Aggarwal, Safia, FAO

Using international Voluntary Guidelines to strengthen governance of forest tenure

Authors: Sofia Aggarwal, FAO

In 2012, the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT) were endorsed by the Committee on World Food Security. Based on a highly inclusive process of consultations conducted over a period of three years, and involving representation from governments, civil society, private sector, academia and UN agencies from around the world -- the VGGT provide principles and internationally accepted standards for the responsible governance of tenure. Since their endorsement, FAO and partners have been holding awareness raising workshops and trainings that are opening up neutral spaces for discussion on customary rights recognition, protection of rights, support for enjoyment of rights, and strengthening procedural rights of citizens in decision making over forest management. Several countries have since then requested assistance from FAO to help align their forest tenure governance in line with the VGGT. FAO developed a VGGT based framework to assess forest tenure in countries. On request, the assessment was conducted in China, Mongolia, Uganda, and Vietnam. The methodology entails: i) a desk review of selected forest tenure systems; ii) a national multi-stakeholder workshop to obtain inputs and perspectives on the initial findings; iii) Key informant interviews to fill gaps; and iv) a second national multi-stakeholder workshop to validate findings. The methodology was expected to build a common vision for addressing forest tenure concerns in country. This paper will present the experiences and outcomes of the country level assessments. The paper will highlight areas where the tenure systems align with the VGGT principles, and where they diverge. The paper will conclude with an assessment of whether and how the assessments are creating multi-stakeholder consensus and ownership over the findings, and enhancing work on strengthening forest tenure governance in these countries with a common vision.

Ahammad, Ronju, Research Institute for the Environment and Livelihoods, Charles Darwin University

Understanding interactions of forest cover changes and rural livelihoods in a degraded landscape of Bangladesh Forest cover changes have diverse outcomes in the livelihoods of rural people

Authors: Ronju Ahammad - Research Institute for the Environment and Livelihoods, Charles Darwin University; Terry Sunderland - Center for International Forestry Research; Natasha Stacey - Research Institute for the Environment and Livelihoods, Charles Darwin University

Like many tropical forested landscapes in developing and least developed countries, the upland landscape in Chittagong Hill Tracts region of Bangladesh has experienced forest cover changes over the years. However, there is limited evidence on how the changes in forest
resources have affected rural livelihoods. The study analysed forest cover changes and associated impacts on rural livelihoods.

Data from both satellite image and community discussions were analysed to understand the historical process of forest cover change in three zones of the landscape. A structured interview was carried with 304 household respondents to understand local perceptions on the changes in forest cover and associated livelihood benefits. Findings based on satellite image analysis showed a dynamic pattern of forest gain and loss over the period in the landscape. But, a severe forest loss was perceived at almost 90 percent households. Compared to small forest gain, high forest loss was perceived at the households living close to the natural forest in remote zone. There was found a loss of the availability in forest products (ie. fuel wood, construction raw materials, wild foods and fresh water), increased travel time and distance required to gather the products at the household level. Farming area relatively increased in the remote zone associated with land/forest clearing activities, yet food sufficiency and annual income remain low here. While farming areas decreased in intermediate and on-road zones but increased monoculture fruit garden and woodlot, intensive cash crops and wage activities contributed to greater food production and income.

In the study combined information from satellite images and local community experiences has been proved effective in minimising the knowledge gaps on actual changes of forest areas. Overall the forest cover changes have both positive and negative social-ecological outcomes. Against a severe forest loss perceived by the local people, there was also observed an increase of tree covers with diverse consequences on the livelihoods. So, future policy should find the strategies to enhance synergies between forest management and livelihood benefits by integrating values of the local communities on their forests.

Amadu, Festus, University of Illinois at Urbana-Champaign

Agroforestry adoption: A pathway to food and livelihood security in the context of climate smart agriculture in southern Malawi

Authors: Festus O. Amadu - Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign; Daniel C. Miller - Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign; Paul E. McNamara - Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign

Tree planting and management comprises a key strategy in many “climate smart” agriculture and rural development programs across the developing world. Agroforestry has been promoted by development agencies and governments as a means to help rural landowners cope with the effects of climate change on their livelihoods while sequestering carbon and delivering other environmental benefits. As such, agroforestry is seen as an important means to advance several of the Sustainable Development Goals, including on hunger (SDG 2) and climate adaptation (SDG 13). However, empirical evidence on the adoption and livelihood impacts of externally supported agroforestry practices remains scant, particularly in Sub-
Saharan Africa. Here we analyze the adoption of agroforestry practices under a large USAID-funded project, WALA (Wellness and Agriculture for Life Advancement), implemented in southern Malawi from 2009 to 2014 and assess their impact on food security. We surveyed 808 households across 5 districts using an ex-post quasi-experimental research design. We use endogenous switching probit regression to analyze the probability of agroforestry adoption resulting from the project, and propensity score matching to determine food security impacts by selecting our counterfactual based on observable characteristics among participants and non-participants. We estimated the project’s average treatment effect based on nearest neighbor and kernel matching algorithms. We find that participation in WALA significantly contributes to the propensity of agroforestry adoption by about 34%. Agroforestry adoption had important livelihood impacts: First, households practicing agroforestry saw increased maize and total crop yields per acre by about 2.5 and 3 bags (per 50kg bag) respectively. Moreover, per capita food consumption expenditure for agroforestry households was about MK35,000 (~50 USD) compared to control households. This consumption expenditure exceeds the average food expenditure of MK17,797 for southern Malawi, as recorded in Malawi’s IHS3 (Third Integrated Household Survey) report. Our findings suggest that external support can help spur agroforestry adoption and that agroforestry can provide an important pathway to achieving several SDGs (not least on hunger and climate adaptation). Finally, our study also contributes methodologically to the literature on forest livelihoods through use of new analytical approaches to estimate the adoption and impacts of agroforestry in southern Malawi.

Andersson, Krister, University of Colorado, Boulder

Women Leaders Achieve More Equal Benefits for Forest Users in Simulated PES Programs

Authors: Krister Andersson - University of Colorado, Boulder; Tara Grillos - Purdue University; Nathan J. Cook - University of Colorado at Boulder

Sustainable and equitable management of the forest commons depends on the ability of community members to coordinate their efforts. The presence of an effective leader is one known factor that can help them achieve this. The role of leaders in communities that participate in programs of Payments for Ecosystem Services (PES) is less well-known. Here, we study how leaders affect the distribution of benefits across user members who share a common forest and participate in a PES program. In cooperation with CIFOR, we visited more than 30 forest user group in Tanzania, Indonesia and Peru. We invited resource users to play a common-pool resource game with members of their own community to simulate, as much as possible, real-life decision-making within a forest commons, in the presence of an external PES program. We randomly assigned a treatment to group of users who then elected a leader with the power to decide the distribution of the payments across group members. In addition, and in all groups, two independent researchers observed and coded the extent to which leaders emerged and took initiative to coordinate decisions during each round of the game. Preliminary findings indicate that elected leaders distribute benefits unevenly across group members – but not in groups that are majority female. Our ongoing research will further
examine the characteristics of leaders both formally elected and informally revealed and how those characteristics are linked to both conservation and equity. The emergence of a leader can encourage cooperation and coordination, but not always in ways that lead to socially optimal equilibria or equitable distribution of resources. Little is known about how particular characteristics of the leader affect both resource outcomes and distribution of benefits. In the implementation of conservation programs, a greater understanding of the characteristics that are associated with effective leadership may have significant implications for both environmental and social outcomes.

Andersson, Linda, Agroforestry Network / Vi-skogen

Agroforestry Network – evidence based research meeting practitioners for policy dialogue.

Authors: Linda Andersson, Vi-skogen, founder of the Agroforestry Network with the partners: Siani, Focali, Stockholm Resilience Centre/SwedBio, Agroforestry Sverige, SLU Global

Agroforestry Network is a Swedish network for international agroforestry practise, which brings together agroforestry experts, researchers and practitioners from different organisations and institutions. The Swedish NGO Vi-skogen founded Agroforestry Network to make agroforestry more known among development cooperation stakeholders and to share knowledge with other agroforestry experts, Today, the partners are Siani, Focali, Stockholm Resilience centre, Agroforestry Sverige and SLU Global.

The network is a collaboration that in different ways is linked to an international arena and have the opportunity to influence the public opinion in Sweden. Agroforestry Network aims to influence the direction of Swedish aid. More money for agroforestry and sustainable agriculture is well invested money. The natural resources sector needs to be prioritized and the focus of the development cooperation should be to support the people living in poverty in rural areas. The purpose of Agroforestry Network is to be an arena for this, to communicate what the network partners do, and the results of our operations. We build on the knowledge and experience of the partners – together we gain a greater weight to influence.

Our network includes an academic component and a communicative part. It involves summits and knowledge gathering with the purpose of communicating agroforestry, to position its partners. We release reports, policy briefs and articles together. The focus is on sustainable agriculture and agroforestry.

Recently, the Agroforestry Network launched the database for scientific publications on agroforestry and the work of our partners. The platform also present key experts on agroforestry from our partners. www.agroforestrynetwork.org

The FLARE Annual Meeting, with one of its themes linking practice and research, fits the Agroforestry Networks’ ambition perfectly. The network would through its participation hope
to create new links between these sectors and discuss potential areas of collaboration in the area of sustainable agriculture and agroforestry.

**Animon, Illias,** FAO

*Harnessing opportunities in the context of SDGs to capitalize cultural services from landscapes for supporting rural livelihoods*

Authors: Animon Illias – FAO; Rajesh Bista - The University of North Carolina at Chapel Hill; Dr. Dharam Raj Uprety, HELVETAS Swiss Intercooperation, Nepal; Shanti Shrestha - The University of Georgia, Nepal

The SDG target 8.9 aims at devising and implementing policies to promote sustainable tourism for creating jobs and promoting local culture and products. Even though the UN General Assembly adopted a Resolution in 2010 to promote ecotourism for poverty eradication and environmental protection, several challenges remain in harnessing its potential in many rural forest and farm landscapes. These issues invite special attention in the International Year of sustainable tourism for development (2017).

Based on policy analysis and literature review, this paper explains how to strengthen the inter-sectoral linkages between forest, agriculture and tourism sectors and gain synergies in advancing the SDGs, particularly SDG target 8.9, for benefitting sustainable landscapes and livelihoods. The global relevance of such linkages, the bottlenecks in achieving the results we want, and strategies for addressing key issues are explained in the paper, drawing from the field experiences from India, Bangladesh and Trinidad and Tobago. Issues related to fostering linkages between ecotourism and agritourism to enhance the socioeconomic benefits from the landscapes are also explained. Even though discussed widely, the knowledge on the demand and supply of landscape’s cultural ecosystem services (e.g. recreation) remain uncertain in many countries owing to the absence of assessing systematically such benefits in monetary terms. The indicators for SDG target 8.9 does not disaggregate data for different landscape elements. This data gap has policy implications in diversifying household income and developing sustainable financial systems based on forest-based ecotourism-related activities. However, forests are increasingly designated for such benefits in many countries and several case studies indicate the growing relevance of capitalizing on these benefits for inclusive and sustainable economic growth in several rural areas. Identifying, recognizing and enhancing the role of landscape’s recreational services to benefit the landscapes and livelihoods should be an integral part of the poverty reduction and landscape management strategies for which the observations in this paper will be highly useful.

**Arounsavath, Frida,** Swedwatch

*Transnational corporations and indigenous rights to forests and land - case studies from Borneo and Bangladesh*
Authors: Frida Arounsavath – Swedwatch; Esther Turnhout - Forest and Nature Policy Conservation Group of the Wageningen School of Social Sciences, Wageningen University; Jakob König - Fair Finance Guide Sweden

Swedwatch’s interview surveys with indigenous communities in Borneo Island and in Chittagong Hilltracts (CHT), Bangladesh, illustrate the impacts of land-based projects and contract farming on their forests, livelihoods and cultures. Drawing on results of interviews with involved companies and investors, Swedwatch concludes that respect for human rights conventions – especially communal rights to land and forests – must remain at the centre of private sector contributions to the SDGs relating to poverty (SDG 1), food security (SDG 2) and reduced inequalities (SDG 10). The main finding from Swedwatch’s semi-structured, open-ended interview surveys with the indigenous communities, companies and invested banks, were that the indigenous communities had been denied their right to be consulted through a so-called Free, Prior and Informed Consent (FPIC) process. Although the projects had dispossessed communities of their access to forests and land, and impacted on their health, wellbeing and cultures, no company had ensured remedy and compensation, or attempted to reactively establish an FPIC process and carry out High Conservation Values (HCV) assessments with the communities. As a point of reference for determining companies’ and investors’ responsibilities and required actions in line with the UN Guiding Principles for Business and Human Rights (UNGPs), Swedwatch integrated so-called Human Rights Due Diligence (HRDD) with relevant conventions and good practice criteria for different stages of the project cycle. Swedwatch’s research illustrates that by including minimum requirements as well as good practice standards, such HRDD analyses can be used to encourage companies to become front runners, and investors to develop company expectations, which stimulate a “race to the top”. The key conclusion from the research is that proactive and on-going HRDD, transparent reporting and remedy and compensation are absolute requirements for a positive role of companies and investors in inclusive sustainable development models.

Matuk, Fernanda Ayaviri, Forest and Nature Policy Conservation Group of the Wageningen School of Social Sciences, Wageningen University

*Incorporating local knowledge, practices and worldviews into integrated land use planning when implementing REDD+ on the ground: the case of Kaxinawá Indigenous Land (Acre –Brazil)*

Authors: Fernanda Ayaviri Matuk - Forest and Nature Policy Conservation Group of the Wageningen School of Social Sciences, Wageningen University; Jelle Begahel - Forest and Nature Policy Conservation Group of the Wageningen School of Social Sciences, Wageningen University; Esther Turnhout - Forest and Nature Policy Conservation Group of the Wageningen School of Social Sciences, Wageningen University

The REDD+ program, in addition to pursuing reduction of carbon emissions, seeks to generate socioecological co-benefits that contribute to local ecological sustainability and poverty alleviation in developing countries. Therefore, REDD+ initiatives focus on local and indigenous communities who depend on forests’ livelihoods and directly manage ecosystem
services (ES). Nonetheless, REDD+ initiatives across the globe struggle to have genuine local participation of indigenous “non-Western” societies, as the idea of REDD+ is based on Western knowledge, practices, and worldviews. This study aims to understand the various challenges that planners and communities face to implement REDD+ on the ground, while considering both global and local needs and perspectives. We conducted interviews, workshops (including different participatory methods) and participant observation, and selected as case study Nova Olinda Kaxinawá Indigenous Land (Feijó, Acre - Brazilian Amazon). This area is part of the REDD+ Acre initiative called “the System of Incentives for Environmental Services” (SISA), and had this policy applied through an ethnoecological land use planning approach. This approach builds on understanding of indigenous knowledge, practices and worldviews as holistic (k-p-w) and as closely associated to land (soil, water, forest) use, to hence co-produce context-based land use and soil management that reduces deforestation, increases soil quality (e.g. with agroforestry), and addresses local demands for ES. We found that SISA achievements were conditioned by indigenous participation in policy elaboration, which redefined the REDD+ project into a program that includes indigenous in its council, finances capacity building and action of local agroforestry agents, and projects that enhance shared-benefits (knowledge/identity rescue, communitarian seeds' bank). SISA's success with indigenous groups in Acre also reflects their pre-existing striking political agency compared to other targeted groups (e.g., small-scale farmers). As such, adoption of ethnoecological approach by SISA planners was shown to empower the local community. Nonetheless, SISA still struggles to be embraced by all community members and there is uncertainty about the continuity of donors’ investment. We conclude that effective use of participatory methods, from policy design to its implementation, is crucial to horizontally inter-relate holistic indigenous land use related k-p-w to Western approaches used by REDD+ and tackle local needs.

Bailis, Rob, Stockholm Environment Institute, US Center

Forest Energy and Sustainability in the Global South

Authors: Rob Bailis - Stockholm Environment Institute, US Center; Maria João Ferreira dos Santos – UNC; Pam Jagger – UNC; Hisham Zerriffi – UBC; Devyani Singh – UBC; Adrian Ghilardi – UNAM, Montserrat Serrano, UNAM Forest Energy and Sustainability in the Global South

Roughly one third of the world’s population relies on wood for their basic energy needs, concentrated in the Global South. This contributes to numerous social and environmental impacts. Small-scale cooking fires used throughout the developing world are smoky and inefficient. Exposure to smoke is a leading contributor to the global burden of disease, collecting sufficient wood to meet the needs of the household requires a lot of effort, and placed large demands on household labor, and, unsustainable wood harvesting can degrade landscapes, contributing to local and global environmental change. Energy transitions are underway in many regions, supported by national policies as well as major international efforts like “Sustainable Energy for All” (SE4All) and the SDGs. However, in some countries,
transitions will be slow and partial, and in others, transitions are unlikely to occur at all. Indeed, the number of people relying on woodfuels and the overall quantity consumed are both expected to grow, rather than decline, in the foreseeable future, which raises concerns about sustainability of energy supply for billions of people. The challenges posed by wood energy are not new and interventions have been implemented for decades; however, few have been successful and problems persist. Over the years, the world’s attention has waxed and waned, but the past decade has seen a remarkable increase in interest, spurred by efforts like SE4All, SDGs, and others. Unprecedented levels of funding have been mobilized and research efforts commissioned, giving rise to a range of new approaches that aim to better characterize and implement solutions. For example, newly available low-cost sensors enable more accurate monitoring of people and activities, while advances in remote sensing and GIScience allow sophisticated assessment of impacts on land use and land cover. In parallel with these technical developments, new governance mechanisms are under consideration, which may help reduce woodfuel’s social and environmental impacts. This panel presents examples of recent methodological developments in wood energy analysis and explores newly introduced policy instruments that attempt to better understand woodfuel sustainability and analyze the likely effects of transitions that are underway.

**Balestri, Sara**, CSCC (Cognitive Science and Communication Research Centre), DISEIS (Department of International Economics, Institutions and Development), Università Cattolica del Sacro Cuore, Italy

*This land is my land! Large-Scale Land Acquisitions and conflict events in Sub-Saharan Africa*

Authors: Sara Balestri and Mario A. Maggioni, CSCC (Cognitive Science and Communication Research Centre), DISEIS (Department of International Economics, Institutions and Development), Università Cattolica del Sacro Cuore, Italy

Through a spatially disaggregated approach to account for local characteristics and a quasi-experimental research design to overcome limitations due to missing georeferentiated information about land deals, we provide sound evidence that large-scale land acquisitions raise the likelihood of experiencing outbursts of organized violence, especially when oriented against civilians. The most striking result is that domestic acquisitions are particularly significant in explaining organized violence outbreak, suggesting that national concentration of power among elites matters for social stability. Extractive resources are found significant predictors of organized violence, confirming their role in the political economy of conflict events. Finally, results show the existence of significant spatio-temporal dependence path, since events of organized violence tend to be recurrent and to persist in space, feeding “neighbouring” effects of proximity and local patterns of violence concentration.

**Barnes, Clare**, London School of Economics and Political Science

*Achieving the SDGs through scaling-out community forestry interventions? Analysing the role of civil society organisations*

Authors: Clare Barnes - London School of Economics and Political Science
In order to achieve various SDGs (such as on poverty, hunger, gender, climate action, life on land) through improving forest-related livelihoods it is often argued that interventions by civil society organisations (CSOs) at community level will play a central role. However, there is a mismatch in scale between the isolated success cases of interventions at community level – in which forest conditions and/or livelihoods improve - and the wider changes required to achieve the SDGs. Studies of such interventions often focus on individual communities, whilst CSOs themselves often attempt to scale out the impact of their interventions beyond the initial community. The approaches CSOs take to scaling-out the impacts of interventions in community forestry has received little scholarly attention. Understanding the scaling-out dynamics is essential for analysing the role of CSOs in achieving the SDGs in a forest context. This paper contributes to filling this gap through employing two analytical steps. Firstly, drawing from critical institutionalism and international development literature, a typology of CSO scaling-out approaches applied to community forestry contexts was created. The typology differentiates between scaling-out mechanisms according to the varying degrees of agency of the CSO, target community and neighbouring communities, the form taken and the processes through which approaches are altered to fit local conditions in neighbouring communities. Secondly, interviews were conducted with CSOs attempting to scale-out interventions in community forestry in the tribal-belt of central India. Our initial results indicate that CSOs rely initially on a spontaneous replication scaling-out mechanism whereby target and neighbouring communities discuss forest institutions, leading to CSO dependent spread in which neighbouring communities approach the CSO for support. We contribute to the critical institutionalism literature through exploring the role of the CSO as a meso-level institutional bricoleur influencing community forest institutions beyond the initial target community. Our typology of scaling-out mechanisms could be used to research CSO scaling-out processes in other forest and community contexts. Our initial results suggest that CSOs remain integral to the scaling-out approach, raising wider questions regarding the feasibility and desirability of relying on CSO interventions for achieving the SDGs in a forest context.

Baynes, Jack, University of the Sunshine Coast

Applying Ethics to Forest and Landscape Restoration

Authors: Jack Baynes1, John Herbohn2, Nestor Gregorio2 and William Unsworth3

1 - University of the Sunshine Coast
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Ethics are central to forest and landscape restoration (FLR) research in developing countries. As part of pre-project planning for a new phase of research projects in Asia and the Pacific, we reviewed how we had previously applied ethical principles to FLR. We also reviewed the ethics of our business relationships with in-country partner organisations. Although we had adequately addressed Australian and partner-country principles of ethical conduct such as risks, benefits, confidentiality and consent, we found that reflecting on the ethics of our
research methodology provided further insight. These insights centred on the limited social autonomy of some communities, individuals (particularly women) and even our staff. This limitation arose because of their subordinate social position in families or groups. Using vignettes from our own research, we conclude that the ethics of relationships between donor organisations and in-country partners are best managed as business arrangements. The ethics of relationships between projects and client groups are more complex because project activities may advantage one societal group over others. Pre-project assessment of the economic and social impact of proposed activities on disadvantaged groups is a prerequisite. Our findings suggest that extended planning and preparation activities with stakeholders to lift their social autonomy will improve the quality of FLR research and development outcomes.

**Bayrak, Mucahid**, Mustafa Utrecht University

*Rethinking socio-ecological systems and external development interventions: REDD+ and local communities in Vietnam*

Authors: Mucahid Mustafa Bayrak - Mustafa Utrecht University

Global investment in forest ecosystems in order to combat global climate change has led to the establishment of the Reducing Emissions from Deforestation and Forest Degradation programme (REDD+), a multilateral development intervention. This is needed as not only does deforestation contribute to one-fifth of global CO2 emissions, but (tropical) forest are also increasingly more vulnerable to the negative effects of global climate change. How an external development intervention interacts with local ecosystems and communities, on the other hand, remains under-researched. The purpose of this study is to re-conceptualize theories on resilience, traditional ecological knowledge and socio-ecological systems (SES) in order to unravel the key factors and drivers of the success or failure of REDD+ among local communities in Vietnam’s Central Highlands. My study proposes an applied SES framework which is used to analyse the dynamics of REDD+ implementation in two communes in Vietnam – the former involved in an UN-REDD programme and the latter involved in a project of Fauna & Flora International (FFI). The overarching question of this study is whether within the context of an external development intervention and climate change, relevant local actors are able to move into the ‘right’ direction to achieve inclusive livelihood development while managing their forest commons and carbon sinks in a sustainable manner.

**Benneker, Charlotte**, Bolivian Forest and Land Authority (ABT), DANIDA

*Between regulators and the regulated; negotiating forest law implementation in Bolivia.*

Authors: Charlotte Benneker - Bolivian Forest and Land Authority (ABT), DANIDA

The degree of local embeddedness of forests policies and regulations determine the effectiveness of their implementation. Policies and regulations that are considered socially unjust and do not consider the capacities of forest users are difficult to enforce and enhance
illegal logging.

In Bolivia, over the last 20 years, large tracts of forests have been privatized and are now owned by communities holding exclusive user rights over forest products. The forest authority, implementing the forest law, has continued to apply large scale commercial forest management regulations irrespective of the characteristics, aspirations or capacities of the (new) forest owners. This posture has resulted in recurrent conflicts between the authority and forest users and in claims to renegotiate the application of the regulations.

Through the analysis of ten local arrangements between the forest authority and forest users, 30 fining procedures of forest owners and numerous in-depth interviews, this study shows how local forest officers have adapted and reinterpreted regulations on timber exploitation over time without formal adaptations of the law. The results demonstrate that: (1) forest management regulations oblivious of on the ground practices are unimplementable and prone to renegotiation, (2) local ad-hoc adaptations are unlikely to favor the economic interest of forest owners affecting the importance of the forest to local livelihoods, and (3) local forest officers without sufficient institutional back-up site with forest users to maintain workable conditions.

Whereas scholars have paid a lot of attention to the analysis of forest policies and laws, this study draws attention to the constant negotiations between the forest Authority and forest users in the process of policy implementation. Spatial variation in outcomes in the Bolivian case depends partially on the political embeddedness of forest users and the capacity of forest officers to juggle between keeping to the rule of law and avoiding social unrest.

Bennett-Curry, Aoife, Oxford University, CIFOR-Peru

New Oil Palm Company-Community Partnerships in the Peruvian Amazon: deforestation consequences of the privatization of rural development

Authors: Aoife Bennett - Oxford University, CIFOR-Peru; Ashwin Ravikumar - Keller Field Museum, Homero Paltán - Environmental Change Institute, Oxford University

The phenomenon of globalized agricultural commodities, where consumer demand in one region influences the crops planted in another, can lead to widespread environmental and social transformation at sites of production. As a commodity crop that prospers in tropical environments, oil palm has become controversial. Its expansion has emerged as a key driver of deforestation, especially Southeast Asia where available land for palm is becoming limited. Increasing global demand for palm oil is opening new frontiers of expansion, such as Latin America. The crop has become a dominant strategy for agricultural development in the Peruvian Amazon, through both government supported smallholder projects and private plantations. Between 2000-2015, 40,000 hectares of old growth forest have been cleared for large oil palm plantations in Peru, facilitated by tax exemption laws that attract private oil palm investors to the Amazon. Our research shows that the recent arrival of such large, powerful foreign companies in the rural Amazon forest-farm frontier has caused a major
socio-ecological shift on the ground, particularly through a new mode of palm production in the region: the Company Community Partnership (CCP).

Using a mixed methods data collection approach including four years of ethnographic work and remote sensing using visual measurement of land use change on 2,447 hectares of smallholder land in four communities, this paper presents results of the socio-ecological impact of the first oil palm CCP in Ucayali, Peru. The CCP, involves a private company and rural communities ‘partnering’ to share land, capital, management and market opportunities under a contractual agreement. Additionally, the company is undertaking ‘public’ works such as infrastructure development in rural Amazonia. It is already known that the company monoculture has deforested more than 9000 hectares for its plantation, and, we have quantified substantial additional deforestation ‘spillage’ out of the plantation into the surrounding communities through the CCP and power relations related to the privatization of rural development. The presentation will contextualize this new mode of palm production and indeed deforestation in the Peruvian governance system, and suggests socio-ecological safeguarding mechanisms for this type of production into the future through the inclusion of external stakeholders.

Blackman, Allen, Inter-American Development Bank

*Does Titling Indigenous Communities Conserve Forests? Evidence from Bolivia*

Authors: Allen Blackman - InterAmerican Development Bank

Recent research has demonstrated that forests to which indigenous communities (ICs) have formal title contain approximately one-fifth of the world’s forest carbon and are cleared at rates far lower than those managed by the state or private sector. Based partly on those findings, advocates claim that providing additional ICs with title will help to stem deforestation. But there are a number of reasons to be cautious. ICs tend to be located in remote areas where deforestation rates would be relatively low regardless of who manages them, so the negative correlation between IC management and deforestation could well be spurious. Also, rigorous empirical evidence on the effect of titling on deforestation is quite thin and mixed. And finally, related theoretical and empirical research suggests titling ICs could either stem or spur forest damage. We examine the effect of titling IC on deforestation in Bolivia, where almost 300 ICs (Indigenous Native Peasant Territories) covering one-fifth of the country’s national territory have received title since 1999. We use fine-scale remotely sensed annual 2001-2012 forest loss data along with fixed effects regression models that control for both observed and (time invariant) unobserved confounding factors, including the location of ICs in remote areas. We focus on the Bolivian Amazon, where deforestation rates have been relatively high. We are not able to discern a statistically significant average effect of titling on deforestation. Neither are we able to discern effects among various subgroups. Our results contrast markedly with a recently published study of ICs in Peru that uses the same empirical strategy (Blackman et al. 2017). That study showed that titling ICs has reduces deforestation by three-quarters in the short run. Taken together, these two studies suggest
that the efficacy of titling ICs as a conservation strategy depends critically on place-based factors. More research in additional countries is needed to identify these mediating factors.

**Brockhaus, Maria, University of Helsinki**

Assessing policy impact and change: a reflection on the benefits and limitations of qualitative comparative analysis (QCA) for the case of REDD+

Authors:
1. Maria Brockhaus - Department of Forest Sciences, University of Helsinki
2. Jenniver Sehring – CIFOR
3. Kaisa Korhonen-Kurki - Centre for Environment, HENVI, University of Helsinki
4. Monica Di Gregorio, Sustainability Research Institute, School of Earth and Environment, University of Leeds

What makes comparative analysis a good comparative analysis, and what is the comparative method when trying to assess the impact of policies and processes of change and assessing rival explanations to an observed political phenomenon (e.g. a turn away from current realities of deforestation in tropical forest-rich countries).

Ragin’s qualitative comparative analysis (QCA) is considered a method innovation useful for comparisons with small and medium case numbers, as it combines a case-oriented (qualitative) and variable-oriented (quantitative) approach. Its actual contribution to advancing comparative policy analysis is however contested.

Hence, building our reflection on an ongoing long-term QCA project (two-step fuzzy-set QCA, binary coding, conducted 2012, 2014, and 2016 in 12 countries in order to investigate policy progress with transformational change to avoid emissions from deforestation and forest degradation as outcome) we develop an assessment framework. We ask if the method of QCA is appropriate to study such policy change, and is able to explain what works, why and under what circumstances—all of which is highly relevant to understand policy impact.

Key issues discussed in the proposed framework:

- Constant evolution of REDD+ globally and within countries à adaptation of indicators and variables, but limited comparability over time
- Binary evaluation and nuanced diversity in country contexts à revision of indicators, but remaining validity issues, trade-offs between comparability and case-specificity
- Variation in data quality spatially and temporally à investments in higher data quality, improving public data bases, but unsolved validity issues
- Interferences between outcome indicators and explanatory variables à reframing of outcome, but limitation of comparability
- Limitations of expert evaluation, namely in terms of researchers’ own biases, different understandings of variables and indicators à intense training, tools to facilitate self-reflection, such as multiple feedback loops but limited validity remains.
While we did gain new insights through the comparative analysis of REDD+ policy progress, and could identify enabling conditions for REDD+ policy impact, the proposed framework to assess and manage limitations (in practical terms) within the QCA design points out many remaining gaps and critical issues, and the urgent need to systematically review other existing QCA applications.

