forests user groups (CFUGs) and their community forests in Nepal

Maraseni, T.N., Neupane, P.R., Lopez-Casero, F., Cadman, T.
Journal of Environmental Management. 2014. Volume 136: 37-46

REDD+ has the potential to reduce greenhouse gas emissions, meet climate stabilisation targets and protect biological diversity. Consequently, millions of dollars are being channelled into developing countries rich in forests, for pilot projects that will provide data for the design of REDD+ projects that are based on incentives and performance. This paper evaluates the impacts of REDD+ pilot projects on community forests and associated user groups (CFUGs) in Nepal. A field study targeted eight CFUGs that participated in a REDD+ pilot project funded by the Forest Carbon Trust Fund in Nepal. The pilot project increased the participation of *Dalit*, Indigenous people, women and the poor, and was able to provide some social safeguards. However, when all the additional costs and foregone benefits of the project are considered, REDD+ is not an attractive market-based option for Nepalese CFUGs. A better approach would be a bilateral or multilateral approach that is not market based, but provides incentives beyond environmental and social safeguards. The results of this study will be useful in designing REDD+ policies and programmes for community forest-based REDD+ stakeholders in developing countries.

Climate risk adaptation by smallholder farmers: the roles of trees and agroforestry

Lasco, R.D., Delfino, R.J.P., Catacutan, D.C., Simelton, E.S., Wilson, D.M.
Current Opinion in Environmental Sustainability. 2014. Volume 6: 83-88.

Smallholder farmers are vulnerable to environmental, climate and weather-related stress, including climate change. There is an increase in understanding of the benefits of agroforestry systems both at farm and landscape scales, and that incorporating trees on farms through agroforestry systems has emerged as having the potential to enhance the resilience of smallholders to current and future climate risks including future climate change. Drawing on global examples with a focus on African case studies, this paper demonstrates the versatile roles of trees and agroforestry in reducing smallholder's exposure to climate-related risks. It goes on to identify challenges in the promotion and adoption of agroforestry at the farm and landscape levels as a climate change adaptation strategy. The paper highlights areas for further research, policy and dissemination efforts, and identifies entry points for agroforestry adoption.

Is there more soil carbon under nitrogen-fixing trees than under non-nitrogen-fixing trees in mixed-species restoration plantings?

Hoogmoed, M., Cunningham, S.C., Baker, P.J., Beringer, J., Cavagnaro, T.R.

Agriculture, Ecosystems and Environment. 2014. Volume 188: 80-84

Afforestation of agricultural land provides an important opportunity to mitigate climate change by storing carbon (C) in both plant biomass and the soil. Here we present results of a study in which we sought to determine whether soil under nitrogen(N)-fixing trees contained more C than soil under non-N-fixing trees in mixed-species plantings, and thus if inclusion of N-fixers is beneficial in terms of increasing soil C sequestration. Soils were sampled directly beneath N-fixing and non-N-fixing tree species in riparian and upland mixed-species plantings in southeastern Australia. Soil C and N contents were assessed at both the landscape and individual planting scales. At the landscape scale, there were higher levels of soil C and N under N-fixing trees compared with non-N-fixing trees. At the individual planting scale, the patterns were less clear with both large increases and decreases occurring across the range of sites. The results presented here indicate that the inclusion of N-fixers may help to increase soil C, and N, but that the response may be site- and species-specific.

Carbon stocks and potential carbon storage in the mangrove forests of China

Liu, H., Ren, H., Hui, D., Wang, W., Liao, B., Cao, Q.

Journal of Environmental Management. 2014. Volume 133: 86-93.

