

12-16 October 2023

# FLARE 2023 | NAIROBI

9th Annual Meeting  
on Forests and Livelihoods



## Book of Abstracts

KEOUGH SCHOOL OF  
GLOBAL AFFAIRS



## Conference Overview

Welcome to the 9th Annual Meeting of the Forests & Livelihoods: Assessment, Research, and Engagement (FLARE) Network! We are thrilled to be able to gather together in Nairobi, Kenya for the first FLARE meeting to be held in Africa and in the Global South, more generally. The 2023 FLARE Annual Meeting is hosted by CIFOR-ICRAF and the Keough School of Global Affairs at the University of Notre Dame, home to the FLARE Secretariat. From the launch of FLARE in Paris in 2015 through to Nairobi in 2023, FLARE Annual Meetings have explored a variety of timely themes at the intersection of forests and livelihoods.

This year's Annual Meeting theme is **“Linking Research and Action for Thriving Forests, Trees, and People.”** The meeting will also explore a number of sub-themes, including:

- Bioeconomy, finance, and innovation for sustainable energy transitions
- Democracy, journalism, and forest livelihoods
- Joining climate and biodiversity goals through forests and trees
- New directions in understanding forest-poverty dynamics
- Youth movement: demographic change and next generation leadership on forests, climate, and development
- Trees across rural-urban systems
- Social Justice in the Forest: Rights, Power, and Collaboration
- Circular economy, markets, and forest livelihoods
- Reforestation challenges and opportunities

## About this Book of Abstracts

This Book of Abstracts complements the [conference program](#), which includes further information on the meeting, acknowledgements, and more. This Book provides detail on the content of the approximately 40 sessions taking place over three main programming days, October 13-15, 2023 and the two optional workshops taking place, October 16<sup>th</sup>. In total, there are some 140 presentations (posters and lightning talks included) in these sessions that address conference themes.

Below are the abstracts for the work that will be presented. Each abstract has a number based on the order it was submitted for review. The corresponding number is found in the Program, to allow for quick navigation through the document.

We sincerely thank the presenters and all who supported them for their hard work and dedication to creating such rich scholarship and programming for the Annual Meeting. Without the thought-provoking and engaging content from the researchers, practitioners, policymakers, and others involved, there would be no FLARE Network. Thank you!



## About the Meeting Hosts

### The University of Notre Dame

Founded in 1842, Notre Dame is a leading research university in the United States that offers undergraduate, professional, and graduate students a unique academic environment animated by Catholic social teaching. The University supports a diverse community of students, teachers, and scholars who seek to advance knowledge in a search for truth while creating a sense of human solidarity and concern for the common good that will bear fruit as learning becomes service to justice. The University of Notre Dame is located adjacent to South Bend, Indiana, the center of a metropolitan area with a population of more than 315,000. It also operates Global Gateways in five major international cities— Beijing, Dublin, Jerusalem, London, and Rome—and six Global Centers in Hong Kong, Kylemore Abbey (Ireland), Mexico City, Mumbai, São Paulo, and Santiago.

### The Keough School of Global Affairs

The Donald R. Keough School of Global Affairs at the University of Notre Dame advances integral human development through research, policy, and practice; transformative educational programs; and partnerships for global engagement. Founded in 2014, the Keough School builds on the strengths of 9 institutes focused on international research, scholarship, and education. The Keough School addresses some of the world's greatest challenges, with particular emphasis on developing effective and ethical responses to poverty, war, disease, political oppression, environmental degradation, and other threats to human flourishing. The School offers undergraduate and graduate degrees in global affairs, with concentrations in governance and policy, peace studies, and sustainable development.

### The FLARE Network

The Forests & Livelihoods Assessment, Research, and Engagement (FLARE) Network was launched just prior to the landmark Climate Conference of Parties (COP) in Paris in 2015. The mission of FLARE is to advance knowledge at the intersection of forests and livelihoods and facilitate its application to policy and practice. Through annual meetings, working groups, impact assessments, and other research and engagement efforts, FLARE seeks to create and nurture a vibrant global community of practice to understand, imagine, and help bring about more just and sustainable futures for people and forests. The FLARE Secretariat is based in the Keough School of Global Affairs at the University of Notre Dame.

### CIFOR-ICRAF

The Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF) works at the nexus of five interconnected areas where trees can make a difference: biodiversity, climate, value chains, food and equity. Trees connect land and climate, farms and forests, economies and resilience, and people and planet. CIFOR-ICRAF connects science with action, creating solutions from the ground up through inclusive partnerships, transdisciplinary research, and demand-driven innovation. In December 2021, CIFOR and ICRAF completed a three-year programmatic and operational merger process. While maintaining separate legal entities, CIFOR-ICRAF now operates under a single governing Board and single leadership team, with a joint regional structure and five joint research themes, all guided by the CIFOR-ICRAF Strategy 2020–2030. The functional merger brings together more than 70 years of combined expertise, over 700 staff working in 60 countries across the Global South, offices in 25 countries, 14 host country agreements, nearly 200 active partnerships, and intellectual assets published in some 25,000 research products. CIFOR and ICRAF are CGIAR Research Centers.

## 2023 FLARE Annual Meeting Team

### FLARE Secretariat

**Daniel C. Miller**, University of Notre Dame, FLARE Coordinator  
**Brian Wanbaugh**, University of Notre Dame, FLARE Program Manager  
**Katia Nakamura**, University of Notre Dame, Postdoctoral Research Associate  
**Beverly Ndifoin**, University of Notre Dame, Graduate Research Assistant  
**Valena McEwen**, University of Notre Dame, Graduate Research Assistant

### Coordination Committee

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**Juan Pablo Sarmiento Barletti**, CIFOR-ICRAF  
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**Houria Djoudi**, CIFOR-ICRAF  
**Michael Dougherty**, CIFOR-ICRAF  
**Amy Duchelle**, Food and Agriculture Organization  
**J.T. Erbaugh**, Dartmouth College  
**Forrest Fleischman**, University of Minnesota  
**Anja Gassner**, Global Landscapes Forum  
**Pamela Jagger**, University of Michigan  
**Daniel Miller**, University of Notre Dame  
**Doris Mutta**, African Forest Forum  
**Katia Nakamura**, University of Notre Dame  
**Pete Newton**, University of Colorado at Boulder  
**Johan Oldekop**, University of Manchester  
**Rose Pritchard**, University of Manchester  
**Pushpendra Rana**, Indian Forest Service & Conservation International  
**Jesse Ribot**, American University  
**Laura Sauls**, George Mason University  
**Etotépé Sogbohossou**, University of Senegal & University of Abomey-Calavi  
**Judith Sonneck**, Global Landscapes Forum  
**Gladman Thondhlana**, Rhodes University  
**Jennifer Zavaleta Cheek**, South Dakota State University

# Abstracts

## **#8: Linking Payments for Ecosystem Services (PES) and participatory biodiversity monitoring approaches in theory and practice: a review and field study in Chiapas, Mexico**

Santiago Izquierdo-Tort<sup>1</sup>, Andrea Alatorre<sup>2,3</sup>, Paulina Arroyo-Gerala<sup>4</sup>, Elizabeth Shapiro-Garza<sup>5</sup>, Julia Naime<sup>6</sup>, Jerome Dupras<sup>7</sup>

<sup>1</sup>Instituto de Investigaciones Económicas, Universidad Nacional Autónoma de México (UNAM), Mexico City, Mexico City, Mexico. <sup>2</sup>Département Des Sciences Naturelles, Université du Québec en Outaouais, Montreal, Quebec, Canada. <sup>3</sup>Institute of Development Policy, University of Antwerp, Antwerp, Antwerp, Belgium. <sup>4</sup>Natura y Ecosistemas Mexicanos, Mexico City, Mexico City, Mexico. <sup>5</sup>Nicholas School of the Environment, Duke University, Durham, NC, USA. <sup>6</sup>Center for International Forestry Research, Bogor, Bogor, Indonesia. <sup>7</sup>Institut des Sciences de la Forêt Tempérée, Université du Québec en Outaouais, Montreal, Quebec, Canada

### **Abstract**

Payments for ecosystem services (PES) mushroomed since the 1990s as key incentive-based instruments for sustainable natural resource management. Although PES are increasingly being integrated into broader biodiversity conservation efforts on privately or collectively held lands and many schemes aim to protect biodiversity, there is a gap in our understanding of how to best assess and monitor programs' biodiversity outcomes. We examine the potential for participatory biodiversity monitoring to fill this gap for PES schemes and how these two approaches can interact in theory and practice. Our research is based on an innovative approach that combines: i) an analysis of existing research on participatory biodiversity monitoring approaches; ii) a comparative assessment of several tools for monitoring biodiversity in a PES context; and iii) the field testing of introducing participatory monitoring with PES participants among communities in Chiapas, Mexico. Our analysis of existing research reveals that introducing participatory biodiversity monitoring offers key benefits –e.g. accessing locally relevant data, inducing conservation support, and increasing program accountability– but raises ethical and technical issues related to data collection and dissemination, particularly where illegal activities abound. We suggest three PES-specific criteria –i.e. payment conditionality, contract spatiotemporal coverage, and participatory potential– should be considered when designing monitoring approaches.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#18: Forests and woodlands regeneration and persistence in the human-modified landscape of the Greater Gombe Ecosystem in western Tanzania.**

Mr. Elihuruma Kimaro<sup>1</sup>, Dr. Michael Wilson<sup>2</sup>, Dr. Jennifer Powers<sup>2</sup>

<sup>1</sup>Tanzania National Parks, Arusha, Arusha, Tanzania, United Republic of. <sup>2</sup>University of Minnesota, Saint Paul, MN, USA

## Abstract

The loss of forests and woodlands is disturbing. Strictly protected areas, such as national parks are a useful tool to address this problem, but, in Tanzania, ~70% of forested and degraded areas are located outside the strictly protected areas. One option proposed for addressing forest loss and restoring degraded areas involves community management of forests: giving the communities rights to own and manage forest reserves, such as the Village Land Forest Reserves (VLFRs). This approach is attractive because it has the potential to benefit both woody plant communities and local livelihoods. Many countries including Tanzania have widely adopted it. However, the effectiveness of this approach for promoting the regrowth and permanence of forests remains poorly understood. The common approach of assessing the performance of these reserves in promoting forest increase by comparing changes between two time periods separated by a decade or more may mask any changes that happen at time scales shorter than the study period. Here, we used Landsat satellite images from multiple dates (2006, 2013, 2016, and 2021) to assess the extent to which 16 VLFRs in the Greater Gombe Ecosystem in western Tanzania promoted the regrowth and permanence of forests. These VLFRs are the product of conservation efforts facilitated by the Jane Goodall Institute that started in 2005. In the same ecosystem, we assessed the efficacy of claimed medicinal plants—*Sterculia quinqueloba* and *Canthium crassum*—in vitro, to encourage agroforestry practices. We detected a 63% increase in forest cover in the VLFRs and a 28% loss in forest cover in the unprotected village land. In the VLFRs, ~11% of regenerated forests between 2006 and 2013 were re-cleared between 2013 and 2021, indicating that additional work is needed to protect existing forests and reforest potential areas. We also, discovered that *S. quinqueloba* and *C. crassum* have antibacterial activities. We used this information in conjunction with published material to generate a list of medicinal plants that we used to promote tree planting in unprotected village land. Maintaining or creating landscapes that provide many types of ecosystem services is critical for ensuring the persistence of biodiversity in modified landscapes.

## Primary FLARE theme

Reforestation challenges and opportunities

### **#36: Reconciling ecological restoration (science) and livelihood sustenance (social): Understanding trade-offs between ecologically sound and socially beneficial forest restoration practices among CFR villagers in Payvahir, Central India**

Mr. Anirban Roy

Ashoka Trust for Research in Ecology and the Environment, Bengaluru, Karnataka, India. Manipal Academy of Higher Education, Manipal, Karnataka, India

## Abstract

The Indian Forest Rights Act (2006) legally recognized forest-dependent people as primary users of forested lands through CFR (Community Forest Resource) titles, promoting CFR-facilitated restoration

nationally. Besides being community-driven forest restoration drives, CFR-restored forest parcels can likely be a tool for carbon sequestration, foster biodiversity, and bear socio-economic implications. However, there are data paucities on how much restoration is achieved and post-restoration state(s). The biodiversity extent in restored CFR parcels, market forces influence, decision-making coherence with scientific backing, and long-term ecological ramifications of actions need investigation followed by disseminating findings to relevant stakeholders.

Here, I will show how reconciling ecologically sound and socially beneficial forest restoration practices involve multi-level trade-offs in CFR-facilitated restoration and how understanding these trade-offs is key to maximizing its impacts. This research was conducted in a CFR-entitled *Payvihar* village in Central India. A two-stage framework of socio-ecological data collection was adopted. Stage 1 recorded the landscape history by collating oral narratives via key informant surveys, forest department reports, and old maps. This was corroborated with geospatial evidence(s) for historical documentation of the titled/restored forest parcel(s). Stage 2 recorded the extant biophysical data through vegetation and canopy analysis and socioeconomic data through household interviews to report villagers' perceptions about services and disservice from CFR-restored parcel(s).

This study revealed how ecological and social discourses of forest restoration practices are so contextual and it is pertinent to remember a central question- "Why, in the first place, was the restoration planned?" Knowing this objective will simplify untangling the complexities of present-day restoration outcomes in that village. The broader findings include villager's awareness regarding the species choice in the CFR-restored parcels (like avoiding non-natives and not prioritizing only generalist tree species during plantations), sustainable harvesting of forest products, and accrual of non-material ecosystem services like cultural and aesthetic values. However, a reductionist-monoculture mentality was traced in the villagers owing to market drivers where one particular plant species was preferred over others.

The study findings will inform the stakeholders about forest management in the right direction to achieve the larger goal of a balanced socio-ecological restoration post-CFR-entitlement.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#37: Cattle in the Community Forest: Documentary Film and Q&A**

Mr. James Robinson

The University of Edinburgh, Edinburgh, Edinburgh, United Kingdom

### **Abstract**

Join us for a documentary film screening (30 min) about an illegal grazing conflict in the community managed forests of southern Tanzania. The screening will be followed by a hybrid Q&A session with researchers, an NGO representative and the filmmaker.

Film trailer: <https://www.youtube.com/watch?v=YvaB-WSjTiE>

Human displacement is a troubling characteristic of many conservation interventions (Agrawal & Redford, 2009) and has wide-ranging social and environmental consequences (Cazabat, 2018). Cattle were a rare sight in Tanzania's Kilwa District until 2006 when the state government forcibly relocated thousands of pastoralists, agro-pastoralists and their livestock from an area now part of Ruaha National Park, over six hundred miles away. Officials claimed the evictions were necessary to protect the Ihefu Wetland - an important wildlife refuge and water catchment (Walsh, 2008). One consequence linked to this displacement is the rise of grazing conflicts in Kilwa's community managed village forest reserves. Community members complain bitterly about illegal grazing, which they claim negatively impacts wildlife and scarce water resources. Attempts to prevent forest incursions risk escalating into physical violence. Through interviews with pastoralists, agro-pastoralists, farmers, forest managers and government officials, this documentary explores the causes and consequences of the conflict.

While there are large bodies of literature addressing topics of pastoralism and protected area conflict (Yilmaz et al., 2019), herder-farmer conflict in East Africa (Benjaminsen et al., 2009), environmental degradation narratives surrounding pastoralist groups (Brockington, 2001) and the ecological impacts of forest grazing (Mtimbanjaye & Sangeda, 2018), very few studies have investigated these issues in the context of community-based conservation initiatives. This project seeks to address this gap.

"Cattle in the Community Forest" was produced as part of a PhD project by James Robinson (University of Edinburgh and RBGE) in collaboration with Tanzanian filmmaker Kassim Mustafa. Documentary film was chosen as a research method to encourage participant engagement, share findings accessibly and to incorporate audience responses into the research process.

Proposed panel: James Robinson, Kassim Mustafa (filmmaker), Makala Jasper (CEO of Mpingo Conservation & Development Initiative), Dr Given Msomba (researcher with expertise on agro-pastoralist eviction), John Ulumara (researcher with expertise in the impact of green initiatives on pastoralists)

## **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

### **#41: Learning Local Primatology: How can an ethnographic approach to human-wildlife interactions better protect forest livelihoods?**

Dr. Catherine Bolten

University of Notre Dame, Notre Dame, IN, USA

## **Abstract**

How can we bridge the divide between conservation-focused primatology and an anthropology that prioritizes human well-being to better protect forests and livelihoods? I am a cultural anthropologist, and since 2014 I have been collaborating with scientific primatologists in the forest-savanna mosaic of central Sierra Leone to address questions of chimpanzee conservation in light of climate change, deforestation, food insecurity, and land conflict with local people on whose land the chimpanzees live. Because the primatologists want to "save" the forest for the chimpanzees, they tend to see the owners



of the land as impediments and threats to conservation, as poor managers of the land, and as the antagonists in a project focused on livable futures. In this presentation, I introduce the idea of "local primatology"--learning to understand charismatic non-human primates through the observations and experiences of local people--to offer a bridge between the ostensibly clashing goals of protecting endangered species on one hand, and the need for continual forest use and farmbrush cultivation to ensure human livelihoods on the other. Through people's own origin stories of chimpanzees, their keen observations of chimpanzee behavior in forests, farmbrush, and in villages, and their issues with chimpanzees raiding their crops, a "local" framework for understanding human-non-human dynamics emerges. From this, we can generate better, mutually-sustaining agreements between communities as they manage their land, and between communities and conservation NGOs that are ideologically opposed to intensive forest use, that are founded not on "scientific" understandings or goals for forests and species, but on local knowledge of changing climatic and landscape dynamics.