Brooks, Stephen, United States Agency for International Development (USAID)

Governance of Mangrove Forests in Vietnam’s Red River Delta: Pilot to Implement Tenure-Responsive Coastal Spatial Planning

Authors: Stephen H. Brooks – USAID; Nayna Jhaveri - Tetra Tech

This presentation aims to share findings on the role of mangrove governance and tenure arrangements in sustainable mangrove management through: a) the global experience across Africa, Asia and Latin America; and b) a case study on tenure-responsive coastal spatial planning piloted in Tien Lang District within the Red River Delta of Vietnam. The continued degradation of mangroves cover a small area globally, but play a disproportionately large role in providing important ecosystem services that are crucial for coastal livelihoods. Facing significant loss from natural disasters, many governments have begun to establish new policies and programs to reduce mangrove loss and promote systems of sustainable mangrove management. Research to date, however, has largely focused on biophysical conditions for mangrove establishment and growth. Much less attention has been paid to the governance and tenure arrangements that both support effective mangrove planting as well as long-term sustainable mangrove management.

The Tenure and Global Climate Change Program has engaged in both a global assessment of the status and challenges to mangrove governance and tenure arrangements, as well as a pilot project in Vietnam to identify effective approaches to mangrove co-management and tenure-responsive coastal spatial planning. Findings from the Vietnam pilot site show that while the plantings in Tien Lang District have led to successful establishment of extensive new mono-specific forests, there has been limited consideration of the type of planning and management regimes needed to secure the conservation of mangroves. In addition, the lack of coordination of management regimes between communes and the underlying ambiguous tenure rights have resulted in conflicts over aquaculture conversion, creation of new land, fishing rights, and elite capture.

In response, the program is piloting a tenure-responsive coastal spatial planning activity within three coastal communes that identifies the specific role of clarified tenure arrangements in improving mangrove governance. Additionally, this work will support the development of implementation guidance for the Coastal Forests decree approved in August 2016 by the Vietnamese government. Ultimately, the global findings and piloted approach from our work are a significant contribution to global discussion on approaches to mangrove rehabilitation as it relates to improved coastal livelihoods.
Cammelli, Federico, Norwegian University of Life Sciences

Rainforests on fire: Amazonian farmers’ response to fire policies and climate change

Authors: Federico Cammelli - Norwegian University of Life Sciences; Arild Angelsen - Norwegian University of Life Sciences

Frequency and severity of fires in the Brazilian Amazon are rising, causing huge carbon emissions, biodiversity losses and local economic costs. The ignition sources are anthropogenic and mostly related to the accidental spread of agricultural fires. Fire risk mitigation is a coordination problem with strategic complementarities: a farmer’s benefit of mitigation depends on complementary action of other farmers. We experimentally assess ex-ante the impact of two different policies under varying exogenous drought risk scenarios. Command and control is more effective than payments for environmental services in promoting coordination, possibly because of participants’ risk aversion (to the fine) and a local demand for justice and law enforcement. We also find evidence of a human-mediated self-reinforcing loop of drought and fires: droughts increase the exogenous fire risk, giving farmers less incentives to mitigate fire risk coming from their own farms.

Capriola, Margherita, Stockholm University

Climate Crimes: climate change and deforestation

Authors: Margherita Capriola - Stockholm University

During the last decades, climate change studies have been focusing more intensely on its anthropocenic essence, as the consequence of production and consumption patterns that require the intensive exploitation of the environment. In line with this school of thought, and new generations of studies on environmental crime, this paper aims to present the environmentally and climate-related issues arising from land degradation in the Peruvian Amazon rainforest. The Amazon’s integrity is today visibly threatened by exploitive economies which not only are giving rise to an ecological crisis of global range, but are also showing to increase the impact of climate change on local communities. This analysis focuses on a single case-study: the territory within the Northern Ucayali and Southern Loreto regions in Peru; and builds on the theory of state-corporate crime developed in the 1990s by Ronald C. Kramer and Raymond J. Michalowski to define the role of state-corporate relationships in the production of social harms. Despite the diffuse literature on climate change, this paper is intended to give a different analytical point of view. So far, most of the studies done with the purpose of confirming the conceptualization of climate change as state-corporate crime, build on the analysis of the most polluting countries. This work’s purpose is to highlight a different reality: how a country as Peru, currently considered of low ecological footprint, and with no-obligation of mitigation (but home of one of the most valuable resource of biodiversity and CO2 reserve) could, by means of the definition of national laws (environmentally and economic-related), burden climate change. In this optic, the analysis gives a further contribution to both the studies of climate change and environmental crime, focusing instead
on those territory, as the Amazon, whose preservation has been identified as mayor tool against global warming and which is instead harmed by the relation between private interests and governments.

**Carpena, Pietro, TREE AID**

*Supporting the development of locally controlled small-scale enterprises based on non-timber forest products in Burkina Faso: TREE AID’s experience*

Authors: Pietro Carpena - TREE AID; Désiré Ouedraogo - TREE AID; Alexis SompougDou - TREE AID; Barthélémy Kaboret - TREE AID

In the fight against poverty the use of forest products are often quoted as having significant potential to improve the livelihoods of rural people living within or close to forest areas. TREE AID works in Africa’s drylands to unlock the potential of trees to tackle poverty and improve the environment.

Non-timber forest products (NTFPs) are an important part of traditional livelihoods in the drylands of West Africa. Communities generally have free access to communal forest resources, and NTFPs are already an important alternative source of income for rural households – especially women. However, marketing forest products to reduce poverty can be hindered by several factors including poor management and business skills, lack of investment, poor market access and information and dwindling natural resource base.

Over the last decade, through its programmes, TREE AID has guided the self-organisation of hundreds of village interest groups in Burkina Faso, Mali and Ghana to develop and manage small businesses, also known as village tree enterprise (VTE) groups, based on NTFPs. With support from the Market Analysis and Development (MA&D) approach developed by the Food and Agriculture Organization of the United Nations (FAO), TREE AID has provided the crucial structures that are necessary to achieve this empowerment.

The support to VTEs groups covers all aspects of the NTFP value chain by facilitating market linkages and introducing private sector approaches to marketing and customer retention to ensure that expanded agricultural enterprise is achieved. The main strength of VTE group model is its systematic consideration of the technological, commercial and financial aspects of a product alongside social and environmental concerns. The findings provided in this oral presentation form part of TREE AIDs integrated landscape approach to significantly contribute to poverty reduction in rural areas by increasing individual and community revenues while ensuring the sustainable management of forests.

**Ceci, Paolo, Royal Botanic Gardens Kew**

*Restoration of dryland systems in the Sahel region: Kew’s Great Green Wall cross-border pilot project*
The African Great Green Wall (GGW) Initiative has been proposed as a solution to the increasing desertification and land degradation of sub-Saharan Africa which affect some of the world’s poorest people who depend on rainfed agriculture to sustain their livelihoods. As part of this initiative, the Kew’s Great Green Wall cross-border project was developed under Kew’s Millennium Seed Bank Partnership (MSBP) to develop a model for restoration in the Sahel region across Burkina Faso, Mali and Niger.

The project model was designed to engage a wide range of in-country collaborators and local communities to generate environmental and socio-economic data which could help the implementation of similar projects in large-scale agrosylvopastoral systems in the Sahel region.

A participatory approach was applied to select useful plant species important for local communities, according to their preferences and needs. A total of 168 experimental plots have been implemented by planting useful woody and herbaceous species propagated in community nurseries while in parallel testing techniques such as Assisted Natural Regeneration (ANR). Surveys were designed and carried out to understand the socio-economic status of participating communities and to monitor relevant outcomes, e.g. the continuation of diversified and sustainable income-generating activities promoted by the project. From a list of 193 useful species, 55 woody and herbaceous species were selected, propagated and planted to restore 2,235 ha of degraded land. Important trees include Acacia senegal for the production of gum arabic and Carapa procera for oil extraction (medicinal properties).

Preliminary results derived from the monitoring of the species (growth and survival rates) and an analysis of the socio-economic factors have produced a first insight of what might determine the success of future projects and help them sustain and improve forest-related livelihoods.

With an emphasis on useful and native woody and herbaceous species, this project will not only contribute to halt the increasing desertification and land degradation of sub-Saharan Africa by addressing Goal 15 (Life on Land) and Goal 13 (Climate Action) but also to support the livelihoods of local communities by tackling Goal 1 (No Poverty), Goal 2 (Zero Hunger) and Goal 3 (Good Health and Well-being).

Cerutti, Paolo Omar, Center for International Forestry Research (CIFOR)

Between the hammer and the anvil: socio-economic and environmental trade-offs for individual and small forest enterprises in Zambia

Authors: Paolo Omar Cerutti - CIFOR-Kenya; Davison Gumbo - CIFOR-Zambia; Xiaoxue Weng - IIED-UK; George Schoneveld - CIFOR-Kenya; Robert Nasi - CIFOR-Indonesia
In Sub-Saharan Africa, timber production by individual and small forest enterprises (ISFE) provides a significant contribution to rural and urban livelihoods. Yet, because existing regulations focus on large-scale, export-oriented, forest enterprises, ISFEs’ production is done outside existing legal frameworks and is thus criminalized by national policies and by international initiatives aiming at trading legal and/or sustainable timber. Criminalization leads to harassment, insecurity, loss of livelihoods and, in a situation of weak or failed states, fosters and maintains corrupt behaviours by indelicate state officials. Criminalization also contributes to the marginalization of the ISFE sector from the broader forest sector, with multiple negative consequences. For example, ISFEs and their production are not accounted for in national and international statistics; their social importance and environmental impacts are overlooked; and their potentially large contribution to national economies is unknown to policy makers.

Using the example of Zambia, its forest sector, and the Chinese demand for very valuable timber species, we analyse the socio-economic, environmental and political trade-offs associated with ISFEs’ informal/illegal timber production. We conducted 303 one-to-one interviews and focus groups discussions in four districts, viz. Kaoma (Western Province), Luangwa (Lusaka), Mansa (Luapula), and Mkushi (Central), with communities, timber harvesters, government and private sector officials, buyers and intermediaries. We illustrate the interplay between criminalization, weak governance, strong vested interests, and lack of knowledge about the resource base. This leads to ill-thought policy decisions (e.g. harvesting or log-export ban), negative environmental and livelihoods impacts, and parallel increases in the benefits of local elites and politicians able to profit from their close relations to power. Our results show a thriving ISFE sector interlinked with regional and international forces which, if not acknowledged, monitored and addressed by national governments and supra-national institutions, risk only producing very short-term rural benefits and long-term negative impacts on the environment and on development strategies.

Chirambo, Dumisani, Brandenburg University of Technology Cottbus- Senftenberg

The Roles of Social Innovation and ICT in Enhancing Forestry Governance and Forestry Entrepreneurship in Sub-Saharan Africa

Authors=s: Dumisani Chirambo - Seeds of Opportunity (Malawi), Brandenburg University of Technology Cottbus- Senftenberg

Population growth, commercialisation of the economy, and (poor) national government policies are contributing to the destruction of forests in Africa (Perez et al., 2015). Arguably, improving rural livelihoods and preserving Africa’s forests may only be attained through radical transformations in the governance of forests.

Some aspects increasing climate change vulnerability in Africa include the region’s education and skills development inadequacies and lack of sustainable governance systems (WEF, 2014). Consequently, Africa will soon become home to 50% of the world’s illiterate population (ibid). Reforming education curriculums to include entrepreneurship and climate change studies
may potentially reduce climate change vulnerability. However, challenges exist in developing and implementing pertinent curriculums and education policies since many African governments have problems in sufficiently funding and investing in education and skills development systems.

Through an analysis of research articles, case studies and policy briefs, this paper explored how an ICT based polycentric climate change and entrepreneurship education framework can be used to improve forestry governance and increase rural incomes. Using such a Framework, enables non-state actors, rather than governments, to teach entrepreneurship and climate change studies to secondary schools and universities using Mobile-Learning platforms such as tablets (with pre-loaded environmental and entrepreneurship content) and mobile phones (Chirambo, 2017). The paper shows that SDG 13 (combat climate change and its impacts) and SDG 15 (sustainably manage forests) can be addressed simultaneously if policy makers and practitioners focus on reducing the costs of telecommunication and the internet as that would reduce the costs for tablets and mobile phones and enable improved access to information and practice on Ecosystem Based Adaptation (EBA) and micro-forestry commercial schemes like Komaza (Komaza, 2017) in rural areas.

**Clare, Stephen**, McGill University

*Panama’s Institutional Readiness to Support Community Forestry*

Authors: Stephen M. Clare - McGill University; Maria C. Ruiz-Jaen - FAO Panama; Gordon M. Hickey - McGill University

Community forestry has been increasingly promoted as a potentially effective sustainable resource management strategy, particularly in developing area contexts. While there are many reasons to be optimistic about the role of community forestry in delivering more equitable forest management outcomes, modes of adoption, implementation and evaluation have been inconsistent and further policy evaluation is required. Panama, a country experiencing widespread degradation and loss of tropical forests and high rates of rural poverty, has been identified as potentially benefiting from community forestry programmes. For this reason, several prominent forest policy actors in Panama, including the Worldwide Fund for Nature (WWF) and the Food and Agriculture Organization of the United Nations (FAO), have been piloting numerous community forestry projects in order to assess the potential for upscaling. This paper reports on these initiatives and assesses Panama’s institutional readiness to support community forestry using Gilmour’s (2016) six keys to effective community-based forestry: Secure tenure (property rights); Enabling regulatory framework; Strong governance; Adequate market knowledge; Viable technology; and Supportive bureaucracy. Using qualitative and quantitative data drawn from document analysis, program evaluations, and key informant interviews with policy actors we identify insights for community forestry policy in Panama with important lessons for other contexts.

**Cohn, Avery**, Tufts University
Goal 2 of the Sustainable Development Goals promotes sustainable agricultural systems including through the intertwined targets of increased agricultural productivity and agriculture resilient to a changing climate. Forests, savannahs, and trees on and near farms (FST) can help to support these two components of SDG 2. Recent evidence from a nationally representative household survey in Mozambique shows that trees on farms increase agricultural productivity. Further research should now explore which mechanisms including, but not limited to forest livelihoods explain the finding. For example, FST regulate the climate of neighboring agricultural systems, supply timber and non-timber forest products, support beneficial pollinators, and supply livestock fodder. Distinguishing among these pathways is important to appropriately target interventions for SDG 2. For example, changes to the status of de facto or de jure communal lands, including for forest conservation could threaten extractive forest livelihoods, but not necessarily ecosystems services. By contrast, changes to the climate could increase or decrease the importance of forest-based climate regulation. The proposed report would examine FST pathways to SDG 2, drawing on evidence from a new panel dataset of households in rural Mozambique. The dataset combines household survey data and in situ soil carbon mapping with high resolution satellite-derived biomass, climate, and agricultural productivity maps. We first replicate FST-agricultural resilience and the FST-agricultural productivity relationships found in other analyses. Then, we perform a series of analyses aiming to distinguish among pathways. For example, we examine the influence of FST on root staple crops vs. other staple crops on the premise that the former might be less sensitive to climate regulation. We close by discussing the generalizability of our data and theory approaches and the implications of forest-agriculture synergies for forest livelihoods and the SDGs.

Forest policy reform in Peru to enhance smallholder participation in landscape restoration

Authors: Peter Cronkleton - Center for International Forestry Research (CIFOR)

Although Peru’s government often blames small-scale farming as the major driver of deforestation in the country, there is good reason to believe that family farms in the Peruvian Amazon could contribute more to landscape restoration. Amazonian farmers typically maintain complex mosaics of forest remnants, successional secondary forests and agroforestry systems as part of their livelihoods. They actively produce timber and non-timber forest products for regional and national markets using management practices that are adapted to local conditions and are relatively sustainable. However, existing policy frameworks do not accommodate these smallholders and policy makers underestimate their potential to contribute to landscape restoration. Recent initiatives to reform forest policy in Peru have offered promising options to formalize smallholder forestry and provide incentives
for the expansion of these systems. In particular, the creation of a national plantation registry could deregulate timber sustainably produced by these farmers. However, reform efforts have encountered bureaucratic inertia and pushback from vested interests that prefer to maintain the status quo. Drawing on recent field research, we examine how farmer management forest fallows to produce timber for regional and national markets. We will review how the existing policy context influences forest use and deforestation, and illustrate how these systems could contribute to landscape restoration. We also describe on-going policy dialogue and collaboration with policy makers in national agencies and regional governments attempting to define mechanisms to better support local forest producers. While focused on a specific Peruvian case, the study provides generalizable insights on policy reform intended to benefit farmer forestry and contribute to landscape restoration. The discussion will suggest strategies for broadening restoration initiatives to include smallholders in ways that enhance equity and local benefits while greatly expanding restoration impacts.

Nguyen, Thi Kim Cuc, Thuy Loi University

Restoration mangrove forest in the North of Viet Nam and livelihoods of coastal communities

Authors: Nguyen Thi Kim Cuc - Thuy Loi University (TLU); Nguyen Xuan Tung - Mangroves Ecosystem Research Center (MERC); Luong Ngoc Chung - Institute of Water Resources Planning (IWRP)

Mangroves contribute significantly to the economies of coastal communities and, as such, their maintenance is important for livelihoods throughout the Pacific. From a livelihoods perspective, mangroves support many types of fisheries – artisanal, commercial and recreational – and numerous types of fishes, shrimps, crabs, mollusks and many other species. In Viet Nam, with about 169,000 hectares of mangroves along its 3,260-km coastline, mangroves are considered an important resource for socioeconomic development. Despite their importance, mangrove forests have declined significantly over recent decades, primarily through loss and degradation associated with population pressure, wood/firewood extraction and conversion to other land uses such as aquacultural and agricultural fields, salt pans, settlements, ports and coastal industrialization. To assess the functions and services of mangroves in the study area, a combination approach of qualitative assessment (review and investigate the existing mangrove areas in comparison with the planted areas; interview key persons, group discussions, field visits) and quantitative assessment methods (household interview and evaluation of quantitative data) were applied with the impact analysis. Livelihood incomes from restored mangroves in 2013 showed that local communities benefited from the increasing value of artisanal fishing activities compared with 2005 as from US$ 5.90–9.30/working day to US$ 8.70–19.20/working day respectively. Additionally, several other households in village generate their main income through bee keeping and buyers/traders. The direct benefits of livelihoods (such as artisanal natural fishing) from restored mangrove areas are equivalent to US$ 435–2,643/ha/year with the beekeeping being worth about US$ 45/ha/year. This case study illustrates how restored mangrove ecosystems have enhanced the livelihoods of poor coastal inhabitants by supporting fisheries, nurseries
and habitats, as well as protecting coastal communities from natural disasters (such as typhoons and waves). Although the assessments in this research could not quantify all the values of mangroves in northern Viet Nam, this study indicates clear evidence that livelihoods have been enhanced through small-scale restored mangroves. In particular, the livelihoods of poor women have been enhanced and stabilized as a result of mangrove forest-based activities.

Darko Obiri, Beatrice, CSIR-Forestry Research Institute of Ghana

The economic significance of forests in household primary health care in Ghana

Authors: Beatrice Darko Obiri - CSIR-Forestry Research Institute of Ghana; Emmanuel Marfo - CSIR-Forestry Research Institute of Ghana; Eric Nutakor - CSIR-Forestry Research Institute of Ghana; Joseph Cobbinah - CSIR-Forestry Research Institute of Ghana; Thorsten Treue - Faculty of Life Sciences, University of Copenhagen, Denmark; Carsten Hall-Smith - Faculty of Life Sciences, University of Copenhagen, Denmark

That forests are natural pharmacies cannot be underscored. In Ghana 70% of the population particularly, rural communities depend on herbal medicines including collections from the forests for their health needs. However, forests provisioning role in primary health care has rarely been quantified. Empirical knowledge on the nature and extent of reliance on plant products harvested from forests as medicines is required to guide sustainable forest planning. This paper estimates the economic significance of the medicinal values of forests to households on the fringes of wet and dry forests in Ghana and draws implications for forest management planning decisions and pro-poor policy interventions. Data was gathered from quarterly questionnaire surveys of 600 rural households over one year and analyzed descriptively and quantitatively. Results indicate that households rely on forest resources mainly for subsistence and exploit these resources throughout the year but more frequently in the first and second quarters of the year. Medicines constitute 5% and 6% of forest collections in wet and dry forest areas respectively. Households in the middle income class exploit forest resources more than those in the lower and upper classes. The forest is the principal land use for plant medicines accounting for 60% of collections. The major plant parts collected are barks, leaves, seeds and fruits using rudimentary methods that threaten sustainability of forests. Eighty-six percent of the collections are from forests under high restriction. The annual value of medicinal collection is less than $500 indicating low price for herbal medicines. It is recommended that medicinal species be among priority plants for national programs aimed at forest restoration including those for climate mitigation/ReDD+ interventions. Integration of medicinal species in land use systems outside restricted forests including croplands, fallows and home gardens will make them more readily available, reduce forest tenure conflicts and contribute to preventing deforestation.

Daupan, Meg, University of Michigan
Community-based forest management (CBFM) is seen as a mechanism to protect the forests while ensuring the well-being of the local communities that depend on them for survival and livelihood. The Philippines has one of the longest experience with CBFM in Asia, but only started using this approach to manage the threatened mangrove forests in the last decade.

This study has broad-ranging relevance to policy-makers, academia, and environmental NGOs, among others, that seek to promote or address further questions on effective community-based governance of mangrove forests and other threatened ecosystems.

In this paper, we sought to answer the following questions: 1. What influenced the changes in mangrove forest management strategies in two understudied localities in the Philippines? 2. What social and environmental outcomes resulted from those changes? 3. What influenced community participation in both sites?

We addressed the research questions through a comparative case design and 117 household surveys. Our data show that the shift to CBFM was strongly influenced by the communities’ experience with stronger typhoons and the existence of community-based rehabilitation projects led by NGOs. We also found that CBFM led to decreased illegal logging incidences, improved forest health conditions, and improved well-being of those who participated in forest activities. Lastly, we found that community participation is hindered by management conflicts with the local government unit, and is positively influenced by membership to People’s Organizations, technical knowledge on mangroves, and financial and training support from the government and the civil societies.

This paper is the first to provide in-depth information on cross-sectoral participation in mangrove CBFM. The findings can help guide decision-making on institutional structures and management strategies for sustainable mangrove forest management and building resilient coastal communities.

**de Jong, Wil**, Kyoto University

*How community forestry can contribute to and benefit from the sustainable development goals*

Authors: Wil de Jong - Kyoto University; Glenn Galloway - Florida University; Pia Katila - Finish Natural Resource Institute; Pablo Pacheco – CIFOR; Benno Pokorny - Freiburg University

Our paper explores the linkages between Community and Smallholder Forestry (CSF) and the SDGs. CSF contributes to and ultimately results in sustainable forest management, and
therefore to the realization of the SDGs. But CSF and SDGs are linked at multiple levels. CSF pursues objectives that can be identified as concurring with a number of SDGs, implying that CSF and SDGs share common goals. Various CSF meta-studies have identified factors or conditions that can causally be linked to achieving of CSF objectives. Clear congruences can be identified between these factors or conditions that are conducive to successful CSF outcomes, and some SDGs. For instance, lack of secure tenure, bureaucratic hurdles, unfavorable commercial arrangements and failing legality compliance are important constraints that undermine successful outcomes of CSF support activities. These constraints can all be linked to specific SDGs and related targets.

The first part of the paper reflects on what are perceived as CSF objectives and explore evidence of actual achievements of CSF, which link to Agenda 2030. The second part of the paper explores the linkages between the prospective successful implementation of the SDGs and to what extent it can be expected that this will also improve the factors and conditions that are linked to the successful implementation of CSF support efforts. The latter requires an in-depth analysis of the prospective implementation of the SDGs at locations or under circumstances where they can contribute to improving factors and conditions that will result in successful CSF support efforts. The paper's third part generalizes the insights from parts one and two and explores if and how the rich experience of CSF support efforts and CSF achievements, and its demonstrated linkages with SDGs, can contribute to a wider successful pursuance of the SDGs in general.

Dell’Angelo, Jampel, VU University Amststerdam, The Netherlands

The Tragedy of the Grabbed Commons: Coercion and Dispossession in the Global Land Rush

Authors: Jampel Dell’Angelo1; Paolo D’Odorico2; Maria Cristina Rulli3; Philippe Marchand4

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Rural populations around the world rely on small-scale farming and other uses of land and natural resources, which are often governed by customary, traditional, and indigenous systems of common property. In recent years, large-scale land acquisitions have drastically expanded; it is unclear whether the commons are a preferential target of these acquisitions. Here we argue that the con-temporary global “land rush” could be happening at the expense of common-property systems around the world. While there is evidence that common-property systems have developed traditional institutions of resource governance that make them robust with respect to endogenous forces (e.g., uses by community members), it is less clear how vulnerable these arrangements are to exogenous drivers of globalization and expansion of transnational land investments. In common-property systems, farmers and local users may be unable to defend their customary rights and successfully compete with external
actors. We define the notion of “commons grabbing” and report on an exploratory study that applied meta-analytical methods, drawing from the recent literature on large-scale land acquisitions and land grabbing. Informed by political economy and political ecology approaches, we coded selected cases on the basis of acquisition mechanisms, claims and property rights, changes in production system, and coercive dynamics, and explored the interactions between the different variables using association tests and qualitative comparative analysis. We found that the majority of the cases included in this analysis (44 of 56) could be examples of commons grabbing.

**den Braber, Bowy**, The University of Sheffield

*Impact of protected areas on poverty and inequality in the Brazilian Amazon*

Authors: Bowy den Braber - University of Sheffield; Christoph Nolte - Boston University; Karl Evans - University of Sheffield; Johan Oldekop - University of Sheffield

Protected areas (PAs) form the key approach to protect biodiversity, but also have social impacts on the people living in and around them. Striking a balance between reducing deforestation and reducing poverty is particularly important in the Brazilian Amazon. To reduce deforestation the Brazilian government has doubled its PA network and it has taken steps to minimize negative social impacts of PAs. However, some argue that protection is still considered an obstacle to poverty reduction. Studies from other countries have shown that PAs can reduce poverty, especially through ecotourism, but the Amazon remains largely inaccessible to tourists.

Currently, impact evaluations have estimated PA impacts against a credible counterfactual (“non-protected area”) mimicking a randomized controlled trial. However, in the case of protection a counterfactual is not only characterized by the absence of protection but also implies another form of land use and land ownership. For example, an area that is not protected could evolve into land for cattle ranching or agriculture, and could be owned by smallholders or large-scale landholders. These land use choices have social impacts and the impact of PAs depends on how well a PA performs against such alternatives. Placing PAs on a ladder of social impact is especially relevant for policy makers who decide between different land use options.

We show the impacts of PAs on poverty and inequality in the Brazilian Amazon in comparison to alternative land uses and actors. We use population census datasets from 2000 and 2010 to construct a poverty index based on income, education and sanitation. We use data from the 2006 agricultural census to extract landholder property size and satellite data to determine land use. We use regression and matching analyses to generate quasi-experimental quantitative estimates of the impact of PAs on poverty and inequality.

This research aims to build on causal inference methodology that is relevant to policy makers and provides insight into the role of protected areas in achieving positive biodiversity and
social outcomes. A better understanding on the impact of PAs will be crucial in reaching the targets set by the Sustainable Development Goals.

**Djoudi, Houria**, Center for International Forestry Research (CIFOR)

*Linking migration, forest and gender: Exploring the role of mobility in understanding shifts in the use of food tree resources in Burkina Faso*

Authors: Houria Djoudi – CIFOR; Catherine Pehou – CIFOR; Barbara Vinceti - Bioversity International

In the northern regions of the Sahel unfavourable conditions concerning rainfall variability, land degradation and land availability determine internal migration flows from the dry northern regions to the forested and more fertile southern regions. Consequently, rural to rural and rural to urban resource flows characterises those livelihoods and shift the use of forest and tree resources in the southern landscapes. However, natural resource management policies as well as development projects are “spatially bounded” and are designed in the assumption of permanent and sedentary households. Food trees are an important source of food, income and play a role as a safety net for rural women. Local regulations governing those trees have a complex gender dimension as they are disconnected from the regulations governing land. Using a combination of qualitative and quantitative research methods including household surveys (migrant and native households) and focus group discussion, our study characterised the impact of permanent internal migration on the use of food trees and their gender specific impacts, and describe the new pattern and dynamics on livelihoods and sustainability of food tree resources. By integrating mobility and migration patterns and their impact on resources and livelihoods, policies and on-the-ground projects could enhance their effectiveness in promoting sustainable forest management and improved livelihoods.

**Doriane, Desclée**, UCLouvain, Earth and Life Institute (Belgium), ERAIFT UNESCO (DRC)

*Contribution of a systemic analysis of livelihoods to sustainable development: Integration of human and geospatial dynamics in a multidimensional diagnostic of human-environment relationships*

Authors: D. Doriane - UCLouvain, Earth and Life Institute (Belgium), ERAIFT UNESCO (DRC); S. Rivière - a; P. Ceci - a; L. Sanou – b; R. Oubida – b; M. Adda – c; S. Sanogo – d; K. Bokary – d; T. Ulian – a

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In most developing countries, rural people are poor and their existence depends heavily on natural resources. Their life choices are directly related to the quality and sustainability of the ecosystems in which they live.
It is increasingly approved that for fighting poverty, it is appropriate to address the issue by expanding the classical economic theories to the Green Economy theory. It includes the concept of natural capital in the processes of growth and sustainable development. Poverty issues need to be addressed in a holistic way, implying adopting multidimensional analysis tools. The Livelihoods Approach allows addressing such issues through the Capitals Theory. Households’ livelihoods opportunities are a set of space-time varying assets allocated between five categories of capital.

For forest dependent people, Livelihoods and Capitals Analyses give a relevant understanding of human-environment relationships. In the Luki Biosphere Reserve, people depend on natural resources for self-consumption and income generation. The Reserve attracts people and is consequently in the process of an environmental degradation. We have investigated the availability of capitals' assets and made links with livelihood strategies by carrying out 314 household surveys in 14 villages.

Methodologically, our study treated a large set of multidimensional household survey data representing the five capitals with a Factor Analysis of Mixed Data tool. Our study finds that using this data analysis tool, a systemic households’ capitals and livelihoods diagnosis can be obtained. Moreover, to improve this diagnosis on dependent people opportunities, a complementary spatial analysis can be done.

We found that where livelihoods levels do not vary significantly, the corresponding capitals’ levels portfolio can be very different.

It shows that to deepen the interpretations and to better understand people – environment relationship, socio-economic and spatial analyses are useful. This makes the resulting diagnosis for monitoring indicators and decision-making for sustainable development more appropriate and contextual.

Duchelle, Amy, Center for International Forestry Research (CIFOR)

Evaluating the impacts of different types of REDD+ interventions on forests and people

Authors: Amy E. Duchelle1; Astrid Bos2; Claudio De Sassi1,3; Erin Sills1,4; Gabriela Simonet1,5; Stibniati Atmadja6; Sven Wunder7; William Sunderlin1

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6 Center for International Forestry Research, Ethiopia
7 Center for International Forestry Research, Peru
The world’s tropical forests hold eminent potential for climate change mitigation as recognized in the 2015 Paris Climate Agreement. When the REDD+ (Reducing Emissions from Deforestation and forest Degradation plus enhancing carbon stocks) concept emerged ten years ago, it was considered a potential triple win: mitigating climate change, conserving biologically diverse forests, and enhancing the livelihoods of forest-dependent people. Since its inception, REDD+ has evolved remarkably, and been piloted through more than 300 subnational initiatives across the tropics. Implementers of these initiatives are applying REDD+ intervention packages that in customized ways combine disincentives (e.g. restrictions on forest access or conversion) and incentives (conditional or non-conditional) to allegedly achieve better protection of forests.