Mangrove forests provide important ecosystem services, and play important roles in terrestrial and oceanic carbon (C) cycling. Although the C stocks or storage in terrestrial ecosystems in China have been frequently assessed, the C stocks in mangrove forests have often been overlooked. In this study, we estimated the C stocks and the potential C stocks in China's mangrove forests by combining our own field data with data from the National Mangrove Resource Inventory Report and from other published literature. The results indicate that mangrove forests in China store about 6.91 ± 0.57 Tg C, of which 81.74% is in the top 1 m soil, 18.12% in the biomass of mangrove trees, and 0.08% in the ground layer (i.e. mangrove litter and seedlings). The potential C stocks are as high as 28.81 ± 4.16 Tg C. On average, mangrove forests in China contain 355.25 ± 82.19 Mg C ha^{-1}, which is consistent with the global average of mangrove C density at similar latitudes, but higher than the average C density in terrestrial forests in China. Our results suggest that C storage in mangroves can be increased by selecting high C-density species for afforestation and stand improvement, and even more by increasing the mangrove area. The information gained in this study will facilitate policy decisions concerning the restoration of mangrove forests in China.

Mapping tropical forest carbon: Calibrating plot estimates to a simple LiDAR metric

Asner, G.P. & Mascaro, J.

Remote Sensing of Environment. 2014. Volume 140: 614-624.

Mapping aboveground carbon density (ACD) in tropical forests can enhance large-scale ecological studies and support CO2 emissions monitoring. Light Detection and Ranging (LiDAR) has proven useful for estimating carbon density patterns outside of field plot inventory networks. However, the accuracy and generality of calibrations between LiDAR-assisted ACD predictions (EACDLiDAR) and estimated ACD based on field inventory techniques (EACDfield) must be increased in order to make tropical forest carbon mapping more widely available. Using a network of 804 field inventory plots distributed across a wide range of tropical vegetation types, climates and successional states, we present a general conceptual and technical approach for linking tropical forest EACDfield to LiDAR top-of-canopy height (TCH) using regional-scale inputs of basal area and wood density. With this approach, we show that EACDLiDAR and EACDfield reach nearly 90% agreement at 1-ha resolution for a wide array of tropical vegetation types. We also show that Lorey's Height – a common metric used to calibrate LiDAR measurements to biomass – is severely flawed in open canopy forests that are common to the tropics. Our proposed approach can advance the use of airborne and space-based LiDAR measurements for estimation of tropical forest carbon stocks.

Urban and peri-urban agriculture and forestry: Transcending poverty alleviation to climate change mitigation and adaptation

Lwasa, S., Mugagga, F., Wahab, B., Simon, D., Connors, J., Griffith, C.

Urban Climate. 2014. Volume 7: 92-106.

A range of published and grey literature over the last three decades has underlined the importance of urban and peri-urban agriculture and forestry (UPAF) in cities of developing regions. The focus in the published

literature is on livelihoods, poverty reduction and ecosystems services at multiple city scales. Cities of developing regions, particularly in Africa, are searching for ways of addressing the unavoidable impacts of climate change and UPAF has demonstrated scalable adaptation and mitigation potential. However, evidence of UPAF's role in mitigating and adaptation to climate change is scattered in various reports and has not been synthesized for its potential role in developing urban adaptation strategies. Building on the earlier poverty reduction focus of UPAF research, this paper contributes to UPAF knowledge regarding mitigating and adapting to climate change in urban and peri-urban areas in East and West Africa. The paper reports a synthesis based on a systematic review of the available literature on these regions, and selected sources on other parts of sub-Saharan Africa. The paper also examines the extent to which literature conveys any evidence for UPAF playing a role in mediating the effects of climate/environmental change. Limited empirical verification was undertaken in Kampala and Ibadan, but this does not form the basis for systematic generalization. The key emerging areas of adaptation and mitigation include enhanced food security, productive greening, ecosystem services and innovative policy for urban resilience and transformation.