### **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#45: Carbon, Communities or Conservation? Analysing trade-offs in five 'best-case' carbon forestry projects in Uganda and Tanzania**

Professor Flora Hajdu

Swedish University of Agricultural Sciences, Uppsala, Uppsala, Sweden

### **Abstract**

Recent years have seen growing calls for large-scale landscape restoration and tree planting efforts for climate change mitigation and, more recently, to counter biodiversity loss. These carbon forestry projects, where tree planting has the aim of selling carbon credits, are usually presented as beneficial for both carbon storage and conservation goals, at the same time as having positive impacts on local communities. In reality, there are trade-offs between these three objectives and even projects designed in dialogue with local communities have various shortcomings. Carbon forestry projects have been criticized for not building on previous social science research on community natural resource use and local knowledge, leading to problematic conclusions about 'local overuse' and deforestation. This paper builds on case studies with five 'best-case' projects: three that engage with local farmers to plant trees, one that encourages cheap and simple restoration of trees and one that works with community land use planning to protect existing forest. Through interviews with project designers, implementers and farmers as well as analysis of documents and websites, we explore how the five projects differ in how they navigate the trade-offs between carbon, conservation and community needs. We find that underlying core motivations behind each project affect general project design, the spirit in which the projects are implemented and how trade-offs are negotiated. Discussing examples of concrete trade-offs that took place in these projects, we show how underlying motivations are key for how trade-offs were settled and discuss what effects this has on project outcomes. The project has also resulted in a web-based guide developed together with different user groups that gives guidance on how to integrate social concerns more into carbon forestry projects. As part of a larger effort to expand critical social science scholarship on global restoration and carbon forestry initiatives – not least as these are currently being massively scaled up – it is key that we open up the narrative of triple-wins in carbon forestry for critical scrutiny. This should be done together with carbon forestry actors with the aim of fostering

projects that truly represent benefits for communities, conservation and, where possible, carbon sequestration.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#46: Forest Landscape Restoration practices and outcomes in rural Cameroon: An actor-cum-institutional analysis**

Mr Raphael Owusu<sup>1</sup>, Dr Jude Ndzifon Kimengsi<sup>1,2</sup>, Mr Shambhu Charmakar<sup>1</sup>

<sup>1</sup>Technische Universität Dresden, Dresden, Saxony, Germany. <sup>2</sup>University of Bamenda, Bamenda, North West, Cameroon

### **Abstract**

Forest Landscape Restoration (FLR) is gaining scientific and policy traction in sub-Saharan Africa (SSA). Existing literature highlights forest governance—actors’ decision-making and the institutional frameworks that shape FLR practices and their outcomes. Yet, studies that employ a joint actors-cum-institutions framework in analyzing FLR practices and outcomes in SSA’s FLR are lacking. To help address this lacuna, we used a policy document review, 9 expert interviews, 24 key informant interviews, and 15 focus group discussions to identify and assess the exogenous and endogenous actors and institutions and their compliance levels in the context of rural Cameroon’s FLR. Using a hybrid actor-institutions lens as the analytical anchor, the study results from the content and thematic analyses revealed that although many exogenous and endogenous institutions shape rural Cameroon’s FLR actors’ behaviour, policy instruments do not significantly recognize and promote the incorporation of endogenous institutions in Cameroon’s FLR framework. In addition, while both the exogenous and endogenous actors partially comply with most of the exogenous institutions, there is a high level of compliance with the endogenous institutions that shape FLR in rural Cameroon. Finally, while the exogenous institutions produce positive and negative ecological, economic, and political FLR outcomes, the endogenous institutions produce only positive sociocultural, ecological, economic, and political FLR outcomes. This, therefore, calls for future research to unravel the actors’ interests and power manifestations, as well as how these reshape FLR-linked institutions. Additionally, studies to determine conditions under which endogenous institutions are mainstreamed in FLR implementation are needed.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#47: Exploring the feasibility of *Madhuca longifolia* seeds as a forest-based livelihood in Tropical Deciduous Forests of Eastern India**

Mr Abhijit Dey

Ashoka Trust for Research in Ecology and the Environment, Bengaluru, Karnataka, India. Manipal Academy of Higher Education, Manipal, Karnataka, India

## Abstract

Mahua (*Madhuca longifolia*) is not only crucial for the Tropical Deciduous Forests (TDF) of India, but also considered as the 'tree of life' by the tribal communities of these forests. These communities count on the collection of two major non-timber forest products – flowers and seeds of Mahua trees. However, the academic attention is mostly around Mahua flowers, ecological significance and economic opportunity of the seeds remain unnoticed.

Here, I examined the seed harvesting technique and then the potential of Mahua seeds as a livelihood source. This work is timely considering the reports of declining Mahua population across India.

This study was set at the forest-fringe villages of Santhal and Munda communities of Ajodhya Reserve Forest, Eastern India. I conducted interviews, participant observation, and sampling of Mahua trees in different land-covers including nearby forests to understand the spatial distribution of Mahua, importance of its seeds, and the harvesting technique.

I found –

- The seed harvesting technique is non-intrusive to seed dispersion and cannot be the reason for the reported population decline. If seeds are not dispersed by frugivorous bats away from the tree, they accumulate under the canopy and are handpicked from ground. Because of low market value, plenty of seeds lie uncollected and face high mortality due to grazing, fungal attack. This provides opportunity for further seed collection. With the presence of a restricted but potential outside market for Mahua seed products (oil, butter etc.), it's possible to scale the market and make a viable seed-based livelihood.
- Mahua population is highly skewed towards old-grown mature trees with very fewer young juveniles and changes with land-cover – number of trees is more outside than inside the forests. Why this pattern and its consequences on Mahua population and livelihoods are under investigation.

Mahua is a forest tree and also maintained as agroforestry practices in private and common lands. However, socioecological understanding of this crucial tree is lacking. My work addresses this gap. Popularizing the seed-based products to the outside market can add to the source of revenue for these communities that can help making this forest-based livelihood relevant and incentivizes upkeeping the trees further.

## Primary FLARE theme

Circular economy, markets, and forest livelihoods

## #49: Traditional Ecological Knowledge (TEK) and sustainability science (SS): A natural relationship to sustain wildlife use & local livelihoods.

Mr Carlos Hernandez-Velez, Mr Torsten Krause

LUCSUS, Lund, Skane, Sweden

## Abstract

Protecting the amazon forest is not only a matter of preserving healthy forest structures coverage but also maintaining wildlife ecological relationships including the livelihoods and cultural strength of local native indigenous communities of the region. To achieve this, scientists, institutions, researchers or any other agency working in amazon region needs to dialogue, listen, share, and discuss with local indigenous systems of knowledge currently referred as Traditional Ecological Knowledges (TEK).

In this research we use Participatory Action Research (PAR) approach and participatory methods with two local indigenous communities in Colombia. This research work with two indigenous villages where multiethnic tribes coexist in the “Gran Resguardo del Vaupes” in CEIMA community (Cubeo, Carapanas, Desana, Baras) and in Amazon department in ATICOYA territory (Tikuna, Yagua, Cocama). We are interested in describing the relation and reflections on the role of local TEK in the regulation of wildlife use at the local contexts. We (external and local) researchers have developed for a year an ongoing process creating diverse local cartographies with wildlife ecological information, complemented using camera traps, semi structured interviews with wildlife hunters and traditional leaders, using also ethnographic methods to register daily events registered in participant observation during local ceremonies and daily field interactions.

Results presented here show in detail the immense knowledge that indigenous communities have of their territory and describe how the local TEK is contributing to wild fauna sustainable use. We also describe how some drivers in the local context is changing this TEK and mention some of the local conflicts that are eroding it. We also present the initial actions that have presented this result to local nation biodiversity authorities.

These case studies support study cases of knowledge coproduction and describe the dialogue of knowledge methodologies that can be reproduced in other initiatives involving TEK and wildlife use in the amazon region. We present this study in a global context with the interest to connect to other different scenarios where these results can be applied and receive feedback that could enhance this process, their local voices and livelihoods.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

### **#51: Mitigating climate or hindering livelihoods? carbon forestry and rural livelihoods implications in Tanzania**

Dr Ronald Ndesanjo

University of Dar es Salaam, Dar es Salaam, Tanzania, Tanzania, United Republic of

### **Abstract**

As the world increasingly moves towards intensified climate change mitigation efforts the global south has presented yet another opportunity for the global north to offset its carbon sequestration obligations through carbon trading schemes. Several forest conservation and tree planting initiatives are now emerging in the global south especially Africa as an effort to maintain the existing and create more carbon sinks (forests) in exchange for carbon credits purchased. Both initiatives are currently being implemented in Tanzania mostly in village lands where village forests exist, and tree planting projects

can be established through villagers themselves on their fields. The study's main objective was to investigate livelihood implication(s) of carbon trading and tree planting projects in Tanzania. The study constitutes two case studies: a forest protection project in Northern Tanzania and a tree planting and restoration in central Tanzania. Data were collected through village meetings and in-depth interviews with community members, project proponents and village government representatives. Overall, findings indicate that the projects in both cases are implemented on village forests (forest protection) and land (tree planting and restoration). This is where hunting, farming and livestock rearing (the main livelihoods for the local communities) are also being undertaken. While the carbon trading scheme under the forest protection case is touted as beneficial through biodiversity conservation and financing of development programmes like education, health and water supply, we found that how carbon credits are traded, and respective income streams are shared among different community groups is rife with uncertainties. We argue that the sustained effort by carbon trading proponents to keep the income stream flowing may eventually pose a threat of restricted and/or loss of livelihoods among local communities in the medium and long term. Therefore, it is imperative that local communities are equally and actively represented in the entire carbon value chain as opposed to being confined to the receiving end as seems to be the case currently. This should go along with robust socio-economic impact assessments of similar initiatives to ensure that local livelihoods are sustained.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#52: Community Forestry during the COVID-19 Pandemic: A Case from the Mid-hills of Nepal**

Anukram Adhikary, [Dr. Rajan Parajuli](#), Dr. Erin Sills

North Carolina State University, Raleigh, NC, USA

### **Abstract**

Since early 2020, the novel coronavirus disease (COVID-19) has severely affected all sectors of the economy, and its impacts have been reportedly disproportionate with additional pressure on poor and marginalized communities. Since rural communities are highly dependent on forest and agriculture for livelihoods, an influx of return migrants in the early days of the pandemic likely increased the consumption of forest products and intensified the agriculture practices. There were reportedly limited activities in forest management yet the demand for forest resources, specifically fuelwood, increased during the pandemic. This study attempts to uncover the COVID-19 impacts on rural livelihoods and the role of CF in helping forest-dependent people in rural Nepal to cope with the unexpected external shock of COVID-19 under the changing socio-economic landscape triggered by rising out-migration. Specifically, we aim to examine how COVID-19 affected (1) the availability and uses of forest products with returned migrants, (2) the level of engagement of community forest user group (CFUG) members in various forest management activities, and (3) contribution of the CFUG to its members as a safety net. Based on a stratified random sampling approach, we selected 1000 CFUG member households from 50 CFUGs in Salyan and Pyuthan districts in the far-western region of Nepal and are currently conducting household surveys and various focus groups and expert interviews. Preliminary findings suggest that while the perceived COVID-19 impacts were minimal, CFUGs as a local independent institution, played a critical role in supporting their needy members during this global health crisis. These findings will



provide timely insights for the post-pandemic recovery efforts in the community forestry landscape in Nepal. This study is supported by a broader project funded by the DISES program of the National Science Foundation, USA.

### **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#55: Land use patterns among cocoa producers in traditional agroforestry systems: The case of the Kichwa people in the Ecuadorian Amazon**

Dr. Cristian Vasco

Facultad de Ciencias Agrícolas, Universidad Central del Ecuador, Quito, Pichincha, Ecuador

### **Abstract**

Producing cash crops in traditional agroforestry systems is widely seen as an effective way of improving farmers' income, while promoting sustainable agriculture. Nevertheless, factors like population growth, the increasing demand for food produced in traditional agrosystems and the farmers' desire of maximizing returns may have negative environmental outcomes, including increased land use intensity in agroforestry and/or the conversion of forest to agroforestry. With data from a detailed household survey (n=330) conducted in October-November 2020 in the Ecuadorian Amazon, this paper examines the socioeconomic factors influencing land use decisions among indigenous peoples producing cocoa in traditional agroforestry systems. The results reflect that the size of cocoa agroforestry plots is substantially larger than that reported for subsistence ones. Similarly, the results show that, on average, 75% of the household's farm is devoted to cocoa agroforestry plots. Multivariate analysis shows that female-headed households that grow more commercial crops and have larger landholdings, have larger agroforestry plots. Instead, the area devoted to forests and pastures is negatively correlated with the chakra size of agroforestry plots. Regarding the share of the farm devoted to the cocoa agroforestry plots, it is larger for households with more educated heads that have cleared larger areas of forest. Despite these findings, we argue that cocoa agroforestry systems are the most sustainable form agriculture, considering the socioeconomic conditions of indigenous peoples in the Amazon.

### **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#56: Unpacking livelihood-centred conservation interventions within the Community Resource Management Areas (CREMAs) in Ghana: A systematic review of evidence**

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## Abstract

Over the past three decades, scholars and practitioners have extensively debated the effectiveness of livelihood-centred conservation interventions (LCIs) in enhancing livelihoods and conservation. Despite their promise and potential, the effects of livelihood-centered conservation interventions on biodiversity conservation and local development have been largely mixed. Even when objectives for improving livelihoods were achieved, local elites reaped the majority of the benefits, while marginalized groups such as Indigenous communities, women, and youth were largely left out. In the case of Ghana, these livelihood-centred conservation interventions have been widely implemented through the Community Resource Management Areas (CREMAs) program launched by the Ghanaian Forestry Commission. Much of the evidence on CREMA implementation is based on individual case studies, with little or no data on the impact of LCIs on a regional or national scale. We will address this gap by synthesizing existing evidence on the contribution of LCIs to equitable and sustainable livelihoods in Ghana. Based on the systematic review of the literature, we will identify and discuss the different types of livelihood-centred conservation interventions, their impacts, and the necessary enabling factors for their successful implementation. Our review will contribute to the body of literature on livelihood interventions, help further understanding of their effectiveness, and highlight policy implications for the effective implementation of existing and future interventions.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

## #60: Community Carbon Right in Indonesia

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## Abstract

The Presidential Regulation Number 98 of 2021 (Perpres 98/2021) concerning the implementation of Carbon Economic Value to achieve the national target for controlling greenhouse gas emissions in national development, is still encountering challenges that need to be addressed. There are several pertinent issues that require attention in the implementation of this regulation, such as the recognition of indigenous and local communities in Carbon Rights ownership, the implementation of mechanisms for transferring Carbon Rights status in Indonesia, which is presently under government authority, and ensuring that indigenous and local communities receive legitimate rights and benefits from Carbon Economic Value (NEK). To address these concerns, a juridical review was conducted by examining Perpres 98/2021 and other associated Indonesia's law instruments to evaluate the implementation of carbon trading. The review highlights several impediments in implementing NEK, such as international cooperation, Ministry of Environment and Forestry approval and authority, and retribution regulation, which slows down the implementation process. Therefore, it is necessary to meticulously consider the involvement of indigenous communities in the implementation of Carbon Economic Value, considering its potential positive benefits for local communities, reduce deforestation rates, and carbon emissions through social forestry approaches.

KEYWORDS

Carbon trading, indigenous people, emission, presidential regulation

## Primary FLARE theme

Reforestation challenges and opportunities

## #71: International Forest Governance: A comprehensive global review

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### Abstract

The international forest governance is a complex set of arrangements where national and international organizations with different mandates and capacities adopt instruments and programmes that guide forest management and affect related livelihoods and human well-being. In global terms, forest protection seems to be failing, since the pace of deforestation continues at “alarming rates” according to the latest State of the World’s Forests report published in 2022 by the United Nations Food and Agriculture Organization (FAO). Moreover, the complexity of forest governance keeps increasing, and the interactions among existing and new arrangements, including synergies and trade-offs, are often unclear. A well-coordinated global forest governance is vital, as existing and new initiatives, instruments, and programmes require a more effective approach to collaboration and coordination if they are to collectively improve forest conditions, livelihoods, and well-being. New initiatives and arrangements will continue to develop, and the global forest community cannot afford to wait to address the resulting governance challenges.

In our study, we examine the existing but dispersed knowledge related to international forest governance, and we analyse and synthesise the information with a special focus on forest governance changes since 2010, including an overview of actors and instruments; the forest-related finance landscape; an identification and analysis of the relevant current discourses; and an analysis of the different governance designs, including opportunities and challenges. Understanding the complexities of international forest governance is essential to promote sustainable forest management and protect not only forests, but also livelihoods and well-being. Thus, with this study we aim to provide a solid base for future research, to inform ongoing policy discussions, and to provide input to future sessions of international processes relevant to forest issues, supporting in this way a more informed decision-making. Given the strong relationships between forest governance and its effects on people, including livelihoods and well-being, a better understanding of the present situation and possible future pathways of international forest governance is crucial to establish proper links between research and action for thriving forests, trees, and people.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#72: Title: Mapping forest restoration using Landsat data and Spectral Temporal Metrics in India.**

Mr Dhanapal Govindarajulu

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#### **Abstract**

Mapping forest cover change is critical to monitor progress in global restoration efforts like the Bonn Challenge. Publicly available global datasets on forest and landcover changes are useful resources to monitor deforestation at global scale. However, anecdotal evidence suggests that these datasets often struggle to reliably capture forest restoration dynamics, especially at national and local scales. Moreover, global forest cover data products also typically only provide estimates of forest cover at specific snapshots in time, limiting their utility for assessing reforestation and environmental and socio-economic impacts over time.

In this presentation, I will demonstrate a solution to this critical data gap using Landsat satellite imagery time series together machine learning techniques to develop continuous fine-resolution maps of forest cover across India for the period 2000-2021. India was selected for our study as previous research has shown India to have high restoration potential, while the India government has also made substantial commitments to reforestation of 15 million ha under the Bonn Challenge. Hence, the ability to reliably monitor spatial and temporal reforestation dynamics in India is essential to both national and global reforestation efforts and targets is crucial.

My findings demonstrate that Landsat time series models can reliably capture spatial and temporal trends in forest cover gain and loss across the dry forests of India, based on validation against India's own national forest estimates made by the Forest Survey of India at district level and from validation points generated from Very High-Resolution Imageries. I show that the developed forest cover maps have significantly higher accuracy in capturing reforestation dynamics than four publicly available global forests and landcover maps (Globeland30, ESA-LCC, PALSAR and Hansen et al. 2013) that are commonly used in forest change impact assessments. Alongside this, I also demonstrate some of the challenges of long-term regional forest cover monitoring, including due to variability in the completeness of the historic Landsat archive, difficulties distinguishing between 'natural' forests and plantations or trees on farms, and limited ability to capture dry forests with low tree cover.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#75: Social, ecological and institutional convergences in the patrimonial tapia (Uapace bojeri) rural forests in the Malagasy Highlands?**

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<sup>4</sup>Université d'Antananarivo, Antananarivo, Analamanga, Madagascar

## **Abstract**

Forests and livelihoods are closely linked in the unique tapia forests of the central highlands of Madagascar. These are composed by an endemic sclerophyllous tree (*Uapaca bojeri*, euphorbiaceae) which is the seat of the highly cultural wild silk production in Madagascar. Behind the classical discourse of a generalized deforestation, several indices and measurements such as multi-temporal remote sensing images, contemporaneous landscape structures and local practice observations, indicate that in several places local people do operate a sound forest management by conserving their wooded landscapes which closely intermix with fields and habitation zones. It results in a very particular brain-like landscape where forest is part of the domestic universe of people and patch-connected. Households significantly earn their living from forest, both by self-consuming NLFP and firewood, and by developing a wild silk handicraft nationally recognized. Among other actions such as the management of the creation of a Community Protected Area, a NGO -Planète Urgence- promotes the conservation and resilience of tapia forests by providing seedlings to organized local grassroots communities (VOI), in charge to them to plant and take care of them. However, preliminary results are highly contrasted, depending on the VOI concerned. A joint interdisciplinary and intersectorial Action-Research program has been initiated by NGO and researchers (microbial ecologists, landscape specialists, and anthropologists), in order to extract success conditions for forest restoration. These studies include both works on soils ecology and mycorrhizae and, landscape and governance approaches. Our results show that success conditions are always a mix of ecological (soil characteristics, presence of nurse plants), landscape (geomorphology, ecological connectivities), socio-institutional (land tenure, explicit/implicit stakes linked with planting zones), and cultural (taboos) factors. It is concluded that such action should be undertaken holistically and collaboratively in order to increase the chance of success of such "external" enterprise, in order to reinforce the resilience of this endemic patrimony, but also to deepen our understanding of ecological ethic locally found in relation to natural resource management. Finally, this study makes it possible to rethink a redeployment of reforestation actions and to lay the foundations for a more effective collaboration between the various stakeholders.