Through CIFOR’s Global Comparative Study on REDD+ (GCS-REDD+), we evaluated the impacts of REDD+ interventions on forest conservation and community well-being at 22 subnational REDD+ sites in Brazil, Peru, Cameroon, Tanzania, Indonesia and Vietnam. We combined socioeconomic surveys in 150 communities and nearly 4,000 households (including control groups) in 2010-2012 (pre-intervention) and 2013-2014 (post-intervention), with an analysis of Global Forest Change data (2000-2015), to assess how different interventions affected changes in income, assets, perceived well-being and forest cover at the community level. Our measure of treatment was the share of sampled households in each REDD+ community that experienced disincentives, incentives or both. We found a reduction in forest cover loss at half of the REDD+ sites, with better conservation outcomes in places where there was higher treatment intensity of disincentives. While both intervention types had neutral impacts on income and assets, higher exposure to disincentives led to decreases in overall perceived well-being, except when balanced out by incentives.

Our research contributes to the call for “Conservation Evaluation 2.0” in jointly comparing environmental and social outcomes of different policy tools applied at the same sites. While disincentives may be the most effective REDD+ instrument for conserving forests, other measures are clearly needed to safeguard and enhance community well-being. This critically needed empirical evidence on REDD+ performance on the ground is relevant to policy makers and practitioners interested in developing REDD+ strategies that can provide both conservation and livelihood benefits.

**Dyer, Michelle**, Stockholm Resilience Center

*Social motivations of forest resource decisions: Logging in Solomon Islands*

Authors: Michelle Dyer - Stockholm Resilience Centre

Why do Solomon Islands’ villagers continue to engage with large scale logging projects by foreign companies when they have decades of experience of the disadvantages of such deals? Solomon Islands has experienced large scale logging by foreign companies on customary owned land since the early 1980s. There have been very few long-term benefits for the majority of customary land holders on whose land this activity has taken place. Instead this
logging regime has resulted in a marked increase in community conflicts and protracted and sometimes intractable land disputes in the courts system. Additionally, it has been characterised by environmental destruction, political malfeasance, financial trickery, unethical practices by foreign logging companies and a failure of the state to regulate or control the logging industry.

This paper explores village level narratives surrounding a logging dispute in a village on Kolombangara Island in the Western Province of Solomon Islands. Drawing on empirical evidence collected through 12 months’ fieldwork using anthropological methods I seek to understand firstly, why villagers continue to engage with logging companies, and secondly, why seemingly viable and financially attractive alternative forestry projects may not be taken up. Additionally, I examine legal recognition of a local conservation Non-Government organisation as an environmental ‘stakeholder’, with an accepted interest in customary land as distinct from the categorisation of ‘landowners’ and what this may mean firstly for the rights of customary land owners, and secondly for the possible control other’s framed as ‘stakeholders’ may have over forests or other resources on customary land.

I conclude that decisions about engagement with logging companies take place at the juncture of struggles over rights to speak for land, viable livelihood options and villager’s sense of relative powerlessness and poverty when natural resources become commodified. While logging continues to be a major source of deforestation in Solomon Islands, increasing interest in mining presents a new and perhaps more permanent threat to the state of Solomon Island’s forests. This presentation thus seeks to bring to the fore the social motivations of forest resource decisions to enable greater viability for sustainable forest options.

Erbaugh, James, University of Michigan

Shifting away from forest transitions theory: Assessing forest landscapes and jurisdictional change in Indonesia from 2000 to 2014

Authors: James Thomas Erbaugh – The University of Michigan

Although much research has focused on the drivers of forest-cover change and the national trends of “forest transition,” this research often lacks sub-national political sophistication. Controlling for sub-national jurisdictional units is necessary for assessing the causal impact of deforestation drivers, but it may not be sufficient. Political boundaries and regimes change over time, sometimes with concerted impacts on forest landscapes. This research examines the impacts of jurisdictional fracture in Indonesia using Indonesian Village Census and land-cover data from the Ministry of Environment and Forestry. It employs causal analysis to identify overarching trends from jurisdictional change and fracture, as well as first-difference models to determine the drivers of forest-cover change within fractured villages. This research encourages quantitative analysis of forest-cover loss that incorporates an understanding of political change over time and that focuses on small-area analysis of forest landscape change.
to promote multi- and inter-scalar insights. In doing so, it shifts interpretation of forest-cover change as a national process to one that is highly contextual, political, and varied.

**Fischer, Harry**, Swedish University of Agricultural Sciences

*Institutional pathways to improved forest conditions in forest commons*

Authors: Harry W. Fischer - Swedish University of Agricultural Sciences; Ashwini Chhatre - Indian of Business; Anja Gassner - World Agroforestry Centre; Arun Agrawal - University of Michigan

Forest commons are a prominent feature of rural landscapes across the developing world. These forests provide important ecosystem benefits and act as a refuge for biodiversity while also supporting rural livelihoods. Extensive research has studied the conditions that promote sustainable management of forest commons, but there remains a lack of clarity on the mechanisms that lead to improved forest conditions as well as the extent to which local institutions mediate the impact of larger drivers of forest change. Our paper combines two large datasets—the International Forestry Resources and Institutions (IFRI) and the Sentinel Landscapes (SL) research programs—with 539 forests from across 22 countries around the world to investigate the association between social and biophysical factors on the one hand, and forest degradation and regeneration on the other. We show that the formal involvement of local community institutions in forest governance is significantly and positively associated with forest regeneration. Additionally, we demonstrate that this effect works through variation in different types of operational rules, the number and kind of improvement activities undertaken in the forest, and the degree of rule compliance. We also find that local institutions mediate the impact of biophysical factors such as the size, elevation, and steepness of the forest management unit, the number of different groups using the forest, the distance of user community to the forest, and the use of alternative energy sources in the community. Our findings validate the emphasis on the devolution of decision-making authority to local communities, while also provide new evidence on the mechanisms through which such devolution leads to better forest conditions. Our insights should help to design smarter interventions by identifying some of the policy and material support needed by local communities in order to promote forest regeneration.

**Fleischman, Forrest**, University of Minnesota

*The impact of tree plantations on rural livelihoods: A systematic review*

Authors: Forrest Fleischman - University of Minnesota; Marissa Schmitz - University of Minnesota; Eric Coleman - Florida State University; Harry Fischer - Uppsala University; Roopa Krithivasan - Clark University; Pushpendra Rana - University of Illinois; Claudia Rodriguez Solorzano - University of Minnesota

Among many other purported benefits, tree planting is supposed to help the livelihoods of forest dependent people by restoring the supply of forest-based goods and services to rural communities. Yet there is also evidence that tree plantations may disrupt forest-based
livelihoods by shifting forest management towards species that are commercially valuable but not usable for subsistence purposes, by encouraging wildlife that threaten crops to move into human-dominated landscapes, or by shifting land rights away from forest-dependent households. Recent international policies, including REDD+, the Bonn Challenge, and the Global Partnership on Forest and Landscape Restoration, envision vastly increasing the areas under various forms of plantation globally, and thus, the potential for plantations to impact forest-based livelihoods is large. We conduct a systematic review of literature examining the widely scattered literature documenting livelihood impacts of afforestation activities, drawing on a broad based literature search dating back to the end of the colonial era. We find that livelihood impacts of tree plantations vary greatly depending on the species planted, the land tenure system in place, the kinds of forest livelihoods being affected, and the level of involvement of affected parties in designing and implementing the plantation program. Our findings suggest that tree plantations are more likely to benefit forest livelihoods when the plantations emphasize species that are valued in local subsistence economies and when forest-dependent people have a strong voice in decision-making. We conclude by outlining a research agenda for better understanding how tree plantations can be managed to maximize their positive impacts on livelihoods.

Francisco, Scott  Pilot Projects Design Collective

A Systems Matrix for Development Goals

Authors: Scott Francisco, Pilot Projects Design Collective

Every attempt to improve, change or intervene in the world brings with it assumptions of values, and structures through which change can occur. Development and design discourses have been testing, theorizing, and re-testing these assumptions and structures for millennia, creating new theories, typologies and movements that advocate particular approaches. One of these movements is systems thinking, a model of cause and effect relationships seen as “purposeful wholes” made up of parts organized in relationships that lead to specific outcomes or emergent properties.

In this paper, I present a simple matrix of four distinct but interacting social systems, creating a heuristic to help practitioners and theorists more effectively articulate and achieve development and design goals. I draw on and integrate “systems thinking”, “practice theory”, structural anthropology, social theory of technology, and micro/macro economic theory. I use the work of Jamshid Gharajedaghi, Donella Meadows, Jacques Ellul, Claude Levi Strauss, Pierre Bourdieu, Jane Jacobs and Elinor Ostrom, relating their work to purposeful systems and the intentionality of systems design.

The paper posits that design and development outcomes can be significantly advanced with an integrative systems perspective that offers a balanced view of these four dominant social systems, their competitive features, their unique values and purposes, and the inputs and outputs that connect them. Using pertinent examples (e.g., Green Revolution or digital technologies) it also examines the current imbalance between these systems (particularly with
respect to over reliance on regulation, and big data (technocentricism) to the detriment of culture-based solutions, and the impact this is having on and the effects this is having on design and development discourse.

Forests and livelihoods is a multi-systems domain, but it lacks a simple framework to support a balanced systems discussion in parallel with its goal-oriented projects. I apply this framework to a case study of, Uaxactun, Guatemala, a forest community with a long history of development and conservation NGO interventions and research. I use the systems matrix to illustrate how a systems approach can reveal pitfalls in previous interventions, and, conversely can be used to design interventions that are holistic and synergistic, in Uaxactun and elsewhere.

**Friman, Jenny**, Göteborgs Universitet

*The ethical and livelihood implications of forest regulations in Burkina Faso*

Authors: Jenny Friman - Göteborgs Universitet

This presentation will discuss how forest regulations and policies matters for the everyday use and access to forest resources in two rural villages in Burkina Faso. Most households in Burkina Faso depend on wood fuel for their everyday life, meanwhile the access and use is strictly regulated through various laws and policies creating implications for rural livelihoods and households. This study explores how forest regulations and policies relate to the practices of using forest resources and for access and everyday struggles of rural households. Moreover, from an intersectional perspective, how these regulations work to shape and re-establish inequalities and power structures. I draw on findings from fieldwork conducted in two rural villages Burkina Faso in 2012 and 2014-2015, based on semi-structured interviews and observation. Semi-structured interviews were also conducted with formal forest agency representatives at the local, regional and national level. Through a practice based approach this study shows how forest regulations discursively re-establish women as wood cutters for the household. Moreover, the forest policies further institutionalizes rural forest dependent livelihoods into using specific traditional tools and methods for collecting wood fuel which implicates an equitable access to forest resources. The study questions the narrative of women as destroyers of forest resources in Burkina Faso and gives useful insights in the ethics of forest policies played out through the everyday lived experiences. Moreover, the study also shows how a practice based approach is useful for understanding the processes of entwinement of formal and socially embedded institutions.

**Gardner, Toby**, Swedish Environment Institute

*Transformative transparency and a deforestation free economy: how supply chain information can improve supply chain governance and sustainability*

Authors: Toby Gardner, Swedish Environment Institute
The last few decades have given rise to an era where, due to the scale and speed with which information is collected and made available, information transparency processes such as monitoring, disclosure, dissemination and verification are increasingly capable of forging entirely new modes of sustainability governance for global commodity supply chains. However, there has been very little critical appraisal of the contribution made by different transparency initiatives and how they can (and cannot) influence new governance arrangements. Here we seek to strengthen the theoretical underpinning of research and action on supply chain transparency by addressing four questions: (1) What is meant by supply chain transparency? (2) What is the relevance of supply chain transparency to supply chain governance? (3) What is the current status of supply chain transparency, and what are the strengths and weaknesses of existing initiatives?, and (4) What propositions can be advanced for how transparency can have a positive, transformative effect on the governance interventions that seek to strengthen sustainability outcomes in the production and trade of agricultural and forest commodities? We present a new typology of information that is relevant to our understanding of the sustainability governance of supply chains and illustrate a number of major shortfalls and systematic biases in the coverage of different kinds of supply chain information. We also present a set of ten propositions that, if taken together, serve to expose some of the potential pitfalls and undesirable outcomes that may result from (inevitably) limited or poorly designed transparency systems, whilst offering guidance on some of the ways in which greater transparency can make a more effective, lasting and positive contribution to sustainability.

**Gassner, Anja, World Agroforestry Center (ICRAF)**

*Sentinel Landscapes- Comparative research for sustainable ecosystem management*

Authors: Anja Gassner1; Jean Paul Benavides2; Brian Chiputwa1; Ashwini Chhatre3; Michael Balinga4; Joachim Binam1; Guddappa Devagiri 5; Harry Fischer3; Dave Harris1; Rhett Harrison1; Yves Laumannier4; Patrice Levang4; Clement Okia1; Jenny Ordonez1; Makui Parmutia1; Alfa Ratu4; Bertin Takousting1; Manichanh Satdichanh1; Norvin Sepulveda6; Siddapa Setty7; Denis Sonwa4; Valentina Roboglio1; Eduardo Somarriba7; Tor-Gunnar Vågen1; Atiek Widayti1; Leigh Winoweiki1; Robert Nasi4

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Effective policies for sustainable ecosystem management need to focus on interventions that reduce the socioeconomic pressures on natural resources, either directly or through modification of their underlying driving forces. For research approaches the dilemma is to find the right compromise between achieving the potential breadth and depth to understand a single context which often is only achieved at the price of a lack of systematic argument and
scientific rigor and on the other hand, macro-quantitative studies testing the relationship of a few variables across a great number of contexts. Macro-quantitative studies are often thought to be too narrow in perspective, too unspecific in the operationalization of concepts, leading to spurious and superficial results; ultimately failing to address the development challenge at a local or regional level. Consequently, most integration of ecological research to decision-making is derived from case studies at local or regional scale.

The sentinel landscape network is the first comparative research approach implemented through CGIAR funding. The objective is to understand the environmental, economic and institutional drivers that enable rural people to invest in the sustainable management of tree resources across widely different forested landscapes. Site selection was based on a most different systems design. To allow for a systematic comparison of livelihood outcomes across a large number of highly variable sites (21 sentinel sites within 15 countries) a standardized methodology collecting indicators on livelihoods, land health and institutions was developed. A total of 280 villages, 8500 households and 4480 field data points were collected.

The sentinel landscape do not claim global representation of forested, tropical landscapes, but the rich data set allows analysis to be conducted to answer important development questions such as a) the importance of trees for human resilience, b) how access to global value chains influence local livelihoods, c) what type of rural households can benefit from sustainable intensification. We demonstrate that, while placed based research is certainly necessary to develop demand driven interventions, systematic, comparative research designs, such as the sentinel landscapes, are essential to predict how the same interventions will work in different places.

**Gehrig, Stefan**, WZB Berlin Social Science Center

*Means to an end or an end in itself? Field experiments on the instrumental value of equity in payments for ecosystem services for the promotion of conservation effort*

Authors: Stefan Gehrig - WZB Berlin Social Science Center; Logan Hamilton - School of Geography and the Environment, Oxford University; Paul Jepson - School of Geography and the Environment, Oxford University

Ecosystem services governance like payments for ecosystem services (PES) influences rights and responsibilities of resource use and is thus a highly normative undertaking. Studies find that recognizing the social equity implications of such policies can, besides positive impacts on livelihoods, have an instrumental value in shaping conservation outcomes. Yet, to date, empirical studies with regard to the effects of equitable policy on the effectiveness to motivate behavioural change among resource users are very scarce. In this work, we circumvent the empirical challenge of distinguishing between cause and effect inherent to survey and correlational research with an experimental design and implement it among forest users from Dien Bien province, Vietnam, who participate in the national PES program. Importantly, previous research showed that the study communities have strong opinions on the fairness of alternative payment schemes which do not fully match with the policy currently
in place. In the field experiment which borrows methodology from behavioural economics, we can manipulate the payment scheme (input-based, output-based, egalitarian, random) between subjects to see if they influence the supply of labour for ecosystem conservation. The experiment consists of two incentivized stages: in a coordination game, we elicit the shared perceptions about the equity and appropriateness of different payment schemes. Then, in a real effort task, we assign subjects to the different payment schemes and measure in a standardized setting the effort they put into the preparation of seedling bags for local afforestation. We find significant differences in the evaluation of payment methods in the coordination game. We also find that different payments induce different effort in the labour task. Specifically, participants who receive conditional payments (piece-rate for bag production) produce more seedling bags than their counterparts with unconditional payments (flat-rate). We find a suggestive tendency that, besides this effect of monetary incentives, payments which match local perceptions of distributive equity (e.g. a flat-rate equal across individuals rather than variable) lead to higher conservation effort. We discuss these and further findings in the local context and reflect on the suitability of experimental research for the design of effective and efficient ecosystem service governance for forest conservation.

Ghilardi, Adrian, National Autonomous University of Mexico (UNAM)

Modeling woodfuel environmental impacts within dynamic landscapes

Authors: Adrian Ghilardi – UNAM; Rob Bailis - SEI-Us; Alexander Quevedo – UNAM, Montserrat Serrano-Medrano (UNAM); Andrew Tarter - University of Florida

Understanding the role that traditional woodfuel demand could play on deforestation or forest degradation can be difficult because both processes are driven by many causes simultaneously. Evidence from the past decades indicates that woodfuel demand alone rarely drives deforestation, although it may serve a facilitating role in conjunction with other processes. For example, agricultural expansion is often the root cause of deforestation and, in many instances; woodfuels are supplied as by-products when land is cleared for farming. On the other hand, woodfuel demand does, in some circumstances, contribute to forest degradation. In trying to better understand woodfuel-driven degradation within landscapes also experiencing deforestation, we developed MoFuSS (Modeling Fuelwood Savings Scenarios), a dynamic model that simulates the spatiotemporal effect of woodfuel harvesting on aboveground biomass, which also accounts for land use changes driven by other causes (e.g. land cleared for farming). We show selected results from case studies in Honduras, Haiti, and south India, including an ongoing validation effort using field data and satellite imagery in the Yucatan Peninsula, Mexico. We conclude by recommending future research directions towards understanding more subtle and long term impacts of chronic woodfuel extraction on the environment, such as 1) species composition when particular species are selectively targeted; 2) genetic erosion when sexual reproduction is inhibited, such as short-cycle coppicing systems for charcoal production; 3) topsoil sterilization and incidences of pests when clear cutting is the main management practice; 4) altered fire regimes in charcoal producing areas; and 5) vegetation recovery thresholds that could lead to unwanted
sucession outcomes after years of intensive management (e.g. colonization by an invasive shrub).

**Godar, Javier**, Stockholm Environment Institute

*The role of soy expansion in driving land use change in South America: producers, traders and global demand.*

Authors: Javier Godar - Stockholm Environment Institute; Toby A. Gardner - Stockholm Environment Institute; Stephen Fick - Stockholm Environment Institute; Clement Suavet - Stockholm Environment Institute

South America’s tropical and subtropical forests are under increasing pressure from agricultural expansion, primarily driven by cattle ranching and soybean production. In recent years the Chaco and Cerrado biomes in particular have become global hotspots of deforestation and biodiversity loss, mostly as a consequence of soybean expansion. Here we use recently untapped datasets on per shipment exports, districts of production and company asset taxation records for the different activities involved in the soy sector, to create an unprecedented high-resolution map of the soy expansion dynamics over the last decade in Brazil, Paraguay and Northern Argentina. These supply chain maps link individual municipalities or counties of production to the downstream traders and countries of consumption, for the totality of the exported soy volumes in a given year.

We examine the role and sourcing dynamics of all individual traders and countries of consumption, linking the dominance of companies and countries to different biomes, regions and countries of production. Based on the analysis of spatial-temporal sourcing patterns we link different companies and countries to changes in deforestation and biodiversity risk exposure of different actors and consumers over time.

This study represents a major advance on earlier studies assessing soy expansion in South America by using a spatially explicit and high-resolution mapping of the total exports of three of the continents major soy producing countries. This analysis provides a stepping stone for two major research frontiers, (i) understanding the migration of sourcing patterns over time and space, thereby helping to disentangle the push and pull factors that shape the strategies of downstream buyers, (ii) understanding the relative importance of leakage effects, where regional differences in environmental enforcement are displacing soy expansion into less regulated areas. Addressing these knowledge gaps is key to informing both the implementation of voluntary zero-deforestation commitments and strategies of territorial governance. The presentation will be anchored on data and visualizations that will be made available in the Trase platform (www.trase.earth), a public information system for supply chain transparency.

**Gordon, Johanna S.**, Stockholm University

*Breaking the Reindeer’s Back – Cumulative Effects of Exploitation, Climate Change and Predator Conservation on Reindeer Husbandry in Sweden's Arctic North*
Reindeer husbandry is carried out by the indigenous minority population of Sweden, the Sami people, on 50 percent of Sweden’s land mass. Reindeer are central to Sami culture, identity as well as economy and depend on the functionality of the ecological system. The combined effects of extended land-use (including the effects of forestry on forage availability), predator protection and climate change add a new set of variables to the system, thus establishing new causal relationships, feedbacks and dynamics resulting in cumulative effects (CE).

Identified challenges in the process of assessing CE include gaps between practice and science based approaches resulting in a lack of CE assessment methods. Further, stakeholders involved in decision-making processes, such as Environmental Impact Assessments (EIA) and Strategic Environmental Assessments (SEA), differ largely concerning world views, epistemology, language and perception of the system of reindeer husbandry, potentially leading to conflict in decision making.

In an interdisciplinary approach with focus on TEK, the method of system analysis was applied to capture the complexity of the system of reindeer husbandry and identify the interacting effects of disturbances. The causalities are represented in conceptual models, Causal Loop Diagrams (CLD). Due to the lack of methods to compare, in a reproducible way, cumulative effects of multiple decisions in a system, I documented the number of loops affecting a key indicator to create a measure of the cumulative effects of multiple drivers.

My study shows that by developing and applying this method, the loop count, the level of system complexity is reflected in the number of causal pathways delivering effects to a given key variable. The intensity of the cumulative effects impacting on the indicator can be evaluated and compared. The process of qualitative modelling provides a transdisciplinary study base for enhancing the understanding of CE on the system. The results of loop count and loop analysis allow resources to be directed specifically towards in depth assessments of CE on identified indicator variables. This work provides a comprehensible communication tool and the research base for qualitative dynamic models accounting for scenario development, elaboration and quantification of CE.

Grillos, Tara, Purdue University

In-Kind Compensations for Conservation and Motivation Crowding

Authors: Tara Grillos - Purdue University; Patrick Bottazzi- Bangor University; David Crespo Rocha - Bangor University; Nigel Asquith - Fundación Natura Bolivi; Julia P.G. Jones - Bangor University

The use of economic incentives, such as Payments for Ecosystem Services, is a widespread strategy for promoting conservation around the world, but a common critique of these...
approaches is that they may unintentionally displace pre-existing, non-monetary motivations for conservation. There is good reason to believe that this risk may be reduced if compensation is provided in-kind instead of in cash form, but this has not yet been directly tested in a conservation setting. Fundación Natura Bolivia provides in-kind compensations to forest users in order to promote conservation. Compensations take the form of inputs to alternative livelihood strategies with minimal or positive impact on the local environment, for example bee-keeping equipment or fruit trees. Using the first randomized controlled trial of an in-kind compensation program for conservation, we examine effects on self-stated environmental values and beliefs, as measured through household surveys conducted both before and after the multi-year intervention. We find that the in-kind compensations induced no measurable negative effects on pre-existing environmental values and beliefs, and in fact, individuals in the treatment group were more likely to prioritize the environment as a value to teach their children after being exposed to the intervention. Results with respect to social values, however, are more ambiguous. Existing literature, based on laboratory experiments conducted in the United States, suggests that in-kind compensation reduces the risk of motivation crowding relative to cash payments, but this is the first study (to our knowledge) to experimentally test the impact of in-kind compensation in a real conservation project. Findings provide a clear contribution to motivation crowding literature, advancing our understanding of how different types of monetary and non-monetary motivations interact to affect behavior. Given the interest in the potential of PES-like schemes to contribute to forest conservation, they also have applied significance to forest and livelihood policies.

Hajjar, Reem, University of Michigan

Capital, labor, and gender: The consequences of large-scale land transactions on household labor allocation in western Ethiopia

Authors: Reem Hajjar - Oregon State University; Rebecca Rutt - University of Michigan; Alemayehu Ayana - Ethiopian Environment and Forest Research Institute; Stephanie Keene - Rights and Resources Institute; Solange Bandiaky-Badji - Rights and Resources Institute; Arun Agrawal -University of Michigan

The scale and pace of ongoing large-scale land acquisitions (LSLAs) are historically unprecedented. Proponents of LSLAs state that the introduction of capital to industrialize previously subsistence-based agricultural contexts is needed to feed growing populations nationally and globally. Critics argue that such transactions seldom recognize local populations’ presence and rights, displace households and economic activities, and reduce incomes, food security and nutrition. Gendered impacts of LSLAs remain under-investigated – particularly in terms of how changes to land and resource access affects women’s livelihoods and household well-being. We argue that LSLAs, through the industrialization of agricultural practices that have at the same time forced local farmers off the land, have transformed labour allocation within affected households, with multiple gendered consequences. We conducted in-depth case studies in six communities in western Ethiopia, four of which had experienced impacts of LSLAs and two nearby that had not, to explore the gendered dynamics of household labour reallocation and resulting impacts on well-being. Through gender-
specific focus groups and key informant interviews, we found that, across the impacted case studies, both men's and women's livelihoods had been transformed by the loss of communal and private lands; landowners and agricultural enterprise owners were transformed to wage labourers on investors' lands, or—in the case of many men—emigrants. The resulting additional burden on women—increased wage labour to make up for lost land and livestock, and increased time spent fetching products from increasingly distant forests, in addition to traditional household responsibilities—had numerous negative psychological, physical, and material impacts on women, including decreased food security (which LSLAs purport to enhance). Given the negative impacts on local livelihoods, particularly women’s livelihoods and well-being, this research brings up important ethical questions with regards to national and international policies and institutions that promote LSLAs in the name of development and improved well-being.

**Hamilton, Logan**, School of Geography and the Environment, Oxford University

**Conflict in Crocker**

Authors: Logan Hamilton - School of Geography and the Environment, Oxford University; Illias Animon - FAO

Over a 10-year period, a valley in Crocker Range Park in Sabah (Malaysia) has witnessed a conflict between a community located inside its boundaries—Ulu Senagang/Mongool Baru—and the state government's parks department—Sabah Parks. Sabah Parks sought to designate the area as a co-managed community use zone (CUZ) in which sustainable practices can continue, but disagreements over governance resulted in a prolonged impasse. This paper assesses whether conflict management tools could overcome the impasse. This study assessed the CUZ conflict via a systematic methodology known as ethical analysis (EA), which aims to reveal stakeholder interests, values and principles and identify barriers and bridges to negotiated settlements. First developed in the medical field and subsequently employed in the analysis of forestry disputes, this is the first time that EA has been utilized in the protected area management context. The EA revealed significant misalignments between stakeholders' positions that were sufficient to prevent a perfect win–win solution from emerging. At least one party would have to make compromises in order for the CUZ to be established. The EA revealed that whilst both sides in this conflict were willing to move forwards with negotiations, they had been prevented from doing so by mutual mistrust and a number of misconceptions that had developed during the negotiation process. The EA tool was effective in identifying the underlying causes of the CUZ conflict, which were determined to be resolvable if both sides were willing to make compromises. The study concludes that other co-managements could similarly benefit from the employment of EA, which can be easily incorporated into existing protected area conflict management structures. We propose that the utility of EA can be further enhanced in the conservation management context by incorporating assessments of stakeholder priorities and worldviews into its analysis.

**Harvey, Celia**, Conservation International
Smallholder farmers, climate change and on-farm tree cover: the importance of trees in helping coffee and maize farmers adapt to climate change in Central America

Authors: C. A. Harvey - Conservation International; F. Alpizar – CATIE; M. Saborio-Rodriguez - CATIE, UCR; M.R. Martinez - Conservation International; R. Vignola – CATIE; B. Viguera - CATIE; A. Chain - Independent consultant

Smallholder farmers are one of the most vulnerable groups to climate change due to their dependence on rain-fed agriculture, yet there is still relatively little information on how smallholder farmers perceive changes in climate, what impacts they are experiencing, and how they are adapting to these changes. There is particularly limited information on how the conservation and management of on-farm tree cover (e.g., shade trees, live fences, riparian forests, etc.) can help farmers become more resilient to climate change. Such information is critical for designing robust adaptation policies and initiatives for the smallholder farming systems that dominate many developing regions. We present the results of a major interdisciplinary study in Guatemala, Honduras and Costa Rica in which we surveyed >800 smallholder coffee and maize farmers to understand their perceptions of climate change, the impacts they are experiencing, and how they are changing their agricultural systems and on-farm tree cover in response to changing climatic conditions. We also conducted detailed field characterizations of on-farm tree cover in a subset of 300 smallholder farms to better understand how farmers are incorporating trees and forests into their livelihood and adaptation strategies. Our results highlight that climate change is already putting significant pressure on smallholder farmers by reducing crop yields, altering pest and disease outbreaks, decreasing farm income and reducing household food security, although the specific effects differ across landscapes and farming systems. A subset of farmers are changing their farm management practices in response to changing climatic condition. The most commonly adopted practice is the establishment of more trees within smallholder farmers to regulate microclimatic conditions and buffer the impacts of extreme temperatures and rainfall, however some farmers are also turning to the increased input of pesticides and fertilizers to offset adverse climate change impacts. Our results provide important insights into how adaptation strategies can be designed and implemented for smallholder farmers and highlight the importance of the conserving, restoring and sustainably managing on-farm tree cover to help smallholder farmers adapt to climate change.

Hasan, Ali, Université du Maine - GREGUM UMR ESO Le Mans

The use of Tropical Rainfall Measuring Mission (TRMM) and Enhanced vegetation index (EVI) to assess tropical forest degradation

Authors: Ali Fadhil Hasan1, François Laurent 2, Lilian Blanc 3, François Messner 4

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Since 2005, the Brazilian Amazon has experienced a decline of deforestation due to regional and federal public policies and to production chains commitments. But in the fragmented landscapes of the agricultural frontiers, the remaining forests is experienced a process of degradation. Recurrent logging and non-controlled fires coming from the neighboring clearing areas are deeply impacting forest ecosystem services. INPE (Brazilian National Institute for Space Research) estimated that forest degradation rate was twice higher than the deforestation rate, between 2005 and 2010.