Integrating ecological restoration into CDM forestry projects

Ma, M., Haapanen, T., Singh, R.B., Hietala, R.
Environmental Science & Policy.2014. Volume 38: 143-153

The Clean Development Mechanism (CDM) is proposed to reduce greenhouse gas emissions and promote sustainable development. CDM forestry projects should contribute to mitigation of climate change through afforestation and reforestation (A/R) activities on degraded land in developing countries. However, like other types of CDM projects, the forestry projects have encountered a number of concerns and critiques. Appropriate approaches and concrete aims to achieve long-term sustainability have been lacking, and reforms have therefore been called for. The aims of this paper are to examine the published information relevant to these concerns, and frame appropriate approaches for a more sustainable CDM. In this review, as a first step to tackle some of these issues, ecological restoration is suggested for integration into the CDM framework. Essentially, this involves the restoration of ecosystem supporting service (soil restoration), upon which forests regenerate naturally rather than establishing monoculture plantations. In this way, forestry projects would bring cost-effective opportunities for multiple ecosystem services. Potential approaches, necessary additions to the monitoring plans, and social impacts of ecological restoration in CDM projects are discussed.

Dynamics of carbon and biodiversity under REDD+ regime: A case from Nepal

Pandey, S.S., Cockfield, G., Maraseni, T.N.
Environmental Science & Policy.2014. Volume 38: 272-281.

There are several pilot projects in developing countries for reducing emissions from deforestation and forest degradation, conserving forests, managing forests in a sustainable way and enhancing carbon stock in forests (REDD+). However, outcomes from these projects, which are crucial for making strategies and developing an appropriate incentive mechanism for REDD+ particularly in relation to impacts on biodiversity, are little researched. The overarching goal of this research is to assess carbon stock and species richness in pilot REDD+ projects in community forests. Forest inventories data for three consecutive years are analysed for projects in Nepal. This study found increases in carbon stocks in forests for all altitudes and canopy types. Forests with dense canopy cover have higher increments compared to sparse canopy. Similarly, forests of lower altitudes have higher carbon stock compared to higher altitudes. The increment is higher in the forests located in middle altitudes which had comparatively low carbon stocks. Regarding species richness, more species are recorded in initial years of the project than later. This indicates a possible reduction in species richness with increasing the carbon stock. There is a need for an incentive mechanism for maintaining species richness together with carbon stock and securing conservation and carbon benefits in REDD+ in community forestry.

How are REDD+ Proponents Addressing Tenure Problems? Evidence from Brazil, Cameroon, Tanzania, Indonesia, and Vietnam

Sunderlin, W.D.
World Development. 2014. Volume 55: 37-52.

This paper assesses proponent activities to address tenure insecurity in light of actions required for effective and equitable implementation of REDD+. Field research was carried out at 19 REDD+ project sites and 71 villages in Brazil, Cameroon, Tanzania, Indonesia, and Vietnam. Results show proponents addressed tenure insecurity by demarcating village and forest boundaries and identifying legal right holders, but were limited in their ability to resolve local tenure challenges that were national in origin and scope. Still needed are national tenure actions, integration of national and local tenure efforts, clarification of international and national REDD+ policies, and conflict resolution mechanisms.

V. PUBLICATIONS, REPORTS AND OTHER MEDIA

Social impacts of the Forest Stewardship Council certification. An assessment in the Congo Basin.

CIFOR

This Occasional Paper assessed the social performance of nine forest management units (FMU) certified by the Forest Stewardship Council (FSC) and compared it with the performance of nine similar noncertified FMUs in Cameroon, the Republic of the Congo and Gabon. Results showed that the longer one company remained in one place, the deeper social relations with the neighbouring population became. This in itself is conducive to an environment in which there is less conflict between the local population and logging companies. However, it is usually only after companies decided to pursue certification that several practical social improvements occurred. In particular, in certified FMUs, this study found better working and living conditions for workers and their families; more inclusive and better governed institutions for negotiations between the local population and logging companies, except with regard to conflict-resolution mechanisms; better managed and more effective benefit-sharing mechanisms; and innovative ways of dealing with problems related to infringement of customary uses. The complex historical and political-economic reality in which certification has developed in the Congo basin might well make issues of attribution and causality difficult to clarify. Yet results help establish a clear boundary that currently exists between certified and noncertified timber: The former is sourced in FMUs that implement not only legally mandated social standards but also voluntarily adopted ones that are superior and more effective. There should of course be no complacency from the FSC or logging companies with certified FMUs in comparing themselves with the 'bottom,' as the logic of the FSC is to reward more responsible forest managers who are assessed against ever-evolving standards, irrespective of the quality of national legislation. But one should also not forget that companies with certified FMUs in the study countries are competing less against a theoretical global logging company than against their neighbours, who daily produce the same species and sell on similar markets, albeit with much lower investments, especially those targeted to improve social performance. In this very competitive and uneven playing field, and with the scarce price premiums obtained so far, the evidence presented indicates that certification in the Congo basin has been able to push companies toward remarkable. **The publication**