## **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#76: Using land inequality to inform restoration strategies for the Brazilian dry forest**

Dr Felipe Melo

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## **Abstract**



Forest and landscape restoration aims not only to restore ecosystems but to improve people's livelihoods. However, mapping of restoration often neglects key socioeconomic aspects such as land-access inequalities. In this article, we quantify and describe the distribution of vegetation deficits (areas that demand mandatory restoration) across small and large rural properties across 1,204 municipalities of the Brazilian Caatinga biome. We mapped 313,537 hectares of vegetation deficit, i.e. areas previously cleared that will need to be restored for legal compliance. This vegetation deficit is almost equally shared between 141,144 smallholders and only 2,986 in large properties. Around half of this vegetation deficit is spatially clumped mainly in the East and along the main river basin of the region dominated by rich large-holders. On the other hand, spatially scattered and poor small landowners hold around another half of the vegetation deficit across several municipalities. Because of such an unequal distribution of native vegetation deficit, we propose three different restoration strategies to account for land-access inequalities and socioeconomic differences at the municipality level. This is one of the first studies to clearly address land inequality and socioeconomic profile of landowners to inform adapted restoration strategies. Restoration planning that ignores land concentration and socioeconomic contexts may reproduce inequalities known to be one of the main causes of ecosystem degradation across Global South countries.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#77: Forest-making: How place-based initiatives of forest restoration carve transformative pathways towards sustainability in agrarian frontiers of the Brazilian Amazon**

Gabriela Russo Lopes

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### **Abstract**

The Brazilian Amazon's arc of deforestation is an agrarian frontier dominated by large-scale commodity production. It is where most of deforestation takes place supported by lock-in mechanisms of a politico-institutional nature (e.g., party politics, public policies), techno-economic nature (e.g., technical knowledge, financial incentives), and socio-cognitive nature (e.g., narratives, values and perceptions). Within this context, many place-based initiatives of forest restoration exist and resist, although often underacknowledged and invisibilized. In this paper, I address the question of "how place-based initiatives of forest restoration carve transformative pathways towards sustainability in agrarian frontiers of the Brazilian Amazon?". My research design analyses two contrasting states in the arc of deforestation: Acre, a new frontier state, renowned for its history forest protection and socioenvironmental mobilizations; and Mato Grosso, Brazil's largest soy producer and exporter, and a consolidated frontier of commodity expansion. Within each state, I analyse a place-based initiative of forest restoration: the RECA Agroforestry Project in the border of Rondônia and Acre, and the Xingu Seeds Network, in Mato Grosso, to understand how they have been created, nurtured and withstood the Covid crisis in such different contexts. I base this analysis on three rounds of semi-structured interviews, two rounds of fieldwork observations, an online survey and document analysis of public policies as well as institutional materials from the case-studies, all conducted between 2019 and 2022. I

propose a place-based approach to transformative pathways, highlighting (i) the protagonism of local peoples through their attachment to the territory, human-nature connectedness and relational values to forests; (ii) local agency continuously exercised through everyday silent praxis of resistance; and (iii) the cross-scale nature of transformative pathways, embedded in political contexts that can nudge transformations into (un)sustainable directions. This study finds that these place-based transformative pathways have been carved through their ability to promote multidimensional transformations in individual values, collective practices and, to some extent, governmental politics. The recognition of these initiatives as crucial agents of change towards sustainable futures is a key part of counter-acting the enduring patterns of deforestation in the tropics, offering insights for academics, policymakers and practitioners.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#80: The Contribution of Bamboo to livelihood improvement in Cameroon**

Rene Maurice Dombeu Kaam<sup>1</sup>, Verina Ingram<sup>2</sup>, Georg Winkel<sup>2</sup>

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### **Abstract**

Bamboo sequesters 1.33 times more carbon than trees. The global market value of bamboo products is around €50 billion. Cameroon has about 1.2M ha of bamboo, second largest area in Africa after Ethiopia, a mix of indigenous and species introduced in colonial times. Bamboo contributes to the livelihoods of c.31,000 people, earning on average €708 annually for harvesters, craftspeople and sellers albeit these incomes are generally below poverty benchmarks. The potential for this grass to contribute further to livelihoods and to mitigate climate change however is under-realised due to a lack of, and inappropriate policy, and insufficient data. This study investigates the socio-economic contribution of bamboo for value chain stakeholders. Using an adapted Poverty Environment Network questionnaire and the Sustainable Livelihoods framework, a total of 233 interviews were conducted (9 village surveys, 128 harvester households in major bamboo production areas, 41 processors and traders and 55 consumers). Quantitative data was analysed using descriptive statistics, aggregation and extrapolations to estimate the sector's importance to stakeholder's livelihoods and economy. An innovative framework coupling Social-Ecological Systems focusing on the resource system, resource units, governance system, users and outcomes, will be used to analyse socio-economic benefits for direct (and indirect) value chain stakeholders and interventions. This data will be presented and how it will be used to provide input to a sectoral policy to be co-developed with bamboo value chain stakeholders, which considers trade-offs between the goals of conservation and climate change mitigation and development. Implications for scientific research, local knowledge and practices, and policy will be presented.

### **Primary FLARE theme**

Circular economy, markets, and forest livelihoods

## #87: Reforestation Challenges and Opportunities

Mr James Nyabola<sup>1</sup>, Dr. Daniel Lutukai<sup>2</sup>, Dr. Moses Ojwang<sup>3</sup>

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<sup>3</sup>Kenyatta University, Nairobi, Nairobi, Kenya

### Abstract

Reforestation has gained significant attention in recent years due to the growing concerns about climate change and its impacts on the environment. In the wake of increased calls for pursuit of sustainable practices for environmental preservation, reforestation offers many benefits including ecosystem restoration, climate change mitigation, and provision of economic benefits to local communities. However, reforestation faces many challenges that need to be addressed to maximize its potential. Among the primary challenges include the lack of suitable land. In many regions, the available land for reforestation is limited and the competition for land-use between forestry, agriculture, and urbanization is high. The need to also factor in the quality of the soil and water availability presents an additional challenge to the reforestation campaign because man's pursuit of the competing land purposes such as industrialization, mining and extraction leads to reduced soil and water quality needed to expedite reforestation. From a policy and support perspective, reforestation campaigns and initiatives encounter inadequate funding and resources. In light of that, it is worth noting that reforestation is a long-term investment that requires significant financial resources and technical expertise. Governments, non-governmental organizations (NGOs), and private organizations need to collaborate and invest in reforestation initiatives to maximize their impact. From an opportunity perspective, reforestation offers many opportunities for local communities including but not limited to job creation, sustainable livelihoods, and economic development. Community engagement and participation are critical to the success of reforestation initiatives. Involving local communities in decision-making processes and providing them with the necessary resources and training can create a sense of ownership and promote long-term sustainability. In hindsight, in the wake of the increased need to address climate change and environmental degradation, reforestation becomes a critical initiative that encompasses not only the administrative bodies and policy makers but also the local communities and just about every being on earth.

Key words: climate change, environment, ecosystem, restoration, industrialization, mining, extraction, degradation, community engagement, economic development, resources

### Primary FLARE theme

Reforestation challenges and opportunities

## #88: 'Charcoal income makes us live independent and decent lives': The case of women charcoal producers in the Sekyere Afram Plains District of Ghana

Dr. Lawrence Kwabena Brobbey, Dr. Frank Kwaku Agyei, Ms. Stella Asare Baddoo

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## Abstract

Charcoal production is drudgery and time demanding, and has for times past been dominated by males. Nevertheless, some women in the Sekyere Afram Plains District of the Ashanti Region of Ghana have defied the gender norms associated with charcoal production and actively produce charcoal as their male counterparts. We collected data through three pathways: survey in 66 charcoal producing households in three communities in the district; focus group discussion with selected producers; and observation of the processes the women go through to produce charcoal. Our findings revealed that income from charcoal helps the women to be independent of their husbands, provide for their households in the slack season where new agricultural crops are not matured for household consumption, and attend to critical social events like funerals and weddings. Although the women charcoal producers are aware of the health risks and environmental impacts of the charcoal production process, and have heard of the advantages of the improved metal and brick kilns, they still use the traditional earthen kiln which has a low recovery rate and efficiency. They do not use the improved kilns due to the cost of purchase and the difficulty in transporting it from one production point to another. The women are worried about the declining number of trees in their operational areas, a situation that forces them to travel long distances in search of trees. Our results contribute to the debate on regulating charcoal production over concerns on environmental degradation and climate change, the greening of the charcoal value chain and the importance of charcoal to rural livelihoods. The state and civil society organizations should intensify the promotion of agroforestry and assisted natural regeneration practices to ensure the sustainability of trees, and also provide improved kilns to identifiable women charcoal producers on hire purchase basis.

## Primary FLARE theme

Democracy, journalism, and forest livelihoods

## #90: Climate Change Threat to Peace and Security in Northern Kenya

Mr Ndirangu Ngunjiri

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## Abstract

**Background:** Climate change is transforming and redefining the way we think about security, northern Kenya is highly vulnerable to climate change, including flooding, droughts, and, most recently, a locust infestation, which have indirect and interlinked implications for peace and security in this area.

**Objective:** determine how climate change affects these resources and the livelihoods of pastoralists, and explore the potential for conflict resolution through climate change adaptation. Also, develop policy recommendations that can help address the climate change threat to peace and security in Northern Kenya.

**Methodology:** Both secondary and primary data were employed, with a combination of qualitative and quantitative research methods. A comprehensive literature review was used to identify relevant studies and reports, and interviews were conducted with key informants such as policymakers, government officials, civil society representatives, and community leaders. Household surveys were conducted to

gather quantitative data on the impact of climate change on livelihoods, migration, and conflict in Northern Kenya. The population target was 2,000 people in 10 counties, the respondents were 1,470, and the period of the study was 2019 to 2022.

**Findings:** projected climate change poses a serious threat to Kenya's national security; it acts as a threat multiplier for instability in some of the most volatile regions in Kenya; projected climate change adds to tensions even in stable regions. In Northern Kenya, pastoral communities are heavily dependent on natural resources such as water and pasture for their livelihoods. Climate change-related shifts in rainfall patterns and increased frequency of droughts have led to resource scarcity and competition, exacerbating existing social and economic vulnerabilities.

**Recommendations:** To address the climate change threat to peace and security in Northern Kenya, conflict-sensitive adaptation strategies are needed. Such strategies should consider the potential unintended consequences of adaptation measures on conflict dynamics and prioritize the participation of marginalized communities in decision-making processes.

**Conclusions:** Climate change increases the human insecurity of people dependent on natural resources for their livelihoods. Rising human insecurity can induce them to migrate or seek out alternative, illegal sources of income, which can also drive conflict.

### **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#96: Do rights-based approaches (RBAs) to conservation really further democratic forest governance? A case study from the Western Ghats of South Karnataka, India**

Ms Roshni Kutty

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### **Abstract**

When studies showed that 'fortress' style conservation that banned human presence in wild areas, did not lead to better conservation outcomes and, in fact, worsened poverty, RBAs were put forth as a solution. Advocates argued that through RBAs the twin goals of biodiversity conservation and furthering social justice could be achieved. This, they said, would not only reduce poverty among local communities dependent on natural resources, but also bring about democratic reforms in natural resource governance. However, with the introduction of property rights among forest-dwelling communities, especially those of indigenous cultures, what has been the effect? Several scholars have bemoaned the nuclearization of these communities, but adequate attention has not been paid to the subsumption of unique cultures with different world views from that of the mainstream society through the act of 'legally' recognising rights. Rather, than recognizing 'the other' as an equal and according respect to their ways of living, RBAs can continue to perpetrate the dominant worldview on indigenous cultures.



My study in the Western Ghats of South Karnataka that looked at the outcomes of implementation of the Forest Rights Act, 2006 find that where indigenous communities did not challenge the status quo of forest governance, they were rewarded with title deeds by the bureaucracy, thus legalizing their claim for community forest rights. Parallely, communities that challenged the status quo, have had their claims kept pending for years, leading to their continued marginalization, impoverishment and denigration. Based on my study, I argue that while RBAs are a step forward in the right direction, they should not be constituted as having truly recognized the rights of indigenous communities over their territories. Demand for forest rights under a legal system that is alien to their cultures does not adequately satisfy demands for self-governance by indigenous peoples. Unless mainstream structures accommodate world views that are alien to them, the world will end up assimilating these unique cultures within the “globalized” mainstream society and with that, permanently lose a repository of alternative knowledge, that could perhaps, be a key to our survival in a fast-changing world.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

### **#99: Early results from SEOSAW: a network of people, plots and methods to understand global change impacts in southern Africa.**

Dr Penelope Mograbi<sup>1</sup>, The SEOSAW Partnership<sup>2</sup>

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### **Abstract**

The Socio-Ecological Observatory for Studying African Woodlands (SEOSAW) is a long-term regional network working to understand the impacts of global change on the ecology and human use of the region's vegetation. SEOSAW collated and collaboratively analysed existing data from ~10,000 plots across the region. The early results are presented here:

1. An analysis of regional patterns in tree growth rates, aiming to inform sustainable utilisation of the woodlands, shows a mean diameter increment of  $1.7 \pm 0.3$  mm/yr across the region, with variation primarily explained by stem-level attributes including competition, stem size and species, with additional explanatory power from site-level climate variables.
2. An analysis of the drivers of the tree alpha diversity across the region shows precipitation plays a primary role in determining patterns of tree richness. There is high turnover and low nestedness across southern African savanna tree floras, and turnover is primarily driven by amount and seasonality of rainfall.
3. Human presence has a low effect on species composition of trees used for edible fruit, charcoal / firewood, and timber, compared to biophysical variables, but woodland structure shows patterns of human utilisation across the region
4. A floristic clustering analysis reveals seven distinct savanna-woodland types in the region, largely synonymous with White's (1983) categorisation, and Linder's (2012) regionalisation, but also providing evidence for distinct types of miombo woodland, unrelated to rainfall.

Further analysis of the dataset is underway, and new data is continuously added according to standardized protocols (herbaceous vegetation, recruitment, human dimensions, coarse woody debris). The network continues to grow and welcomes new participants.

### Primary FLARE theme

Joining climate and biodiversity goals through forests and trees

## #101: Advancing social justice in the forest-related labour market through enterprise formalisation: A case study of Jua Kali wooden furniture in Kenya

Dr. Rattiya Lippe<sup>1</sup>, Stephen Maina Kiama<sup>2</sup>, Veronica Alonso<sup>3</sup>, Dr. Thomas Buchholz<sup>4</sup>, Paul Jacovelli<sup>3</sup>, Dr. Jörg Schweinle<sup>1</sup>

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### Abstract

The informal economy significantly contributes to employment and income generation, with billions of workers earning their livelihoods in conditions of decent work deficits. The adverse impact of informality on working conditions, inadequate social protection and denial of rights in the workplace can lead to marginalisation and inequality, which are counterproductive for workers to achieve social justice. Enterprise formalisation, as one of the most important policy-related approaches, can pave the way for formal employment and enhance social cohesion. Well-tailored formalisation strategies for the specific economic sector require a clear understanding of the diverse nature of informal enterprises and the drivers underpinning their decision choices. While the characteristics and drivers of informality were analysed in several economic sectors, less is known for the case of wood-based manufacturing. This study fills this gap through the lens of informal wooden furniture enterprises in Kenya, locally called “Jua Kali”. Our case study draws on primary survey data from Jua Kali wooden furniture in Nairobi, one of the hotspots of Kenya’s informal economy. Two clusters of Jua Kali wooden furniture were identified by applying Partitioning Around Medoids based on characteristics such as informality index, education, work experience and business profit. The clustering result suggests that the Jua Kali wooden furniture comprises two distinct profiles of informal enterprises, i.e. survivalist and opportunity enterprises. The findings further reveal that both segments of enterprises conduct their business in the informal economy because of the co-presence of necessity and opportunity-driven motivations. About half of the studied Jua Kali confirm that the entry cost of formal registration and ongoing compliance is the most burdensome issue to formally registering their businesses. This is followed by the complexity of the registration process. Lack of access to social protection such as sickness and employment injury benefits is widespread among Jua Kali wooden furniture and even more pronounced among those in the survivalist segmentation. The findings shed light on the importance of reducing decent work gaps coupled with a registration procedure tailored to the characteristics of enterprises can enable conditions to facilitate the transition to formality and advance social justice in the long term.

### Primary FLARE theme

## #103: Recuperation of Afrotropical secondary forests in the Congo Basin

MSc. Viktor Van de Velde<sup>1</sup>, Dr. Isaac Makelele<sup>2</sup>, Dr. Marijn Bauters<sup>1,3</sup>, Prof. Corneille Ewango<sup>4</sup>, Prof. Pascal Boeckx<sup>1</sup>

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<sup>4</sup>Université de Kisangani, Kisangani, Tshopo, Congo, the Democratic Republic of the

### Abstract

Natural forest regeneration is a low-cost and efficient alternative for active reforestation efforts and is often the only possibility for ecosystem restoration in low-income countries. The global area of these naturally regenerating forests has already surpassed that of primary forests and will keep increasing because of the ever-growing anthropogenic pressures. These secondary forests are especially prominent in Central Africa, a region where smallholder slash-and-burn agriculture is by far the prevalent method of food and energy production. Despite their large extent, the recovery trajectories of these regrowth forests are still poorly confined. To create a comprehensive view of the ecological and biogeochemical recovery of these secondary forests, our team studies these ecosystems using several chronosequences in the region around Kisangani in the Democratic Republic of the Congo (DRC). These chronosequences consist of permanent forest inventory plots, forming space for time approximations that comprise forests of 5 – 60 years old and pristine forest reference situations. Our forest inventories have shown that after 50-60 years of secondary succession, the aboveground carbon (AGC) stocks attain only ca. 50% of the old-growth forest values. Additionally, the recovery of species diversity can be achieved within decennia, whereas the recovery of the original species composition takes a much longer time. To investigate these trends on a larger scale, our team has set up a meta-analysis of secondary forest inventories within the African continent, using data from the DRC, Uganda, Zambia, Angola, Tanzania, Madagascar, Cameroon, Ivory Coast, Ghana, and Kenya, linked to regional climatic and edaphic variability. Characterizing forest regrowth in Africa will fill important knowledge gaps, with clear management implications and improvement of integrated assessment models. The latter is particularly critical since global change models are biased by the lack of data from the Congo Basin, the second-largest tropical forest on Earth. Finally, the urgency of studying secondary forests is reflected in the UN's decision to declare 2021-2030 the 'Decade on Ecosystem Restoration', with the characterization of natural forest regrowth being critical to identify focus areas for ecosystem restoration.