The existing methods, like the DEGRAD program from INPE, detect events like fire or logging which cause a degradation, but there is a lack of method to evaluate the medium and long-term consequences on forest structure and vulnerability to climatic events like dryness. We propose a method to assess tropical rain forest degradation based on its vulnerability to dryness. The method was applied in the municipality of Paragominas, located in eastern Pará state, Brazil, and covering 19,342 km². Our hypothesis is that the photosynthetic activity of degraded forest is strongly reduced during dry season. We used vegetation and montly precipitations indices derived from satellite data (Modis and TRMM). Linear regressions were performed for each MODIS pixel, to evaluate the relation between photosynthetic activity and rainfall. Using these indices, previous studies showed that rainfall is not a limiting factor during dry season for a non-disturbed primary rain forests. Indeed, the trees explore deep water storage and reduce dry air stress due to the high and close canopy and the length of the root system. But, the indices were never used to assess forest degradation. The index was processed for the 2000-2015 period and was compared with field observation on the forest structure characterizing the degradation state. The results show that photosynthetic activity is decreasing with the degradation intensity. Forest degradation increase vulnerability to fires and represent a serious threat to forest conservation in Amazonian agricultural frontiers.

Hesselden, Fiona, University of Huddersfield

Exploration of a forest based enterprise’s contribution to livelihoods using Ostrom’s framework for analysing the sustainability of socio-ecological systems

Authors: Fiona Hesselden - University of Huddersfield

Wild coffee collected in the montane forests of southwest Ethiopia provides an important source of income for forest fringe communities in the area. As a high value non-timber forest product there has been some success in harnessing this value through forest product co-operatives in conjunction with benefit sharing mechanisms associated with participatory forest management agreements which seek to achieve sustainable ways of conserving biodiversity and the wild coffee gene pool.

However, a number of production and purchasing challenges have arisen for the forest product co-operatives that have tested their relationship with forest management.

I use Elinor Ostrom’s framework for analysing the sustainability of socio-ecological systems (i)
resource unit; ii) users; iii) governance system; and vi) resource system), to explore the variables that impact on the ability of small forest based enterprises to contribute to livelihoods and wellbeing. Results suggest that the user profile and benefit sharing mechanisms established between the governance system (in this case participatory forest management with some customary ownership) and the enterprise are important variables in contributing to livelihood outcomes and the sustainability of the governance system/enterprise relationship.

This work adds to the literature using Ostrom’s model as a tool at the case study level for diagnosing sustainability challenges and conceptualising explanatory relationships. At a practical level it illustrates how it can be used in the context of forest based enterprises to illuminate specific variables that relate to livelihood benefits (or threats) and related impacts on resources. As such it provides a perspective for analysing the actual and potential contributions of small and medium forest based enterprises to livelihoods and wellbeing.

Ickowitz, Amy, Center for International Forestry Research (CIFOR)

Contribution of forests to diets across five sites in sub-Saharan Africa

Authors: Amy Ickowitz - Center for International Forestry Research (CIFOR); Bronwen Powell - Penn State University

There is some evidence that people living in forested ecosystems enjoy better diets than their counterparts living in non-forested ecosystems, but the extent of these differences and the causes of these differences are still unclear. From 2013-2015, the Center for International Forestry Research conducted a study looking at diets of mother-child pairs in forested communities in five sub-Saharan African countries – Burkina Faso, Cameroon, Ethiopia, Uganda, and Zambia. Using 24-hour dietary recall methods collected in both rainy and dry seasons as well as qualitative data from focus group discussions, we trace dietary patterns at each site across seasons. We examine the source of each food and/or ingredient consumed to see how much foods collected from forests contributed to nutritionally important food groups relative to those cultivated on farm and purchased in markets. We found substantial variation in this contribution across sites – not only in amounts of each food group consumed – but also in the importance of forests to different food groups. We found very different patterns of diets and forest use across rainy and dry seasons. Despite high income/asset poverty at the sites, the quality of diets was relatively high. In all of the sites, diets compared favorably with published data on national or regional dietary patterns. Overall though, we did not find very large quantitative contributions of foods from forests to diets. Much of the contribution that forests make to diets is likely indirect through the ecosystem services that forests provide to agriculture and not the direct contribution to food. We discuss the implications of our findings in the context of recent narratives about food security, nutrition, forests, agriculture, and markets.

Sigamany, Indrani, Independent Researcher

Advocating for Community Forest Rights: Women as Proactive Agents
Authors: Sigamany, Indrani - Independent Researcher

In the Aravalli Hill forests of Rajasthan, where access to justice remains uneven and elusive for indigenous peoples, a group of Adivasi women are claiming land rights through activism. Colonial and post-colonial laws in India facilitated extractive forest resources for profit, till the enactment of the Forest Rights Act of India 2006 (FRA). In theory, the FRA promises land security for forest peoples historically dispossessed of customary land rights and displaced from ancestral lands, and it revolutionizes forest peoples’ potential for legally challenging land dispossession. Using a gender case study of reshaping legal culture, I present a novel conceptual framework and empirical evidence of the struggle for community rights pertaining to land rights, forest based livelihoods, and self-determination. By deconstructing gender inequality and the evolution of an Adivasi forest community’s empowerment, I also outline the barriers to realising forest rights, namely: the legal chronology of land expropriation during colonial occupation, extractive neoliberal policies, and subversive forest governance structures and officialdom. Despite this backdrop of disenfranchisement, I spotlight the emergence of a modest but significant case in the Aravalli tribal culture, of indigenous women’s empowerment in the face of patriarchal realities, emboldened by newly acquired legal forest rights. Since ancestral land is the source of livelihoods, habitat, and a key to maintaining indigenous culture, it plays a vital role for indigenous women. In the context of gender inequality in predominantly patriarchal societies, the threat to forest based livelihoods and loss of lands is experienced more acutely by women whose productive and reproductive roles are so closely interlinked with forest lands forcing them into a vulnerable role. This has dictated an increasing impoverishment, initiating a discourse on the feminization of poverty, in which women comprise the majority of the poor. I weave my socio-legal analysis into how ethnobotanical knowledge and gender roles have been eroded by land expropriation since forest lands became sovereign property in the eighteenth century, and more recently, how some women are finding empowering roles in the struggle for land rights.

Iordachescu, George, IMT School of Advanced Studies

Forest livelihoods policies and ethics of spectacular deforestation of the Carpathians: A critical inquiry

Authors: George Iordachescu - IMT School of Advanced Studies, Italy

A specter is hunting Romania today - the specter of deforestation. Media outlets, NGOs, technocrats and a diverse lineup of public figures broadcast and debate ardently how the country’s forests vanish while asking for steady waves of regulations against the phenomenon. This paper shows how forest livelihoods are affected by the spectacle of illegal logging that permeated recent legislative developments.

Due to intense lobbying of environmental NGOs mirrored by social movements in the urban areas, the Romanian public authorities enrolled over the last years in a wide-ranging reform of environmental policies. A new forestry code was adopted, new bills on forestry sanctions were
discussed and several legal instruments were enforced to mitigate the use and abuse of forest resources. At the same time, national and international sources and community based associations reported a general decline of the volume of timber extracted. Meanwhile half of the households nationwide rely on wood and other organic materials for heating. Around mountainous areas local communities started being portrayed generally as harming the environment following the already well-acknowledged tradition of the Anthropocene debate according to which entire groups of people or collectivities are held responsible for earth-system crises.

The severance of locals’ relation with the forest is mostly visible in those communities that have been historically disenfranchised and upon which both public and private protected areas currently overlap. This proliferation of overlapping protection regimes is seen as post-development of rural areas proposed by a state that mimics public involvement and participation.

Four case studies of forest dependent communities, exhaustive mapping of forestland commons across the Carpathians and ethnographic data on tens of rural households and their dependence on forests complement our analysis of the official statistics on forestry available at national and European level. The findings suggest that spectacular renderings of illegal logging and deforestation mediate social relationships and human – environmental interactions while setting in motion governmental actions which have considerable impact on the livelihoods of forest dependent people.

Our contribution asserts the relevance of analyzing how spectacles of nature disconnect people’s livelihoods and situate their experiences in the discussions about today’s environmental challenges.

Jagger, Pamela, University of North Carolina

Woodfuel Reliance and Human Well-Being: Insights from a Global Study on Poverty and Environment

Authors: Pam Jagger - UNC-CH, USA; Arild Angelsen - UMB, Norway; Nick Hogarth - CIFOR; Sven Wunder - CIFOR

Over 3 billion people globally rely on solid fuels and traditional technologies for meeting daily household energy demand. Understanding the role of woodfuels (fuelwood and charcoal) in meeting energy demand, and the role they play in securing livelihoods is critically important in light of concerns about the health effects of exposure to smoke and the contribution of biomass burning to regional and global climate change. This paper explores the role of woodfuels in rural livelihoods using a global study on forests and poverty with data from 25 countries, 330 villages and over 7,000 households. The focus of the analysis is on the absolute and relative contribution of woodfuels to rural livelihoods, and the demand and supply factors that drive household woodfuel income.
We estimate that woodfuels account for 7.9% of total household income, with woodfuel income roughly twice as important in dry forest ecosystems as in wet forest ecosystems (9.5% compared to 5.2%). Woodfuels are the largest contributor to forest income accounting for 35.5% of forest income. Woodfuels are more almost twice as important as a contributor to forest income in dry forest than in wet forest ecosystems (41.2% compared with 26.5% in wet forest ecosystems), even though absolute woodfuel incomes are roughly equal. Using a series of mixed effect regression models we find that for our sample, there is limited evidence that woodfuels are an inferior good. In general, wealthier households have higher absolute and relative woodfuel incomes. Ownership of a clean cookstove (e.g., gas or electric) reduces woodfuel income, and participation in the charcoal industry increases woodfuel income. We find that forest ownership and investment in tree planting are associated with higher woodfuel incomes for the full sample, and in dry forest ecosystems. We also find evidence of a strong substitution effect for forest vs. non-forest sourced woodfuels in both wet and dry forest ecosystems. Our findings suggest several policy levers for influencing the roll of woodfuels in rural livelihoods, including promoting clean cookstoves and limiting charcoal production to reduce reliance on woodfuel incomes, and planting trees and encouraging private ownership of forests to enhance woodfuel incomes.

Jones, Julia P.G., Bangor University

What are the combined local welfare outcomes of different futures for forest conservation in Madagascar?

Authors Jones, J.P.G. 1; L. Andriamaro 2; A. Cameron 1; C. Harvey 2; J. Hewson 2; M. Mulligan, 3; M. Poudyal 1; B. Ramamonjisoa 4; P. Ranjatson 4; J. Razafimanahaka 5; K. Schreckenberg 6; I. van Meerveld 7

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The ecosystem services supplied by tropical forests, such as biodiversity conservation and carbon storage, have global values and so attract global investment. However forest conservation can have local costs by restricting local people’s opportunity for agricultural expansion. The net impact of forest conservation on local welfare is complex. We present the results of a major interdisciplinary project in a new protected area of eastern Madagascar. We used land use change modelling to compare likely forest cover under business as usual and effective conservation scenarios, extensive empirical and modelling work to explore the impact of forest change on locally valued hydrological ecosystem services, and detailed socio-economic research (with more than 1200 households) to explore the local costs of...
conservation and benefits from micro development projects funded through conservation investments. We show that local people bear significant opportunity costs of forest conservation (50,000 people bear annual costs equivalent to 40-120% of median annual income). While conservation provides cleaner water to up to 12,000 people relative to business as usual, these tend to be people further from the forest edge and so not those bearing the greatest opportunity costs. Micro-development projects have had mixed success at generating local benefits (and there are spatial biases in terms of who is reached). This research underlines the challenge of delivering conservation without harming local wellbeing. We argue that much greater investment in local development is needed alongside forest conservation so it can contribute to, rather than jeopardise, the sustainable development goals.

Karak, Madhuri, City University of New York

Law, Community and Forest Rights in an Indian Resource Frontier

Authors: Madhuri Karak - The Graduate Center, City University of New York

India’s 2006 Forest Rights Act [FRA] was conceived as a historical restitution of injustices meted out to forest dwellers during state appropriation of forest resources since the colonial period. Although the law recognizes individual, community and habitat rights to forestland, the majority of titles under FRA have been granted to individuals, implicitly undermining traditional patterns of land use.

Based on 15 months of ethnographic research in the bauxite-rich, densely forested mountains of southern Odisha, India, I will discuss an indigenous anti-mining social movement’s efforts to reinstate rights to protect, conserve and manage forests as a community. Drawing on a series of Supreme Court rulings, state-appointed expert committee reports, transnational human rights organizations’ appeals and depositions made at India’s first environmental referendum (2013), this presentation will show how a vocabulary of rights does not encompass the Kondh tribe’s relationship to its lands. Kondhs manage forests, cultivate hill slopes and use streams. The value-constituting role of Kondh labor in maintaining the Niyamgiri mountains as a forested commons is part and parcel of a larger matrix of social relations, a way of everyday life that is as much about material practices of use and management as it is about affective care and obligation.

The FRA has been a powerful tool for staking claims and securing access to forest-related livelihoods over the last decade. However, the law’s implementation has privileged individuals as rights-bearing subjects over forest use traditions mediated by networks of clan, kin and marriage. Despite its capacious vision, the FRA’s narrowed praxis is related to and reinforced by the state’s predatory land acquisition impetus for bauxite mining in Niyamgiri. Forest livelihoods, even when protected by progressive laws, are especially vulnerable in resource frontiers. By narrowing the scope of the FRA to individuals – more susceptible to expropriation than a community – livelihoods are compromised in favor of the extractive potential of forests. This case raises an ethically troubling question at the heart of
development: are forests public goods better utilized as extractive capital for national economic growth, or a commons that sustains livelihoods under threat from enclosure and dispossession?

Kassa, Habtemariam, Center for International Forestry Research (CIFOR)

The importance, determinants and implications of smallholder plantations expansion in Eastern African Highlands: A Case study from Mecha district of western Ethiopia

Authors: Berihun Tefera1; Habtemariam Kassa2; Mulugeta Limeneh3

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The general trend in Eastern African highlands has been shrinkage of natural forests and rapid expansion smallholder plantations. This generated debate among policy makers and land use planners. Some fear that plantations are taking over prime agricultural land while others consider this as rationale decision by farmers to better adapt to climate change and respond to growing market demands from nearby urban centers. The drivers, determinants and implications of smallholder plantations on agricultural landscapes are poorly understood. By interviewing 400 randomly selected HHs and using regression models, this study attempted to identify determinants of smallholder plantations. 76.8% of respondents had plantations, and allocated 25% of their landholding for plantations. 8% of planters used all their land for plantations. Those who engage in plantations are mainly the youth who seasonally migrate and engage in non-farm work elsewhere, and women and elderly who face labour shortages to be engaged in annual crop production. HH decision to have plantations were influenced mainly by landholding (P<0.001), livestock ownership (P<0.05), existence of a neighbor who planted eucalyptus (P<0.01) and having better access to roads (P<0.01). Inverse relationship between proportion of plantation area and landholding suggest that farm will continue to have plantations even when farm sizes decline. Income from plantations was used to buy food items (by 40% of the HHs), clothes and other necessities (33%), and agricultural inputs (31%). Non-planters and landless youth also benefited from plantations through raising seedlings, and engaging in planting, cutting, sorting and transporting of wood. The paper also discusses the trends and drivers of plantation expansion, determinants of plantation areas and HHs intention to plant in the future, as well as implications of these for development and land use planning. These trends and driving factors should be understood in considering job opportunities for the youth, and in development and land use planning in the Ethiopian highlands. Further studies are needed to better understand the influence of smallholder plantations on the landscape, their potentials to be linked with wood industries, to maximize labor use patterns, and income sources and levels of households in drought prone highlands of Eastern Africa.

Kassa, Habtemariam, Forests and Human Well-Being Research Team, CIFOR

Migration, Remittances and Forest Dependence in Ethiopia: findings from an on-going study
While migration and remittances are areas that have received a lot of attention, migration and forest links are highly understudied. CIFOR began studies to help fill in knowledge gaps in six countries. The number of international migrants from East Africa, major source of migrants to Europe and the Middle East continues to rise, and in 2015 reached over 0.5 million each from Ethiopia, Kenya and Uganda. These countries receive billions of dollars in remittances annually, and became the largest foreign currency earner for Ethiopia.

This paper highlights findings of a study we conducted in Arsi Negelle district of Oromia Region in 2014/15. Reports show a sharp increase in the number of international migrants from the district. Results of a formal survey administered on 250 randomly selected HHs showed that 7% of all HHs have at least one migrant HH member, and 72% want to send HH members abroad. Among 107 HHs with migrants, 70% have one, 21% have 2 and 9% have more than two migrant HH members, and 81% reported that remittances improved their wealth status. Both males and females migrate, and 92% of migrants are youths, between 16 and 30 years. 85% of HHs with migrants received remittances. 74% of HHs without migrants believe that sending one HH member abroad will significantly improve their socio-economic status. Remittances are used to meet basic needs such as food and cloths, to buy agricultural inputs, to build assets, to start up new business, and to fulfil social obligations like wedding and funeral ceremonies. Respondents believe that remittances help reduce HH dependence on forests. Similarly, 74% of respondents said that remittances reduced their dependence on forests, mainly for wood.

Based on these findings a major study is under way where a panel survey has been administered in 2016 and 2017 to 1056 randomly selected HH from 8 districts in three regional states, from where over 80% of migrants from Ethiopia originate. The study will shade light on the trends and determinants of rural out-migration and its influence on HH forest use behavior, on intra-household division of labor and on household food security.

Kelly, Timothy, School of GeoSciences, University of Edinburgh

The value of valuation? Environmental valuation methods for sustaining investments in forest monitoring and protection

Authors: Timothy Kelly - School of GeoSciences, University of Edinburgh; Ricardo Scacchetti - Altus Impact NGO; Vanja Westerberg - Altus Impact; Deborah Goldemberg - Instituto Beraca; Etienne Silva - Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio)
The monetary valuation of forest goods and services has become a central feature of environmental economic research over the past few decades, one example includes TEEB. However, there is a distinct gap in the research concerning the post hoc analysis of forest valuation studies. While most forest valuation studies are framed as if to address real-world choices in forest management, very few studies examine whether decision-makers subsequently used the valuation results to inform policy or resource allocation. The extent to which forest valuation methods have actually been used to direct government resources would not only provide an important metric for success, but would also indicate the viability of using forest valuation to secure future investments. Our study is inspired by a relatively new body of research that examines the Value of Information (eg. Forney et al. 2012), comparing the cost savings when decision makers either do or do not have access to earth observation data. Examining the efficacy of various forest valuation methods is especially pertinent for the global south, where international commitments to combat climate change have prompted tropical countries to develop forest monitoring and protection systems. As a first step, we examine the wide-range of existing forest valuation methods and identify the most prominent valuation studies for six tropical forest countries, specifically Brazil, Colombia, Mexico, Indonesia, Ghana, and Kenya. Through a desk study, we collate evidence of these forest valuation studies being used to justify government resource allocation, especially with regard to developing national monitoring and protection systems. We then examine the national policies and laws of each country that explicitly reference the value of forests, and identify the points when the legislative rhetoric has actually been supported by government expenditure (see approach by Phelps et al. 2017). Linking forest valuation methods with real-world resource allocation not only demonstrates the practical impact of valuation research, but also helps to build the business case for sustained investment in forest monitoring and protection systems.

Krause, Torsten, Lund University

Defaunation as the Damocles sword in forest governance

Authors: Torsten Krause - Lund University Centre for Sustainability Studies

In December 2015, the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) in Paris highlighted once more that reducing deforestation and forest degradation is of global importance. However, forests and forest fauna are increasingly under threat worldwide. While human activities directly affecting forests, including deforestation (e.g., land conversion) and degradation (e.g., selective logging) have received increasing attention at the UNFCCC, a third “de” - defaunation has to a great extent been overlooked. Forest fauna loss does not only reduce tree species diversity and jeopardize forest people’s food security, it also erodes key ecosystem services and functions. Yet, global forest conservation initiatives currently mandated by the UNFCCC are mainly concerned with preserving tree cover and the potential for forests to act as carbon sinks. The main objective of this paper is to analyze defaunation in the context of global and domestic forest governance. It is argued that the lack of holistic approaches to forest governance, in which the preservation of fauna is adequately considered, threatens the long-
term effectiveness and equity of global and local efforts to protect forests. In turn, the decrease in forest resilience and tree diversity also reduces the long-term availability of non-timber forest products, that is fruit and nut bearing trees, who need forest fauna for their regeneration. To further explore the impacts of this major gap in international forestry governance, a case study in the Colombian Amazon is used to analyze how the current foci and gaps of forest governance across scales affect allocation and access of environmental benefits and burdens in the region. This is particularly relevant in a time where forests are under threat from illegal mining and an onslaught of extractive activities facilitated by renewed governmental interest in controlling natural resources in the previously neglected Amazon region.

**Kutty, Roshni**, Ashoka Trust for Research in Ecology and the Environment (ATREE)

*Forest Rights Act, 2006: Stuck in a maze of bureaucratic interpretations?*

Authors: Roshni Kutty - Ashoka Trust for Research in Ecology and the Environment (ATREE), India

Forests have long been a contested space – by local, regional and global actors. Forest policies formulated by national governments seek to bring about a balance of meeting the aspirations of all these actors. India’s Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (hereinafter referred to as FRA) is one such attempt at forest governance that tries to incorporate the conservation concerns of global and local stakeholders. But, does this law take into consideration the diversity of communities, cultural contexts and forest ecosystems of India while attempting to devolve rights of forest governance to local communities? How has this law been interpreted in these multi-fold contexts?

Using the varied legal forest categories and forest property regimes in Karnataka, India, I showcase the ingenuity with which FRA has been interpreted in various districts of the state. My study examines the reasons for these different interpretations among the implementing agencies and the outcomes of such interpretations on the community, targeted by the law to benefit. My presentation shows how the range of administrative interpretations of FRA has resulted in the dilution of the spirit of the law. The presentation will also show how these administrative interpretations are influenced by factors like political pressure, increasing bureaucratic presence (share of power), ideologies of conservation and inter-departmental mandates. The interplay of these multiple tensions compels genuine claimants to struggle with accessing their rights under the Act and realizing its full potential. The expression of administrative discretion often results in the creation of a cumbersome process of getting forest rights legally recognised, thus limiting the scope of this Act.

This presentation is an attempt to highlight, both for scholars as well as for activists and policy makers, the importance of laying due emphasis to administrative discretion in the implementation of decentralized forest governance tools. It points out the delicate balance that has to be maintained between giving enough space within the Act for local actors to
decide on forest management aspects, while at the same time ensuring that this space is not misused in contrary to the spirit of the law.

**Larson, Anne, Center for International Forestry Research (CIFOR)**

*Gender lessons for climate initiatives: A comparative study of REDD+ impacts on subjective wellbeing*

Authors: Anne Larson - Center for International Forestry Research (CIFOR); David Solis - North Carolina State University; Amy E. Duchelle – CIFOR; Stibniati Atmadja – CIFOR; Therese Dokken - Norwegian University of Life Sciences; Ida Aju Resosudarmo - Australian National University; Abdon Awono - CIFOR

This article uses data from a longitudinal study of subnational REDD+ initiatives in six countries to analyze their gendered impact on subjective wellbeing. Reducing Emissions from Deforestation and Degradation (REDD+) is one approach for implementing the Paris Agreement to mitigate climate change through the land use sector. Like other solutions for addressing global problems, there is much to learn from the experience of REDD+ initiatives that is relevant for future efforts. Although the primary goal of REDD+ is to maintain and enhance forest carbon stocks, much of the framework surrounding REDD+ not only promotes but also requires attention to community wellbeing. Women’s wellbeing, in particular, has been emphasized in recent climate agreements, through the reference to a gender-responsive climate policy, including in the Paris accord, and the 2016 Decision 21/CP.22 on Gender and Climate Change. In addition, goal 5 of the Sustainable Development Goals is to “achieve gender equity and empower all women and girls”.

Comparative research on subjective wellbeing was conducted at 62 villages participating in 22 REDD+ initiatives and 61 control villages at two periods in time, using a before-after-control-intervention (BACI) design. Focus groups with villagers (68% male) and women (100% female) permit a gendered comparison of definitions of wellbeing and outcomes of initiatives. The results suggest that perceived wellbeing decreased in REDD+ villages both for villagers as a whole and for women, relative to control villages, but the decrease was much worse for women. Regression analysis at the village level finds this decline in women’s perceived wellbeing to be significantly correlated with REDD+ interventions. The results demonstrate the importance of gender-responsive analysis. In particular, the results confirm the importance, raised by gender specialists, of taking a gender-responsive approach from the beginning in global climate initiatives: gender is not something to be patched on later.

**Lee, Jean, Colorado College**

*Farmer Participation in a Climate Smart Future Agriculture*

Authors: Jean Lee - Colorado College
Farmer Participation in a Climate Smart Future

Agriculture is a significant driver of deforestation in the developing countries. Pro-poor agricultural carbon projects attempt to lower emissions from agriculture by paying farmers to implement sustainable agricultural land management (SALM) practices that increase crop productivity and reduce greenhouse gas (GHG) emissions. More recently, these projects have been proposed as a way to leverage climate finance for climate-smart agriculture (CSA) projects, which hold the promise of achieving the "triple-win" of mitigation, adaptation, and food security. However, similar to other payment for ecosystem services projects with dual aims of environmental protection and poverty alleviation, the extent of farmer participation—and the delivery of benefits—in such projects remains highly questionable and uncertain.

This research adopts an in-depth, qualitative research approach to understand the extent of smallholder participation in the world’s first smallholder agricultural carbon market project—the Kenya Agricultural Carbon Project (KACP). The study examines farmer eligibility, willingness, and ability to participate through document review, semi-structured interviews, and focus groups. The study found that institutional factors such as strong partnerships and redundancies in actors’ roles increase the likelihood of farmer participation. In addition, the in-depth interviews revealed that addressing farmers’ self-determined development pathways increases the likelihood of farmer willingness to participate. Findings also suggest that focusing on changing farmers’ perceptions of their land and strengthening existing social networks are key leverage points that not only increase their willingness to participate, but also their ability to adopt SALM practices.

REDD+, another carbon market mechanism that has expanded from solely addressing deforestation to also include social safeguards, continues to move forward in the international climate change debates on mitigation and adaptation. Lessons from KACP suggest that those who aim to use the carbon market to fund inclusive smallholder initiatives should encourage international and local actors to collaborate in design and implementation stages of projects. While lessons from KACP shed light on the challenges of smallholder carbon markets, results leave room for optimism that there is potential to leverage climate finance for climate-smart initiatives if project developers have a strong focus on strategies to increase participation.

Lee, Jean, Colorado College

Is Coffee a Solution? A case study of upland farmers in Laos

Authors: Jean Lee - Colorado College; Valentina Robiglio - ICRAF World Agroforestry Centre; Fergus Sinclair - ICRAF World Agroforestry Centre

Coffee agroforestry systems have been promoted as a solution to bolster farmer livelihoods and achieve objectives such as biodiversity conservation and protecting forest cover. The upland region of Laos, where farmers have traditionally practiced shifting cultivation, have been the subject of substantial interest for agroforestry projects.

The Wildlife Conservation Society (WCS), in collaboration with the Saffron coffee company, is
implementing a shade-grown Arabica coffee project in the Nam Et-Phou Louey National Protected Area. WCS’s objective is to reduce hunting pressures on wildlife by increasing farmers’ income, which dovetails with the country’s requirement that all projects must contribute to economic development.

Despite the potential of the project to produce multiple benefits and contribute to overlapping local, national, and international interests (e.g. diversified sources of income, economic development, avoided deforestation and biodiversity conservation), policies that drive land use change and farmers’ livelihood strategies may affect the extent to which this project will be feasible. Through document review and interviews with farmers, this research identifies farmer's current livelihood strategies to assess the extent to which the project can achieve its objectives.

Results showed that while the higher prices of coffee were thought to be an incentive for farmers, the current contract and concession farming system (to support the large-scale production and export of maize) deters many farmers from growing coffee given the relatively large upfront investment and the longer rate of return. In addition, Land Use Planning processes in the late 1970s had resulted in the redrawing of forest boundaries and new forest categories, rendering many farmers uncertain of the different forest definitions, where they could plant the coffee, and whether they would have access to the coffee if boundaries were redrawn again. Results suggest that while localized projects that contribute to farmer livelihoods may seem appealing at first, regional factors and pre-existing conditions such as concession farming would require the project to provide more immediate alternatives. In addition, results confirm that local changes to land use will be unlikely without more explicit and secure forms of land ownership, which will require a high degree of national government intervention and buy-in.

**Liao, Chuan, University of Michigan**

*Anticipating carbon emission in the global land rush*

Authors: Chuan Liao – University of Michigan; Kerstin Nolte - GIGA German Institute of Global and Area Studies, Arun Agrawal – University of Michigan School for Environment and Sustainability

Large-scale land transactions, commonly known as the ‘global land rush’ or ‘land grabbing’, have been emerging throughout the world. The scale and pace of recent such transactions are historically unprecedented, with an estimate of 20-230 million hectares of land having changed hands in the last decade. Despite the growing consensus on negative environmental effects of land use changes induced by the global land rush, its impact on global environmental change is unclear. We analyze the patterns of land and carbon flows in the global land rush, based on a total of 1469 land transactions on 38M ha of land intended for agriculture purposes documented by the Land Matrix Initiative. The results suggest that establishing large-scale farms on the transacted land entails substantial land use and land cover changes. When the natural vegetation is removed on the entire acquired area, we
estimate a total of 2.51 GtC carbon emission. When investors’ farming technology is fully adopted on the transacted land, it is likely that an additional 25.3 MtC emissions will be generated from the use of synthetic fertilizer annually. Our scenario-based analysis indicates that forest conservation policies, organic certification, and other institutions can be effective strategies to mitigate carbon emission at the land clearing and crop production stages.

**L’Roe, Jessica, Middlebury College**

*How are non-farm jobs impacting investment in rural land and plantation forests in Uganda?*

Authors: Jessica L’Roe - Middlebury College Department of Geography

Smallholders often have diversified income portfolios including forest, farm, and non-farm activities. Forest-based livelihood activities clearly affect the health and local value of forests, but it is also important to attend to the knock-on effects of other types of livelihood activities and the factors that condition cross-sector strategies. This study asks how non-farm wages impact rural land use and land investment at the household level. In particular, I focus on the role of land and trees as financial instruments for savings, investment, and insurance. I trace the way land purchases and establishment of tree plantations depend on the magnitude and frequency of wage increments that a household receives. I use publicly available data from the Living Standards Measurement Survey conducted by the World Bank and the Ugandan Bureau of Statistics in 2005 and 2010 to track land purchases and income sources for a countrywide sample of 1500 households. I show that households that receive non-farm income in large increments have higher odds of investing in land, even controlling for total amounts received annually. I use a local-scale case study documenting the extent of investment of wages in land purchases and tree plantations in western Uganda to ground the country-scale analysis. I draw attention to the potential for strengthening viable alternative savings options to reduce land competition and highlight the role that plantation forests may play in smoothing incomes and building assets. I conclude by discussing how these results contribute to debates about whether and how non-farm income takes pressure off rural land and forests or leads to aggregate scale forest transitions.