Report on the workshop on technical and scientific aspects of ecosystems with high-carbon reservoirs not covered by other agenda items under the Convention

UNFCCC

This document contains the report on the Subsidiary Body for Scientific and Technological Advice workshop on technical and scientific aspects of ecosystems with high-carbon reservoirs not covered by other agenda items under the Convention, held on 24-25 October 2013 in Bonn, Germany. The report summarizes the information provided by scientific experts and representatives of Parties, the Intergovernmental Panel on Climate Change and international and regional research programmes and organizations on the technical and scientific aspects of ecosystems with high-carbon reservoirs, such as coastal marine ecosystems, in the context of wider mitigation and adaptation efforts. It also provides a summary of the main technical and scientific elements arising from the workshop. **The publication**

IPCC Working Group reports

The IPCC working group reports I, II and III are now available online. Click **here** for further information.

The two latest available working group reports are as below:

II Assessment Report 5. Summary for Policymakers. "Climate Change 2014: Impacts, Adaptation and Vulnerability"

IPCC

The Summary for Policymakers of the Working Group II contribution to the Fifth Assessment Report was approved, and the full report accepted, by the IPCC on 30 March 2014. **The publication**

IPCC Working Group III Assessment Report 5. Summary for Policymakers. "Climate Change 2014: Mitigation of Climate Change"

IPCC

The Working Group III contribution assesses the options for mitigating climate change and their underlying technological, economic and institutional requirements. It transparently lays out risks, uncertainty and ethical foundations of climate change mitigation policies on the global, national and sub-national level, investigates

mitigation measures for all major sectors and assesses investment and finance issues. The publication

SEA Change / UKCIP webinar "Special webinar on the new SEA Change / UKCIP climate change adaptation M&E guidance notes + Q&A"

SEA Change and UKCIP

A webinar titled "Special webinar on the new SEA Change / UKCIP climate change adaptation M&E guidance notes + Q&A" took place on Tuesday March 25 2014, 9:00 AM UTC, 4:00 PM Indo-China Time (ICT = UTC+7). Despite some technical difficulties we had an audience of 60+ professionals who stayed with us to the end and also had a lively discussion during the Q&A. The recording has been put online together with links to a selection of relevant reading materials that were discussed, and these can be accessed through the following link: http://www.seachangecop.org/node/3180

Building n

atural capital: HOW REDD+ CAN SUPPORT A GREEN ECONOMY

UNEP

REDD+ is the approach adopted by the United Nations Framework Convention on Climate Change (UNFCCC) to reduce greenhouse gas emissions from forests. REDD+ stands for reducing emissions from deforestation and forest degradation in developing countries, plus conservation, sustainable management of forests and enhancement of forest carbon stocks (UNFCCC, 2010). If systematically pursued, REDD+ would bring new momentum and new funding to the task of preserving the world's forests. REDD+ is already delivering important outcomes as it brings further world attention to the conservation of tropical forests, monitoring the state of forests, and the contributions of people living in and around forests. A Green Economy is defined by UNEP as "an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities." The primary conclusion of this report is that many synergies between REDD+ and the ongoing transition to a Green Economy are currently under-utilized. Realizing these synergies will accelerate the transition while maximizing the return on REDD+ investments. REDD+ can be an important support element for achieving a Green Economy. On the other hand, REDD+ is likely to be successful only if it is supported by an enabling environment that includes Green Economy elements such as good governance, law enforcement, land tenure reform, sustainable supporting financial mechanisms, equitable distribution of benefits, and valuations and recognition of natural capital. This report provides a concise summary of the elements necessary for integrating REDD+ into a Green Economy. It provides policymakers with innovative ideas for supporting economic development while maintaining or increasing forest cover. Those promoting a Green Economy can see how REDD+ can add important momentum to their efforts, especially complimenting pro-poor strategies. Business leaders will learn how REDD+ and the Green Economy can improve investment conditions, leverage their investments, and ultimately increase long-term returns on investments. Students and the general public will increase their understanding of why REDD+ and the Green Economy together provide a pathway to sustainable development that benefits all countries. The publication