### Primary FLARE theme

Reforestation challenges and opportunities

## #105: Playing to Link Research and Action for Thriving Forests, Trees, and People

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## **Abstract**

This play session offers opportunity to experience and discuss play as a meaningful instrument to connect research and action for the creation of new possibilities of being, acting, feeling and engaging with society's concerns for a better ecologically and socially fair world. Play offers opportunities for acting a head taller than we are (Vygotsky, 1934), that is, going beyond our immediate possibilities because it allows our imagination to impact on our past experiences, and our past experiences to impact on our imaginings and generate new social activities (Holzman, 2021). It also enhances the exercise of power through engaging, collectively, democratically and creatively in revolutionary activities that expand the immediate understanding and potential for acting (Van Oers, 2013). This session offers an opportunity for understanding how we can play with devastating issues of our present reality and experiment with a *sentipensante* (feeling-thinking) way of doing research (Fals Borda, 2009), that involves both the mind and the heart. Through play, performance, and theater activities, it will be possible to understand forms of immersing in realities to make them apparent. This movement is followed by discussions for emerging with possibilities to understand these realities from intercultural perspectives which will then support reflecting about possibilities to become responsive and responsible for the generation of ideas and actions to transform them (Freire, 1970). This experience will be exemplified with projects developed by the Language in Activities in School Contexts Research Group (LACE), a group of doctors, doctoral, master, and undergraduate students, educators and Basic Education students. The group has worked with people in situations of social vulnerability such as indigenous communities, quilombolas (Afro-Brazilian enslaved groups who escaped slavery and have constituted their own communities for centuries), LGBTQIAPN+, women, immigrants, deaf, elderly, Afro-descendants, among others who suffer from processes of exclusion aggravated and/or resulting from climate emergencies in São Paulo/ Brazil. The proposal is developed with shared responsibility from the demands expressed by partner educational institutions, which together with the researchers, collaboratively develop a multimodal repertoire to investigate, analyze, prepare, implement, and evaluate the potentialities and possibilities of revolutionary actions in their contexts.

## **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#109: Going Beyond the Conservation Narrative: Highlighting the Importance of Mangroves as Food Systems, from a Gendered Perspective**

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## **Abstract**

Indonesia is home to the greatest density of mangrove forests, with 40 indigenous species, accounting for 21% of the globe's mangroves. Communities living among mangroves are highly dependent on these aquatic and forest resources for food, income, and cultural services. While mangroves provide essential habitats for a range of aquatic foods the specific role of mangroves as a food system and provision of food and nutrition security has been overlooked in scholarly and applied research, which has mostly focused on conservation, management needs and blue carbon opportunities. Despite a growing record of research highlighting the importance of women in fisheries and forestry-based livelihoods and their role in safeguarding food security, few studies have considered more comprehensive gender-based norms in the utilisation of mangrove food systems. This paper presents findings on the role of mangroves as food systems, and the gendered differences in utilisation in West Kalimantan, Indonesia. We applied a participatory seasonal food availability mapping tool during gender-specific focus group discussions with 30 mangrove fishers, and gleaners from two villages. Findings show mangroves are an essential food system providing a wide variety of foods for home consumption and increasing local income. Participants identified and scored the availability of 267 species, with women identifying 88 more species than men. Results also demonstrate that mangrove food systems are viewed, understood, and utilised differently by women and men. Both genders sourced a higher number of species for home consumption when compared to those they targeted to sell. Women utilised mangrove species for a greater number of reasons and used a wider variety of habitats, whilst men focused on targeting specific species to generate income. Results also showed that women experienced a greater number of barriers to access due to, amongst others, a lack of physical assets and safety concerns. The results from the research demonstrate the importance of understanding the gendered utilisation of mangrove systems and highlight the need for this information to be accommodated in mangrove management to protect household food and nutrition security gained from mangroves for the communities most reliant on them.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#111: Smallholder Tree Producers in Sustainable Peace for Tropical Forest Restoration: A Systematic Review**

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### **Abstract**

Population growth and rampant urbanization fuels inequitable access and scarcity of natural resources. Scarcity and inequitable access creates a pathway for natural resource based conflict. On-farm trees could sustainably contribute and renew the supply of scarce natural resources, and thus contributing to sustainable peace and saving tropical forest. This study adopted the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines to undertake this systematic review. The study aimed to identify the role of smallholder tree farmers in sustainable peace and saving tropical forests. A total of 48 study were included in the review following satisfactorily meeting the eligibility criteria. Smallholder on-farm trees has facilitated microclimate regulation, improved water retention capacity through prevention of soil erosion and water run off. Contribution of smallholder on-farm trees has helped in climate change mitigation and adaptation thus ensuring food security, increased pasture through fodder



production, improved land and soil quality and enhanced watershed restoration. Moreover, on-farm trees has facilitated livelihood diversification among pastoralist communities frequently faced by natural resource conflicts. In Kenya, Wangari Maathai contributed in tropical forest restoration by planting at least 51 million trees through community participation. Notably, smallholder on-farm trees has helped in the tropical forest restoration and return of ecosystem goods and services. These efforts have considerably reduced natural resources scarcity thus promoting sustainable peace and smallholder tree producers have depicted leadership. The study recommends implementation of policies that promote scale up of on-farm trees thus foster forest restoration, reduce pressure over forest resources and embolden sustainable peace.

## **Primary FLARE theme**

Reforestation challenges and opportunities

### **#112: Actor challenges and perceived societal ecosystem services of forest landscape restoration strategies in Oromia and SNNPR, Ethiopia.**

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## **Abstract**

Forest landscape restoration (FLR) initiatives are important for poverty alleviation, climate mitigation, and biodiversity enhancement. Different actors prefer different restoration outcomes, and restoration strategies can provide mixes of ecosystem services (ES).

Fulfilling all actors' goals and inclusive decision-making requires a profound understanding of the perceived FLR challenges, ecosystem service (ES) demands, and the match or mismatch of ES from different restoration strategies.

We assess actors' perceived challenges and the ES mixes provided by agroforestry systems, plantations, and exclosures, and evaluate discrepancies or consensus for ES demands and challenges.

Data is collected across different spatial scales from the federal to the village level through face-to-face interviews with key informants. Key informants comprise 69 from the state administration, 34 religious' institutions, 42 educational institutions, 13 international and five national NGOs, five enterprises, and 372 households.

We analyzed nine challenges from the literature and 30 bundles of ES from the MA framework. We used the ranking and pebble scoring method to capture the important services per restoration strategy and challenges.

Overall, results indicate a consensus among actors that inadequate funds, inadequate extension services, crop expansion, change in climate-rainfall fluctuation, and diverse interests of actors are major challenges. We observe discrepancies where enterprises and (inter)national NGOs agree, and others are undecided about unclear tenure.

In exclosures, actors perceive carbon sequestration as important, unlike enterprises and international NGOs. Also, enterprises perceive only fiber and pollination, households and group leaders perceive spices-flowers, and (inter)national NGOs perceive erosion control as important.

In plantation, all actors perceive timber and fuel as important, unlike national NGOs. Also, state administration, enterprises, education institutions, and national NGOs consider carbon and erosion control important.

In agroforestry, consensus is on timber as a major service. Discrepancies occur when only national organizations, religious institutes, households, and group leaders perceive erosion control and provision of shade as additional important services.

In conclusion, actors face multiple challenges, and perceived services align with the goal of climate mitigation and poverty reduction rather less on biodiversity enhancement. Thus, FLR initiatives that target biodiversity conservation should consider subsidies and provisioning services first, in timing and defining priorities.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#113: Indigenous knowledge of *Telfairia pedata* as a potential agroforestry component in Northern Tanzania**

Dr Philipina Shayo

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### **Abstract**

The oyster nut *Telfairia pedata* (Sims) Hook, a vine that interweaves on tall hard wood trees, exclusively found in Tanzania (both mainland and Island), Mozambique and Uganda. The people of Northern Tanzania place a great value to them due to their remarkable lactogenic properties, which make them popular to nursing women. Three hundred and forty six (346) respondents were interviewed in regions of Arusha, Tanga and Kilimanjaro, Northern Tanzania between September 2019 and April 2020 to document the indigenous knowledge on the production of underutilized oyster nut. We used participatory rural appraisal (PRA), focus group discussion, semi-structured interviews and ecological survey by purposive sampling in the survey. The nuts have traditionally been used as food spice, cooking oil, cultural rituals and to reduce degenerative diseases. On their farms, the majority of respondents (83%) claimed to plant the climber for agroforestry purposes. Whereas, majority of farmers have one to three climbers on their farms, and there are nearly ten types of hard wood tree species that were mostly chosen through indigenous knowledge by farmers to support the growth of the vine. Additionally, *Albizia schimperiana* trees were most frequently connected with oyster nuts (40%), followed by *Persea americana* trees (14%), and the least was *Croton macrostachyus* (9%). Indigenous knowledge was also used to distinguish between female and male seeds based on their size and shape. It also found that the climber can produce up to 10 fruits per season. We also learnt that the fruits mostly fall during the night

and that it was impossible to determine ripeness or appearance, while it was still hanging on the tree. This implies that farmers' have knowledge about the production of oyster nuts, even though the expertise was not acknowledged or linked to scientific information. We strongly recommend that, in order to promote conservation, sustained production of oyster nuts in agroforestry systems, the utilization of indigenous knowledge should be emphasized and validated.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#114: Post-conflict cattle ranching expansion in northwestern Colombian Amazon. Structural connectivity changes based on time-series analysis.**

Ms Jesica Murcia López

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### **Abstract**

The Natural Park Serranía de Chiribiquete is the largest national park in Colombia and the largest tropical rainforest national park in the world with an area of 43 000 km<sup>2</sup> and declared a World Heritage Site by UNESCO in 2018. The deforestation and related degradation in the forests and savannas of this region is alarming and there is an urgent need to better understand the underlying causes, processes and consequences of the land transformation dynamics. Cattle ranching is considered to be one of the major driving forces of land use change in the region. The purpose of this study is to map the areas, where pastures for extensive cattle ranching activities are located and/or expanding, and the related land transformation patterns in these important tropical ecosystems i.e., the Yari savannas towards the Natural Park Chiribiquete in the arc of deforestation in the region. Using a timeseries analysis from 2016 (when the national peace accord was signed) until 2021, the area and distribution of cattle ranches and herds, as well as their cumulative effects in protected area jurisdictions will be mapped. The results are expected to provide the necessary information on the functional connectivity of forest and savanna lands, which is required for spatial planning and sustainable forest/agriculture management in tropical ecosystems.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#115: Combining socioeconomic and biophysical data to identify people-centric restoration opportunities**

Dr Pooja Choksi<sup>1,2</sup>, Prof Arun Agrawal<sup>3</sup>, Ivan Bialy<sup>4</sup>, Dr Rohini Chaturvedi<sup>5</sup>, Dr Kyle Frankel Davis<sup>6</sup>, Prof Shalini Dhyani<sup>7</sup>, Prof Forrest Fleischman<sup>1</sup>, Jonas Lechner<sup>8</sup>, Prof Harini Nagendra<sup>9</sup>, Dr Veena Srinivasan<sup>10</sup>, Prof Ruth DeFries<sup>2</sup>

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## Abstract

Ecological restoration is a crucial nature-based solution for carbon sequestration and biodiversity conservation. To fulfill targets of the Nationally Determined Contributions, the Bonn Challenge and land degradation neutrality, research has identified areas of high value to restoration across the world based on biophysical characteristics. While global restoration studies and prospecting tools enable private and public entities to decide where to focus restoration efforts for maximum biodiversity and carbon sequestration value, they leave people off the map. Designing restoration projects requires integrating socio-economic and cultural needs of local stakeholders for enduring and just outcomes. We use India as a case study to demonstrate a people-centric approach to help policymakers translate global restoration prioritization studies for application to a country-specific context and to identify different socio-environmental conditions restoration programs could consider when siting projects. We chose India because it has a high biophysical restoration potential and one of the largest restoration targets of 26 million hectares by 2030. Focusing, in particular, on poverty quantified by living standards, and land tenure, we find that of the 579 districts considered in our study, 116 of the poorest districts have high biophysical restoration potential (upper 50th percentile for biophysical potential and poverty). Similarly, 168 districts have below average biophysical potential and below average poverty (below 50th percentile). In most districts, the predominant land tenure is private, indicating an opportunity to focus on agri-pastoral restoration over carbon and forest-based restoration projects. However, in districts above the 80th percentile in terms of biophysical restoration potential and poverty, approximately 40% had a predominant land tenure of forest (N = 9) and non-forest commons (N = 9). Our study indicates the potential and need to pursue restoration in a manner that addresses both ecological and social goals. Furthermore, our *de jure* land tenure system assessment identifies which types of land could be targeted for more tenure-responsive, long-lasting, and socially just outcomes. Coarse socio-economic datasets cannot replace local consultations and needs assessments to ensure restoration projects provide benefits to local people. However, these data and analyses can be used as preliminary filters for different restoration methods.

## Primary FLARE theme

Reforestation challenges and opportunities

## #116: Social and ecological outcomes of restoring a tropical dry forest in Central India

Dr Pooja Choksi<sup>1,2,3</sup>, Mayuri Kotian<sup>3</sup>, Dr Zuzana Burivalova<sup>4</sup>, Prof Ruth DeFries<sup>1</sup>

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## Abstract

Tropical dry forests (TDFs) support endemic biodiversity, and the livelihoods of millions of people around the world. Invasive species, such as *Lantana camara*, are a predominant cause of TDF degradation. In the context of Lantana invasion and subsequent restoration of TDFs, there is a lot of research on ecological outcomes, such as evidence of changes in forest structure and diversity and bird assemblages associated with Lantana invasion in TDFs. However, the impact of Lantana invasion on lesser studied fauna, such as insects, is unknown, and there are few studies which measure the social outcomes of Lantana invasion and TDF restoration. In this study, we quantified the impact of Lantana invasion and subsequent restoration in a Central Indian TDF on vocalizing fauna and people's livelihoods and perceptions. We surveyed 656 households across study villages, and quantified biodiversity using acoustics in 55 locations in restored, unrestored, and reference sites, which we call Low Lantana Density (LLD) forest sites. We found that a higher proportion of respondents in villages near unrestored sites use Lantana as firewood and farm boundaries than the proportion of respondents in villages near restored and LLD sites. We found a negative association between LLD sites and a social indicator – the distance travelled for grazing cattle, which may provide long-term ecological benefits in terms of vegetation regeneration in unused parts of the forest. Restoration did not increase the ease of forest use, such as lesser time spent collecting firewood, as we expected. Instead, people across site types valued restoration efforts for the cash payment received for participating in Lantana removal. We found that restored and LLD sites had lower acoustic space occupancy in higher frequencies (9-24kHz), which may indicate the presence of a larger insectivorous predator community in these sites. Our study finds limited synergy between social and ecological restoration outcomes, with no significant biodiversity 'benefit' but with a few positive social outcomes. Our results assist policy makers with future direction of TDF restoration efforts at larger spatial scales. The evidence we provide is applicable to numerous social-ecological systems, which grapple with balancing biodiversity conservation and local resource needs.

### Primary FLARE theme

Linking research and action for thriving forests, trees, and people

## #118: Understanding cross-scale dynamics to inform integrated landscape approaches: Evidence from Ghana and Zambia

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### Abstract

There is growing recognition global challenges such as biodiversity loss, climate change, food insecurity, and poverty are interconnected issues. This signals the need for a shift from conventional sectorial management to integrated solutions, and integrated landscape approaches (ILAs) are an opportunity in this regard. ILAs are broadly defined as long-term participatory processes for reconciling competing land uses for improved socioeconomic and environmental outcomes. ILAs are predicated on the assumption collaboration across scales, sectors, and diverse social groups can and will occur to achieve more equitable and sustainable landscape governance. Yet, there is little evidence showing if, how, and when collaborative governance occurs. This study explores the constraints and opportunities of collaborative landscape governance in Kalomo District, Zambia and Ghana's Western Wildlife Corridor. Each

landscape has undergone significant land cover change and rapid deforestation due to charcoal and tobacco production, bushfires, infrastructure development, and agriculture expansion driven by a growing population. The multi-functionality of these landscapes and mounting pressures from a changing climate and population growth make an ideal case study for assessing the potential of operationalizing ILAs. To understand the cross-scale dynamics that influence collaborative governance in each landscape, we conducted 78 in-depth, semi-structured interviews and 13 focus group discussions. Data collection took place at the community scale with community members and traditional leadership, and at the district and regional scales with institutional representatives such as NGOs, private sector, and government departments. Semi-structured interviews were designed to understand land-use priorities and perceptions of power and decision making authority across stakeholder groups. Focus group discussions were used to explore perceptions of collaboration. Results from five months of fieldwork provide important insight into the political ecological forces (such as power, scale, and other social constructs) that shape existing governance structures in these two landscapes. These findings are critical for understanding the process of collaboration expected to underpin ILAs and closing the gap between ILA theory and practice. Beyond ILAs, these findings contribute to the governance literature more broadly and can inform policy and projects that aim to engage multiple stakeholders with diverse priorities and positions of power. Panel Session: Reed\_Panel

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#120: Socioeconomic determinants of trees on farms: regional variation and regularities in Uganda**

Dr Sam Harrison, Dr Casey Ryan

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### **Abstract**

Trees on farms are an important aspect of improving rural livelihoods, developing climate-smart agriculture, and benefiting the wider environment in tropical agricultural systems. Still, there is a lack of research in understanding what socioeconomic determinants of tree cover on farms are generalisable at broader scales.

We know that the prevalence of trees on farms depends on many factors, including the socioeconomic characteristics of farmers, like household demographics or education, and biophysical conditions like climate. Current research in understanding the determinants of tree cover on farms is focused on context-specific case studies of agroforestry adoption, but broader scale patterns in the determinants remain elusive. More generalisable information is needed to ensure effective and informed policy and action.

Our study combines earth observation products, census and household survey data with small area estimation and random forest regressions to explore the hypothesised socioeconomic determinants of tree cover on farms regionally in Uganda. We show that, on average, across all regions, travel time to cities was the most important determinant of tree cover. Still, there is significant regional disparity in which factors are the most important as well as inconsistent directions of the relationships.



The results provide valuable insights into where specific determinants are more important in explaining tree cover on farms in Uganda. The results are relevant to designing and planning interventions and extension services at the policy level and on the ground. For example, by improving access to markets for tree products where travel time to cities is seen to reduce tree cover; ensuring extension services address barriers to women where the gender of the household head is an important factor; or tailoring advice to larger households where the results show they might face extra barriers to increasing on-farm tree cover.

This spatially explicit information can help improve agroforestry adoption through better extension services and interventions tailored to regional understandings of tree prevalence on farms, tackling the most important barriers in each region.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#122: Are native trees more ecological and economical profitable in agroforestry system than exotic trees? case of *Pentaclethra macrophylla* and *Acacia auriculiformis* based agroforestry system in Yangambi landscape, DR Congo**

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## Abstract

**Introduction:** Agroforestry systems (AFSs) have a good reputation for boosting soil fertility and crop production and providing ecological services, all of which are necessary to ensure continued food security for a rising population without severely worsening environmental conditions. *Pentaclethra macrophylla* and *Acacia auriculiformis* are among important trees species used in AFS in Congo basin. Positive or negative effects of these trees on crop production, carbon (C ) storage and farmers financial profit of these trees in agroforestry system have been poorly or not been addressed in earlier studies.

**Objectives:** Hence, this research compares the impact of *Pentaclethra macrophylla* (native species) and *Acacia auriculiformis* (exotic species) on soil macro-nutrients, food crops (cassava, maize, and peanut) yield, the above ground and soil carbon as well as the financial profit during two cultural years. The study sought to understand the effect of planting densities of native and exotic legume tree species on carbon storage and farmers benefits.

**Methods:** The plot experimentation was a multifactor design implemented through Yangambi landscape in DRC. This plot had 3 replicates by tree-species, 4 tree-planting density or tree-spacings (2500, 625 and 278 trees×ha-1 as well as crop-only), and the 3 food crops.

**Results:** This study has found that the both tree species did not differ significantly with regard to their ecological and economic benefis. Nonetheless *P.macrophylla* was found to be more efficient in food crops production while *A.auriculiformis* was more efficient in above ground carbon storage.