**Macura, Biljana, Stockholm Environment Institute**

*Evidence synthesis methods to help better understanding of forests and livelihoods*

Authors: Biljana Macura - Stockholm Environment Institute; Neal Haddaway - Stockholm Environment Institute

Systematic evidence syntheses, including systematic reviews and systematic maps, are secondary research methods for collating existing evidence on a specific topic. These methods are used to inform research, policy and practice with best available evidence across a variety of scientific fields: from medicine to international development and environmental management. Systematic reviews aim to answer questions relating to the effectiveness of an intervention or the effects of an impact. Systematic maps aim to describe the nature of the
evidence base in a searchable database, highlighting knowledge clusters (subsets of the evidence base where sufficient evidence exists), knowledge gaps (subjects that have little or no evidence) and methodological patterns in collated primary research. The methods follow rigorous, objective and transparent processes to comprehensively identify and collate all available evidence and minimise bias. The process of systematic reviewing include following steps: 1) review question identification and formulation with stakeholder engagement; 2) peer-reviewed and published protocol that outline the intended methods for the review, 3) comprehensiveness searches for academic and grey literature from a variety of sources, 4) careful screening of all identified articles according to predetermined inclusion criteria, 5) detailed assessment of the susceptibility to bias and generalisability of each study, 6) well-documented synthesis of the evidence base, 7) transparent reporting of the review results with extensive supplementary information, and 8) summary of the review project using a variety of media tailored to stakeholders needs. Systematic reviews and maps are ‘gold standard’ synthesis methods. They are ideal tools for collating growing qualitative and quantitative evidence of human-environmental interactions as they help to better understand complex social-ecological systems, develop or refine theories, identify knowledge gaps, or support forest research, policy and practice decision-making.

Malkamäki, Arttu, University of Helsinki

Authors: Arttu Malkamäki1; Dalia D’Amato1; Nicholas J. HogarthJ.1; Markku Kanninen1,2, Pirard; Anne Romain Toppinen, 1; Wen Zhou2

The socioeconomic impacts of large-scale tree plantations for local communities. Examining the empirical evidence.

1. Department of Forest Sciences, University of Helsinki, Finland
2. Center for International Forestry Research, Indonesia

To meet increasing global demand for industrial round wood, the area of large-scale tree plantations has expanded significantly during the last decades. Concerns about the long-term sustainability of this ex-pansion, and the associated impacts on ecosystem services and local livelihoods have caused controversy. This systematic review synthe-sizes the available literature on the impacts of large-scale planta-tions on local communities, and identifies trends, bias and gaps in the empirical evidence base. All relevant literature from scholarly databases and relevant organizational sources was screened. Following screening and quality assessment, the resulting database had 100 in-dividual studies from which data was extracted and synthesized. Re-sults show no clear evidence that large-scale plantations are bring-ing benefits to local people. This may be partly due to a topical bi-as in the evidence base, with most studies focused on land use con-flicts. However, there was some more recent evidence of livelihood diversification and improved resilience, resulting from improvements in plantation governance. Efforts for multi-stakeholder management of plantation landscapes should be encouraged, but to be successful these management schemes must be balanced, and suitable sustainabil-ity indicators used to monitor progress. In addition, the terms of
multi-stakeholder collaboration cannot be overly conditional or dictated by short-term economic or political interests.

**Marquardt, Kristina**, Swedish University of Agricultural Sciences

*REDD+, forest transition, agrarian change and ecosystem services in the hills*

Authors: Kristina Marquardt - Swedish University of Agricultural Sciences; Dil Khatri - Swedish University of Agricultural Sciences, Forest Action; Adam Pain - Swedish University of Agricultural Sciences

The REDD+ literature in Nepal in its assessment of the likely impacts of REDD+ has paid little attention to the drivers behind the increasing forest cover and the changing role of forests in Nepal’s rural economy. This research explores how changes in the agrarian economy in the Nepalese mid-hills have had locally specific effects on forest area, agricultural practices and ecosystem service (ES) provision and use. The contribution of agriculture to rural livelihoods has declined in many locations and in parallel the demands on community forests have changed. However pockets of subsistence agriculture are likely to remain in the hills and these will remain dependent on forest related ES provision. REDD+’s formulaic approach to forests and carbon sequestration fails to address the question of how forests in different contexts can support sustainable agriculture. The findings draw on field observation and interviews with officials and organisations, forest user groups, forest users and small-scale farmers in Dolakha and Chitwan districts.

**Massarella, Kate**, University of York

*Hype, Hope and Disappointment: The Dynamics of Expectations in Forest Conservation and Development Pilot Projects*

Authors: Kate Massarella¹, ², Susannah M. Sallu², Jonathan E. Ensor³, Rob Marchant¹

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³Stockholm Environment Institute, Environment Department, University of York

This article explores the dynamics of expectations in international forest conservation and development initiatives, and the impacts and implications of (unfulfilled) expectations among actors involved. We develop an analytical framework from the sociology of expectations literature and use it to analyse extensive qualitative data from the case study of REDD+ pilot projects in Tanzania. We find that expectations play a performative role, mobilizing actors and resources, despite uncertainty identified among policy makers and practitioners. We also find that once raised, expectations are dynamic and continually mediated by local realities, and this conflicts with attempts to ‘manage’ them. We argue that a link, or trade-off, exists between fully piloting new initiatives and raising expectations, finding that failure to address this trade-off leads to disappointment among some village level recipients of pilot projects.
Our findings directly challenge the discourse of needing to pilot to overcome uncertainty, which flows from the desire to develop novel interventions. We argue instead for critical engagement with expectations prior to the start of projects and, in so doing, the embedding of accountability for expectations into conservation and development practice.

**Matias, Denise Margaret**, Center for Development Research (ZEF) Bonn

*Tradeoffs between the SDGs and a community forestry enterprise: the case of indigenous honey hunters in the Philippines*

Authors: Denise Margaret Matias - Center for Development Research Bonn; Christian Borgemeister - Center for Development Research Bonn; Henrik von Wehrden - Leuphana University

As global work on sustainable development through the Agenda 2030 kicks into full gear, more effort is needed to emphasize inclusivity of forest communities. Several sustainable development goals (SDGs) are relevant to the development of forest communities; however, pursuing some of these SDGs may come at a cost to the forest communities’ cultural traditions and agency. In order to analyze these tradeoffs, we conducted spatial, quantitative, and qualitative analysis of field data gathered through GPS mapping, community surveys, focus group discussions, and key informant interviews. On a survey on local knowledge of extant honey bee species, only 24% of the 251 local community members surveyed could correctly identify the giant honey bee (*Apis dorsata* Fab.). Inferential statistics showed that correct identification of the giant honey bee is contingent on a low level of education and higher household vegetation. Spatial analysis revealed that mean NDVI of giant honey bee nesting areas has dropped from 0.62 in the year 1988 to 0.41 in the year 2015. This happened in spite of an integrated conservation and development project intervention within the community since the year 1990. In the community forestry enterprise, an integrated value chain analysis showed that downstream actors such as retailers capture most of the economic value of wild honey, i.e., earning 19 times that of the gross margin earned of the honey hunters. Transforming a traditional socio-cultural practice into an economic activity in the indigenous community also negatively impacted their traditional culture. Through these results, we see an indication that pursuing SDGs especially 4 and 15 should be done with the cultural traditions and agency of the indigenous community in mind. In the pursuit of the SDGs, it should be kept in mind that mere focus on economic returns may come at a cost to other intangible yet equally important characteristics of the forest communities.

**Menton, Mary**, University of Birmingham

*How does governance mediate the relationships between ecosystem health and poverty alleviation? A systematic map of the evidence*

Authors: Mary Menton - International Development Department, University of Birmingham; Fiona Nunan - International Development Department, University of Birmingham
Recognition of the links between ecosystem health and local livelihoods has led to an increasing number of projects and policies that seek to protect ecosystems whilst promoting poverty alleviation at the same time. Whilst policies and measures can be designed to deliver ‘win-wins’, effective implementation will be influenced by who makes decisions, what decisions are made and why, and whose interests are taken into consideration. The arrangements for, and processes of, such decision-making can be viewed as forming the ‘governance’ of natural resources, or of forests and their ecosystem services. If the governance arrangements are ineffective and unfair, or produce unsustainable and unfair outcomes, then the potential for sustainable management and poverty alleviation is limited. Conversely, good governance can bring the desired win-win outcomes. The literature relevant to forest governance and well-being is diffuse in focus and approach, drawing on a range of variables, theories and frameworks, thus making it difficult to tease out commonalities and generalisations across contexts. Systematic mapping, a method used to describe and catalogue the available literature and evidence using systematic and transparent review processes, can bring clarity to this topic. We are carrying out a systematic mapping as part of a synthesis project looking at governance research within the Ecosystem Services for Poverty Alleviation (ESPA) programme, which has funded research on the links between ecosystem services and poverty alleviation for a decade. The evidence map assesses the available research and gaps therein regarding natural resource governance, including forests and other ecosystems. We will present the results of this mapping with a particular focus on the ways that governance approaches mediate the relationship between forest ecosystem services and well-being in developing countries. Our work identifies key lessons regarding forest governance that promotes sustainable livelihoods and maps out the knowledge gaps which will require further research on the ground. These lessons provide insights into the governance approaches that can help governments and other actors implement policies and interventions that promote win-wins for both forests and livelihoods.

Meza Prado, Kelly, Natural Capital Project

Putting Suppliers of the Map: A participatory approach to illuminating upstream actors’ roles in water funds

Authors: Kelly Meza Prado - Natural Capital Project, University of Minnesota; Leah Bremer - Natural Capital Project, Stanford University; Kate Bramann - Global Landscape Initiative, University of Minnesota; Bonnie Keeler - Natural Capital Project, University of Minnesota; Pedro Moreno - Water for Life and Sustainability Water Fund, Colombia; Amalia Morales, Association of Users of the Bolo River Watershed, Colombia

Water funds—a type of investment in watershed services programs where groups of watershed stakeholders invest in source water protection—represent a rapidly growing approach to watershed conservation and water with reforestation and forest protection co-benefits. In Latin America, alone, there are over 20 operating programs, with many more in the pipeline working as strategies for watershed protection and forest landscape restoration goals. However, despite their rapid growth, little research attention has focused on the perceptions and perspectives of upstream actors (the ‘suppliers’ of ecosystem services) who
carry out source water protection and reforestation on their land. Understanding and
documenting these perceptions and perspectives is critical both from an equity perspective,
as well as from a durability perspective as water funds are unlikely to be effective over the
long-term without support from local land stewards who feel they are benefiting in an
meaningful way. To address this gap, we carried out interviews and participatory mapping
with farmers, educational centers, and local communities in the ‘Water for Life and
Sustainability’ water fund in Valle del Cauca, Colombia. Interviews focused on participant
motivations in participating in the water fund, perceived benefits and risks, perceptions of
climate change, and the role of water funds in the Colombian peace process. We brought
together the stories, photos, videos, and participatory maps collected in the field and created
a web-based tool which visualizes and communicates the perspectives, ideas, and experiences
of upstream actors. This work highlights the critical role of upstream actors in the co-
production of ecosystem services, as a pioneer effort to put the ‘suppliers’ of ecosystem
services on the map.

**Miccolis, Andrew**, World Agroforestry Centre - ICRAF

*Implementing the Brazilian Forest Code: assessing the potential of agroforestry for mandatory
restoration of conservation areas among smallholders in three case studies*

Authors: Andrew Miccolis, ICRAF; Henrique Rodrigues Marques, ICRAF; Fabiana Mongeli
Peneireiro, Mutirão Agroflorestal; Marcelo Francia Arco-Verde, EMBRAPA; Luciano Mansor de
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The new Brazilian Forest Code obliges all rural landholders to restore parts of their land,
known as Legal Reserves and Permanent Preservation Areas, for the purposes of conservation.
This law allows farmers to use agroforestry systems for such mandatory restoration, however,
it does not specify what this entails in practice, what species can be used and how exotic
species can be intercropped with native trees in ways that reconcile conservation goals with
agricultural production. This wide-reaching policy is in the process of being regulated by
several state governments, which are establishing ecological indicators and monitoring
protocols for verifying compliance with restoration regulations. Our study uses a rapid socio-
environmental appraisal tool to evaluate, among other factors, the extent to which
agroforestry systems are complying with these norms while also meeting smallholder farmers’
objectives. Based on a literature review and case studies in three separate eco-zones, the
Amazon, Cerrado and Atlantic rainforests, we assess the potential of agroforestry for meeting
these ecological indicators, what types of systems are most suited to these contexts and
whether farmers are managing their conservation areas adequately. Our findings show that
the kinds of agroforestry solutions that best meet these mandatory restoration regulations
while also meeting farmer objectives are “successional” or “biodiverse” systems that are
densely planted and have high species diversity, thus imitating natural forest succession
dynamics. However, these systems pose substantial challenges, most notably: they are
knowledge and labour-intensive and require high quantities of a wide diversity of planting
materials as well as access to markets for their agroforestry products. Moreover, continuing
lack of clarity in state regulations, particularly regarding management practices, makes
farmers weary of investing in these solutions because of perceived risks that their management options might not be considered compliant in the long term. These findings are expected to provide key inputs to states in the process of regulating the new law as well as to environmental agencies in charge of enforcing it.

Miller, Daniel, University of Illinois

Mapping the Evidence on the Socio-economic and Environmental Impacts of Agroforestry in Low- and Middle-Income Countries

Authors: Daniel Miller - University of Illinois; Pablo J. Ordonez - Department of Agricultural and Consumer Economics, University of Illinois; Kathy Baylis - Department of Agricultural and Consumer Economics, University of Illinois; Karl Hughes - ICRAF (World Agroforestry Center) Pushpendra Rana - Department of Natural Resources & Environmental Sciences, University of Illinois

The integration of trees into agriculture is widespread across the countries of Africa, Asia, and Latin America. Agroforestry practices, ranging from cultivation of forest gardens to intercropping of trees within annual crop fields, have often been promoted for their environmental benefits, including erosion control, carbon storage, and biodiversity conservation. Such practices have also been shown to provide socio-economic benefits like improved nutrition, greater agricultural productivity, and income generation for rural households. For these reasons, agroforestry is seen as being key to advancing a number of the UN Sustainable Development Goals (SDGs). However, systematic knowledge of what agroforestry practices are effective, for which objectives, under what circumstances, for whom, and why remains lacking. To address this research need we compile and map the evidence on the impacts of agroforestry on agricultural productivity, ecosystem services, and human well-being. We searched six academic citation databases and 30 organizational websites for relevant articles using search terms tested with a library of 40 relevant articles. Articles were screened for relevance against predefined inclusion criteria at title, abstract and full text levels according to a peer-reviewed protocol. We present a visual matrix of the occurrence and extent of existing evidence, which includes four classes of agroforestry interventions and a range of specific outcomes related to broader agricultural productivity, ecosystem services, and human well-being impacts. We identified over 200 relevant studies. Results suggest important biases in the current evidence base, with agricultural yield and ecosystem services outcomes more frequently studied. Economic and material aspects were the most studied human well-being outcomes, with other dimensions (e.g. education and health) relatively poorly covered. Regionally, more studies were in Africa (especially East Africa) and India with comparatively few in Latin American countries. More generally, we find the literature focuses more on adoption of agroforestry practices rather than continuing through to rigorously assess the impacts of these practices. Our study makes clear key linkages where evidence is available for more comprehensive systematic review and highlights important areas where additional primary research is needed to better inform policy and practice to achieve the SDGs in agricultural-forest landscapes across the developing world.
**Mustalahti, Irmeli,** University of Eastern Finland

*How to overcome constraints of conflicting relations between sustainable development goals? Proposing greater transparency and deliberative natural resource governance in Laos*

Authors: Irmeli Mustalahti - University of Eastern Finland

The current development agenda, the 2030 Agenda for Sustainable Development, states that all people, including the poorest and most vulnerable, should be included when implementing the “no one should be left behind” target. However, based on my research, such inclusion seems to be difficult due to the interlinkages between different Sustainable Development Goals (SDGs). This paper exemplifies this challenge through the case of a study in Laos. Here I aim to show how the implementation of the measures supporting SDGs related to environmental sustainability could conflict with the SDGs related to livelihoods and justice. In Laos, the logging and log export ban based on the Prime Minister’s Order (PM’s Order 15), issued in May 2016, is one of the concrete steps towards SDG 13 – to take urgent action to combat climate change and its impacts. And it is also related to two on-going agreements and processes: reducing emissions from deforestation and forest degradation (REDD+) in developing countries, and the EU Forest Law Enforcement Governance and Trade (FLEGT). In this paper, I argue that these agreements and processes are not only mechanisms for implementation of SDGs, climate change mitigation and greater forest legality: These measures are also mechanisms for global environmental governance that can lead to major changes, also constrains, in livelihoods. This paper calls for greater inclusion of actors in participation and implementation of the “no one should be left behind” target in the various processes and instruments; there is a need for transparency and deliberation over the processes in which important decisions about natural resources and land resources are made. In an effort to overcome the constraints of conflicting relations between the SDGs, this paper suggests that SDG indicators could include audits and monitoring carried out by disadvantaged groups in order to track changes in forest-related livelihoods.

**Myers, Rodd,** CIFOR / University of East Anglia

*The messiness of governance: technical and political solutions under REDD+*

Authors: R. Myers – CIFOR; A.M. Larson – CIFOR; A. Ravikumar - CIFOR, L. Kowler; CIFOR; A. Yang – CIFOR; T. Trench - CIFOR

Reduction of Emissions from Deforestation and Forest Degradation (REDD+) was originally conceived to address the global problem of climate change by reducing deforestation and forest degradation at national and subnational levels in developing countries. Since its inception, REDD+ proponents have increasingly had to adapt global ideas to local demands, as the rollout process was met with on-the-ground realities, including suspicion and protest. As is typical in projects involving global actors, in part to coalesce the support of a wide range of actors, much of what has transpired in REDD+ processes centres around technical solutions. We argue that these tend to address issues of justice (or ‘fairness’) in distributive
terms, while political perspectives that appreciate contested claims of recognition and representation injustices are more elusive. Using data collected from over 700 interviews in five countries with both REDD+ and non-REDD+ cases, we argue that the failure to incorporate political notions of justice into conservation projects such as REDD+ results in ‘messiness’ within governance systems, which is a symptom of injustice and illegitimacy. We find that, first, conservation, payment for ecosystem services and REDD+ project proponents applied technical lenses to problems, leading to solutions that focused on procedures, such as ‘benefit distribution’. Second, the focus on the technical came at the expense of representation and recognition. Third, the lack of attention to representation and recognition justices resulted in procedural and outcome illegitimacy. This led to messiness in the governance systems, which was often addressed in technical terms, thereby perpetuating the problem. If messiness is not appreciated and addressed from appropriate notions of justice, projects such as REDD+ are destined to fail.

**Nandigama, Sailaja, Birla Institute of Technology and Science (BITS) Pilani**

*Combining Qualitative and Quantitative Methods to Evaluate Community Forestry Interventions in South Asia: An Experiential Account*

Authors: Sailaja Nandigama - Birla Institute of Technology and Science (BITS), Pilani

One could only count what could be counted. Given this assertion, what is not countable is aborted in the mainstream community forestry interventions. Measuring women’s empowerment is one of the most important and complex concerns of any contemporary conservation and development (C&D) intervention. However, while targeting the communities participating or while evaluating the success and failure of the C&D interventions, the existing approaches are solely relying on countable formal institutional arrangements. The informal power dynamics regulating the traditions and customs of a patriarchal community do not often get any attention they deserve. Even worse, only those developments and practices that can be counted without any ambiguity are taken up by the interventionists working on the ground. Often times, including the complex power relations and social practices of communities in question is treated as unworkable to a large extent. As a result, the qualitative sensibilities get relegated to the background while the mainstream quantitative methods get to enjoy the foreground.

In the same tone, gender equality is aimed to be achieved through a series of ‘gender tools and techniques’ which would result in measurable outcomes. Quite often, counting the number of women participating in the meetings, or documenting the frequency of the meetings—or doing both—becomes the measure of success, rather than appreciating the levels of the actual transformations in gender relations at the community level. To work around this predicament, I have been using both qualitative insights and countable quantitative measures to map the nuances involved in women's empowerment. Using mixed methods, I am able to reflect upon the complex power dynamics at the community level, while being able to represent the actual levels of transformations in women's power and their visibility. This paper argues that a good blend of both the approaches would result in
overcoming the need for propagating only those gender equality measures that are countable. In this paper, I will explain the ways of combining the qualitative and quantitative methods for appreciating the complex realities of socially stratified communities of Global South with illustrations.

**Nasi, Robert.** Center for International Forestry Research (CIFOR)

*The lessons never learned? Development and peatlands in Borneo*

Authors: Robert Nasi – CIFOR; David Gaveau – CIFOR

We just had a large global conference on “Peat Matters” organized in Indonesia concluding about the need to spearhead a “community-first and people-centered approach to peatlands management”. This was following, also in 2017, the “discovery” of a very large, supposedly unknown and largely untouched peatland area in the Congo Basin. These two events to be replaced in the overall landscape restoration discourses and following large peat fires in 2015 that choke the South-East-Asia region. Peatlands seem suddenly fashionable....

At this junction, it might be useful to pause and reflect on more than 40 years of disastrous development decisions, improper management choices, and inappropriate governance on the peatlands of Borneo. In this presentation, we will retrace the historic of peatland area in Borneo, with an emphasis on Kalimantan, and analyze the long-term impacts of development decisions taken in the 60s and still felt today. These decisions triggered one of the largest ecological disaster of the 20th century resulting in degraded lands, impoverished people, huge economic losses and a significant extant of industrial plantations. We will also present a specifically designed monitoring tool, propose options for the future, and distill some lessons learned so that we do not perpetuate or repeat the same past mistakes, in Indonesia and elsewhere.

**Nerfa, Lauren,** University of British Columbia

*Measuring household forest dependence using a metric based on collection of forest products*

Authors: Lauren Nerfa – UBC; Hisham Zerriffi – UBC; Jeanine Rhemtulla - UBC

Rates of deforestation, forest degradation and livelihood dependence on forests are high in tropical landscapes dominated by agricultural communities. In the absence of alternatives due to poverty, subsistence farmers collect multiple products from forests, particularly fuelwood, food and medicinal plants. Household collection of forest products, however, may not to be the primary cause of deforestation and degradation, rather factors such as land conversion to agriculture and over-harvesting of timber are key drivers. Given the trends of deforestation and forest degradation in the tropics coupled with community dependence on forests, quantifying the extent of forest dependence is important for informing approaches to poverty reduction combined with forest conservation.
Forest dependence has primarily been investigated using forest-derived income, notably through the global comparative analysis by the Poverty Environment Network. Ascribing monetary values to forest products may be unsuitable for contexts where households primarily consume rather than sell forest goods and it does not address the burdens on households of relying on forest products (ex. time use). We derive a complementary metric to forest income by operationalizing forest dependence through measures of effort expended and amounts of forest products collected, to account for the livelihood significance of forest use in both absolute and relative terms.

We conducted household surveys on livelihoods and forest dependence in agricultural communities adjacent to a degraded forest in southern Malawi, a densely populated country with high rates of poverty and forest ecosystem change. The surveys elicited data on income, assets and use of all forest products (amounts of each forest product collected per month, time taken to walk to collection sites and household members who collect). Results using the metric of forest products collected will be compared to the forest-derived income method to assess the strengths of the suggested metric for quantifying forest dependence, as applicable in community forestry research. We then employ the forest dependence metric to address the relationship between forest dependence and relative poverty of households.

Ngouhouo Poufoun, Jonas, Laboratory of Forest Economics

What drives livelihoods’ strategies in rural areas? Evidence from the Tridom Conservation Landscape using Spatial Probit Analysis

Authors: Jonas Ngouhouo Poufoun - Laboratory of Forest Economics, INRA; Philippe Delacote - Laboratory of Forest Economics, INRA

Most rural households in the Congo Basin rely primarily on small-scale agricultural activities, harvesting and direct use of forest ecosystem goods and services for their livelihoods including food security, fuelwood, water supply and primary healthcare. Yet, depending on the orientation between land-converting activities and forest resource extraction, effort allocation by households might either increase deforestation, increase forest degradation, or enhance both. Factors governing the decision to adopt a particular land-use or livelihood’s strategy and the extent of their effects are complex and vary considerably from one place to another. These individual decisions will have significant impact on the household’s wellbeing, on the environment, and on the economic value of the landscape and should therefore be taken into account by policy makers. The aim of this paper is to understand which factors drive the choice of activity portfolio in rural regions. More precisely, the role of human, financial, natural and location assets in the portfolio choice is investigated. A unique dataset is used from our recent survey with 1035 random and stratified households in 108 villages of the Tridom landscape to investigate household preferences between (1) specialization and diversification strategies, (2) land-conversion and non-land-conversion activities, and (3) between strategies relying on forest vs other strategies. Our results, using spatial probit model, show significant similarities on the likelihood of households living in the same
neighborhood to prefer a given livelihoods strategy. Beside socioeconomic characteristics, the existence of human-wildlife conflict, as well as the indigenousness, directly lead household’s heads to make the choice of diversified strategies, or to choose activities related to land-conversion. These choices lead to some significant spillover effects on the likelihood of neighboring household’s heads to adopt the same strategies.

**Nolte, Kerstin**, GIGA German Institute of Global and Area Studies

*Labour Market Effects of Large-Scale Agricultural Investment: Conceptual Considerations and Estimated Employment Effects*

Authors: Kerstin Nolte - GIGA German Institute of Global and Area Studies; Martin - Ostermeiera - University of Göttingen, Germany

Large-scale agricultural investments (LSAIs) in general and their socio-economic implications in particular have been heavily debated in recent years. While some claim that LSAIs are an important catalyst for development in neglected rural areas, others caution that they pose a risk to rural communities’ livelihoods. The extent to which LSAIs provide benefits for local communities is hence still contested. This paper sets out to conceptually understand what effects the establishment of a large-scale farm has on the rural labor market in low- and middle-income countries. In addition, we empirically address the question of whether large-scale farming as recorded in the Land Matrix creates or destroys employment. We develop a transition matrix to identify several scenarios based on key determinants of the direct employment creation potential of LSAIs, namely the former land use, the crop type and the production model. We empirically assess the actual importance of these scenarios and the employment creation to be expected from this sample of LSAIs based on labor intensities. We further look into the net employment effects for land formerly used by smallholder farmers. Our analysis shows that LSAIs massively crowd out smallholder farmers, which is only partially mitigated through the cultivation of labor intensive crops and the application of contract farming schemes. This holds true for all regions targeted by LSAIs, although regional differences are found in terms of magnitude. The paper concludes that these effects tend to be large on the local scale (i.e., in the immediate surroundings of the investment site) but small in relation to total national employment in agriculture. However, indirect employment creation related to LSAIs, which is discussed but not empirically addressed in this paper, needs to be taken into account to have the full picture.

**Nomura, Keiko**, University of Edinburgh, School of GeoSciences

*Fate of forests in oil palm concessions in Southern Myanmar*

Authors: Keiko Nomura - University of Edinburgh, School of GeoSciences; Edward Mitchard - Ecometrica; Genevieve Patenaude - University of Edinburgh, School of GeoSciences

How do oil palm companies make decisions to clear forests? Myanmar has more than 400,000 ha of oil palm concessions, but the percentage of areas planted varies significantly by company. Our research investigates circumstances and decision-making factors behind the
nascent oil palm business in Myanmar.

About the Research
In Southeast Asia, deforestation led to a large decline of forest carbon stocks over recent decades, with the rate of deforestation appearing to relate closely to the volume and price of global commodities such as palm oil and timber. However, it has been difficult to assign precise responsibility for forest loss due to the complex sequence of events that lead to land cover change, with there being multiple drivers and underlying causes of deforestation even in a single location. This research will analyse the forest cover change in oil palm concessions in Myanmar, with the aim of identifying factors that explain the ongoing deforestation in these areas.

Methodology
Tree canopy cover data in 2017 and 2018 will be used to assess deforestation as well as degradation rates in different land use types in selected plots, providing the basic data that can be used in combination with other spatial representation of drivers (e.g. distance to roads) to assess the current drivers of tree loss. Comparisons between the two years (2017-2018) allow the identification of forest change dynamics.

Significance
The difficulty and complexity of the problem in addressing drivers has been recognized in many papers on deforestation and land use. Our research will build on the framework that was constructed by Carodenuto et al. (2015) by identifying enabling conditions for oil palm companies to drive deforestation for plantations, which explain the region-specific factors that empower underlying causes of deforestation.

Oldekop, Johan, University of Sheffield

Key emerging issues for forests and livelihoods in the 21st Century

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New global sustainability agendas and multilateral climate agreements have reemphasized the importance of forests, particularly human-dominated tropical and subtropical forests. Research on forest sustainability increasingly recognizes interactions and feedbacks between human and natural systems at inter-continental and global scales. Better understanding these dynamics requires identifying key social, economic, political and biophysical trends likely to have disproportionate impacts on forests landscapes in the medium- to long-term. We advance seven key issues that are not yet widely known or understood, but that may have significant effects on forests and forest-dependent people in the coming decade. These issues span a wide range of topics including climate change, new technologies, infrastructure development, and demographic changes. They were identified by a group of 24 experts (the authors), spanning academic, governmental, and non-governmental organisations using a horizon scanning approach designed to identify emerging threats and opportunities. Understanding and addressing these seven issues could immediately provide policy-relevant foresight and help prioritize both research and practice.

Opincaru, Irina-Sinziana, University of Bucharest

*Forest commons and community development in Romania, Covasna County*
Forest and pasture commons in Romania (obște or composesorat) manage 14% of the forest surface in the country and have a strong historical legacy, functioning as fully-fledged community organizations. Commons all over Romania valorise local resources by selling timber, receiving subsidies or by investing in tourism ventures and contribute with these revenues to the local development. By analyzing over 40 interviews with presidents or directors of forest and pasture commons in Covasna County, Romania, this paper aims to discuss the relation between the commons and the livelihoods of over 40,000 commoners. My study shows that forest and pasture commons in Covasna are the most important engines of development of the rural areas where they exist, having valuable contributions to these areas’ cultural, social and economic environment. Given their significant contribution to rural livelihoods and well-being of poorer and marginalized groups, forest and pasture commons should be taken into account with all their specificities in the creation of the public policies and funding schemes supporting rural areas.

Orjuela, Monica, CATIE

Governance challenges of community forestry: The perspective of local actors in the Biosphere Maya Reserve, Guatemala and the Miskito territory, Nicaragua

Authors: Mónica Orjuela Vásquez – CATIE; Ronnie De Camino - CATIE

Governance of community forestry spans from local to national levels and, in cross-border territories, beyond. This study adopted the perspective of local actors to determine enabling conditions that allow strengthen community forestry in the Maya Biosphere Reserve (MRB), Guatemala and in the Miskito territory in Nicaragua. We applied FAO’s Framework for Evaluation and Monitoring of Forest Governance to identify relevant aspects of community forestry governance across two reference frameworks: Principles, Criteria & Indicators of the FSC, and the principles of Active Territorial Governance. In those cases community forestry are threatened by the lack of political will to deal with the dynamics of opening the agricultural frontier, and the institutional and organizational weaknesses of the community groups, puts community forestry in a position of high vulnerability. In both countries, the principal impediment to community forestry is the governments’ limited capacity or will to effectively control the illegal usurpation of land earmarked for, or with high potential to initiate, community forestry. The resulting advance of the agricultural frontier by diverse stakeholders, ranging from marginalized, often landless people to powerful interest groups involved in both licit and illicit activities, leaves the communities with limited options to resolve conflicts over land and forest use rights. From a local perspective, an inclusive process of territorial planning appears a viable solution to resolve these conflicts over natural resource governance. We conclude with an outlook on how such an integrated management approach at landscape level could be implemented with high degrees of social legitimacy.
**Perge, Emilie**, World Bank

*Forest and Poverty in Turkey: tracking changes with high-frequency data collection*

Authors: Emilie Perge - World Bank; Craig Meisner - World Bank

Steady economic growth over the past decades has brought Turkey to the threshold of becoming a high-income economy. However, forest villages have not benefited from this growth and households are migrating out of forest villages in search of better opportunities. A lack of data on poverty and livelihoods in forest areas limits the understanding of how households can use forest resources to improve their welfare. Such analysis is aligned with two themes: “Pathways to Prosperity” and “Linking Practice and Research.” For this analysis, we collected household panel data. In a first round, we carried out a very detailed household survey on forest resources so as to robustly measure forest-related income from cash and non-cash sources and poverty. We then modeled poverty and forest dependence with a small set of determinants. In a second round, we collected these determinants to predict forest income and poverty.