Linking FLEGT and REDD+ to improve forest governance

European Tropical Forest Research Network and TROPENBOS

Section 1 of this publication introduces the two main international forest initiatives, FLEGT and REDD+. Section 2 describes interactions between various initiatives in a general way. Section 3 deals with governance, law and institutions. It includes articles on safeguards, land tenure and civil society participation, among other topics. Section 4 describes the existing and potential implications of international forest initiatives for communities and smallholders, and section 5 provides two perspectives on the potential linkages between Timber Legality Assurance System (TLAS) and Measurement, Reporting and Verification (MRV). The publication also includes an article on risk reduction measures for REDD+ investments in which FLEGT could play a role. section 6 discusses several other types of interactions: the potential value of the FLEGT approach for other commodities, experiences with forest funds that may be useful for new REDD+ initiatives and the importance of fuelwood in both REDD+ and FLEGT discussions. The publication

Making REDD+ work for communities and forests: three shared lessons for project designers
IIED

REDD+ stands for reducing emissions from deforestation and forest degradation and is a global initiative that uses money from public sources, carbon market finance and the private sector to offer developing countries financial incentives to reduce emissions from forested lands and invest in low-carbon pathways to sustainable

development, so reducing the world's overall greenhouse gas emissions. If REDD+ succeeds, it could help protect the world's forests as 'carbon reservoirs' to slow down and mitigate climate change impacts. But REDD+ is far more complex than just forest conservation with automatic payments for storing carbon bolted on. It brings a business-like focus to forest conservation. This issue of Gatekeeper shares our practical experience of how the Mpingo Conservation and Development Initiative (MCDI) has confronted the challenges of designing a REDD+ project in southeastern Tanzania. **The Publication**

Community Forestry and REDD+ in Asia: Lessons Learned and Ways Forward. Issues Brief

USAID and Forests Carbon, Markets and Communities.

Given concerns about deforestation and hopes that efforts to better manage forests can contribute to

climate change mitigation, what can we learn from experience with community forestry? With considerable effort now being devoted to Reducing Emissions from Deforestation and forest Degradation (REDD+)1, it is timely to assess key lessons from decades of community forestry. REDD+ proponents do not need to "start

from zero," and "reinvent the wheel," but can build on valuable experience and existing systems. The Forest Carbon, Markets and Communities (FCMC) Program commissioned a series of four reports – three regional and one global synthesis – on Lessons Learned from Community Forestry and their Relevance for REDD+. This Issues Brief summarizes key points from the report on Asia. **The publication**

V.I JOBS

Technical Assistance for Support to Mechanism for Monitoring Turkey's Greenhouse Gas Emissions

ÖBf Consulting

ÖBf Consulting is looking for highly motivated and experienced candidates for a the EuropeAid project "Technical Assistance for Support to Mechanism for Monitoring Turkey's Greenhouse Gas Emissions". The positions to be covered are: (i) Team Leader/Climate Change Expert, (ii) Senior Legal Expert, (iii) Senior Expert on GHG Inventory Work and (iv) senior expert on national communications. For further information and professional qualification requirements, see the full text. **Full text**

VII. ANNOUNCEMENTS

Global Forest Watch

WRI

A dynamic online forest monitoring and alert system that empowers people everywhere to better manage forests. The mapping application unites satellite technology, open data, and crowdsourcing to guarantee access to timely and reliable information about forests. **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.

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