**Recommendations:** Therefore, there is need to enact laws that extend the association of native trees species with food crop in agroforestry system for balancing the needs of biodiversity preservation, food security, and ecosystem services in DR Congo. Furthermore, there is need to develop and implement C offsets standard relating to AFS in DRC' environmental and agricultural laws and codes for AFS to become more profitable for smallholders farmers adoption.

**Key words:** Comparative agroforestry, *Pentaclethra macrophylla*, *Acacia auriculiformis*, ecological and economic benefits, Congo basin.

## Primary FLARE theme

Trees across rural-urban systems

### #123: Community Perceptions of the Importance of Ecosystem Services from Gazetted Forests: A Case of Nasarawa State, Nigeria

Mr Banki Chunwate<sup>1,2</sup>, Professor Robert Marchant<sup>2</sup>, Professor Lindsay Stringer<sup>2</sup>, Dr Eleanor Jew<sup>2</sup>, Dr Femi Oladeinde<sup>1</sup>

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## Abstract

Understanding the current state of knowledge on landscape uses that support livelihoods in protected areas is fundamental for informing forest conservation and reducing land degradation in forest communities. This work evaluated the ecosystem services derived by communities local to the protected gazetted forest reserves in Nasarawa State, Nigeria. Fieldwork and participatory methods such as household surveys, key informant interviews, and focus groups were used to elucidate information from the forest communities. A multistage sampling technique was used, and three forest reserves representing three geopolitical zones of the state were selected based on their accessibility and security. Statistical packages for social science (SPSS), NVivo, and Python 3, were used for data analyses to generate descriptive statistics, code themes, and undertake linear correlation analyses. The communities indicate the gazetted forest provides edible fruits, sources of income, agricultural produce, and climate regulation as very important benefits to individuals in the community, while sources of rainfall, increased land fertility, biodiversity, and climate regulation protection were perceived as the most important benefits from the gazetted forest reserve to society beyond the communities. Comparative results show similar and different benefits perceived from the three forests. For example, most people indicated that traditional worship is considered very important in Odu forest, whereas it was seen as less important in Doma, and not an important benefit to the Risha forest community. Development of forest areas should consider how much people depend on forest products such as building materials, food, and medical herbs and also value the forest benefits in terms of general health and welfare to access these forests. These are important for communities and could facilitate more informed land use planning and zoning in areas of high social or cultural importance. In turn, this could assist in the development of forest policies that can specifically target people in particular areas of high forest use.

## Primary FLARE theme

Circular economy, markets, and forest livelihoods

### **#125: "Resilience, remoteness and war shape the land cover dynamics of the largest remaining block of miombo woodlands"**

Mr Christopher Andrews

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#### **Abstract**

"The highlands of southeast Angola are the headwaters of the Okavango Delta and are host to the world's largest intact formation of miombo woodlands. This area is sparsely populated, largely inaccessible and harbours unique biodiversity. Recent interest from NGOs is increasing the possibility of a new protected area in the region, contributing to the "30 x 30" target of the Global Biodiversity Framework. With the potential for a new protected area, it is important to quantify the extent and change of different land covers as livelihoods in the miombo are intertwined with natural vegetation types and anthropogenic land covers. Land cover transitions and their drivers have not been quantified at scale here- preventing targeting and prioritisation of conservation interventions. We developed a 1990-2020 land cover time-series, analysing deforestation, woody losses (dense-open transitions), woody gains (open-dense transitions), and cropland regrowth. Woodland cover in the region has remained roughly constant, despite transitions between dense and open woodlands. Dense-open transitions peaked post-civil war, potentially related to the resettlement of displaced people. Over 30 years,  $61\% \pm 2\%$  of dense-open transitions were offset by woody gains, peaking a decade after the war, showcasing rapid ecosystem recovery. A woodland resource-use frontier consisting of deforestation and dense-open transitions in the north-west, spreading from more populated provinces is evident. A distinct area of "core", largely untransformed woodland occupies 34% of the study region. Urban demand for agricultural products, charcoal and other timber derived goods is the likely driver of agricultural expansion and timber harvesting, causing deforestation and woody losses, particularly in the frontier area. Woody gains are associated with remoteness from anthropogenic pressures and biophysical drivers that facilitate woody vegetation growth. Regrowth of cropland shows that shifting cultivation is important further away from urban centres, where agriculturalists allow fields to regrow, highlighting the resilience of miombo systems. We anticipate that our research will inform policy makers and conservation management, aiding in locating and prioritising interventions to sustainably produce agricultural and woodfuel products for increasing urban demand. Additionally, supporting conditions for maintenance of biophysical processes and livelihoods in remote areas is crucial to equitably achieve 30 x 30."

## Primary FLARE theme

Joining climate and biodiversity goals through forests and trees

### **#126: On track to achieve No Net Loss of forest at Madagascar's biggest mine**

Miss Katie Devenish<sup>1</sup>, Dr Sébastien Desbureaux<sup>2</sup>, Professor Simon Willcock<sup>3,1</sup>, Professor Julia PG Jones<sup>1</sup>

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## **Abstract**

Meeting the Sustainable Development Goals requires reconciling development with biodiversity conservation. Governments and lenders increasingly call for major industrial developments to offset unavoidable biodiversity loss, but there are few robust evaluations of whether offset interventions ensure No Net Loss (NNL) of biodiversity. We focus on the biodiversity offsets associated with the high-profile Ambatovy mine in Madagascar and evaluate their effectiveness at delivering NNL of forest. As part of their efforts to mitigate biodiversity loss, Ambatovy compensate for forest clearance at the mine site by slowing deforestation driven by small-scale agriculture elsewhere. Using a range of methods, including extensive robustness checks exploring 116 alternative model specifications, we show that the offsets are on track to avert as much deforestation as was caused by the mine. This encouraging result shows that biodiversity offsetting can contribute towards mitigating environmental damage from a major industrial development, even within a weak state, but there remain important caveats with broad application. It also reveals the scope for forest conservation to contribute towards biodiversity, as well as climate, commitments. Our approach could serve as a template to facilitate other evaluations of biodiversity or carbon offsets and so build a stronger evidence-base of the effectiveness of these interventions.

## **Primary FLARE theme**

Joining climate and biodiversity goals through forests and trees

## **#127: Mapping the suitability and adoption potential of agroforestry in the United States Midwest**

Sarah Castle

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## **Abstract**

Agroforestry practices offer the potential to increase agricultural sustainability, but their adoption remains limited, especially in some of the world's most highly productive regions like the United States (US) Midwest. Current agricultural practices in these regions tend to have major environmental impacts and are projected to be significantly affected by climate change. Realizing the full potential of agroforestry in such high productivity regions requires knowledge of the opportunities and constraints facing greater uptake of locally appropriate agroforestry practices. To meet this need, I present an agroforestry suitability map developed using geospatial analysis and modeling to identify potential priority areas for targeting agroforestry across the US Midwest. This suitability map advances previous work by integrating ecological, economic, social, and political variables to conduct a holistic assessment of suitability. It shows regions expected to provide productive tree growth, be economically viable, reduce the risk of environmental degradation, and increase landscape diversity. To do so, I integrated biophysical and social-economic datasets, such as soil, crop yield and value, climate, slope, hydrology, land use, and demographic data. This framework for agroforestry suitability modeling was developed

based on an extensive literature review along with key informant interviews to identify modeling parameters and user needs. Results reveal considerable opportunities for expanding agroforestry practice both at plot-scale and within specific regions, where policies could be targeted. The suitability map can be used to inform agricultural conservation policy and decision-making related to agroforestry in specific locations. This work also provides a theoretical foundation for interdisciplinary suitability modeling that can be adapted for use in other global regions. This paper concludes by discussing future directions for agroforestry research, practice, and policy in the US Midwest and beyond.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#128: What is just restoration and what prevents the message getting through?**

Prof Adrian Martin

University of East Anglia, Norwich, Norfolk, United Kingdom

### **Abstract**

The key question addressed is how environmental restoration initiatives can balance the imperative to tackle the climate and ecological emergency with the need to address social justice concerns. Funding for large-scale restoration is set to increase, both in response to international policy such as the Kunming-Montreal Global Biodiversity Framework and to corporate investment in carbon-offsetting. Restoration activities can be targeted and designed in numerous ways, for example in accordance with ecological modelling alone or incorporating social justice requirements, including decolonisation agendas. Here I report on two projects that explore the challenge of incorporating justice into restoration projects, with a particular focus on tree planting. Both are undertaken in partnership with environmental NGOs that are leading restoration projects, one operating at a national level in Scotland, the other with extensive global reach. Whilst efforts are increasingly made to consult with local communities and to ensure some economic benefits, where these are undertaken without attention to more diverse values among local communities, and in the absence of actions to diversify control and ownership of land, the result can be entrenchment of injustice rather than restorative justice. Furthermore, we find that corporate investors (in particular) struggle to understand how both non-material values and the need to address power over land can fit with their ways of working. Due to the plethora of international and national initiatives to promote restoration activities to meet climate and biodiversity targets, there are currently many academic and practitioner initiatives to establish guidelines for socially responsible restoration, much of it focused on forests. This work contributes to this larger effort, exploring the implications of more challenging social justice agendas and providing insight into this challenge through practitioners and funders.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#129: Regulatory Pragmatism and Forest Governance along the India-Nepal Border**

Professor Susan Ostermann

University of Notre Dame, South Bend, IN, USA

## **Abstract**

Many of the world's vulnerable forests are located in developing countries (Sunderland et al 2005) where state coercive capacity is often limited (Reinsberg et al 2019). Despite this, legal protection is a common forestry policy intervention (Rhodes et al 2017). Coercively strong states struggle to use enforcement to achieve large-scale compliance with environmental regulations (Kagan, Gunningham & Thornton 2003; Mackey et al 2015; Hansen et al 2013; Rhodes et al 2017); resource constraints and political factors, often tied to those living in or near forests, force different approaches (Milmanda & Garay 2019). When the state is coercively weak, this prioritization becomes extreme (Ostermann 2019) and many forest protection projects fail (Rosyadi, Birner & Zeller 2005). These failures have led some to blame limited state capacity (Laurance 1999).

Yet, some coercively weak states achieve widespread compliance with regulatory projects that are, a priori, challenging and unpopular, suggesting that states have capacities beyond coercion. In an effort to discern these alternative capacities, I look at compliance that is seemingly against the odds: rule-following behavior that defies cultural norms, self-interest and weak coercive capacity. In particular, I examine variation in compliance with wood-taking prohibitions in two contiguous national parks, in India and Nepal, investigating the mechanisms by which the Nepali state has, despite limited enforcement capacity, secured compliance with regulations that run counter to customary norms and to target population self-interest.

Utilizing a border design along the open India-Nepal border, and drawing on FCD analysis, as well as survey, observational and qualitative data, I demonstrate that the Nepali state fostered widespread compliance with wood-taking prohibitions by engaging in regulatory pragmatism, delegating regulation to key community-level actors living just outside of Chitwan National Park. This, in turn, fostered accurate knowledge of wood-taking prohibitions and higher compliance rates. The Nepali state also pragmatically provided alternative fuel sources to forest-dependent communities, lowering the cost of compliance for the poor and facilitating rule-following behavior. Taken together, these findings demonstrate that limited coercive capacity need not be a barrier to compliance with forest-protective environmental regulations.

## **Primary FLARE theme**

Reforestation challenges and opportunities

## **#130: Rural communities' views on woodland benefits in Guinea-Bissau: the importance of wild edible plants**

Ana Leite<sup>1</sup>, Luis Catarino<sup>2</sup>, Sambu Seck<sup>3</sup>, Quintino Mbunhe<sup>4</sup>, Aida Cuni-Sanchez<sup>1,5</sup>

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Guinea-Bissau. <sup>5</sup>Department of Environment and Geography, York Institute for Tropical Ecosystems, University of York, York, York, United Kingdom

## Abstract

1. The West African woodlands provide an immense range of benefits to the livelihoods of many rural households inhabiting the region, but they have been severely degraded due to various land use pressures and climatic changes. While many studies in West Africa have evaluated woodland goods and services, few studies explicitly make the diversity of local people's values the focal point of research, which has been deemed critical for planning sustainable management strategies.
2. Using a sociocultural approach that combines focus group discussions and walk-in-the-woods in 20 villages located in the north of Guinea-Bissau, our research investigates how rural communities of different ethnic groups value the nearby woodlands and perceive vegetation trends.
3. We found that Wild Edible Plants (WEPs) are an important woodland benefit for all ethnic groups, particularly in times of food shortages, and that all perceive their declining availability due to woodland clearance for the establishment of cashew orchards. Differences in the benefits cited as important were more evident between farmers (Manjack, Balanta, and Mandinka) and pastoralists (Fulani) groups. For example, all farmer groups showed the symbolic connection with the woodlands linked with the existence of irās which are spiritual entities that inhabited those places (not mentioned by the Fulani).
4. Fulani consume a higher diversity of WEPs, including more root tubers and leafy vegetables, but apart from the WEPs most traded in urban markets (which are also managed locally), an imminent dietary change was noted with reduced WEPs consumption in response to the increased availability of rice (the main staple in the country).
5. Synthesis and applications: our study highlights the need for further in-depth studies of local people perspectives and values surrounding the West African woodlands. This will allow a better understanding of the possible synergies and differences that can be further promoted to sustainably manage this ecosystem. Specifically, we argue for the urgent need of adapting woodland management to account for the provisioning of wild foods.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

## #133: How Forests and Trees on Farms Shape Household Well-Being in Ethiopia

Elizabeth Stifel, Dr. Daniel Miller

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## Abstract

Trees on farms provide important inputs to support the well-being of rural households across Africa, but quantitative national-scale evidence on their contribution over time remains limited. Information on the household reliance on trees on their own land compared to nearby forests is similarly scarce. Forests and tree-based systems provide food, timber, and ecosystem services such as soil improvement, erosion

prevention, and pollination. They have also been shown to reduce exposure and sensitivity to climate-change related shocks. This study examines the dynamic relationship between trees on farms, forests, and household well-being through a case study of Ethiopia, where poverty and environmental degradation remain major issues. We use nationally representative panel survey data from the World Bank's Living Standards Measurement Study for Ethiopia from 2011-2012, 2013-2014, and 2015-2016 to shed light on these dynamics.

We used a fixed effects panel regression model to estimate the relationship between household consumption and the intensity of trees on their farms. Results suggest that a 10 percent increase in land allocated to trees on farms is associated with a 3 percent increase in household consumption. We also interacted the intensity of trees on farms with the share of the community land that is forested. We found that as the forest share in the community increases, the positive marginal effect of farmland trees on household consumption gets smaller and becomes statistically insignificant for forest shares greater than 10 percent. These findings are consistent with a similar study of trees on farms in Uganda, but include additional information on the interplay of trees on farms and forests in shaping household consumption. Our results show that trees have played a significant role in supporting household well-being across rural Ethiopia. The findings hold insights for understanding agricultural-forest landscape dynamics and suggest the potential of on-farm trees for poverty alleviation that meets climate and other sustainability goals in that country and beyond.

### **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#134: Gender and REDD+ Implementation: The Importance of Functionaries in Developing Conversion Factors and Empowering Women in Perú**

M.A Domenica Maza, Ph.D Deborah Delgado

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### **Abstract**

Perú has 53.06% of its territory covered by amazon forest (MINAM, 2015), making it an important testing ground for REDD+ initiatives. One such initiative is the Programa Nacional de Conservación de Bosques para la Mitigación del Cambio Climático (PNCB) which aims to preserve 54 million hectares of forest while having indigenous communities as its core actors. However, while the PNCB adheres to policies and national plans that promote the rights of indigenous women and includes a gender approach in its guidelines, functionaries often ignore these in practice and reproduce a gender-blind approach throughout the whole process and the activities within PNCB.

This study aims to draw attention to the potential of REDD+ programmes to promote the development of capabilities in accordance with Amartya Sen's capability approach, and how their mechanisms can be crucial in promoting women's participation, leading to empowerment by changing the context they live in (creating a new reality) and developing Conversion Factors (CF). Our study focused on two regions (San Martín and Loreto) and employed a mixed-methods approach comprising a literature review, semi-structured interviews with stakeholders, and data analysis of programme outcomes. Indigenous communities were included as participants in the study, with one community in each region serving as a

control group to enable the measurement of changes resulting from the PNCB. Specifically, our research centred on five communities in the delta of the Ampiyacu River in Loreto, and two communities in the Lamas district in San Martín. We analysed sixty-five interviews with key communities' members, representative of indigenous associations, NGOs in the area, as well as PNCB functionaries.

This research found that the functionaries responsible for implementing the PNCB programme play a crucial role in its success in terms of promoting the development of personal, social and environmental conversion factors inherent in the mechanisms and activities, thereby creating capabilities and empowering women, as well as promoting social justice for women and the communities. However, if the implementation fails to consider women indigenous rights and traditional knowledge, as well as their participation, it may exacerbate existing inequalities.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#136: A Big Releaf: Large-Scale Forest Restoration in Brazil**

Roberto Toto<sup>1</sup>, Dr. Jennifer Alix-Garcia<sup>1</sup>, Dr. Katharine Sims<sup>2</sup>, Dr. Bruno Coutinho<sup>3</sup>, Dr. Carlos Muñoz Brenes<sup>4</sup>, Ludmila Pugliese<sup>5</sup>

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### **Abstract**

Forest restoration is recognized globally as a vital strategy to combat climate change, preserve biodiversity, and maintain ecosystem services. Yet, scarce evidence exists evaluating the impact of forest recovery interventions at a very large scale. This study addresses this gap in the literature by empirically measuring the impact of the Atlantic Forest Restoration Pact (“PACTO”)—one of the largest forest restoration programs worldwide—on forest restoration in the Brazilian Atlantic Forest. Using spatial land cover and forest change data on private land from 2009 to 2019, we isolate the causal impact of PACTO from post-matching differences-in-differences estimation, controlling for spatial observables, land features, weather, and protected areas. We provide some of the first empirically-rigorous estimates of any large-scale forest recovery intervention by employing a spatial matching procedure to develop a non-intervention group for comparison, which substantially diminishes estimation bias. Our main results show that (1) PACTO increased restored forest cover by 9.4 percentage points on average, and (2) there was substantial variation in the impact of PACTO across Brazilian states. For instance, PACTO was most effective in the state of Bahia where restored forest cover increased 15.4 percentage points. In general, we observe stronger restoration effects, both on average and in protected areas, within states with higher per-capita environmental fines. This is consistent with the theory that stronger state level institutions provide an additional incentive to engage in restoration. These findings demonstrate that large-scale forest restoration on private land is possible, but that the institutional environment plays a key role in supporting these efforts.