The analysis of the data provides insights into the factors that shape the contribution of natural resources to household welfare over time. We find that households’ dependence on forest resources increases with poverty levels but that there exist forest-based options to help households improve their welfare.

The second round of questionnaire is often the missing piece in studies on poverty and forests. Data collection being expensive and hard to implement, large-scale household surveys are not representative of forest areas and cannot collect in a frequent manner. The methodology we developed allows one to implement cost-effective and frequent data collections and to measure robustly changes in forest dependence and poverty over time and at representative of forest areas.

This activity can be integrated with satellite images and communication technologies to further measure forest-poverty relationships. The methodology can be used by various program, and be made to fit within their own survey instruments.

**Persson, Martin**, Chalmers University of Technology

*Deforestation and associated carbon emissions embodied in trade of agricultural and forestry commodities – a pan-tropical analysis*

Authors: Martin Persson - Chalmers University of Technology; Florence Pendrill - Chalmers University of Technology; Javier Godar - Stockholm Environment Institute; Thomas Kastner - Senckenberg Biodiversity and Climate Research Centre; Dan Moran - Norwegian University of Science and Technology; Sarah Schmidt - Norwegian University of Science and Technology; Richard Wood - Norwegian University of Science and Technology
The aim of this paper is to provide evidence on how and where global supply-chains link consumers of agricultural and forest commodities across the world to the expansion of agriculture and forest plantations into forests in tropical countries. To this end, we link pantropical, spatially explicit data of forest loss and carbon stocks to agricultural statistics at national and sub-national level (for Brazil and Indonesia), allowing us to attribute deforestation and associated carbon emissions to agricultural crops forestry commodities. Additionally, we estimate carbon emissions for these commodities associated with drainage of tropical peatlands. We then trace these impacts to (final) consumption across the world using an economic, multi-regional input-output model (EXIOBASE) and a physical trade model (Kastner et al. 2011).

We find that across the tropics, in the period 2001–2010, expanding cropland, pastures and forest plantations were responsible for an average of 1.3, 0.8 and 0.5 Mha forest loss per year, respectively. The main proximate drivers of deforestation were beef and oilseeds (soybeans) in Latin America, cereals and vegetables in tropical Africa, and oilseeds (oil palm) and forest plantations in tropical Asia. Associated carbon emission amounted to 510, 270, and 170 MtCO2/year for cropland, pasture and forest plantation expansion respectively, with croplands attributed an additional 380 MtCO2/year due to peatland drainage (a quarter of which is due to oil palm plantations in Indonesia alone). While most of the agricultural and forestry products with embedded deforestation and associated carbon emissions are consumed domestically, in the tropical countries of production, a substantial share (roughly 30%) is traded internationally, with Europe and China being the main export markets.

While earlier studies have used similar methods to show how global land use is being increasing interconnected across scales, this study advances our understanding of the role of domestic and international demand for agricultural and forestry commodities in driving tropical forest loss. A better understanding of these linkages can help inform and support the design of forest conservation policy, both from the supply- and demand-side, by highlighting commodities and trade relations especially implicated in deforestation in different parts of the tropics.

Pokorny, Benno, University Freiburg [Panel abstract]

Including local people in landscape restoration policies: Insights from Peru, Bolivia and Brazil

Authors: Benno Pokorny - University Freiburg; Andrew Miccolis – ICRAF; Valentina Robiglio – ICRAF; Peter Cronkleton - CIFOR

As an important goal endorsed by world leaders in the New York Declaration on Forests during the 2014 UN Climate Summit, the Bonn Challenge established a global effort to restore 350 million hectares of degraded and deforested lands by 2030. Accordingly, regional implementation platforms are emerging, such as the 20x20 Initiative launched at the COP 20 in Lima, which aims to bring 20 million hectares of degraded land in Latin-America into restoration. Rather than taking a pure reforestation approach, the Bonn Challenge adopts a Forest Landscape Restoration approach, which aims to restore ecological integrity and
simultaneously improve human well-being through multifunctional landscapes. This means that local people and communities are at the heart of the effort. However, considering experiences with conservation initiatives such as PES, REDD+ and ICDPs, it is likely that the Bonn Challenge will struggle to address needs and interests of local people in face of competing development agendas, even more as proponents explicitly expect the private sector to play a leading role. By exploring cases from Peru, Bolivia and Brazil, this session focuses on three questions: (1) How are local peoples’ needs and objectives considered in emerging restoration programs and policies? (2) Do local people have significant capacity to contribute to landscape restoration goals? and, (3) How can restoration proponents and policies tap into existing potential and relevant indigenous knowledge? The four presentations critically reflect on these question as a basis for further discussion. The presentations demonstrate the importance of local people for achieving restoration goals, and will present illustrative examples of attempts to integrate them into restoration efforts. However, the cases also reveal how current initiatives struggle to incorporate local peoples’ capacities and interests and adapt programs accordingly. In their attempt to achieve ambitious quantitative success indicators, many initiatives may ignore the needs of local people or miss opportunities to integrate them, thereby risking their initiative’s long-term success. There is a need to use more systematically the vast existing knowledge on possibilities of restoration that more effectively include the human component to positively stimulate local potentials.

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*Relevance of local people for the success of conservation initiatives: A critical reflection on evidences from the Bolivian, Peruvian and Brazilian Amazon*

Authors: Benno Pokorny - University Freiburg; Steffen Entenmann Johnson - Consultant Bolivia

There is common agreement about the importance of integrating local land users in contemporary initiatives for land restoration so to guarantee local benefits and long-term success. However, in the attempt to achieve the ambitious restoration goals, emerging initiatives tend to emphasize on large-scale programs implemented by companies and private investors in which local people play an only marginal role, if at all. We intent to create a better understanding on the relevance of local land users in such initiatives by critically analysing their role in forest conservation initiatives—particularly Protected Areas and Forest Concessions—found in the Amazon region of Bolivia, Brazil and Peru. Through the analysis of satellite images, deforestation statistics, census data, and documents, we will first categorize the range of conservation schemes regarding the role and assumptions given to local people and the generated local benefits. The corresponding conservation areas will be localized, and analysed regarding their environmental and social performance. We will then compare the calculated indicators to assess to what degree they support the initial expectations. Findings indicate that all initiatives are considerably influenced by local people. Conservation approaches ignoring this fact, such as large-scale timber concessions, hardly achieve their
conservation goals. But, also approaches in which local people play a stronger role may not achieve their goals due to unrealistic assumptions about local needs, capacities, and benefits generated. Our findings suggest that efforts for the conservation and restoration of forest ecosystems should not only be oriented towards local people’s capacities, but also need to take care for realistically satisfying local development interests. The high expectations in the private sector to become the leader of conservation and restoration initiatives should be seen with caution.

| Porro, Roberto, Embrapa Eastern Amazon |

*Community forest management, spatial mobility and deforestation: challenges for forest / agriculture integration at an environmentally-focused land reform scheme in Anapu, Eastern Amazon*

Authors: Roberto Porro - Embrapa Eastern Amazon; Noemi Sakiara Miyasaka Porro - Federal University of Pará

The intense spatial mobility of land reform settlers toward better livelihoods has been presented as one of the main causes of deforestation in the Brazilian Amazon, as it reconciles environmental, economic and social objectives. Sustainable forest management by smallholder communities is frequently included as a strategy of government agencies and NGOs to revert deforestation trends. In this study we aimed to understand the connections among participation in community forest management (CFM), plot turnover, household income and deforestation. Despite the difficulties for the feasibility of community-based forest management, it remains one of the few alternatives for local governance in contexts under forest cover. Yet, public policies and programs for forest conservation based on local collective actions are still poorly understood and lacking public support. Our empirical research was carried out in an environmentally focused land reform settlement near the Transamazon highway, the Virola-Jatobá Sustainable Development Project (PDS) in the municipality of Anapu, Pará state. Social struggles in the Anapu PDS, whose most visible expression was the murder of Dorothy Stang in 2005, provoked developments that, even after a decade, still influence local livelihoods and forest integrity. In this settlement, CFM has been for over a decade a major governmental instrument to curb deforestation, avoid land turnover and improve income. Direct observation in anthropological action research shows that CFM will only succeed if resulting from collective action assembling the diverse and divergent social groups in the PDS. We also identified that specific social norms related to swidden, slash-and-burn fields have the potential to generate collective action, even towards forest management. Our data show that rather than the resources derived from the CFM, it is their incorporation into the founding institution, the swidden fields, that support the continuity of local livelihoods, and consequently desirable levels of income, reduced spatial mobility and feasible deforestation control goals. Considering the local diversity of actors and complexity of contexts, we conclude that the adjustment of social norms, now connecting swidden fields to forest management is a critical condition for the effectiveness of CFM and the environmental land reform modality.
Poudel, Amir, Center for Natural Resources Management, Analysis, Training and Policy Research

Migration, Youth Workshops and Forestry: Case Studies from Nepal

Authors: Amir Poudel -Center for Natural Resources Management, Analysis, Training and Policy Research (NARMA), Johns Hopkins University

Migration of people from rural areas to cities and foreign countries is drastically increasing in Nepal. This changing dynamics is impacting forests by limiting the number of people that take part in enterprises such as non-timber forest products and eco-tourism among others. With mostly young members migrating, there is already a vacuum in the number of entrepreneurs who strive for such enterprises. The need to stop this migration trend is very urgent. I adopted case study approach to show three examples of how community has been successful to retain its youth population. I conducted ‘youth workshops’ in community forests of Dolakha, Tanahau and Chitwan to understand why youths in the area did not opt for migration. I show that if given a platform (like youth workshops) to express their plans with knowledgeable persons (like forest rangers, forest experts), people can actually change their decision not to migrate from their locality and strive to get involved locally. I also show that these youth workshops could be a potential venue to communicate new forest management and income generating ideas. While there are literatures linking migrations with various features of forestry, there is a lack of understanding of ways to retain and engage the migrating people in local forest based enterprise and other forest management activities. The process adopted during such youth workshops and findings that came out of this study could be used in other localities of Nepal and elsewhere.

Prado Córdova, José Pablo, Universidad de San Carlos de Guatemala

Bottom-up drivers for ethically oriented forest policies stemming from contemporary grassroots initiatives in rural Guatemala

Authors: José Pablo Prado Córdova - University of San Carlos, Guatemala

Social mobilization plays a major role in nature appropriation strategies. Current forest policy debates seem to bring about a contentious dispute over social core values, i.e. a rational utility-maximizing agent at odds with an emancipated subject more in line with collective action, reciprocity and giving. Most policy frameworks, however, tend to be devised with the aim of administering forest resources under the assumption that rational choice and utility-driven subjects will abide by the market workings vis-à-vis global needs for raw materials or ecosystem services. These policies seldom factor in local efforts carried out by rural communities whose imaginaries hinge on a sense of belonging. This paper departs from field-based work undertaken over the period 2014-2017 in three sites in Guatemala, namely: (i) Ciudad Peronia, where a local community managed to bring about a transfer of land rights from the Army of Guatemala to the National Council of Protected Areas in order to establish a nature reserve; (ii) Tacaná, where small-scale farmers promote agroecology and spread a land
ethic in the region; and (iii) the organized resistance along the southern coast, where sugar-cane land lords bring about negative externalities by tampering with Madre Vieja river for irrigation purposes. All three sites were analysed by conducting in-depth interviews. Forest-related issues popped out in all cases, namely: (i) by preserving forest species in the newly created nature reserve; (ii) by differentiated fuel wood consumption levels and a deeply sense of connection with the (forest) land in Tacaná; and (iii) by a forest-restoration argument as one of the main tenants of local efforts to halt river manipulation along the southern coast. This analysis shows the emerging theoretical insights in line with the need for a social contract and a solidarity-based economy exemplified by the ethically grounded drivers behind local advocacy efforts and social mobilization.

**Pritchard, Rose**, University of Edinburgh

*Rural livelihoods and the ‘tyranny of trees’ in African savannas*

Authors: Rose Pritchard - School of Geosciences, University of Edinburgh; Casey Ryan - School of Geosciences, University of Edinburgh; Isla Grundy - Department of Biological Sciences, University of Zimbabwe; Dan van der Horst - School of Geosciences, University of Edinburgh

The ‘tyranny of trees’ describes the fear of savanna ecologists that degradation narratives developed in closed-canopy forest are motivating ecologically inappropriate afforestation programmes in savannas. However, this debate has focused on the biodiversity and ecological functioning of savannas and open-canopy woodlands, with no analysis of the role of trees in the livelihoods of environmentally-dependent rural communities. The miombo woodlands of southern Africa have been identified as vulnerable to misguided interventions maximising tree cover, but are also key to the livelihoods of around 150 million people, making it critical to understand how changed landscape structure could impact rural wellbeing. Here we draw upon a case study of six villages in central Zimbabwe to assess the importance of trees in savanna systems to rural households. We firstly present woodland survey data quantifying the relationship between woody biomass and six key provisioning ecosystem services and demonstrate that declining woody cover is associated with declines in the availability and quality of all studied services except fibre. We then use household survey data to quantify the importance of woodlands to household income portfolios, showing that 37% of net household income is derived from environmental resources such as firewood and that 68% of this environmental income is derived from tree-dominated land cover types. We finally consider the importance of woody resources in household coping strategies, finding that wild fruit trees provide a ‘final safety net’ in periods of extreme hardship. We conclude that it is crucial to recognise the woodlands in southern Africa as human-dominated socioecological systems, where trees are a critical component of the landscape. Any discussion of the ‘tyranny of trees’ is therefore incomplete without consideration of the role of trees in rural livelihoods, and there may be many situations where tree planting can improve the resource base upon which the rural poor rely.

**Habimana, Didier**, FAO

*A new tool for assessing the extent and effectiveness of the community-based forestry*
In past decades considerable attention has been paid to CBF and related forest tenure transformation as a potent vehicle to involve communities in practicing Sustainable Forest Management (SFM) and governance that promotes and safeguards livelihoods. The application of CBF around the world has gradually lead to the extension of forest area meant for collective and smallholder management. However, despite the growing focus on the topic, there has not been a systematic assessment on the extent and effectiveness of various types of CBF regimes at a global scale due to the complexity of assessing a wide variety of approaches utilized throughout the world. For this reason FAO embarked on a process of developing and testing a standardized assessment framework based on clear generic criteria and indicators that can be applied nationally for the collection of both qualitative and quantitative data. This tool was designed with the aim of enabling a systematic assessment of the extent and effectiveness of existing CBF regimes, and also to determine the level to which legal recognition or transfer of forest rights to communities contributes to sustainable forest management, and provides improvements in key environmental, social and economic outcomes that benefits smallholders and communities. The initial conceptualized framework benefited greatly from inputs during an expert meeting held in Rome in May 2015. Based on agreed methodological modalities that would ensure the framework best applicability at national level, the tool was successfully applied in fourteen countries. These country assessments provide a range of information on the extent of existing types of CBF regimes addressing their respective policy objectives, area coverage, as well as associated rights. They further measure the overall effectiveness of these regimes by looking at three key classes of capital assets: the natural, social/institutional and human, and financial. The Authors concluded that the assessment framework has proven to be effective in measuring the impact and effectiveness of CBF. Finally the compilation of the fourteen CBF assessments shows that the stronger the legal recognition or transfer of forest rights to communities and smallholders there is, the more tangible are improvements in SFM, environmental, social and economic outcomes.

Reed, James, Center for International Forestry Research (CIFOR)

*Means and ends: Attributes and action points for reconciling conservation and development*

Authors: James Reed - CIFOR/Lancaster University; Josh van Vianen – CIFOR; Rachel Carmenta - CIFOR/Cambridge University; Jos Barlow - Lancaster University; Terry Sunderland - CIFOR

In response to the recognition that sectorial approaches to land management are inadequately meeting persistent global challenges of poverty, food insecurity, and biodiversity loss, more holistic approaches to land management are increasingly being sought to reconcile conservation and development at the landscape scale. Such “integrated landscape approaches’ have recently been embraced by researchers, donor communities, conservation and development agencies, as well as becoming ubiquitous in international conventions for climate, biodiversity, and development. Despite this, implementation efforts and evaluation of
progress of landscape approaches remains challenging. We have reviewed evidence from across the tropics to identify attributes and action points that have been deemed to be of practical use for the implementation and evaluation of landscape approaches. We have used principal component analysis to synthesize frameworks for integrated approaches to highlight where areas of congruence exist and consider how this compares with recent reviews of landscape approaches in practice. We then provide a summary of action points that we have documented within categories of: (i) incentivizing behavioral change, (ii) monitoring and evaluation, (iii) modelling and scenario building, (iv) stakeholder engagement, (v) advances in spatial mapping, and (vi) navigating complexity. This article provides a valuable resource for actors operating across the spectrum of research, policy and practice as we continue to develop the means by which we will fulfill such global commitments as the New York declaration on forests, the Aichi biodiversity targets, and the goals of the climate and development agendas. Our synthesis of the evidence provides a useful starting point for overcoming implementation and evaluation challenges, identifies where further research is required and serves to reduce duplication of future research efforts.

Reed, James, Center for International Forestry Research

Bridging Finance Gaps for Climate and Development: Pitfalls, Progress and Potential

Authors: James Reed - Center for International Forester Research; Yitbarek Tibebe Weldesemaet - Environmental Society of Ethiopia; Zelalem Tibebe Weldesemayat - Ethiopian Chemical Corporation

In a world where natural capital is often unpriced or undervalued, thus making resource exploitation very lucrative, environmentally degrading activities will continue to dominate the economy. The past decade has seen a bourgeoning interest in scaling up private investment to address persistent socioeconomic and environmental challenges globally. The recently formulated sustainable development goals and global climate agenda have further heightened the urgency for a more holistic and integrated conceptualization of transitioning towards a sustainable low-carbon economy. Despite the increasing appeal of green finance as a concept, the delivery of an empirical evidence base that illustrates the effectiveness of projects aligned with climate action and sustainable development—both in terms of measurable performance and value for money—has been less forthcoming. Concurrently, there have been numerous claims of the potential of ‘unlocking’ the trillions of dollars of private finance that is available for investment. We perform a critical analysis of literature from across a spectrum of research topics to explore the inhibiting barriers and apparent disconnect between the purported available—or required—finance and the actual finance invested in sustainable development. Furthermore, we consider actions that government agencies and the research community might consider in order to better incentivize private investment in developing and low-income countries that will facilitate low-carbon sustainable development. We provide suggestions for fiscal and policy reform in addition to identifying the need for a centralized reporting and convening body. We conclude that far more coordinated efforts are required to encourage investments in long-term and sustainable landscape-scale initiatives. Current efforts at securing finance, implementing initiatives and
building the knowledge base are accelerating but remain fragmented and often sectorial in their nature and thus we offer some key recommendations for areas of future progress.

Roberntz, Peter, WWF Sweden

*The Fair Wood Research Project – Realizing the opportunities with community timber value chains*

Authors: Peter Roberntz - WWF Sweden; Aaron Kaplan - Eco-Innovation Foundation

Deforestation and degradation is often driven by immediate local needs and lack of incentives to preserve and manage natural forests. Examples of donor independent and successful long-term sustainable community projects in tropical forests are few whilst many development organizations struggle with responsible exit strategies. At the same time restoring and managing natural forests offer opportunities which are underutilized today. One of these opportunities is the development of sustainable and equitable timber value chains. However, due to past failures, there are perceptions that community timber production for high end markets is not a viable option and priority is often given to Non Timber Forest Products (NTFPs).

WWF, EIF, Pivot Point and FSC partnered to investigate more about the feasibility to develop a program, named Fair Wood, which could support community timber value chains. Funding was received from Sida for a one year Fair Wood research project which was finalized in early 2017. Research was conducted both upstream the value chain, i.e. in a selected number of community forest sites, and downstream at the market end.

The Fair Wood research project confirmed previously known, but also less known barriers why communities with forest tenure and use rights have difficulties to produce timber for local and export markets. Challenges are, amongst others, insufficient focus on the forest resource including silviculture, wasteful and poor wood processing, elite capture, transportation issues and insufficient innovation at the market end. However, research indicates that these challenges can in many cases be overcome, if coordinated support with adequate knowledge throughout the value chain and patient finance are at hand. Innovations in product development with lesser known tree species also offer opportunities. Furthermore, companies both upstream, i.e. at the local forest management and processing end, and downstream, i.e. at the consumer end, show an interest to support communities to become part of timber value chains. Hence, the support in timber value chains could become one of many strategies to both strengthen local livelihoods and conservation. Research results have been translated into a modular approach that should be tested with a selection of existing community forest projects.

Robiglio, Valentina, World Agroforestry Centre - ICRAF

*Mainstreaming an Option by Context approach to support public policy decision making about sustainable cacao production in Peru*
Authors: Valentina Robiglio - World Agroforestry Centre - ICRAF

The impressive booming trajectory of cacao expansion in Peru raises concerns from sustainability and environmental impact perspective since expansion is deemed to be driving deforestation and forest and land degradation processes in the Amazon in a country that has internationally engaged in an ambitious and challenging deforestation reduction process to be achieved by 2021 and where there is and increasing demand for deforestation free products. During one year the ICRAF team in Peru facilitated a co-learning process engaging government stakeholders and technical experts to raise awareness and support decision making in moving towards an integrated framework for sustainable and low carbon cacao development. The present paper presents the first steps in the process during which an Option by Context analytical framework was proposed to qualitatively explore producers’ management practices, their productivity and environmental outcomes in support of technology, financial tools and policy design. Expert knowledge was used to frame production practices as articulated options, identifying major opportunities, bottlenecks and barriers to their implementation at the household level that is intended as the level where decisions about land use change resources management and practices are taken. This paper documents the process and discusses the added value of framing emerging environmental challenges related to cacao expansion as options to achieve desired outcomes beside productivity and based on that support the design of appropriate interventions for a transition towards a more sustainable cacao production in the Peruvian Amazon.

Robiglio, Valentina, World Agroforestry Centre - ICRAF

Forest landscape restoration: new opportunities or known threats for smallholder farmers at the agricultural frontiers in the Peruvian Amazon?

Authors: Valentina Robiglio - World Agroforestry Centre – ICRAF; Reyes Martin - World Agroforestry Centre – ICRAF; Lourdes Quiñones - World Agroforestry Centre - ICRAF (consultant); Benno Pokorny - University of Freiburg

In response to the Initiative 20x20 Peru has joined other Latin-American countries, by developing policies to stimulate restoration, including efforts targeting smallholder productive landscape mosaics. This paper draws on Authors’ on-going experience of contributing to a pilot initiative in support to the formulation of the Forest Landscape Restoration (FLR) roadmap for the province of Padre Abad in the Peruvian Amazon and seeks 1) to assess opportunities for the successful inclusion of smallholder farmers in sub national restoration processes and 2) to characterize the restoration options and the enabling framework to promote them. To do so we first assess the institutional and policy framework within which restoration is expected to occur by reviewing past and currently enforced environmental and agricultural development policies and initiatives in the area of study and evaluating their outcome in terms of potential synergies and conflicts in relation to smallholder livelihoods strategies and landscape mosaics dynamics; we then assess farmers preferences and implementation capacities to select restoration options among locally adapted endogenous practices and technologies emerging out of development projects promoting agricultural,
agroforestry and forestry innovation. Eventually we evaluate the potential contribution to FLR of the practices and technologies selected, by delineating zones within the mosaic in which they might be adopted and scaled. The paper shows that smallholders can effectively contribute to FLR through options that meet their livelihoods strategies in particular production targets. We anticipate that initiatives for the restoration in forest landscape mosaics should put smallholder’s participation at the centre so to guarantee effectiveness and long-term success and deliver innovative strategies to integrate agricultural and forestry policy.

**Rodriguez, Claudia**, Dartmouth College

*Institutional legacies and the comparative efficacy of protected areas: Evidence from the Calakmul and Maya Biosphere Reserves of Mexico and Guatemala*

Authors: Claudia Rodriguez - Dartmouth College; Tara Grillos - Purdue University; Patrick Bottazzi - Bangor University; David Crespo Rocha - Bangor University; Nigel Asquith - Fundación Natura Bolivia; Julia P.G. Jones - Bangor University

Although there is abundant evidence that some protected areas are more effective than others at achieving conservation goals, little attention has been paid to understanding the reasons why some protected areas are more effective than others. We argue that an important, but often neglected, factor is the history of institutional development that pre-dates protected area establishment. Through a comparative analysis of pathways of institutional development in two internationally adjoining protected areas, Calakmul and Maya Biosphere Reserves in Mexico and Guatemala, we demonstrate that differences in farmer and community-level conservation behavior between the two reserves are the result of differences in land tenure systems that pre-date reserve establishment. Farmers and communities in the Calakmul Biosphere Reserve have more favorable attitudes towards conservation, conserve more forest on both individual and community land, and are more likely to create conservation reserves on both land types. Differences in land tenure systems resulted in a lower population density, greater tenure security, and greater economic and political equality in the Calakmul Biosphere Reserve. The result is that farmers and communities in Calakmul are more able to conserve because individuals hold more land than is necessary for subsistence, lack the manpower to convert to large-scale commercial production, and have built a political system which has shared benefits from forest conservation more equitably. Our work highlights the value of understanding historical political and institutional conditions in the design and development of effective protected areas.

**Salk, Carl**, Swedish University of Agricultural Sciences

*Do not attend this talk if you already agree that games are a useful tool for forest assessment, research and engagement*

Authors: C. Salk – Swedish University of Agricultural Sciences; S. Redpath – University of Aberdeen and Swedish University of Agricultural Sciences; H. Andren - Swedish University of
Games are a practical tool for understanding and influencing forest livelihoods and conservation. While appreciation of games is growing, many conservation researchers and practitioners remain uncertain about their utility, unaware of their breadth of purpose, and unclear how to implement them. Here, we present results of a recent workshop that produced practical guidance on types, objectives, selection and ethics of conservation-related games. We divide games into three classes: theoretical models, experiments and role-playing. Each of these has a unique combination of advantages and limitations. Theoretical models can quickly suggest whether understanding of a system is correct. Experiments provide evidence of interventions’ effectiveness, but are necessarily simplifications of reality. Role-play offers exploration of a broad range of dynamics and outcomes with real human agents, but can be tricky to document and generalize.

We identified six broad conservation-related objectives which games can further, but not all classes of games are relevant to all objectives. Most types of games can (1) provide insight into how conflicts emerge, evolve and resolve. Theoretical and role-playing games can (2) help identify stakeholder interests and resource dynamics, and how they affect conflicts and behavior. Role-playing games may be particularly effective at (3) promoting listening, dialogue, shared understanding and development of innovative approaches among stakeholders. Role-play and experiments are useful to (4) understand how different interventions and institutions change stakeholder behavior, and role-play may help (5) bring about actual change in stakeholders’ behavior. Finally, theoretical and experimental games are useful tools to (6) develop new theory.

We end with a discussion of ethical considerations and other barriers to conservation-related game use and how they can be addressed. Taken together, these findings show that games have an important role in expanding the scholarly literature and exchanging insights among forest stakeholders.

Sassen, Marieke, UN Environment World Conservation Monitoring Centre

Quantifying changes in ecosystem services provision in coffee and cocoa agroforestry systems

Authors: Marieke Sassen - UN Environment World Conservation Monitoring Centre, Plant Production System Group, Wageningen University and Research; Arnout van Soesbergen - UN Environment World Conservation Monitoring Centre, Environmental Dynamics Research Group, King’s College London
Historically, coffee and cocoa production has been an important cause of tropical forest loss and degradation. Yet, cocoa and coffee agroforestry also contribute to the livelihoods of millions of smallholder farmers. They support important ecosystem services both locally and in the wider landscape, such as water and climate regulation, soil related services, pollination services, carbon sequestration, habitat services, etc. These services are often not recognised and taken into account in farm and national level decision-making. As a result, traditional low-input multi-functional agroforestry systems with high tree shade are being transformed to high input low shade monoculture agroforestry or replaced by non-tree based seasonal cash crops. Yet, tree cover in coffee and cocoa agroforestry can contribute not only to sustainable production at the local level, but also to national level targets regarding deforestation and reforestation, as set out under national REDD+ strategies, the SDGs, Aichi targets and land restoration commitments. In this study, we modelled the potential gains and losses in ecosystem services from coffee and cocoa systems under different future landuse change scenarios - expressed as tree cover change - in focus production districts in Ethiopia and Ghana respectively. Scenarios included: conversion of existing agroforestry to monoculture maize, decreasing or increasing tree-shade and expansion of agroforestry to areas with lower tree cover. We used a hydrological model to assess change in freshwater provision, water quality and soil erosion, and adapted equations relating crown cover to above ground biomass to estimate change in carbon stocks within the main hydrological basins affected by the production areas. Carbon and soil erosion were most affected: increasing tree cover increased carbon stocks and decreased erosion risk. Water quality overall improved with increased tree cover, whilst water provision varied with the water use of different vegetation types. Importantly, this study highlights gaps in knowledge and data for quantifying ecosystem services provision from agroforestry systems at the national or sub-national scale. The results from the modelled scenarios and the further assessment of their implications for the values of ecosystem services flowing from these systems can help clarify potential consequences for local livelihoods, national economies and REDD+

**Scacchetti, Ricardo.** Altus Impact Lasse Loft, Leibniz Centre for Agricultural Landscape Research (ZALF), Institute of Socioeconomics, Germany

*Fostering non-timber forest products: The case of the Rio Cautário Extractive Reserve in the Amazon*

Authors: Ricardo Scacchetti - Altus Impact Lasse Loft, Leibniz Centre for Agricultural Landscape Research (ZALF), Institute of Socioeconomics, Germany; Stefan Gehrig - WZB Berlin Social Science Center, Markets and Change, Germany; Dung Ngoc Le - Center for International Forestry Research (CIFOR), Vietnam; Jens Rommel - Leibniz Centre for Agricultural Landscape Research (ZALF), Institute of Socioeconomics, Germany

In this paper, we present how a project in the Rio Cautário extractive reserve (Rondônia, Brazil) helped communities to build a successful strategy to foster local non-timber forest products (NTFP) value-chains.