### **Primary FLARE theme**

## **#137: GOVERNANCE AND MANAGEMENT DYNAMICS OF COMMUNITY BASED FORESTS IN KENYA: CASE STUDY OF LOITA FOREST IN NAROK COUNTY**

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### **Abstract**

Forests in Kenya were under traditional community management regimes up to 1891. Formal management of forests by state started in Mangrove forest along the Kenya coast at Vanga and, later the entire country in 1900. In 1997 decentralized forest governance was successfully piloted through Participatory Forest Management in Arabuko-Sokoke forest at the Kenyan coast. This informed review of the Forests Act, Cap 385 to The Forests Act, 2005 subsequently revised to Forest Conservation and Management Act, 2016. The Act has explicit sections on decentralized forest management with special focus on communities. The devolution of forest governance especially through Community Forest Associations (CFAs) has given the communities a sense of legal ownership and management. Through the CFAs the communities participate in the management of forests close to their residences. They organize themselves in groups to facilitate management and extraction of products and services from the forests. This study was carried out to document status of the management structures of Loita forests currently managed by community under traditional rules represented by the Oloibon institution. The objective of the study was to document the governance structures applied in these forests and their effect on the management of the forests including its conservation. Data was collected through interviews with the officials of the CFA, other organizations with stake in the forests. Results indicated that there is population increase putting pressure on the forest and its resources. There is improved infrastructure and mechanization in the area. Currently there are challenges on the governance system which poses a risk to the existence of the forest. The Oloibon institution which has safeguarded the forest is losing its effectiveness due to factors like emergence and spread of Christianity and land demarcation. There is encroachment into the forest for production of food crops and charcoal burning.

These challenges pose the question on the success of devolved structures based on community governance institutions. Another issue to address is the role of indigenous management structures in safeguarding forests and ensuring their ability to provide the required ecosystem products and services over time.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#138: REDD+ projects and its impact on households' incomes in Indonesian Borneo**

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## Abstract

In Indonesia, the promise of result-based payment (RBP) from Reducing Emissions from Deforestation and Forest Degradation initiative (REDD+) was only materialized recently. Early REDD+ projects (established in early 2010s) were required to self-fund through carbon credits sales or donor aid support while improving the livelihoods of local people. This paper examines the impact of REDD+ projects in Indonesia on farming and overall household incomes (i.e., from all economic activity) in the absence of benefit-sharing from RBP. Our hypothesis is that farming income in REDD+-participating households (or treated households) may decrease or remain stable as REDD+ prevents forest clearance for agriculture, but farming income loss will be mitigated as REDD+ encourages income diversification. We assess two such projects in Indonesian Borneo using panel survey data from over 400 households gathered in 2010, 2014, and 2018, by employing difference-in-differences and matching methods. Our results show a consistent increase in farming and overall household incomes in the East Kalimantan site in 2014 and 2018, but we find no conclusive evidence that this rise was caused by REDD+ implementation. Similarly, while there was a decline in farming income in the Central Kalimantan site in 2014 and 2018 across control and treated households, this was not statistically associated with REDD+ implementation. The same downward trend was observed in overall household income of treated households in 2014, but it was reversed by REDD+ implementation in 2018. The findings indicate that our hypothesis did not apply to East Kalimantan's REDD+ project as farming and overall household incomes continued to increase, likely influenced by local macroeconomic improvement or implementation of other interventions. In Central Kalimantan, REDD+ did no harm to local people as farming income decline was not statistically influenced by it. But in the longer-term, the increase in treated households' overall income in 2018 indicates Central Kalimantan's REDD+ project offset farming income losses by increasing (or diversifying) household income sources. Overall, our study highlights the need for more comprehensive and detailed evaluations of REDD+ projects in Indonesia and other countries, especially in terms of their impact on local livelihoods and the effectiveness of benefit-sharing mechanisms.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

## #139: Escaping deforestation lock-in: Assessing bioeconomy innovations for a land-use transition in the Brazilian Amazon

Dr Mairon Bastos Lima

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## Abstract

While transitions theory has long focused on energy systems, in many countries it is the land-use sector the main source of greenhouse gas emissions. Agricultural production from tropical countries accrues as

much as 20% of global greenhouse gases. In Brazil, as much as three-quarters of all emissions come from deforestation or agriculture – with energy use accounting for only 18%. Therefore, in some contexts it is the land-use sector that most urgently needs change. Yet, only recently has research begun to apply the wealth of sustainability transitions scholarship to the problem of unsustainable land use. Some authors have started to point to a “deforestation lock-in” – here sustained by cattle-ranching and soy expansion – similar to the carbon lock-in identified in fossil fuel-based energy systems.

This research takes a step further to assess how bioeconomy innovations could help escape such a lock-in. Drawing on the multi-level perspective of transitions theory and taking the Brazilian Amazon as a relevant empirical case, this work identifies (1) the dominant land-use regime; (2) broader, landscape factors creating windows of opportunity for change; and (3) niche innovations that could eventually gain scale to replace the present regime. The methods include a review of the tropical deforestation literature through a transitions lens as well as primary data collection in the form of field interviews with key informants and focus groups in the Brazilian states of Pará and Mato Grosso in 2023.

The findings identify numerous niche bioeconomy initiatives in the form of “socio-biodiversity value chains” that could potentially replace dominant soy and beef production in the Amazon. However, such bioeconomy innovations that go beyond mere add-ons to major agri-food complexes (e.g., soy-or beef tallow-based biodiesel) still face tremendous bottlenecks in terms of technology, access to finance, market development, as well as socio-cultural buy-in. To escape deforestation lock-in, more collaboration is needed between such local innovators and external actors that can help enable them to overturn the present regime. This study specifies the most critical barriers in the innovators’ own views but also cracks in the present regime that provide windows of opportunity, offering recommendations for policy and further research.

### **Primary FLARE theme**

Bioeconomy, finance, and innovation for sustainable energy transitions

## **#143: Can REDD+ safeguards ‘do better’ for Indigenous Peoples and local communities? Results from a global comparative study**

Dr Juan Pablo Sarmiento Barletti, Dr Anne M. Larson

CIFOR-ICRAF, Lima, Lima, Peru

### **Abstract**

Safeguards for the UNFCCC’s REDD+ mechanism arose in response to concerns voiced by forest-dependent communities over its potential to infringe upon their rights and territories. Since then, several institutions have also developed voluntary standards for carbon markets, in addition to safeguards guidelines adopted by multilateral funding institutions. Across these standards and guidelines, safeguards are conceptualized and articulated in different ways: as bulwarks against the impacts of interventions (“do no harm”); as means to achieve sustainable development outcomes (“do good”); or as mechanisms to catalyse the transformation of forest-dependent communities (“do better”).



It is urgent to clarify and understand the role of safeguards as the climate crises prompts interest on the part of countries and corporations in 'nature-based solutions' to meet their emissions reduction targets and commitments to biodiversity. This influx of investments in tropical forests can bolster sustainable development objectives, but also poses risks to communities, including the creation of perverse incentives and the deepening of existing social and economic inequities.

This paper will present the results of a literature review and fieldwork in the DRC, Indonesia and Peru on experiences with REDD+ safeguards to understand when safeguards work, for whom, and why. We found that while safeguards have become a mainstay of REDD+ discourse and practice, there is considerable variation in their underlying objectives, the ways in which they are formulated, and the extent and effectiveness of their implementation. Thinking through safeguards, we will present a typology to understand their potential for change, as well as synthesised factors to support and protect community rights.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

### **#144: *How are we doing?* A learning tool for more inclusive participatory processes - Workshop**

Dr Juan Pablo Sarmiento Barletti<sup>1</sup>, Dr Anne M. Larson<sup>2</sup>

<sup>1</sup>CIFOR-ICRAF, Lima, Lima, Peru. <sup>2</sup>CIFOR-ICRAF, Washington DC, Washington DC, USA

### **Abstract**

Virtually all major efforts to address global problems regarding land and resource use call for some kind of multi-stakeholder forum, platform or process (MSPs). MSPs have been linked to more sustainable and resilient outcomes, more effective multi-level and multi-sector governance, more equitable and beneficial outcomes for local populations, more productive research engagement, and as catalysts for action. However, uncritical optimism towards the planning and implementation of the multi-stakeholder paradigm, supported by the lack of evidence-based lessons, is unhelpful. In our own research we found that MSP organizers often think that simply inviting people to the table assures equity and voice when it only glosses over differences and thus does not foster the changes promised by collaboration. Responding to these findings and to requests by research participants for tools that support equity in multi-stakeholder processes, we developed a series of complementary monitoring and learning tools (<https://www.cifor.org/toolboxes/tools-for-managing-landscapes-inclusively/>).

This workshop will engage with issues of equity and social inclusion in MSPs through two components. The first will start with a brief presentation of the workshop's aims and a synthesis of the key findings of CIFOR's comparative study on equity and social inclusion in MSPs (<https://www.cifor-icraf.org/gcs/research-themes/multilevel-governance/multi-stakeholder-forums/>). The presentation will set the frame for an open discussion between participants on their different experiences with forums. The second will showcase the implementation methods and development of a learning tool to support equity and inclusiveness in MSPs. *How are we doing?*, was developed with MSP participants to be implemented by themselves as a reflexive and adaptive learning tool. Participants will learn how to use the tool and how to adapt it to different contexts.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#146: Interdisciplinary research for biocultural ecosystem restoration: lessons from the Center for Ecological Restoration - Kenya**

Dr. Andrew Gichira

Center for Ecosystem Restoration-Kenya, Nairobi, Limuru, Kenya

#### **Abstract**

Kenya loses approximately 12,000 hectares of forest cover annually primarily due to deforestation and land degradation resulting from land conversion, wildfires, urbanization, commodity extraction, and overgrazing. Inspired by the United Nations 'Decade on Restoration', the Center for Ecological Restoration - Kenya (CER-K) have catalyzed collaborative efforts to combat land degradation, restore degraded ecosystems and mitigate climate change through a comprehensive and interdisciplinary approach. Here we highlight the critical role of interdisciplinary research in addressing the restoration challenges faced by Kenya. Focusing on three diverse ecosystems within the country, CER-K emphasizes the integration of science, policy, and practice to achieve successful restoration outcomes. Using participatory research, we explore diverse ways of holistic assessment of ecosystem health, identification and monitoring of key indicators, promotion of community ownership, and engagement of key stakeholders. We present selected case studies to demonstrate the practical application of our approach: (i) the implementation of ecosystem health monitoring techniques in the restored indigenous sub-afromontane forest at Brackenhurst Kenya. Robust monitoring and evaluation of intervention measures are critical in guiding the adaptive management of the restoration project. From the montane forest site, we highlight the effectiveness of the monitoring protocol that is able to assess indicators of restoration success such as biodiversity and ecosystem services; (ii) the mapping of key restoration actors and resources in coastal ecosystems, illustrating the importance of identifying and leveraging available resources for restoration initiatives; (iii) we discuss the outcomes of the engagement process of local communities in the design of ecosystem restoration projects in the Savanna, emphasizing the importance of community involvement and empowerment. This interdisciplinary strategy points to the importance of the biocultural approach to restoration programs. This combines scientific and traditional ecological knowledge, informed policy decisions, and engaged community participation to drive evidence-based decision-making and promote successful ecological restoration practices in Kenya. Our findings underscore the role of CER-K and the need for collaborative efforts for replicating our approach in similar restoration contexts worldwide.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#149: Integrating Human Dimensions in Forest Landscape Restoration**

Dr Stephanie Mansourian<sup>1,2</sup>, Dr. Johan Oldekop<sup>3</sup>, Dr. Ida Djenontin<sup>4</sup>

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<sup>3</sup>Manchester University, Manchester, Greater Manchester, United Kingdom. <sup>4</sup>Penn State University, Pennsylvania, Pennsylvania, USA

## **Abstract**

The current decade has placed ecosystem restoration in the spotlight, highlighting its valuable role for a range of outcomes, not least climate change mitigation, food security, biodiversity conservation, among others. Forest landscape restoration (FLR) is an approach to restoring forested landscapes that specifically considers both ecological and human dimensions. Yet, to date, in most cases, human considerations are taken into account in a relatively ad hoc fashion and FLR implementers (typically ecologists or foresters) lack comprehensive guidance to address these aspects. Although some frameworks exist (e.g., SER's social benefits wheel, or WRI's Road to Restoration) they remain largely theoretical and do not address the full set of human-related issues along the lengthy FLR process. For example, while early on, a common understanding of the causes of deforestation and/or forest degradation is essential, later in the process, it may be important to ensure that results can be anchored in supportive policies.

Through a unique partnership between the Society for Ecological Restoration (SER), the International Union of Forest Research Organizations (IUFRO), WWF and the consulting firm, Mansourian.org - supported by an expert group of social scientists - we are developing guidance to fill this gap.

Our research firstly identified the human dimensions associated with FLR – starting with understanding deforestation and forest degradation, through to sustaining FLR. It then took the FLR process and sought to determine the concrete human-related aspects that require attention along each step in the process. To support practitioners, we also explored related tools (in associated fields of practice - such as rural development – and from relevant organisations and disciplines).

This practical guidance for integrating human dimensions into FLR projects will provide practitioners with support to understand and integrate human dimensions of FLR (and other forest ecosystem restoration) in their practice, particularly as more attention is being given to FLR and forest restoration during the UN Decade on Ecosystem Restoration.

## **Primary FLARE theme**

Reforestation challenges and opportunities

## **#151: Using biocultural diversity to unite global environmental change agendas**

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## **Abstract**

Global environmental agendas are currently disconnected. Despite widely acknowledged links between climate change and biodiversity loss, the UNFCCC and UNCBD continue to host separate Conferences of

the Parties. This disconnection can lead to duplicated efforts, inefficient use of valuable time and financial resources, and at times, ineffective and conflicting policies. However, across all these agendas there is growing recognition that valuing and restoring people's connections with the rest of nature, including forests, are key to successful biodiversity and climate action. We argue that a biocultural diversity framework, which encapsulates the multiple interactions and interrelations between people and nature, can bridge divides between different social and environmental crises and reveal shared goals for forests, trees, and people. We support our argument by synthesising 68 studies to show how different elements of biocultural diversity link to key social and environmental goals from global conservation and climate agendas. Mainstreaming biocultural diversity could help design a more united, aligned environmental change agenda that speaks to multiple socio-environmental goals for forests and livelihoods. This better alignment of climate change and biodiversity conservation agendas could potentially unlock vast amounts of funding and drive integrated policies designed to address multiple sustainability challenges simultaneously.

### **Primary FLARE theme**

Joining climate and biodiversity goals through forests and trees

## **#152: Natural forest regrowth improves people's dietary quality in Nigeria**

Laura Vang Rasmussen<sup>1</sup>, Bowy den Braber<sup>1</sup>, Charlotte Hall<sup>1</sup>, Jeanine Rhemtulla<sup>2</sup>, Matthew Fagan<sup>3</sup>, Terry Sunderland<sup>2</sup>

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### **Abstract**

Two billion people currently suffer from micronutrient deficiencies. Existing literature shows that forests can improve people's dietary quality – yet forests are often overlooked in food security policies, which focus primarily on the production of staple crops and the production of calories. The Bonn Challenge has set a goal of restoring 350 million ha of forest by 2030, but it remains unclear whether the restored forests will exhibit the species diversity needed to improve people's diets in the same way as existing forests. Here, we report how natural regrowth in Nigeria has affected people's dietary quality. We do so by combining a new map on natural regrowth from 2000 to 2012 with food consumption panel data from the World Bank's Living Standards Measurement Study from over 1100 households in Nigeria. We then use a combination of regression and weighting analyses to generate quasi-experimental quantitative estimates of the impacts of natural regrowth on people's food intake. We find that people living in areas where natural regrowth has occurred have higher intake of fruits and vegetables and thus higher dietary diversity. As it is already well established that natural regrowth has ecological benefits, our study shows for the first time how natural regrowth is a promising strategy towards achieving win-win outcomes for both people and the environment in the long-term.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#153: Enhancing societal resilience through improved understanding of trees' and forests' resilience and vulnerability in a changing world**

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### **Abstract**

Agroforestry and the restoration of forest landscapes are increasingly prominent global concerns, acknowledging the roles they play in supporting climate change adaptation. Most often, we take the multiple roles and ecosystem services of trees and forests for granted, and we pay less attention to the trees and forests themselves. However, the suitability of tree species is changing due to climate change. Besides, human disturbances are increasing, fire frequency is increasing, and societal demand for forest products and ecosystem services is changing. The growing urban heat islands and social inequality also call for evidence-based decision-making by assessing climate risk, environmental pollution, and tree management. There is a need to strengthen the link between research and action on tree and forest science as climate change alters the growing conditions for trees, changes the distribution of vegetation zones, and increases diseases, stress, and pests. To ensure progress towards attaining the Sustainable Development Goals (SDGs), it is crucial that the negative impacts of climate change on trees and forests, and on forest-dependent communities be addressed.

This workshop will bring together scholars studying to improve the scientific and indigenous peoples understanding of how trees and forests and agroforestry systems are changing, management options to enhance their resilience, and societal responses to adapt and mitigate climate change-induced changes, thereby guaranteeing knowledge-based action, efficient policies, and outcomes to promote resilience in cities and rural areas. The workshop will encourage scientists and forest professionals to think beyond their own research interests and to consider interdisciplinary approaches, concepts, and development topics related to forests and trees, people, and climate change. Finally, the potential to build interdisciplinary working groups and future collaborative research proposals will be explored.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#154: Is forest restoration informed by evidence? A case from community forests of Nepal**

Dr Lila Nath Sharma

ForestAction Nepal, Kathmandu, Bagmati, Nepal

### **Abstract**

Forest restoration is a highly prioritized international environmental agenda at the backdrop of environmental challenges like biodiversity loss, climate change and desertification. UN decade on ecosystem restoration, Global Biodiversity Framework and various global campaigns for tree planting all

reinforce importance and urgency for forest restoration. Conventionally, plantation of trees in degraded area has remained a key strategy to restore degraded forest and sequester atmospheric carbon. Nepal's community forestry program has been considered as a successful program in degraded forest restoration. This program has prioritized plantation and tree protection since its infancy which still continues. However, we do not have analysis on how planned and informed are restoration activities in practice. In this context, taking a case of community forests (n=22) in Jalthal remnant forest, we analyse whether restoration practice is need based and informed by ecological data. We reviewed management plans of community forests, assessed forest restoration sites and species planted, analyzed forest nurseries, analyzed restoration activities, and discussed with forest leaders and regulatory authorities to restoration activities. We found that forest restoration in CF is short term, sporadic and unorganized. In general, restoration has been equated as increasing tree density and cover. Restoration activities have prioritized trees while other facets of forest biodiversity and ecosystem services are seemingly overlooked. Restoration is rarely informed by ecological data and is generally governed by conventional practices of plantation. Exotic species has often been used in restoration sites that can easily support natural regeneration. Community forest- a successful program in various fronts of decentralized forest management, needs to revisits its restoration activities to mitigate environmental problems and secure ecosystem services to dependent local people. Restoration informed by ecological data and recent scholarship in the subject matter would indeed help community forests in achieving wider environmental goals.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#155: New estimates of non-renewable biomass in the global south for the period 2010-2050**

Dr. Adrian Ghilardi<sup>1</sup>, Dr. Rob Bailis<sup>2</sup>, Dr. Ulises Olivares<sup>1</sup>, Dr. Edgar Rilke<sup>1</sup>

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### **Abstract**

Clean cooking projects around the world rely heavily on carbon savings credits that are estimated under the assumption that a reduced consumption of woodfuels will result in fewer net CO<sub>2</sub> emissions to the atmosphere. Even though this logic is correct, quantifying how much net CO<sub>2</sub> is emitted by traditional cooking is difficult, in part due to the wide variation in space and time in how the vegetation responds to woody biomass harvest.

To help clean cooking projects estimate the sustainability of woodfuel harvest (namely the fraction of non-renewable biomass or fNRB) in both a Business-as-Usual and intervention scenarios, we developed MoFuSS: a methodology that integrates many of the complexities associated with woody biomass harvest patterns and natural regrowth. With the aim of not cutting corners, MoFuSS integrates various drivers of land change, woodfuel demand sources, and end-user technologies. MoFuSS is an open-source GIS-based model that simulates the spatio-temporal impacts of woodfuel harvesting over dynamic landscapes, while accounting for savings in non-renewable woody biomass from reduced consumption.



We will present new estimates of non-renewable biomass in the global south for the period 2010–2050, with emphasis on the policy implications of these results. We'll close with a very short demonstration of a web-based tool developed to query any area of interest across the global south. We believe these results will be of interest to any stakeholder involved with the clean cookstoves universe.

## **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

### **#160: Data Science to Help a Traditional Agroforest Community to Use Their Culture and Biodiversity Wealth as a Foundation for Economic Development Planning: The Case Study of Beringin Tinggi Village in Sumatra Indonesia.**

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## **Abstract**

Indonesia has 25,863 forest-based villages, many practice traditional agroforestry systems, mimicking the structure and biodiverse complexity of natural forests, their over-stories and canopies are populated by key food and building tree species. The understories and floors are full of vegetable plants, weaving materials, medicinal plants, etc. Many studies recognize the role these traditional agroforest systems play in saving biodiversity and forest integrity, but few look at this wealth of biodiversity and the related culture, especially the woman's perspective, as a foundation to build the economy. Most efforts to save them have focused on enabling payments for environmental services, integrating market commodities, or providing small livelihood programs.

Our premise is that the biodiversity in these agroforest systems hold high economic potential and can be transformed into real economic value at scale. But first we need to understand deeply what they contain. We carried out a three-year participatory action research with Beringin Tinggi village in Sumatra. Since 2010 the village is gradually transforming its traditional agroforest into cinnamon and coffee plantations. An ethnobotany study involving women of the food culture identified approximately 150 existing food plants, but the populations of these can no longer sustain the community. We then created a comprehensive database of eight key tree food species identified in the ethnobotany research, covering 160 farm plots belonging to 132 farmers. An exercise with the village women to develop a business plan for specialty products from these tree crops, which are aimed to Indonesia's growing circular and green economy market found high economic potential in them. Access to capital, modern technologies, management systems and markets, is needed.

Saving these trees helps to secure associated biodiversity in the agroforest understory and floor where medicinal plants and materials for the creative industry such, medicinal, weaving and textile materials grow. We have developed an

internet-based application to collect "village and biodiversity" data. Ownership of such datasets could help forest villages to develop systems to manage their traditional agroforest resources, processes and green businesses that do not jeopardize the integrity of their culture and their traditional agroforest.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#161: Towards just and sustainable forest conservation? Lessons from conservation and development initiatives in northeastern Madagascar**

Clara L. Diebold<sup>1,2,3</sup>, Dr. R. Ntsiva N. Andriatsitohaina<sup>4</sup>, Melarcia Batty<sup>4</sup>, Paul C. Harimalala<sup>4</sup>, Dr. Sarah-Lan Mathez-Stiefel<sup>3,1</sup>, Prof. Dr. Peter Messerli<sup>1,2</sup>, Prof. Dr. Julie G. Zaehringer<sup>1,3,2</sup>

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### **Abstract**

As global demand for biodiversity conservation and carbon sequestration continues to rise, it is crucial to address the fact that forest conservation costs are primarily borne by people residing in forest frontiers. It is essential to find approaches that allow affected communities to benefit from the conservation of natural resources while leading the lives they desire.

The northeastern region of Madagascar has long been recognized as one of the world's "hottest biodiversity hotspots," resulting in numerous conservation and development initiatives (CDIs). However, many of these initiatives have been perceived as ineffective in halting deforestation and have faced criticism for contributing to social injustices.

This study explores how current CDIs in the region operate, aiming to learn from their experiences as a first step to co-designing pathways towards more just and sustainable forest conservation. Through a qualitative approach, we delve into the perspectives of project staff, beneficiaries, and local inhabitants in the targeted villages. By analyzing these insights, we reflect on the role of scientific knowledge, as well as Indigenous and local knowledge, in the design and implementation of CDIs. Additionally, we examine issues of power dynamics and actor inclusion/exclusion within these initiatives.

The findings of this study not only have direct implications for the CDIs involved but are also relevant for similar initiatives implemented in forest frontier contexts. Furthermore, the study contributes to the reflection on the ways predominantly internationally driven projects are designed and implemented in the Global South. Such reflections are urgently needed for reorienting conservation and development actions towards more sustainable and equitable pathways.

### **Primary FLARE theme**

## **#162: A traditional method to protect and conserve trees outside forest: A case of Homegarden agroforestry systems in Sonitpur, Assam, India**

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### **Abstract**

Trees are the crucial components of homegarden agroforestry systems around the world. The homegardens represent the simultaneous system of agroforestry. In the simultaneous system, as the name suggests, both the crop and the trees are grown together sometimes also with the association of livestock. Homegardens are among the ancient system of food production. Many recent studies have documented the role of homegarden agroforestry systems in the conservation of tree species. However, less is known about the reason why particular tree species is given preference over another in a managed agroecosystem like homegarden. As a part of our study, we surveyed, interviewed, and prepared an inventory of 192 rural households in four prominent socio-ecological zones of the Sonitpur district in Assam. The main aim was to understand the number, variety, and richness of the tree species in the homegardens of these households. The Shannon and Simpson index for tree species diversity in the homegardens of four different socioecological zone were found to be in the order of 1.325, 1.232, 1.262, 1.267, and 0.682, 0.527, 0.512, and 0.66 respectively. The surveyed homegardens had the highest of 42 tree species and a median of 15 in each household. Economic returns and cultural and recreational preference was the major reason for the cultivation of the selected species.

### **Primary FLARE theme**

Trees across rural-urban systems

## **#165: Trees in forests and on farms improve diets in rural Malawi**

Emilie Vansant<sup>1</sup>, Dr. Bowyer Braber<sup>1</sup>, Dr. Charlotte Hall<sup>1</sup>, Dr. Judith Kamoto<sup>2</sup>, Florian Reiner<sup>1</sup>, Dr. Johan Oldekop<sup>3</sup>, Dr. Laura Vang Rasmussen<sup>1</sup>

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### **Abstract**

The global food system fails to provide healthy, affordable diets to the world's poorest populations. Policies in low- and middle-income countries (LMICs) promote agricultural intensification and expansion of staple grains at the expense of forests and trees, which are important and often-overlooked sources of micronutrient-rich foods. While there is emerging evidence supporting the links between forests and nutrition, few studies expand this scope to include trees outside of forests. Here, we examine the effect of tree cover, and the use of food trees on farms, on women's micronutrient adequacy. Our novel, interdisciplinary dataset features socioeconomic, land-use, and dietary data collected from 460 women

in rural Malawi in both dry and wet seasons. We found that a) greater tree cover and b) food trees on farms are associated with higher vitamin A, iron, zinc, and folate adequacy levels. Critically, the effect of tree cover on micronutrient adequacy levels is partially mediated by the use of food trees on or around farms. This study is novel in its scope and depth of analysis, moving beyond the forest/non-forest dichotomy in landscape characterization and assessing dietary quality at the micronutrient level. Our findings show how trees along the farm-forest gradient can contribute to healthy diets for vulnerable populations, and can thereby inform targeted, nutrition-oriented agroforestry and/or forest restoration initiatives.

We shared these results with our study communities by creating children's books and seasonal calendars that highlight the importance of nutritious, tree-based foods. These products were co-developed with local experts and feature insights from our household surveys and focus groups. We distributed the books/calendars through interactive workshops in schools and health centers, providing communities with a "re-packaged" version of their knowledge in the form of products that can be easily stored and shared. This bottom-up dissemination approach 1) facilitates inter-community and inter-generational knowledge transfer and 2) promotes the collection and consumption of wild, tree-based foods, with downstream benefits for dietary quality and biodiversity stewardship. We hope this application of our research will inform and inspire future contextually-relevant solutions to co-address environmental and nutrition challenges in LMICs.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#166: Wild animals are becoming pests: Socio-ecological transitions and new human-wildlife relations in the Nepal Himalaya**

Dr Dil Khatri<sup>1,2</sup>, Professor Dinesh Paudel<sup>1</sup>, Dr Bishnu Hari Poudyal<sup>3</sup>

<sup>1</sup>Southasia Institute of Advanced Studies, Kathmandu, Bagmati, Nepal. <sup>2</sup>Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Uppsala, Uppsala, Sweden. <sup>3</sup>ForestAction Nepal, Kathmandu, Bagmati, Nepal

### **Abstract**

Nepali farmers are experiencing unprecedented challenges of wildlife encroachments into the farming. This problem has become severe in the mid-hills where community forestry program has significantly increased the forest cover and the region is experiencing an acute shortage of farm labors due to unprecedented level of labour outmigration. These evolving dynamics have raised important questions in the biodiversity conservation discourses, policies and practices demanding a new definition of the relationships between humans and wildlife, where some wild animals are seen as pests for farming communities.

In this paper, we examine the nature, extent and drivers of wildlife problems and provide critical gauge to the policy responses. We use a framework that combines the idea of forest transition (ecological changes) and the concept of agrarian change focusing on changing livelihoods strategies that have been gradually driving communities away from subsistence systems. We argue that the existing forest-people

relation in the mid-hills is changing rapidly and understanding these changes and explaining what these means for local collective action practices are central to understand why particular dynamic of wildlife problem is emerging. This paper draws on the qualitative field study and workshops conducted in three mid-hill districts of Dhading, Sindhupalchok and Ramechhap experiencing serious problems due to increasing the population of wild animals raiding farms, livestock and people.

Findings show that the rural people have experienced an increased problem from wildlife such as human casualties, crop damage and livestock killing. These growing challenges further forced farmers to seek alternative off-farm employment. The local responses have limited success and therefore people are expecting a higher policy level action to tackle the problem. We suggest a reform in the policy and practices in order to effectively cope with the problem of wildlife encroachment in the farming community. Our analysis also helps us develop better theoretical understanding of changing nature-society relationships in Himalayan with important implication for the collective action over management of forests.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#167: IUCN red-listing to assess the conservation status of ecosystems**

Somaya Ghoraba<sup>1</sup>, Marwa Halmy<sup>2</sup>, Boshra Salem<sup>2</sup>, Nadia Badr<sup>2</sup>

<sup>1</sup>IUCN Commission on Ecosystem Management, Gland, Switzerland, Swaziland. <sup>2</sup>Alexandria University, Alexandria, Egypt, Egypt

### **Abstract**

Sustaining ecosystems maintain nature's contribution to humans and enhance livelihood. The IUCN has developed the Red List of Ecosystems (RLE) framework, which is a headline indicator in the monitoring framework of the Kunming-Montreal Global Biodiversity Framework. It applies standard criteria and categories to assess the conservation status of ecosystems using five main criteria that measure the changes in the area and integrity of ecosystems. We applied the RLE to three ecosystems: wetland, sand plain, and salt marshes of the Burullus Protected Area (BPA), located on the Mediterranean coast of Egypt. Ecosystems of BPA provide plenty of ecosystem services to the local community, such as fisheries, reed thatching, fuel from plants, climate regulation, protection against sea level rise, and bird-watching. However, human activities such as pollution, overfishing, aquaculture, and urban development have deteriorated the status of the protected area. The RLE assessment advanced the understanding of ecosystem dynamics and elucidated causes of collapse risk and the current status of ecosystems. We acquired remotely-sensed data on different dates to tackle spatial changes over time. For ecological assessment, we collected long-term data for biotic and abiotic variables to estimate the relative severity of degradation based on standard calculations. The assessment revealed that sand plains and salt marshes qualified as Critically Endangered caused by socio-economic activities, e.g., urban expansion, land reclamation, and farming. The wetland qualified as Endangered caused by the discharge of agricultural and domestic effluents. The assessment produced a complete ecosystem description of key processes and interactions, a diagnostic model, and meta-data of spatial and ecological variables, which can guide legal frameworks and conservation plans in protected areas and biosphere reserves. Ecosystem risk assessment can inform the management of the protected area by framing goals that

focus on reducing and reversing current risks, particularly those that emanate from beyond the protected area boundary, and by prioritizing the most threatened ecosystems for restoration. The outcomes can be used in testing and evaluating policies for achieving sustainable development and guiding the implementation of national and international conservation strategies such as the Sustainable Development Goals and Global Biodiversity Framework. "Jefwa\_Panel"

## Primary FLARE theme

Joining climate and biodiversity goals through forests and trees

## #170: Human-Driven Degradation Impacts on Mangroves in Southern Sierra Leone

Lea Christin Huber<sup>1</sup>, Moses Nsanyi Sainge<sup>2</sup>, Zebedee Njisuh Feka<sup>3</sup>, Richard Abdoulaye Kamara<sup>2</sup>, Alie Kamara<sup>4</sup>, Martin Sullivan<sup>5</sup>, Aida Cuni-Sanchez<sup>1,6</sup>

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## Abstract

Mangroves are important stores and sinks of blue carbon, foster biodiversity and provide ecosystem services supporting local livelihoods and enhancing coastal protection. However, mangroves are declining in extent and experiencing degradation due to human activities. To link research and action for thriving forests, trees, and people, this study sought to contribute to a better understanding of impacts of different forest-use regimes on mangrove ecology in order to design effective restoration, conservation, and adapted management systems. We investigated how different levels of human-driven degradation affect forest structure, above- and belowground carbon stocks, tree species composition, and the population structures of dominant tree species. We investigated 19 transects of different degradation levels (pristine, moderately degraded, heavily degraded) in various locations (oceanic, riverine, interior) in the Sherbro river estuary in Sierra Leone.

Our results showed that pristine mangroves stored 707 Mg ha<sup>-1</sup> of carbon including soils to 1 m depth. Degradation resulted in declining basal area, decreasing density of large trees ( $\geq 30$  cm diameter) but increasing stem density of small trees. All carbon pools declined with increasing degradation across all locations. While above- and belowground carbon decreased by 96 %, soil carbon (up to 1 m depth) decreased by 44 %. Heavy degradation resulted in a change in the dominating species from *Rhizophora racemosa* to *Rhizophora mangle* across all locations. Our findings stand out by documenting carbon stocks of pristine mangroves that are higher than values reported from many other regions in Africa. Additionally, we documented fundamental changes in species compositions from one mono-dominant species to entirely different dominating species.

Based on our findings we urge conservation of pristine forests, restoration of degraded mangroves, and the establishment of management systems based on a comprehensive understanding of human-driven

degradation impacts. Designing management systems that are ecologically informed, thereby more effective, and consider livelihoods and needs of local communities, e.g. by allowing certain uses, can constitute a link between research and action for thriving forests, trees and people.

## **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

### **#171: Reimagining community institutions in the context of commercial extraction of high value forest products: A case community forests in Central Himalaya**

Dr Govinda Prasad Paudel, Dr Dil Bahadur Khatri, Mr Sushant Acharya

SouthAsia Institute of Advanced Studies (SIAS), Kathmandu, Bagmati, Nepal

## **Abstract**

Community forests are recognised as an exemplar of decentralized community-led forest management in Nepal. Over half of the country's households have engaged in managing more than one third of total forests across the nation. Research commend community forests for their role in enhancing forest-based employment opportunities, farm productivity, conservation of biodiversity, soil and water. Poor and marginalized communities in high mountain depend on income from the collection of high valued non-timber forest products for forest enterprises. However, some reports have highlighted the problems of forest resource depletion, possibly due to market induced overextraction, that threatens a sustainable forest product supply.

The researchers have extensively engaged in investigating biophysical as well as socio-economic dimensions of the forest. Despite a growing body of research, there has been little scholarly attention on market-community linkage and its impact on local collective action. In this paper, we address this lacuna by investigating the challenges to collective action in the face of commercial extraction of high-value forest products.

Drawing on common property resource literature, qualitative interviews, focus-group discussion, on-site observation and insights from ongoing action research in the mountainous Dolakha district, we intend to understand how market determine community's forest resource collection pattern. We then suggest how we reimagine the local community institutions that are better prepared to benefit from the market and safeguard declining valuable forest resource.

Our preliminary findings suggest that the market-led overextraction coupled with change in forest structure, a dense canopy interrupting the sunlight, due to inadequate forest management activities contribute towards depletion forest resources and risking the future benefit to communities form the forest. We conclude that the current form of institution, including community's mechanism to deal with the ongoing market forces, has limited ability to tackle with the common property resource challenges and therefore require reimagining institutional arrangements so that they can better cope with the collective action challenges.



## Primary FLARE theme

Circular economy, markets, and forest livelihoods

### #174: Global Faith Tree Growing for Ecosystem Restoration

Mr. Tom Barasa<sup>1</sup>, M/S Chantal Elkin<sup>2</sup>

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#### Abstract

Conservation scientists point to tree planting as among the most effective ways of tackling climate change, with an aim of about 1 trillion trees to be planted by 2030 to support People, Nature and Climate. UNEP's Faith for Earth Initiative and WWF's Beliefs and Values Programme are collaborating to better understand global efforts by faith actors in tree growing and to explore their potential to help meet this need. A global faith tree growing scoping assessment was carried out in 2021/2022, and a deeper focus on Kenya.

Globally, faiths own 8% of habitable land surface and 5% of commercial forests, and have millions of houses of worship, schools and media channels to reach their communities to support forest restoration. Caring for the environment is central to all major religious beliefs and value systems. As an expression of these beliefs and values, global religious groups are planting millions of trees for spiritual, economic and social well-being. Yet to date, there has been no concerted effort to understand the scale and potential of faith tree planting to meet global conservation goals.

The study took a desktop-review and field-based survey approach, with literature obtained from scholarly work and online sources. In-person interviews with key faith actors were conducted in Kenya. Our preliminary research showed that in the last 20 years, faith actors planted 331+ million trees globally, with plans for additional 357 million by 2030. About 255 million were planted in Africa and Asia alone, with commitment to planting 284+ million more by 2030. In Kenya faith actors reported collaborating with other stakeholders to plant 10+ million trees between 2018 and 2021, equivalent to restoring 7,600+ ha degraded forest.

Faith actors are spread across every type of ecosystem, and have the infrastructure, networks, and dedication to engage in large scale tree growing, including contribution of their land, financial resources and labor to care for the planted trees. But they need technical and financial support to do so at scale. This assessment provides a starting point for pilot projects and long-term approaches that include faith actors as key stakeholders in forest restoration.