Rondônia is the state with the highest rate of deforestation in the Brazilian Amazon. The Rio
Cautario reserve was created in the mid-90s, allowing forest-dwelling communities to acquire rights to sustainably exploit natural resources and live in the reserve. The protection of forest resources is therefore in the hands of the local communities, who face ever-increasing pressures from timber and agribusiness sectors. The sale of NTFPs accounts for a significant part of communities’ income, offering pathways towards sustainable livelihoods as opposed to logging and cattle ranching.

Our project included both research and action, targeting to combine three aspects: 1) reserve’s forest resource potential (type and volume of products available in the forest), 2) communities’ social organization (skills and intra/inter-community relationships), and 3) NTFP markets (market opportunities and difficulties of each product). Research methods included a forest inventory, semi-structured-interviews with community and market-players, workshops, and secondary-data analysis. The action phase used these data to help the community to develop a concrete action plan and governance.

Acknowledging the main causes that lead many market-driven forest initiatives involving smallholders in the Amazon to failure (Pokorny, 2010; Amaral, 2005), our project built a cost-efficient approach that allows forest communities to make the most of NTFP-markets. The project’s emerging success is based on several factors, in particular the significant national NTFP-market growth (IBGE, 2016) and market players’ commitments to Corporate Social Responsibility. However, positive supporting conditions already in place - including public incentives, infrastructure and regional industries – also contributed. In this light, the project avoided common causes of project failure by leveraging favorable market and external conditions and taking into consideration local human and social capital, determinant to economic prosperity (Guiso, 2004).

Recent fieldwork shows that the project has boosted the local NTFP-market, improving income levels (a key element for poverty alleviation) and promoting the conservation of the forest.

Serrano-Medrano, Montserrat National Autonomous University of Mexico (UNAM), Montserrat

Residential fuelwood use scenarios in Mexico to 2030

Authors: Serrano-Medrano – UNAM; Alexander Quevedo – UNAM; Adrian Ghilardi - UNAM

Approximately 2, 600 million people around the world currently burn fuelwood (FW) to cover daily household needs, such as cooking. The sale of fuelwood in rural and peri-urban regions could be an important livelihood activity for poor families. FW use could also help to lighten or even nullify the economic burden created by reliance on commercial fuels like cooking gas (LPG). We estimate FW total demand (exclusive and mixed LPG-FW use) in Mexico under a spatio-temporal explicit approach. Our model integrates local census data to obtain the number of FW users and data from case studies to obtain FW per capita consumption. This model projects FW consumption to the year 2030, analyzing FW saturation and population
trends from 1990 and 2000 census data of near forty thousand localities with FW use. We validate our results by contrasting our results with household income and expenditures biannual surveys sampled across the country during the 2002-2014 period. We also, analyze LPG use data to calibrate our findings regarding FW-LPG mixed use. This study shows a bottom-up model to estimate local FW total demand and its impact on local forest stocks. As well, our results highlight the importance of forest energy to release economic pressure within households and thus help to enhance the benefits of poor people current means of livelihood.

**Shah, Payal,** Okinawa Institute of Science and Technology

*Determinants and Implications of Global Protected Area Effectiveness*

Authors: Kathy Baylis - University of Illinois at Urbana-Champaign; Payal Shah - Okinawa Institute of Science and Technology Graduate University; Jonah Busch - Center for Global Development; Jens Engelmann - University of Wisconsin

More than 15% of global terrestrial land is under some form of protection. Establishing protected areas is a cornerstone of global conservation policy targeted at preservation of species, ecosystems and in adapting to and mitigating the impacts of climate change. Protected areas are important for conservation, but only if they are effective in protecting land from degradation and conversion. Protection is also not without cost. Restricting use by nearby communities can have significant economic and cultural consequences for these former forest uses. Further, parks are heterogeneous over their effect. If all parks were relatively more effective at protection, less land would be needed to be under protection to produce the same environmental benefit.

We use a high resolution global dataset of annual tree cover change from 2000 to 2012 to understand the determinants and implications of the heterogeneous effectiveness of protected areas globally established between 2000 and 2012. We use difference-in-differences with spatial matching to estimate the average treatment effect on the treated of changes in deforestation within protected areas by country. Next we determine the relationship between these country level effectiveness and enforcement/corruption levels and GDP. We then estimate the benefit of making parks more effective by asking three specific questions: 1) what factors as associated with park effectiveness? 2) How much could we gain (as measured by increased forest cover) by bringing all national park systems up to the effectiveness of the most effective national park system in the income/regional bracket? and 3) How much less land would we need to protect (and money would need to be spent for land purchases) if new protected areas could be as effective as the most effective country in the same income (and income/region) bracket.

**Shapiro-Garza, Elizabeth,** Duke University

*Adaptation from the ground up: Participatory frameworks for assessing climate change impacts and adaptations strategies with smallholder coffee producers in Latin America*
Coffee agroforestry systems are ecologically important in areas with high deforestation as they can mimic the structure and ecosystem service production of forests and also provide livelihood support to an estimated 25 million coffee producers worldwide, with over 70% considered smallholders. Unfortunately, these systems are particularly vulnerable to climate change. As in many sectors, proposed adaptation strategies are both overly generic given the wide variation in climate change impacts in each region and overly complex and costly for effective implementation by smallholders. This paper describes participatory action research we conducted with smallholder coffee producers in Guatemala, Colombia and Peru from 2014-2016 to explore the feasibility of various adaptation strategies. Our research examined: 1) perceptions of climate change impacts; 2) the strategies currently employed to reduce vulnerabilities; 3) the feasibility of strengthening these or introducing new adaptation strategies; and 4) the ways in which the feasibility of these adaptation strategies varies according to the environmental, political, economic and cultural context in which they are implemented. We found that the feasibility and viability of adaptation strategies varied amongst the cooperatives based on the localized impacts of climate change, differing access to various types of capital and the broader political and economic context. This research demonstrates both the need for and the viability of participatory action research in developing climate change adaptation strategies, particularly when working with smallholder producers as the general complexity of their livelihood strategies makes it difficult to assess best options for adaptation without: 1) including them in the process; 2) tailoring strategies to their particular needs and context. Because of smallholders’ general lack of financial and political capital, many of the most effective adaptation strategies will require collective action; conducting participatory research on a collective scale can also build awareness and consensus for the need to act and how.

Shapiro-Garza, Elizabeth, Duke University

Indigenous carbon: The dynamics and outcomes of forest-based offsetting in Oaxaca, Mexico

Authors: Elizabeth Shapiro-Garza - Duke University, Jean Lee – Colorado College

Conservation trading mechanisms, in which degrading activities are offset by conservation or restoration in other areas, are currently widely implemented for forest-based biodiversity conservation, habitat restoration and reduction of greenhouse gas emissions. However, these projects have been heavily critiqued for perceived failures in creating real, additional, permanent and verifiable offsets and for the potential for negative environmental and social impacts. The central focus of this study is to test the validity of these critiques against the context of a community-based forest carbon project in Mexico, the Integrator of Indigenous and Campesino Communities of Oaxaca, that sells offsets on a voluntary national and international markets. Our analysis is based primarily on interview data from key actors at
multiple scales: the participating communities, intermediary non-profit organizations and 
carbon credit buyers. We find that the project largely avoided many of the potential pitfalls of 
forest carbon offset projects, producing the conditions under which greenhouse emissions 
can be securely offset and local social and environmental benefits can be realized. Whether 
this model could be replicated would likely depend on the presence of key conditions: 
preexisting institutional strength at the local level; high levels of social capital between buyers, 
intermediaries and producers; and the ability to operate in the voluntary market. In particular, 
we find that a voluntary offset market can allow for higher, more stable prices, avoids the high 
transaction costs of certifications, and permit activities tailored to the local conditions and 
context of the producers.

**Sills, Erin**, North Carolina State University

*Local responses to federal forest policy: the green municipality program in the Brazilian Amazon*

Authors: Erin Sills - North Carolina State University; Alex Pfaff - Duke University; Justin 
Kirkpatrick - Duke University; Luiza Andrade - University of São Paulo; Rebecca Dickson - Terra 
Carbon LLC

As part of its response to rapidly accelerating deforestation of the Amazon in the mid-2000s, 
the Brazilian federal government adopted policies that held local jurisdictions responsible for 
deforestation within their borders. This led to a “green municipality program” in the state of 
Pará, which sought to build local capacity and political will to comply with federal 
deforestation policy, thereby protecting local access to agricultural markets. We assess the 
impacts of this program, using quasi-experimental methods to account for the self-selection 
of participating municipalities. Specifically, we ask whether and how participation in the 
program changed local economies and rates of deforestation.

The state government of Pará implemented the green municipality program in partnership 
with civil society. For example, the NGO Imazon received international funding to provide 
technical assistance to the program as a whole and specifically to ten pilot municipalities. We 
assess effects on these ten municipalities by compiling longitudinal data on outcomes and 
estimating (a) two-way fixed effects panel regressions and (b) synthetic control matching. We 
employ multiple methods both because of the possibility of heterogenous effects across 
municipalities and because of the small sample size of participating municipalities.

We find evidence that on average, participation has both decreased deforestation and 
increased yields of perennial crops, consistent with a local economic strategy of shifting to 
higher value and more stable agricultural production. We also estimate effects on 
deforestation and crop yields in each participating municipality with synthetic control 
matching. Using placebo tests to establish statistical significance, we find that participation in 
the program has reduced deforestation only in two municipalities. Both are large (meaning 
that federal restrictions on the area of annual deforestation are more binding), joined the 
program when it was first launched, and have made significant progress on program 
implementation (including enrolling the target percentage of private lands in a registry). Not
surprisingly, this suggests that engaging local jurisdictions furthers environmental goals only when there is both strong external pressure and strong local capacity to meet those goals.

**Carnovale, Maria**, Duke University [Presented by Erin Sills, North Carolina State University]

*Governance Chains for Forest Conservation: can states plus big firms equal equity and efficiency?*

Authors: Maria Carnovale - Sanford School of Public Policy, Duke University; David Kaczan - World Bank; Alexander Pfaff - Sanford School of Public Policy, Duke University; Erin Sills - NC State University

Incentivizing individual improvements in land management requires costly information about landholder actions, from both during and before program implementation. Two forms of relationships, vertical and horizontal, could reduce these information costs. Vertical relationships are those between suppliers and firms in supply chains. They extend a state’s reach within and across political borders by encouraging firm to use commercial links to influence suppliers (e.g., Lacey Act, FLEGT). Firms may also increase output per unit resource with capital investment (Pfaff et al. 2017a), or contribute economies of scale for implementation of improvements (Gibbs et al. 2016, Pfaff et al. 2017b). Horizontal relationships are those between actors in similar vertical positions, e.g., every landholder in a region. Collective land-incentives programs target such groups, with responsibility and rewards at the group level (Cisneros et al. 2015, Kaczan et al. 2017). Enforcement requires only region-level information on baselines and outcomes, raising feasibility (Segerson 1988, Xepapadeas 1991, Kerr, et al. 2014). Because individuals may free ride within such groups, however, successes have relied upon horizontal social relationships that facilitate peer monitoring and social pressure (Ostrom 1990, Rodriguez et al. 2016).

Policies exploiting vertical relationships typically lack the regional or spatial elements of collective policy and, thereby, face some of the challenges of individually-based policies. For instance, ‘zero deforestation’ certifications may constrain behavior by suppliers in monitored chains, yet have limitations: non-compliant producers may sell secretly to compliant suppliers (‘laundering’) or simply avoid monitoring via non-certified chains (market segmentation, Alix-Garcia and Gibbs 2017). Additionally, new non-compliant production may replace any decrease in chains’ production due to certification (‘leakage’). We suggest that adding regional elements to vertical commercial liability might improve horizontally-based interventions by adding commercial leverage. They might also improve impacts from vertical linkages by generating new horizontal relationships, using collective vertical contracts, or by forcing broader coverage for typical vertical relationships. State oversight would likely be required to ensure equity because power dynamics are significant within and around vertical contracts. Motivated by these concepts and theory, we present a suite of case studies to consider when such designs may be expected to improve land management.

**Sims, Katharine**, Amherst College
Land conservation payments also conserve communal social capital: regression discontinuity evidence from Mexico

Authors: Jennifer M. Alix-Garcia - Agricultural and Resource Economics, University of Wisconsin-Madison; Katharine R.E. Sims - Economics Department, Environmental Studies Affiliate, Amherst College; Victor Hugo Orozco Olvera - World Bank Development Impact Evaluation Group; Laura Costica - World Bank Development Impact Evaluation Group; Jorge David Fernandez Medina - National Forestry Commission of Mexico; Sofia Romo Monroy - National Forestry Commission of Mexico

Payments for Ecosystem Services programs incentivize communal and individual landowners to protect or improve natural resources. Many conservationists fear that introducing compensation for actions previously offered voluntarily will reduce social capital – the institutions, relationships, attitudes, and values that govern interactions among people – yet there is little rigorous research investigating this concern. We examined the effects of Mexico’s federal PES program, one of the largest in the world, using survey data at the household and community level collected from more than 800 communities across 12 states in 2016. We compared responses for communities that applied to the program and were accepted versus communities that had applied to the program but were rejected. We used a regression discontinuity estimation approach, which exploited a cutoff in program assignment due to different priority point scores in order to identify the program’s causal impact on social capital. We found that payments increased land-cover management activities as intended, while maintaining or slightly improving pro-social work effort and multiple measures of social capital. These findings demonstrate that major environmental conditional cash transfer programs can also conserve the attitudes and institutions underpinning pro-social behavior.

Singh, Devyani, University of British Columbia

Fuelwood collection patterns: application of home range analysis to human behavior

Authors: Devyani Singh - University of British Columbia; Ther Aung - University of North Carolina at Chapel Hill; Dr. Hisham Zerriffi - University of British Columbia

Almost 40% of the world’s population (or 3 billion individuals) depend on solid fuels (including traditional biomass such as wood, crop residue, and dung) to meet their daily household cooking energy requirements. In India, more than 70% of the rural households and 20% of urban households rely on fuelwood as their primary source of cooking energy. Globally, woodfuels represent about 7 percent of primary energy consumption and almost half the total removal from forest is fuelwood. This consumption of biomass as fuel, may have negative impacts on local forest resources (e.g. forest degradation, loss of ecosystem services), the global environment (e.g. via unsustainable harvesting of wood) and social consequences (e.g. time spent collecting). The extent of these impacts depends upon the local resource and the particular fuel collection habits of local populations. Yet, research on fuelwood collection patterns is limited, both in scale and depth. Previous studies on fuelwood collection locations have relied on self-reported data or geographically large-scale analyses.
Research on actual measured distance, location, or time required for collection is limited, particularly spatially explicit measures of collection. We add to this literature and fill the gap by applying home range analysis, typically used for movement of wildlife, to human fuelwood collection patterns in India. We tracked villagers using GPS loggers in five villages across three different districts in India to cover a range of topography, forest resources, and fuelwood demand, and also collected their household socio-economic data. We use the minimum convex polygon to map fuelwood collection patterns at each of these five villages. Preliminary results indicate that fuelwood collection is not evenly spread out among villages with distances for collection varying by the quality of forest resources available and by the nature of farm crops that can substitute for wood from forests. To the best of our knowledge, this is the first time that home range analysis has been applied to analyze human behavior, specially fuelwood collection patterns and boundaries. Thus, our research could be a base to build upon for further, more detailed analysis, (for example using kernel density methods with more detailed GPS data).

Smith, Harriet, University of Edinburgh

Examining the impact of land use intensification on wellbeing and inequality in rural Mozambique

Authors: Harriet Smith - University of Edinburgh; Casey Ryan - University of Edinburgh; Emily Woolen - University of Edinburgh; Frank Vollmer - University of Edinburgh; Janet Fisher - University of Edinburgh; Isla Grundy - University of Zimbabwe; Pedro Zorrilla - University of Edinburgh; Sophia Baumert - Universidade Eduardo Mondlane; Mariana Carvahlo - Universidade Eduardo Mondlane; Mansour Mahamane - Universidade Eduardo Mondlane and the extended ACES team

The livelihoods of the poor are often disproportionately dependent on forest resources. Land use intensification (LUI) is often seen as a key component of rural development, however LUI can undermine forest ecosystem services. LUI may reduce overall rural poverty levels but increase inequality, as better-off households access new productive assets, whilst the poorest, unable to access productive assets, may suffer most from reduced availability of forest resources. However to-date, there is very little quantitative evidence examining how LUI impacts poverty and inequality. To address this we focus on Mozambique, a country experiencing rapid changes in land use and high rates of forest loss, and examine how LUI affects levels of multidimensional poverty and inequality at village level. We focussed on three LUI systems: 1) smallholder commercial agricultural expansion; 2) commercial charcoal production and 3) smallholder subsistence agricultural expansion. Drawing on data from 1630 household surveys, land cover data and rural appraisals, we found that LUI equates to a reduction in above-ground woody biomass (Mg C/ha) across study sites, indicative of an increase in forest resource use with increasing LUI. However, distributions in wellbeing and inequality varied amongst LUI systems. Commercial agricultural intensification led to improvements in village wellbeing but had no clear impact on inequality; charcoal production intensification saw decreases in mean village wellbeing, with high levels of inequality coinciding with high production levels; while subsistence agricultural intensification appeared
to increase village wellbeing and decrease inequality. Our results are some of the first to examine the links between LUI and wellbeing, demonstrating that different intensification systems, or syndromes, lead to different wellbeing and inequality outcomes. Context-specific interventions are thus required. Land use is set to intensify in sub-Saharan Africa, therefore further studies on understanding the effects of LUI processes on poverty and wellbeing are required to determine if outcomes are analogous across broad scales, regions or biomes.

Soe, Khaing Thandar, Seoul National University

Perceptions of Forest-Dependent People towards their Participation in Forest Conservation: Case Study in Bago Yoma, South-Central Myanmar

Authors: Khaing Thandar Soe - Department of Forest Sciences, College of Agriculture and Life Sciences, Seoul National University; Youn Yeo-Chan - Department of Forest Sciences, College of Agriculture and Life Sciences, Seoul National University

The complex interactions between local communities and their forests has been giving policy makers a multiplex view of management between nature and people. People especially rural communities who are more adjacent to forests depend on the direct goods and services provided by the forests for their livelihoods. Unsustainable policies and practices, at multiple scales from global to local, continue to threaten those forests and people who are depending upon them.

In Myanmar, there is still a weak understanding of rural people’s perception on forest, non-timber forest products’ (NTFPs) relevance on their livelihoods, and lack of implementable strategies for sustainable forest management. Myanmar is currently working on REDD+ readiness and capacity building, making this study well-timed with current activities.

Our study analyzed the economic contribution of forest resources to rural livelihoods in Bago Yoma, Myanmar, aiming at understanding their perceptions of benefits from the forest and towards their participation in forest conservation while examining the actual needs of local communities in relation to the use of environmental resources.

We designed an appropriate survey instrument. Income accounting, income diversification and NTFPs dependency were calculated to know share of income from NTFPs in total household income of agricultural land-owners and landless people. Willingness to participate in conservation activities and awareness of deforestation were examined by giving possible options why deforestation happens. Our study showed that households have more willingness to participate in forest conservation if there is alternative income opportunities and if the government would provide land for agricultural production.

Here in our research, a hypothesis that a policy of “sustainable forest management should be coordinated in long with rural development” will be proposed. Policy: “giving agricultural land rights or hiring forest land to cultivators can increase the willingness of rural communities to participate in forest conservation activities”.

89
Soltani, Arezoo, Norwegian University of Life Sciences

*Multi objective bio-economic model for conflict analysis in carbon trading game*

Authors: Soltani Arezoo - Norwegian University of Life Sciences; Meley Mekonen Rannestad - Norwegian University of Life Sciences; Ole Hofstad - Norwegian University of Life Sciences

Multi objective bio-economic model for conflict analysis in carbon trading game REDD is an agreement aiming at reducing emissions from deforestation and degradation through provision of a market for carbon trading where village communities in developing countries may sell carbon stored in their adjoining forests and woodlands and governments or NGOs are willing to buy the stored carbon. This paper explores strategic interactions between the two actors. While reducing GHG emissions caused by deforestation and forest degradation in minimum cost is an objective for the buyers, the village community aims at maximizing net present value of income from all uses of land. Using a bio-economic model and bargaining game theory for Mlumbilo village in Tanzania, we showed that the REDD+ funds required to avoid deforestation and forest degradation is much higher than what has been paid for reducing emission in the EU market. Moreover, the choice of reference level has profound implications for the negotiated prices of CO2 and the cost efficiency. The results also revealed that game theory is a useful tool for analysing negotiations between stakeholders with different and conflicting goals. Rather than assuming an omnipotent planner maximizing social utility, we have simulated the outcomes of strategic behaviour among village communities and REDD+ agents. This is a more realistic setting, not only in Tanzania, but also in many other tropical countries.

Stjernquist, Ingrid, Stockholm University

*Group modeling as a tool to develop conditions for multi-stakeholder co-management of landscape resources*

Authors: Ingrid Stjernquist - Stockholm University; Peter Schlyter - Stockholm University,

Green infrastructure is, in Sweden currently a frequently used, but vaguely defined, concept pushed to promote biodiversity conservation and recreation by various government agencies e.g. the Swedish EPA and the Forestry Board. Given the near absence of legislative tools for regional planning as well as a large number of individual land owners, acting independently on the land, landscape planning for conservation and connectivity poses a challenge. Given the fact that nature in the European setting is a cultural product, nature conservation is also cultural heritage conservation and both are dependent on active small-scale traditional forestry and agriculture as well as on EU subsidies. Maintaining an attractive landscape and varied ecosystem services is in turn of great importance for making the countryside and smaller habitations attractive for inhabitants, services and the local economy – i.e. livelihoods outside the immediate land use sectors. Formal structures to plan for multifunctional landscapes are lacking.
The case is located Scania, South Sweden, in an highly populated area with increasing and potentially conflicting multiple demands on the landscape resource. We have used a group-modelling approach with local stakeholders to develop conceptual systems dynamics models covering the social, economical and ecological aspects of sustainability as well as identifying process drivers, feedbacks; current and future landscape dynamics; conflict areas as well as joint objectives. Stakeholders represented various actors like farmers/forest owners, NGOs, tourism/ecotourism, recreational users, municipalities and National Park Management.

The conceptual systems modelling allowed stakeholders to both synthesize and critically assess, their own and others, perspectives, assumptions and biases while reducing superficial conflict over discourse thus moving towards more constructive local resource management. The modelling identified lack of trust in Authorities and a perceived legitimacy deficit as central impediments towards better planning. The results suggest a potentially transferable and scalable approach to facilitate landscape scale planning for multifunctional landscapes including green infrastructure, nature and cultural conservation and connectivity.

**Stoian, Dietmar, Bioversity International**

*From disabling to enabling: Evolution of community forest governance in Guatemala and Nicaragua*

Authors: Dietmar Stoian - Bioversity International, France; Aldo Rodas - Ministry of Agriculture, Livestock and Food, Guatemala; Jessenia Arguello - Mercon Coffee Group, Nicaragua

Community forest governance, ranging from national policies, rule and regulations to local management and business arrangements, is a key factor for the viability of collective forest management and enterprise development. Based on a comparative analysis of enabling and disabling conditions in Petén, Guatemala and the North Caribbean Coast Autonomous Region (NCCAR), Nicaragua, we reconstruct the evolution of community forest governance in two contrasting settings. In the Petén, usufruct rights have been granted since the late 1990s to local communities in the Multiple Use Zone of the Maya Biosphere Reserve (MBR) through 25-year community concessions. Over the next few years the latter’s environmental and socio-economic performance will be assessed by the state authority in charge of the MBR (CONAP), as part of the concession renewal process. In the NCCAR, 16 indigenous territories have been established over the past two decades in recognition of the native communities’ ancestral and customary rights to land.

Our comparative analysis of conditions enabling or disabling community forestry in the two regions took into account 16 factors outside of the reach of the communities and six factors directly controlled by them. We show that, overall, conditions for community forestry are more enabling in Petén, particularly as regards sense of ownership among the communities, availability of commercially valuable species (mahogany), market access, degree of community organization, and capacity for forest management and wood processing. In NCCAR, de jure land rights are stronger but de facto security is compromised by massive encroachment and
failure of the government to effectively protect indigenous land rights, paired with the communities' low organizational and technical capacities for managing the forest and running forest enterprises.

Given that the conditions at the onset of the concession process in the MBR were similar to those in the NCCAR today, we argue that the case of Petén provides valuable insight into how largely disabling conditions for community forestry can be converted into an enabling environment that ensures both forest conservation and livelihood benefits through community stewardship of forests. We conclude with policy implications for scaling the Petén experiences in Nicaragua and elsewhere in Latin America and beyond.

**Tegegne, Yitagesu**, European Forest Institute

*How can tropical countries align forest concession with Sustainable Development Goals and climate commitments?*

Authors: Yitagesu Tekle Tegegne, European Forest Institute, Bioeconomy, Finland; Jo van Brusselen, European Forest Institute, Bioeconomy, Finland

There are at least 122 million ha of natural forest concessions in the tropics of Africa, Latin America, and Southeast Asia, covering about 54% of the public production forests. Their sustainable management has considerable implications for sustainable development, biodiversity conservation, climate change mitigation and adaptation, and global forest resources in general. However, little, if not no, studies have critically analyzed how tropical forest concessions can be improved, better managed and be an instrument to mainstream sustainable forest management, therefore crucial for achievement of achieving Sustainable Development Goals (SDGs) and climate change agenda. This study has two main research questions: what should tropical countries do to ensure that forest concessions contribute to achieving SDGs, particularly to SDG 1 (poverty), SDG8 (sustainable growth), SDG 12 (sustainable consumption and production) and SDG13 (climate change)? And what challenges may stand in way of aligning forest concessions these global commitments? This study has drawn upon information gathered through: (i) an extensive review of literature; (ii) multilingual online survey (N=72); and (iii) in-depth interviews with renowned experts (N=25) in tropical forestry and forest concessions. The finding of the study will highlight pertinent recommendations on what, by whom, when and how tropical forest concessions can actually work for sustainable development.

**Troncarelli, Lia Taruiap**, University of São Paulo

*Conditional Cash Transfers in the Amazon forests: Does increased cash income affect the time invested and the consumption of natural resources by the Kisêdjê indigenous peoples?*

Authors: Lia Taruiap Troncarelli - University of São Paulo, Carla Morsello - University of São Paulo
Conditional cash transfers (CCTs), such as the Bolsa Família Program (BFP) in Brazil, have increasingly been adopted in the last fifteen years to advance poverty reduction worldwide. The strategy aims to break the cycle of poverty transmission, by transferring cash conditional on pre-specified household investments on human capital. Because around 76% of the world’s poor population live in rural areas, and remote forested areas account for a large share of the world’s poorest, CCTs are frequently implemented among largely autarkic forest inhabitants and indigenous groups. In these contexts, prior evidence shows the monetization of local economies can affect how people explore natural resources. Despite that, it is still unclear whether and how increased reliance on income that does not rely on time investments, such as CCTs, affect people’s exploitation and use of natural resources. We evaluate whether increased cash income from CCTs affected the time invested and the consumption of natural resources. We tested two opposing hypotheses. First, the consumption of agricultural and forest products should decrease because indigenous peoples use cash from CCTs to purchase substitutes. Second, instead of decreasing, the time invested and the consumption of fish and bushmeat should increase because people use CCT income to purchase fishing and hunting equipment. Moreover, because hunting is considered a more prestigious activity among indigenous societies, hunting should increase more than fishing. To test these hypotheses, we relied on data from the Kĩsêdjê, a largely autarkic Brazilian indigenous group from the Amazon. During two seasons, we evaluated 467 individuals (38 households) adopting qualitative (seasonal calendar) and quantitative techniques (structured interviews, direct observations of time investments, time diaries and weigh days). Data analysis relied on pre-processing data and multilevel regression models. We believe, our results may contribute to our understanding of the interlinks between poverty alleviation and forest people’s livelihoods. Despite the increased adoption of CCTs in forested locations worldwide, there are still few systematic assessments of their consequences to the use of natural resources by local communities, and whether these transfers may have unanticipated negative effects to people’s livelihoods.

Uprety, Dharam Raj, HELVETAS Swiss Intercooperation Nepal

Analysis of the drivers of forest landscape restoration, and build ecosystem resilience to foster livelihood in Nepal

Authors: Dharam Uprety, HELVETAS Swiss Intercooperation Nepal; Rabin Niraula, HELVETAS Swiss Intercooperation Nepal

The present study, which was conducted 2014 covering 1100 Community Forests belongs to Churia region has brought the insightful observation regarding the role of different regimes in the management of forest resources, and thereby enhancement of the forest cover. Measurement of change in forest cover, both inside and outside of Community Forest provides an information about the change in forest resources over the period 1992 and 2014. Geographic Information System (GIS) and Remote Sensing (RS) was used to compare the satellite imageries for the period of 1992 and 2014 in order to analyse the state of forest cover change. The demarcation of Community Forest boundaries in churia region was conducted
based on available boundary maps and transferred to Google Earth and GIS platform.

There are different forest management modalities like Community Forestry, Collaborative Forest management, and Leasehold Forestry for the management and restoration of forest ecosystem, and thereby meeting the livelihood needs of people. The study aimed to compare the suitability of the management regime in the Churia region (the middle mountain range of Nepal), that can foster the forest ecosystem, and thereby contribute to enhance the people's livelihood.

Results show that forest cover in the Churia region has increased by 7500 ha (1%) in 22 years, i.e. 1.35 million ha (76%) in 1992 compared to 1.36 million ha (77%) in 2014. It is also found that the area of dense forest is increased by 42,000 ha whereas, the area covered by bushes and grassland is reduced by 39,000 ha. The Study further shows that there is a decline in cultivated land by 20,000 ha. Comparing the forest cover change in Community Forests with that of other management regimes, has shown that the Community Forests are the best management regime for enhancing the forest cover.

**Uwimbabazi, Moreen**, National Forestry Resources Research Institute

*Factors Influencing Adoption of REDD+ by Small Holder Farmers in Uganda*

Authors: Moreen Uwimbabazi - National Forestry Resources Research Institute; Isaac Kiyingi - National Forestry Resources Research Institute

Private forests account for 70% of forested land in Uganda, yet the level of deforestation thereon is proceeding at an alarming rate (>2.5% per annum). In Uganda, approximately 24 million people are stated to be ‘forest dependent’, relying on forests to support their basic needs and livelihoods. Private forests are located in rural areas where most people are landless and land tenure security is very low. Rural landless households depend on forest encroachment as a social security and livelihood platform. Therefore, in a bid to curb deforestation and forest degradation, a pilot project to reduce emissions from deforestation and forest degradation (REDD+) was started. REDD+ started in 2008 with the intention of enhancing forest carbon stocks and lessening poverty among rural households. REDD+ in Hoima District, western Uganda has mainly been spearheaded by Non-Governmental Organizations (NGOs), who have worked closely with private forest owners (PFOs). However, almost 10 years down the road, the level of deforestation on private forests in Hoima still proceeds at an alarming rate (2.6% per annum) and most households are still leaving in abject poverty. Hence, we sought to find out why small holder farmers (PFOs) have not complied with the REDD+ regulations even after receiving various incentives from the REDD+ project. Key informant meetings, focus group discussions and household surveys were conducted in five sub-counties in Hoima. Our findings show that the three main factors hindering farmers’ adoption of REDD+ were: (1) Weak incentives: the incentives given to PFOs are not commensurate with other livelihood activities such as agriculture or plantation forestry, (2) PFOs were promised payments for conserving the natural forests, but no money has come through yet, (3) land conflicts and land insecurity hinder full compliance by PFOs due to lack
of clear ownership. Without addressing these hindrances, deforestation and forest degradation on private lands will likely continue unabated and PFOs’ livelihoods may instead worsen. The information collected from this study is expected to inform the Uganda REDD+ strategy that is currently under development. This project aims to conserve and restore forest ecosystems which lies under the theme forests, livelihoods and SDGs.

van Soesbergen, Arnout, UN Environment World Conservation Monitoring Centre

Agricultural development, biodiversity and ecosystem services in the Lake Victoria Basin

Authors: Arnout van Soesbergen - UN Environment World Conservation Monitoring Centre and Department of Geography, King’s College London; Marieke Sassen - UN Environment World Conservation Monitoring Centre and Plant Production Systems Group, Wageningen University and Research; Andy Arnell - UN Environment World Conservation Monitoring Centre; Sarah Darrah - UN Environment World Conservation Monitoring Centre; Yara Shennan Farpón - UN Environment World Conservation Monitoring Centre

Competition for land is increasing as a consequence of the demands for food and commodities and for conserving biodiversity and ecosystem services. Land conversion, in particular forest loss and degradation, continues to lead to a loss of biodiversity and trade-offs among ecosystem services, with mostly negative outcomes for local livelihoods. Decision makers need to understand such trade-offs in order to better balance different demands on land and resources. Therefore, there is an urgent need for spatially-explicit information on the effects of different trajectories of human-induced landscape change on biodiversity and ecosystem services.

In this study we developed a novel framework to evaluate priority areas for action to support conservation and development, and applied it to the Lake Victoria basin (LVB) in East Africa, covering parts of five countries. It includes spatially-explicit consideration of the drivers of land use change, including population change, trends in commodity markets and agricultural production. Regionally specific scenarios up to 2050 developed in consultation with local stakeholders and quantified with a global economic model (IMPACT) were used as inputs into a land-use change model to project plausible futures of landscape change due to likely changes in these drivers. Model runs were implemented for different forest protection levels based on current and future assumptions about protected areas and their effectiveness. Modelled land use/cover scenarios were then used to assess the potential future impacts on biodiversity and ecosystem services in the landscape.

Our results show that depending on protected area coverage and effectiveness, the impacts on forest conservation at the national scale vary, with forest loss actually increasing in some of the LVB countries when protected area coverage was set at its highest. Furthermore, our results highlight areas within the LVB with the highest and lowest potential impacts on biodiversity and ecosystem services under future scenarios of land use change and different forest protection levels. Such results can support decision makers in (a) assessing and visualising where pressure on biodiversity and ecosystem services is likely to be highest, (b)
assessing potential trade-offs and (c) making more informed choices balancing conservation and development needs.

Verde Selva, Gracie, The University of Western Australia

Can ecological fiscal transfers support forest livelihoods? A case study from the Brazilian Atlantic Forest

Authors: Gracie Verde Selva - The University of Western Australia

Protected areas (PA) are crucial to Brazil’s conservation efforts, but often imply high costs for local populations. PA regulation often criminalizes traditional extractivist activities, which form the basis of many community’s economy and identity. The Brazilian state of Paraná was the first to implement an ecological fiscal transfer (EFT), a redistribution of tax revenue based on ecological criteria. Known as the Ecological ICMS (ICMS-E) this mechanism compensates local government for the opportunity costs of hosting PA. My research focuses on a municipality within the largest remnant of Atlantic Forest, of which only 8% remains intact. The municipality’s territory is 98% PA, it contains a diversity of traditional communities and exhibits the worst socio-economic indicators of the state. The ability of traditional communities to exist within the protected forest depends on their ability to develop alternative forms of revenue, which in turn depends on institutional collaboration and support. The ICMS-E is a significant source of income for local government and is derived from the presence of areas for which traditional communities are caretakers. Semi-structured interviews were conducted with representatives from government and civil society to determine if and how the ICMS-E revenue is benefitting forest communities. This study finds that opportunities exist to utilize ICMS-E revenue for the development of an economic strategy to address the livelihoods of forest dwellers. However a lack of knowledge of the mechanism, low political articulation and poor institutional capacity limit its effectiveness. EFTs have low transaction costs, can be implemented anywhere that has a fiscal system, and can be engineered to suit particular contexts. Yet EFTs are underutilized by policymakers, with only a few examples globally. This study intends to deepen understanding of the ICMS-E’s contribution to supporting traditional communities. The lessons learnt may help policymakers in the development of this type of mechanism elsewhere.

Voorhoeve, Joanneke, Utrecht University

Modeling implications of charcoal transitions on local to global carbon dynamics predictions

Authors: Maria J. Santos - Utrecht University, Copernicus Institute of Sustainable Development; Joanneke Voorhoeve - Utrecht University, Copernicus Institute of Sustainable Development; Tuyeni Mwampamba - Universidad Nacional Autonoma de Mexico Campus Morelia; Vassilis Daioglou - PBL Netherlands Environmental Assessment Agency; Detlef van Vuuren - Utrecht University, Copernicus Institute of Sustainable Development, PBL Netherlands Environmental Assessment Agency; Stefan C. Dekker - Utrecht University, Copernicus Institute of Sustainable Development
Globally, charcoal corresponds to a small fraction of the total energy mix. However, with continued urbanization in the Global South, charcoal will remain an important fuel locally and will likely become an important fuel globally. Integration of effects of charcoal use across scales is fundamental because global goal-setting is highly dependent on local action and involvement. One of the assumptions of global models for charcoal use is that as countries become more developed they will switch to other (cleaner) energy alternatives, making land available for natural ecosystems and other land uses. Recent reports, however, indicate that a complete transition away from charcoal is highly unlikely for most countries, and will be slower than expected, suggesting that at the local scale, landowners’ land use decisions will continue to respond to local and subnational charcoal demand dynamics. The extent to which local land use choices may affect carbon cycling could scale up to affect global estimates of the impact of charcoal production. Here, we assess the implications of scaling up local effects of charcoal production on the carbon cycle on predictions of charcoal needs based on global production and demand dynamics. To do so, we calibrated a carbon-cycle process-based model with local characteristics of charcoal production conducted in managed oak woodlands in Mexico to assess the impact of local scale biomass removal on carbon cycle, and compared these estimates to the projected demand of charcoal estimated by the integrated assessment model IMAGE. We find that locally, charcoal production can have lasting effects on carbon cycling. These effects can last for 15-20 years affecting the restoration potential of areas needed to meet growing charcoal demand. These novel methods that are adapted to local conditions and the charcoal sector, and which permit coupling of local and global models improve our understanding of charcoal transition speed, and can thus better inform on the impacts of energy transitions and probable pathways towards a more sustainable charcoal sectors.

Wang, Weiye, University of British Columbia

*Community Conservation Concession Agreement—A New Practice in Protected Areas in China*

Authors: Weiye Wang - University of British Columbia

Due to the top-down governance arrangement, communities always lack chances to be involved in the decision making process regarding their own homeland. The Community Conservation Concession Agreement (CCCA) provides a possibility for communities to adopt community-based conservation and management. The Sanjiangyuan Nature Reserve is one of the biodiversity hotspots under this jurisdiction; it encompasses the headwaters of three largest rivers on the continent (Yangze, Yellow, and Mekong). Through the adaptation of the CCCA initiated by NGOs, the Sanjiangyuan nature reserve turned over the management rights of some reserve lands back to local communities. Local community started conservation activities such as patrolling, wildlife monitoring, and environmental education; along with their abundance traditional ecological knowledge and religion. The purpose of this study was to explore how the CCCA work within the local community framework. The research was conducted in the Sanjiangyuan Nature Reserve. Qualitative interviews with NGOs, government officers, and local people representatives were used. The results indicate that CCCA is a useful...
A way to identify threats to biodiversity, empower local people to take conservation action, and reduce people’s dependence on natural resources. However, the success of CCCA needs preconditions such as government support, local people’s initiative, effective monitoring, and sustainable funding support.

**Weldesemaet, Yitbarek**, Environmental Society of Ethiopia

*Effectiveness and enabling potentials of Formal Environmental Institutions (FEIs’) for reforestation projects in Northern Ethiopia*

**Authors**: Yitbarek Weldesemaet - Environmental Society of Ethiopia; Zelalem Tibebe Weldesemayat - Ethiopian Chemical Corporation

Adaptation schemes including afforestation, reforestation, and forest conservation projects became an essential strategic priority for Ethiopia in addressing its international climate commitments and for implementing its FEIs’ (environment-related policy, laws, strategy, guidelines, rules and regulations). The success or failure of these schemes depends to what extent these FEIs’ are able to deal with collective issues and dimensions of interaction between actors involved. This study evaluated the effectiveness and enabling potentials of the existing FEIs under the reforestation projects implemented in Northern Ethiopia. The study is based mainly on qualitative evidence to capture local perceptions, opinions, and awareness of the projects’ capacity to handle adverse effects in relation to these FEIs’ and the actors’. Data were collected from both primary and secondary sources and analysed using the Contextual Interaction Theory (CIT) conceptual framework. The theory assumes that the course and outcome of institutional implementation depend more crucially on the characteristics of the actors involved particularly their motivation, information, power and interaction.

The results indicated that the reforestation projects have had varying challenges and opportunities with actors’ motivational, information, power and interaction factors. The major motivational factors include prioritisation, economic benefits, and government capacities. The information based factors comprise knowledge of the FEIs’ availability and understanding the FEIs’, and source and adequacy of funds to implement. The power and interaction factors consist of collaboration and communication between actors; empowerment issues; and capacity to sustain the projects. It was clear from the results that, the institutions did not fulfil the motivation, information, power and interaction factors needed to achieve the objectives of the reforestation projects. Therefore in making these FEIs’ more effective and enhancing their enabling potential, clear-cut implementation mechanisms and monitoring and evaluation systems have to be developed while gearing the projects towards improving the collaborative and integrated efforts of the actors.

**Weldesemaet, Yitbarek**, Environmental Society of Ethiopia

*Enhancing rural prosperity through forest landscape Restoration; a case of Northern Ethiopia*

**Authors**: Yitbarek Weldesemaet - Environmental Society of Ethiopia
Restoration schemes are considered as the potential approaches for reinstating previously degraded forest landscapes, thereby contributing to the local households' economic prosperity. Despite such qualitative assertions, the quantitative accounting of restored forest landscapes economic contribution to rural households' income is hardly ever assessed in Ethiopia. Therefore, this study quantified the net economic return of restored forest landscape to local households, by comparing the cost of restoring the landscape; with the economic return generated by valuing its ecosystem services. Data were obtained from a biophysical assessment; the household survey supported by secondary information from relevant local offices a model forest landscape from Northern Ethiopia.

The study findings showed that the restored forest landscape’s marketable ecosystem services generated USD 364,320 in just 4 years after the restoration; providing each household with a share of USD158 y−1. The projected maximum economic return estimated from the restored forest landscape will be about, USD 2,369,360 increasing the share of each household to USD 1,030. Moreover, if these households decide to restore their entire surrounding forest landscape, in about 20 years they can expect a per household share of USD7,600 y−1. This estimated benefit is attainable because the restoration programme organised rural beneficiary households into formal institutions with management and utilisation bylaws, thereby ensuring their sustainable pathway to prosperity. This indicates that the economic return of restoring forest landscapes is attractive enough to motivate community and/or their government’s investment while also serving as a potential indemnity for financial intermediaries to extend investment loans. In maximising the realisation of this benefit, it will require thorough research for the development of markets for different bio-geographic zones as well as link these services to international protocols, global warming, and world trade. Moreover, such economic return can be sustained if restoration efforts are complemented with evolving appropriate working plan prescriptions.

Wilson, Sarah Jane, University of Michigan

The Future of Forest Work and Communities: Culture, youth outmigration, and forest work

Authors: Sarah Jane Wilson - University of Michigan

Community-based forestry is widely promoted to conserve tropical forests and improve rural livelihoods. But at a time when community-based forest conservation is funded at unprecedented levels, its future impacts may be overshadowed by larger global forces. Around the world, young people are leaving forests for cities, even where land rights and community forestry programs are well established and supported. This “geriatrification” of forest communities is creating uncertain futures for people, and forests. This trend raises several urgent questions: Is community forest management a viable option for conserving forests in the face of globalization? Will there be forest communities in the future, and what will they look like? What are the prospects for ‘meaningful work’ for today’s young people in forests?

While many researchers and practitioners have anecdotally observed this trend, little work has
explored its impacts and causes, particularly cultural ones. The Future of Forest Work and Communities, a FLARE working group of world leaders in community forest conservation, seeks to answer the above questions by developing tools and strategies to co-create a vision with youth for thriving forest cultures. I coordinate this diverse group of researchers and practitioners as we work to understand the needs of, and how to best support, young forest entrepreneurs and workers.

We are currently undertaking a series of innovative “visioning sessions” to engage youth in communities around the world, including Mexico, Bolivia, Canada, Ecuador, and Nepal. I present our visioning workshop methodology, provide examples of meaningful forest work from two case studies, and present preliminary results from our visioning sessions (currently underway). Preliminary reports suggest that increased connectivity (physical and digital) has created both challenges and opportunities for young people working in forests, and that globalization has produced changes in forest societies and cultures that make it necessary to develop new and innovative solutions to empower youth work in forests – on their own terms. Ultimately, data generated from our work will be used by practitioners, donors, and policy makers to create innovative interventions that engage young people in enterprise and culture building, and are rooted in tradition but connected to the global economy.

Wilson, Sarah Jane, University of Michigan

Forest recovery amidst deforestation: Rural farming culture drives local forest transitions in the Ecuadorian Andes

Authors: Sarah Jane Wilson - University of Michigan; Robyn Clark – CIFOR; James Reed – CIFOR, Lancaster University; Terry Sunderland - CIFOR, James Cook University

Andean forests decreased in area over the past decade as people cleared them, mainly for farming. But amid this deforestation, forests returned to some regions, producing local ‘forest transitions’ – net increases in forest cover. The mechanisms that drive these local transitions – often in part the actions of residents – are still little studied. This paper investigates forest cover dynamics an Andean region where people are actively reforesting by planting trees. We ask: 1) does regional deforestation continue amid reforestation efforts; 2) what is the impact on forest biodiversity; and, 3) what effect does this local – and localized – tree planting have on regional forest cover? We used remote sensing analysis of LANDSAT imagery, forest tree surveys in planted, naturally regenerating, and primary cloud forests, and household surveys and interviews with residents of four communities. Results from remote sensing analysis using satellite imagery from 1991, 2001, and 2010 show that prior to reforestation projects (before 2001), deforestation rates in Intag, a region in the Northeast Andes, were high (> 3%/year). During the subsequent period (2001-2010), forest recovery surpassed deforestation, resulting in a net forest cover increase of 3% – a local forest transition. However, although deforestation rates slowed precipitously (< 2%) people continued to clear forests in the highlands even as forests regrew around communities. Household interviews and oral histories suggest that this spatial shift in forest cover partially explained by people’s reasons for planting trees – to restore water and other key ecosystem. The results thus point to a new
‘path’ by which forest transitions occur – the ecosystem service scarcity path – in which local demand for forest ecosystem services drive forest recovery. Because biodiverse primary forests were cleared as less diverse secondary forests returned, the potential of transitions to conserve forest biodiversity is less optimistic than it might at first seem. However, because communities throughout the Andes are experiencing environmental degradation and soil fertility loss, results are broadly applicable and stand to benefit both people and forests. Our insights into fostering the conditions that promote such transitions will interest policy makers, managers, and local communities.

**Withey, Lauren**, UC Berkeley

*Community-Titled Tropical Forest Under Steady Outmigration: the case of Colombia’s Pacific Coast*

Authors: Lauren Withey - University of California, Berkeley Governing Commons scholars argue that the first step in any successful management of common-pool resources is to establish boundaries around the resource and the number of resource users (Ostrom 1990). Yet in many rural regions today, a different issue affects community forest management: outmigration. Where youth from community-managed forest lands are drawn to cities, leading to a decline in those directly dependent on and accountable for forest resources, what are the consequences for local governance and forest use?

Colombia’s Pacific coast provides an ideal opportunity to explore this question. Afro-Colombian communities on the coast have had collective titles to their tropical forest lands for some twenty years. Yet over those years, a mix of forces, including violent conflict and shifting economies, have pushed community members into urban areas. Community leaders worry that the depopulation of their villages might lead the central government to revoke their community titles. Yet the 1993 law that allows for these titles also requires that forest use should “guarantee the persistence of the resource.” How does rural-urban migration affect communities’ ability to fulfil this obligation?

This study examines this question, relying on two years of interviews, focus groups, surveys, and participant observation across 6 villages in two Afro-Colombian communities. It finds that while outmigration reinforces a disconnect between community members and their ancestral territory, community governance practices - such as construction of top-down and bottom-up communication and mobilization networks, ongoing leadership training, and education about community traditions, including forest use - mediate the relationships migrants have with their communities, and the ultimate impacts of migration on forest use.

The paper goes beyond discussions of broader forest cover trends associated with changing populations to build on the work of Hecht et al. 2015 and Robson 2009 and assess the ground-level effects of interactions between migration and forest use. In particular, it asks what these trends mean in communities that have hard-won collective titles to their lands – titles many in the conservation community argue are efficient and effective tools for reducing
deforestation (e.g., Ding et al. 2016) – and how these trends affect and are affected by governance practices.

**Wong, Grace**, Stockholm Resilience Centre

*How to design REDD+? Looking for lessons from within and outside of forests*

Authors: Grace Wong - Stockholm Resilience Center; Cecilia Luttrell - Center for International Forestry Research, Bogor; Lasse Loft - Leibniz Center for Agricultural Landscape Research, Müncheberg; Maria Brockhaus - University of Helsinki; Anastasia Yang - Thünen Institute of International Forestry and Forest Economics; Pham Thu Thuy - Center for International Forestry Research, Bogor; Amy Duchelle - Center for International Forestry Research, Bogor

Policies and initiatives to drive changes in forest management and use often involve a combination of regulations and incentives to motivate these changes at multiple levels. REDD+, a global initiative negotiated under the UNFCC, is being designed as a results-based payment to financially incentivize emissions reduction from deforestation and forest degradation. The implementation of REDD+ will take place however at national, sub-national and local levels, and understanding how regulations and payments will filter through different governance structures and influence different contexts will be critical for outcomes that are effective, efficient and equitable.

Over 2012-2016, we carried out a systematic examination of different practices and experiences in benefit sharing to derive lessons and options for the design of REDD+ benefit sharing mechanisms (BSMs). We looked at existing BSMs in natural resource and non-natural resource sectors (e.g. community forestry, PES, conditional cash transfers), policy instruments for sharing natural resource revenues/incentives across levels of government (e.g. ecological fiscal transfers, redistribution of revenues from the extractive and forest sectors) and specific regulatory features relevant to REDD+ (e.g. fiscal responsibility, eligibility and targeting, multi-level governance). This paper synthesizes findings from the 19 studies that were carried out to provide insights to the following questions: 1) How is performance and finance monitored? 2) How is equity across different levels conceptualized and operationalized within a BSM? 3) How are co-benefits generated and monitored? 4) Can BSMs be designed to minimize the risks relative to the REDD+ safeguards? A clear finding is the importance for acknowledging and assessing trade-offs between levels (from national to local) and between the effectiveness, efficiency and equity criteria. This information will be relevant for the design of a REDD+ BSM that is relevant, accountable and legitimate for the specific national, subnational and local contexts.

**Woollen, Emily**, The University of Edinburgh

*Land use intensity syndromes in Africa and their impacts on ecosystem services and human well-being*

Authors: Emily Woollen - University of Edinburgh; Casey Ryan - University of Edinburgh; Harriet Smith - University of Edinburgh
ACES project team members, ESPA funded Land use intensity syndromes in Africa and their impacts on ecosystem services and human well-being. Land use is intensifying in the wet savannas of sub-Saharan Africa, linked to increasing land scarcity and commercialisation of agricultural and forest products. As such, land use intensification (LUI) is a process occurring in both agricultural and wooded systems. Our current understanding of the impacts of LUI on ecosystem services and human well-being is currently limited by conceptual and methodological gaps. For example, land cover is often used as a proxy for land use or LUI, with an assumption that land cover change and forest cover loss affects ecosystem service provision, with cascading impacts on human well-being. However, land cover is an inadequate proxy of LUI, as several intensification processes do not affect land cover but yet have critical effects on ecosystem functions and service provision (e.g. selective logging or increased cropping rotations). Therefore, we synthesized the current literature on land use change and its impacts into a set of comparable syndromes of LUI currently occurring at the last major frontier in the global land system: the wet tropics of Africa. We use the LUI concept of Erb et al. (2013) and summarise what is known about the impacts of LUI on ecosystem services and human well-being. We define the input, output, and system property changes that define the major syndromes, allowing for the inclusion of land use changes which do not affect land cover, but which have significant effects on ecosystem properties and long term service provision. We propose that using LUI syndromes can provide a new approach to finding common outcomes of LUI on ecosystem services and human well-being, and improve our understanding of their relationships. Finding common outcomes of LUI syndromes can help policy makers and land managers to optimise outcomes for people and forests, which are applicable across broad regions and in different contexts.

Zacareli, Murilo, University of São Paulo

Mapping National Legislations on Biodiversity among OTCA Countries: Implications for Access and Benefit-Sharing

Authors: Murilo Zacareli - University of São Paulo; Doriane Desclee - UCLouvain, Earth and Life Institute, Belgium; Baudouin Michel - ERAIFT UNESCO, University of Kinshasa, DRC

The aim of this proposal is to present biodiversity legislations among OTCA countries – the Amazon Cooperation Treaty Organization – to give a sense of how public regulations vary across members with the intention to map out the public regulations that the aforementioned countries have designed in response to the biodiversity regime initiated by the Convention on Biological Diversity (CBD). In a second stage, issues regarding Access and Benefit-Sharing (ABS) are addressed given that not all of the countries have ratified the Nagoya Protocol. The aim is to answer the following question: In the face of unequal national legislations on biodiversity, what are the implications for access and benefit-sharing for OTCA countries?

The CBD itself foresees the share of benefits from the use of biodiversity among local communities, that is, those who are linked to biodiversity through traditional knowledge have to be considered in the whole process. Most of the paper will be built on information
available in official documents, such as National Reports, a document delivered by Parties to the CBD Secretariat with the aim to provide information on the advancement of the biodiversity agenda, and on the CBD website, a resourceful and reliable source of information.

Ma, Zhao, Purdue University

*Using direct transfers to promote forest conservation: theories, realities, and opportunities*

Authors: Zhao Ma - Department of Forestry and Natural Resources, Purdue University; Jonathan Bauchet - Department of Consumer Science, Purdue University; Claudia Radel - Department of Environment and Society, Utah State University; Ricardo Godoy - The Heller School for Social Policy and Management, Brandeis University; Laura Zanotti - Department of Anthropology, Purdue University

Direct transfers have become an increasingly important tool for addressing society’s need for effective, efficient, and equitable conservation and development, and have been widely used to generate forest conservation outcomes through Payments for Ecosystem Services (PES) programs. At the core of PES is the assumption that payments made to individuals must be conditional on observable actions or measurable outcomes. This implies that, in a forest context, forest communities need to be coerced (through monitoring and enforcement) to conserve forests. However, political ecologists have long argued that natural resource managers in the Global South possess intrinsic motivations for conservation. Research has also shown that enforcing conditionality can be financially costly and socially problematic. We conducted a three-part pilot study that (1) reexamined the theories of direct transfers through a systematic literature review, (2) explored how conditional transfers have been used to promote forest conservation through a short household survey module implemented in Bolivia, and (3) assessed on-the-ground perspectives on the monitoring and enforcement of conditionality through a survey of PES program administrators in the Tropical Andean countries. We found that PES participants were wealthier and more socially and politically engaged than non-participants. Perceived ability to comply with the conditions was considered an important factor influencing PES (non-)participation. While all PES programs we surveyed reported offering conditional transfers and monitoring for participant compliance, penalties for non-compliance mostly existed on paper and were rarely enforced. These results suggest that relaxing conditionality has the potential to increase participation in PES, particularly among those who are poorer, more marginalized, and more risk-averse, and presents an opportunity for simultaneously achieving desired forest conservation and livelihood outcomes. Our pilot study, hence, points out a need for researchers, policy makers, and conservation practitioners to reconsider the conditional PES model, and lays a foundation for a more comprehensive assessment of the extent to which conditionality can be relaxed to enable forest conservation without sacrificing social equity.

Chiputwa, Brian, World Agroforestry Centre (ICRAF)

*Welfare impacts of Shocks (droughts and PEV) on smallholder farmers in Kenya*
Climate change has emerged as one of the key policy challenges that threatens food and nutrition security of the rural poor, especially in Sub-Saharan Africa (SSA). Climate smart agriculture and sustainable intensification have emerged as new development paradigms, attracting millions of US dollars for interventions to make these rural households climate resilient. While the threats of climate change are real and serious, development practitioners often overlook numerous other stresses and shocks that rural farming households may be exposed to. Exogenous shocks, other than climate which may be socially/politically induced conflicts agriculture or price fluctuations. In this paper, we examine how shocks in the form of drought and political instability impact crop productivity and food security among maize based farmers in Kenya smallholder farmers’ livelihoods over a 10 year period (2000 and 2010). We base our analysis on a unique balanced panel dataset of 1243 households collected by Tegemeo Institute of Egerton University and Michigan State University. To account for weather variability, we use monthly temperature and rainfall data generated from remote sensing (50 km pixel resolution). Use of panel data enables us to capture dynamic nature of food systems (path dependency, discontinuous changes) and the heterogeneity in the mechanisms that allow people to earn their own living (the existence of multiple equilibria, nonlinearity). We use a difference-in-differences (DiD) approach to estimate the causal effects of an external shock by comparing the changes in outcomes over time between a sample of the population that is exposed (i.e. the treatment group) and a sample that is not (the control group). DID permits the comparison of differences in outcomes, between groups by controlling for bias from unobserved variables that remain fixed over time, before and after experiencing the shock. Our study finds that households exposed to post-election violence have significantly lower maize yields and become vulnerable to food insecurity compared to those not exposed. Rigorous evidence on the dynamic effects of shocks on household food insecurity can provide very useful insights informing the design of poverty reduction policies and social safety nets programs other than those that focus on climate resilience.

Lai, Jiayen, University of Edinburgh

*Environmental justice in land-use planning: the implication of Environmental Impact Assessment on Indonesia’s forest administration*

Deforestation-related conflicts are increasingly intense amongst various forest stakeholders due to a lack of transparency and public involvement in forest administration. To achieve an equitable environmental regulatory system, it is important to ensure the transparency and effectiveness of land use decision-making. Applying an environmental justice framework, the study offers a systematic review of the current procedural justice’s negotiations on Environmental Impact Assessment (AMDA) process in Indonesia and seeks to determine which interpretations of equity are embodied in the key proposals and policy approaches to AMDA process. It draws the attention on the evolution of procedural justice’s concepts in AMDA’s aims, objectives, and scopes, in responses to the international and national demands.
of equitable land use administration. This study is part of a Ph.D. research project on the capacity of the Indonesia’s AMDAL system to assess the social impact of forest conversion. On a broader note, the study aims to reinforce the growing realization that the governance of global forest decision implicates elemental ethical questions regarding justice and equity.

Ongugo, Paul, Kenya Forestry Research Institute Kenya

Gender and Benefit Sharing in Participatory Forest Management (PFM): The case of Mt. Elgon and Cherangany Hills Forest Ecosystems-Kenya

Authors: Paul O. Ongugo - Kenya Forestry Research Institute Kenya; Jane W. Njuguna - Kenya Forestry Research Institute Kenya; Benjamin Owuor - Kenya Forestry Research Institute Kenya

Participatory Forest Management can be defined as structured collaboration between governments, commercial and non-commercial users, interested organizations, and community groups, and other stakeholders, to achieve shared objectives related to the sustainable use of forest resources (GOK, 2007). Schreckenberg et al. (2006) indicated that majority of countries in Africa and Asia are promoting the participation of rural communities in the management and utilization of natural forests and woodlands as a way of enhancing their livelihoods. According to the Forest Act 2016 communities form Community Forest Associations (CFAs) before entering into a forest management agreement with Kenya Forest Service (GOK, 2016). This approach was links improvement of forest biodiversity and livelihoods improvement among forest adjacent communities. Although the CFAs are meant to benefit and include all the members of the community, a majority of the associations have failed to involve women equally in decision making positions and membership thus affecting equity and efficiency in management and benefit sharing (Agrawal, 2001). A research was carried out in the Mt. Elgon and Cherangany forest ecosystems among ten Community Forest Associations (CFAs) from the two forest ecosystems. Twenty households were selected from every CFA out of which ten women were interviewed using structured questionnaires. In addition, focus group discussion was held with five local opinion holders from the communities using prepared guiding questions. Results from the study show that PFM has the potential of enhancing local level gender specific livelihoods. This can be done by involving women in non-destructive income generating activities. This potential is however curtailed by the poor local level community governance structures which discriminate against women. The paper therefore recommends a strategic reorganization of local level community governance structures which will not only support sustainable provision of ecosystem services but will also spur livelihoods at household level while targeting women.

Pham, Phuong, Vietnam Women’s Academy

The impact of climate, regulatory and socio-economic changes on food and livelihood security from a gender perspective. A case study of an ethnic minority-forest based community in Vietnam

The study examines the combined impacts of climate, regulatory and socio-economic changes on food and livelihood security from a gender perspective in an ethnic minority-
forest-based community—the Co Tu—that was isolated in Central Vietnam up until the 1980s. Over the past two to three decades, Co Tu women and men have experienced livelihood and food insecurity caused by the negative impacts of climate and regulatory changes on forest resources and agricultural livelihoods. In addition, greater integration with the outside world and the Kinh communities through economic activities, which have been facilitated by a new National Highway 14b, have caused social changes in the Co Tu community. The study has employed four data collection methods including key informant interviews, focus group discussions, in-depth interviews and a household survey conducted with 300 households in eight villages. The study analyzed qualitative data for the content and thematic analyses in order to produce meaningful explanations on the nature of the analyzed phenomenon or evidence. From a gender perspective, the loss of men’s livelihood activities have forced women to adapt and move toward a cash economy, increasing their workload and responsibilities. Traditional gender relations have been challenged causing important changes in women’s and men’s statuses in the family and in the community. Although there are positive changes in terms of women’s status and greater economic role, these changes may also bring about tensions regarding gender roles and conflict within the family during this transitional phase. Recognizing the new challenges facing both women and men in a rapidly changing social and natural environment would contribute to gender equality and women’s empowerment. The study can well serve the FLARE meeting theme which are ‘Forest, Livelihoods, and the SDGs’ by providing evidences of combined impacts of climate change, regulatory change, and social change on food security and gender relations of the poor communities whose livelihood rely on forest resources and agricultural livelihoods. The evidences can contribute to the achievement of SDG Goal 1 ‘No Poverty’; Goal 2 ‘Zero Hunger’; Goal 8 ‘Decent Work and Economic Growth’, and Goal 5 ‘Gender Equality’.