## Primary FLARE theme

Social Justice in the Forest: Rights, Power, and Collaboration

### #175: Application of Tea Buffer Zones for Prevention of Forest Encroachment and Livelihood Improvement in Kakamega Forest Kenya

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## **Abstract**

Forest encroachment in indigenous natural forests in Kenya has been one of the major contributors to forest deforestation. Kenya lost about 50% of its forest covering about 300,000 hectares between 1980 and 2000 due to extensive logging, charcoal burning, and extensive clearing of forested regions for food crops plantations. Various strategies have been employed to stop and reverse this negative trend, Forest buffer zones using tea crop has been one of the approaches implemented over the years through the Nyayo Tea Zones Development Corporation. This study investigated the effectiveness of the 100-meter tea buffer zones as a management strategy for the prevention of forest encroachment and livelihood improvement in Kakamega forest reserve Kenya. Geographical Information Systems (GIS) was used to map the extent of protection attributed to the tea buffer zones between the period 1985 -2022. The household survey and Focus Group Discussions were conducted among 108 forest-adjacent communities to obtain their views on the importance of the tea buffer zones and their perception of forest conservation. The results from GIS indicate that along the tea buffer zones, 4.5% of forest ecosystem recovery was realized between 2005 and 2022. Socioeconomic results indicate that 30% of the forest adjacent communities were employed on the buffers tea farms, additionally, the communities rated the forest as a very important natural resource (69.7%) as it provided them with key benefits including the source of food and medicine (31.2%), provision of firewood (24.8%), environment conservation (14.7%) and preservation of cultural sites (7.3%). Based on their opinions the communities rated the forest buffer contribution to forest conservation moderately at 43.1%. These outcomes show a perfect association between forest conservation strategies and livelihood improvement. The decision to place tea buffers along the forest reserves proved to be an effective tool in preventing forest encroachment and improving the livelihoods of the forest-adjacent communities through the provision of alternative income.

## **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#177: Linking Research and Action: Participatory bamboo value chain development in Eastern Province, Zambia.**

Dr Nicholas Hogarth<sup>1</sup>, Dr Maarit Kallio<sup>2</sup>, Ms Mwaba Muleba<sup>3</sup>, Dr Mila Sell<sup>4</sup>, Mr Chipo Chisonga<sup>1</sup>, Mr Hockings Mambwe<sup>1</sup>, Mr Wellington Chazya<sup>1</sup>, Mr Chilala Ndeke<sup>1</sup>, Mr Petros Schavula<sup>3</sup>, Eng Maimbo Malesu<sup>5</sup>

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## **Abstract**

In Zambia, high levels of deforestation and forest degradation, biodiversity loss, and climate change threaten the natural resource base that >80% of the population depends. While the Zambian

government has ambitious goals to counter these problems, a disconnect between research and development interventions has hampered progress to achieve thriving forest landscapes, trees, and people.

Led by the Center for International Forestry Research (CIFOR), the EU-funded Zambia for Agroforestry, Biodiversity and Climate project (Z4ABC) is pilot testing the development of climate-relevant, productive, and sustainable agroforestry, forestry, and wildlife-based value chains (VC) across five pilot sites using the value-web approach. Multi-disciplinary and participatory research and development activities are used to co-develop and implement a selection of VCs in collaboration with stakeholders at the national to local levels, and with actors along the VC.

The pilot site in Eastern Province is an example of challenges faced related to the above-mentioned threats to natural resources. Despite being the center of a thriving multigenerational product enterprise, the once expansive distribution of Savanna Bamboo (*Oxytenanthera abyssinica*) is threatened by agricultural land conversion and overharvesting. The pilot aim is thus to conserve and expand the bamboo resource base through sustainable management and restoration, while improving local livelihoods through VC development.

Based on multi-actor platforms (MAPs) and pre-intervention data collection (gender and age segregated focus group discussions n=3, VC analyses n=20, household surveys n=138), the main findings are: i) bamboo has an important risk-coping/safety-net role for household response to shocks and expected and unexpected expenditures; ii) Baseline cash income from bamboo is higher than agriculture, even before project interventions to improve product range, value adding, and access to higher value markets ; iii) Actors at all levels (i.e. along the VC, chief and district authorities, private sector) are committed and motivated to engage in the development of the bamboo value-web.

Although primarily a development project, Z4ABC has demonstrated progress toward better harnessing research for action, with the participatory approach strengthening engagement with local communities and stakeholders, enhancing positive outcomes for the development of bamboo VCs, and setting a solid foundation for scaling up in Zambia and beyond.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#180: 'Restoring' Forests as Safety nets: Emerging Insights towards a global restoration agenda**

Dr. Harry Fischer<sup>1</sup>, Dr. Anwesha Dutta<sup>2</sup>

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### **Abstract**

Within the broader scholarship on forests and livelihoods, forests have emerged as significant safety net source, particularly for rural households mainly through reallocation of labor to extractive activities, in

order to smooth income. This assumes significance during periods of shocks and crisis also as a coping mechanism. Scaling this up, forests have assumed center stage as a low hanging fruit in policy endeavors to tackle globally climate change mitigation and adaptation, biodiversity conservation, and poverty alleviation. Restoration of degraded forests and afforestation has emerged as a major activity adopted by national and international agencies alike to address these challenges at a local level, assuming prominence through the UN Declaration of Decade of Restoration of Ecosystem. We situate this within our research on forest as safety nets in times of crisis across three Indian states on forests as safety net during crisis carried out during and at the aftermath of the pandemic. Our findings indicate that forest use increased for poorer populations, particularly for food and fodder that could not be purchased on the market. Forest use varied substantially across agro-ecological contexts, where lush evergreen forests provided a far wider range of benefits for rural populations facing distress. We also found that many people spent increasing time in the forest for leisure activities, highlighting forests' important role for other subjective, non-commercial aspects of well-being. Critically, forests' safety net function was perceived as secondary of other forms of state support, including access to subsidized food and employment. This implies that, although forests may help to supplement household needs, there continues to be a need for diverse forms of policy support to help vulnerable households confronting distress. Our work, spanning several diverse parts of India, presents a valuable opportunity to re-evaluate how forest restoration programs can better respond to the needs of vulnerable populations facing social, ecological, and economic stressors.

## **Primary FLARE theme**

Reforestation challenges and opportunities

## **#182: Livelihood resilience: Two decades of forest cover changes and livelihood's strategies in the MAP region**

Dr Renzo Giudice<sup>1</sup>, Prof. Dr. Jan Börner<sup>1,2</sup>

<sup>1</sup>Center for Development Research - University of Bonn, Bonn, NRW, Germany. <sup>2</sup>Institute for Food and Resource Economics, Bonn, NRW, Germany

## **Abstract**

Forests ecosystems support the lives and livelihoods of millions of people, secure globally and locally key biological and biophysical processes, and store and sequester large amounts of carbon dioxide and other greenhouse gases. Nevertheless, deforestation and forest degradation continue in many tropical regions. Exploring how the loss of forests affects the livelihoods strategies of people is then essential in order to understand, quantify, and communicate the value of standing forests and contribute with halting their loss. We explored this question by interviewing a set of 66 rural households during June-July 2022 in the Brazilian state of Acre in the Amazon basin. We applied the PEN (Poverty Environment Network) questionnaire in order to elucidate their income levels and main income sources, including forest, agricultural and off-farm economic activities. The same set of families had previously been interviewed between 2006 and 2007 using the same PEN questionnaire. Approximately half of these households are to be found within a protected area, namely the Chico Mendes RESEX, whereas the other half is located outside of it. A gradient of forest cover was identified at different scales (micro basin and farm) to form clusters into which each household was assigned. We used forest cover loss maps from 2006 to 2022 to quantify the changes in forest cover and relate those changes to any

declared changes in income levels and main income sources by the interviewed households. Our study finds that households located in the areas that have experienced the less forest cover change at the aggregated level (microbasin) along these years, have been able to maintain their livelihoods strategies in comparison to those located in areas with significantly more forest cover loss. We attribute this livelihood resilience to the provision of ecosystems services that healthy forests provide. Our small panel data provides the opportunity to show evidence that keeping forests standing contribute with the resilience of social-economic systems. We expect that our results could be used by local authorities in designing and justifying forest conservation initiatives, such as landscape connectivity interventions and payments for ecosystem services.

## **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#188: Human-wildlife conflict and poverty among forest proximate people: A household study through the lenses of Sustainable Development Goals.**

Ms. Medha Sundar P D<sup>1,2</sup>, Dr. Ujjal Kumar Sarma<sup>1</sup>

<sup>1</sup>Indian Institute of Forest Management, Bhopal, Madhya Pradesh, India. <sup>2</sup>Forest Research Institute, Dehradun, Uttarakhand, India

## **Abstract**

Rural development of forest proximate people(FPP) demands special attention as it bridges both development and biodiversity conservation and poverty is commonly identified as the cost of biodiversity conservation for FPP in the global south. Human-wildlife conflict(HWC) is one of the major challenges to the FPP through several direct (crop loss, cattle lifting, human injury, and death) and indirect (Opportunity cost, transaction cost, and health impacts) impacts. So far the research of HWC is largely focused on the biodiversity conservation implications. However, HWC affects FPP's well-being including livelihood opportunities, agricultural activities, food security, and access to basic amenities. While the research community is gradually recognizing the human dimensions of HWC, its implications on Sustainable Development Goals(SDGs) need framing through social justice and equity.

In this scenario, the aim of our study is to explore the synergies of HWC and SDG 1 (No poverty), using literature review along with qualitative in-depth interviews with forest proximate people(FPP) at the household level. The paper is part of the ongoing research in the Wayanad wildlife sanctuary of Southern Western Ghats, India.

Many of the countries of the global south have a considerable population of Forest proximate people. Against the backdrop of Sustainable Development Goals, the attainment of SDG 1(No poverty) of FPP should be read along with biodiversity conservation. As the UN-30 is approaching, ignoring the possibilities of the impact of HWC on rural development is likely to affect the realisation of SDG attainment by not fulfilling the principle of "Leave No One Behind (LNOB)". This is where the present study can be significant in drawing light on the forest-poverty dynamics policy changes in a wider frame.

## **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#190: The FSC certification system, and how to engage to 'Linking Research and Action for Thriving Forests, Trees, and People'.**

FSC Senior Advisor, Dr. Harrison Ochieng Kojwang<sup>1</sup>, FSC Coordinator Eastern Africa Annah Agasha<sup>2</sup>, FSC Regional Director Africa, Dr. Peter O. Alele<sup>1</sup>, Senior Research Coordinator, Dr. Marion Karmann<sup>3</sup>

<sup>1</sup>FSC International, Africa, Nairobi, NBO, Kenya. <sup>2</sup>FSC International, Africa Regional Office, Kampala, Kampala, Uganda. <sup>3</sup>FSC International, Bonn, NRW, Germany

### **Abstract**

Voluntary certification of forest management has become the main tool to support responsible procurement globally. With its Forest Stewardship Principles and Criteria as a starting point, we will showcase the role of the Forest Stewardship Council (FSC) in livelihoods improvement and responsible management of the world's forests, with > 190 million hectares of forest currently certified globally, and how researchers can engage in the related processes.

Developed to be relevant to different forest ecosystems and diverse cultural, political, and legal settings, FSC's standards require managers of certified forests to conform with strict social and environmental indicators for responsible forest management and livelihoods improvement. For example, FSC requirements include certified operations to be compliant with all applicable laws (Principle 1 of 10), to maintain or improve the social and economic well-being of workers (Principle 2) and of local communities (Principle 4), to uphold the rights of Indigenous Peoples (Principle 3); to maintain, conserve, and/or restore the ecosystem services and environmental values of managed forests, and also avoid, repair, or mitigate negative environmental impacts and, to set aside 10% of the managed area for conservation (Principle 6).

FSC's system incorporates several safeguards within its system, to allow for robust, multi-stakeholder-based decision making processes, transparency and independent monitoring and assessments of forest management. FSC supports governments to meet 14 of the 17 Sustainable Development Goals. Thus, FSC's system is worthy of systematic research to build the much-needed evidence base.

During this workshop we will actively interact with the audience to increase interest and research actions on how FSC's standards are developed and applied; including lessons that could be learnt and used in future improvements of FSC's forest management tools. We will point out research needs, and how you can find the best audience for your input. We offer Q&A sessions and an open discussion on key research topics and options for engagement and collaboration between FSC & research.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#191: Re-storying forests: reconsidering what's in store for forest restoration**

Dr Harry Fischer<sup>1</sup>, Dr Andrea Petitt<sup>2</sup>

<sup>1</sup>Swedish University of Agricultural Sciences, Uppsala, Uppsala, Sweden. <sup>2</sup>South Asian Institute of Advanced Studies, Kathmandu, Kathmandu, Nepal

## **Abstract**

Restoration of forests is now all the rage

A decade to do it says the UN front page

An effort for biological diversity

Engaging both locals and the university

But what is the story about these trees?

It allows for what kind of diversities?

From when do we strive to create our design?

What point do we pick on the forest timeline?

We lived in harmony with 'nature' goes the tale

But striving to restore that is doomed to fail

'Cause we all used to die in harmony with 'nature'

Now we're in the hands of forest legislature

Who tells the story and can it be re-told?

Including new voices if we dare to be bold

The storying of forests might well diverge

Between local community and policy surge

Looking at restoration as a creative act



Might tell new stories which might have real impact

And creativity is more-than-human of course

Just look at trees and plants directing their life force

Being creative together and co-create anew

A social forest for we didn't know we knew

Through co-creativity we now soften our gaze

Engage creative methods and slow down the pace

Writing a poem for diversity that's lost

A die-verse pondering of creativity and cost

Re-storying the forest from a different point of view

Can include new perspectives and tell us something new

Postscript:

Contemporary policy discussions on forest restoration argue that restoring degraded forest can support improved human well-being. Yet contemporary restoration planning often falls short of these objectives. This is, in large part, due to our inability to “tell a better story”. Indeed, traditional scientific language is inadequate to convey people’s lived experiences, values, and aspirations for landscape change. This presentation outlines an emerging research agenda for how creative, artistic, and storytelling methods can forge new directions to help to build richer, place-placed expressions of forest restoration agendas, and the ways that these efforts can be operationalised into action to support a broader vision of human thriving.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#192: Sustainable Forest Transitions: Forest Gains and Poverty Alleviation in Low- and Middle-Income Countries**

Dr Johan Oldekop

University of Manchester, Manchester, Manchester, United Kingdom

## Abstract

Halting and reversing forest loss is crucial for climate change mitigation and biodiversity conservation and is receiving increasing academic, policy, and media interest. Scholars have devoted much attention to deforestation, yet our knowledge of processes driving the reverse phenomenon – forest gains—and their effect on poverty and wellbeing remain limited. Here, we review the relationships between forest gains and poverty alleviation. We highlight conceptual, methodological and data limitations that have hampered understanding of how drivers of transitions from deforestation to forest gain (forest transitions) contribute to joint forest gains and improvements in rural poverty and wellbeing. First, drivers of forest transitions are often studied in isolation. We thus know little about the relative importance of concurrent drivers, how drivers interact, how effects of similar drivers differ within and between countries, or how effects accumulate at local, national, and international scales. Second, links between forest transitions and rural poverty remain largely untested. Changes in rural livelihoods, poverty and wellbeing are often considered drivers of forest transitions but not outcomes of forest transition processes. This gap also highlights the importance of considering feedback between the outcomes and drivers of forest gains. Third, our ability to address these two gaps has been hampered by low-powered statistical analyses of forest transitions. Most quantitative analyses of forest transitions have relied on some form of statistical regression or basic correlations. These analyses tend to be constrained by small sample sizes and a lack of data availability—particularly socioeconomic data—that has prevented them from accurately describing socioeconomic contexts or controlling for factors that might themselves act as forest transitions drivers. As part of our review, we develop a new analytical framework to better understand linkages between drivers of forest transitions and their impacts on forests, and rural livelihoods. We argue that to develop a new theory of “Sustainable Forest Transitions”, scholars need to better integrate existing socioeconomic and environmental datasets to generate a more nuanced understanding of how drivers of forest transitions influence rural livelihoods, poverty, and wellbeing.

## Primary FLARE theme

Reforestation challenges and opportunities

## #193: Population-environment transitions in the Brazilian Caatinga dry forest

Lucas Alencar<sup>1</sup>, Luke Parry<sup>2</sup>, Felipe Melo<sup>1</sup>

<sup>1</sup>Federal University of Pernambuco, Recife, Pernambuco, Brazil. <sup>2</sup>Lancaster University, Lancaster, Lancashire, United Kingdom

## Abstract

Understanding links between population and environment dynamics in the Global South is vital for designing policies that promote poverty alleviation and forest conservation. We evaluated population-environment dynamics and their relationship to human development conditions in the Brazilian Caatinga Biome, the world’s most populous dry forest. First, we calculated the forest cover and the number of people living in landscapes (n = 6193, circular buffers with 5km radius). We estimated that 9.4 million people live in landscapes with at least 20% forest cover in the Caatinga. Between 2006-2017, the forest-proximate population increased by more than 670,000, although 35% of the landscapes experienced population declines. Forest growth happened in 55% of the landscapes, with a total positive

net cover change of almost 460,000 hectares. Landscapes experiencing forest gains and population gains were the most common scenario (33%), followed by forest losses/population gains (32%), forest gains/population declines (20%), and forest losses/population declines (15%). Afterwards, we aggregate the population and forest changes at the municipality scale and used a cluster analysis and spatial modelling to examine how these changes are related with changes in development conditions. We find a strong spatial autocorrelation in the Caatinga's population and environmental dynamics and no consistent association with development indicators. However, growth in forest-proximate populations was positively correlated with family farming, urban expansion and reduced income inequality. In practical terms, our finding that forest cover increases can co-occur with population increase shows that it is possible to restore forest cover in degraded areas of Caatinga without negative consequences to human populations. Critically, we found that population and environmental dynamics in the Caatinga are decoupled and appear not to share municipal-scale socioeconomic drivers. Instead these dynamics may reflect larger-scale processes of change, such as drought exposure, contradicting dominant scientific discourses that blame small-holders practices (e.g. slash-and-burn agriculture, firewood gathering) as primary causes of disturbance and deforestation in the Caatinga. Forest change in other dry forests may also be driven by multi-scale processes and not directly by population (de)growth, highlighting the need for a nuanced understanding to better inform policy design for sustainable development.

### **Primary FLARE theme**

New directions in understanding forest-poverty dynamics

## **#194: Gender dimensions in the Brazilian cattle ranching sector**

Leonie Hodel<sup>1</sup>, Prof. Dr. Rachael Garrett<sup>2</sup>, Prof. Dr. Johanna Jacobi<sup>1</sup>

<sup>1</sup>ETH Zurich, Zurich, Zurich, Switzerland. <sup>2</sup>University of Cambridge, Cambridge, Cambridgeshire, United Kingdom

### **Abstract**

Tropical deforestation, resulting from the extraction of resources driven by commodity demand, poses significant challenges to society and the environment. In the Brazilian Amazon, the main driver of deforestation is cattle ranching. Despite various efforts to mitigate deforestation in the cattle sector, such as forest protection laws, intensification programs, and market exclusion mechanisms, these interventions have not achieved the desired outcomes, and deforestation rates remain alarmingly high. The persistence of extensive pasture management practices can be partly attributed to the cultural significance of cattle ownership, which symbolizes prestige, freedom, and well-being. This cultural system is characterized by male dominance and patriarchal norms, with women often assigned primary responsibility for domestic work.

To shed light on the gender dynamics within the Amazon's cattle ranching sector, this study examines land use "lock-ins" and explores alternative trajectories for sustainable futures. Specifically, we assess the land management practices of male and female cattle ranchers from diverse social backgrounds within the existing hierarchical system. By employing a socio-perceptual approach and using both qualitative and quantitative interviews conducted in the state of Acre in the Brazilian Amazon, we answer two key questions: (i) Do male and female ranchers employ different land management

practices? (ii) Are there variations in their relationships with the environment and their visions for the future?

Our findings reveal that conflicting attitudes and values, which contradict conservation laws, significantly contribute to the deficiencies observed in existing policies. This study highlights the voices of marginalized groups within the cattle culture, particularly women from diverse social and racial backgrounds, whose land use strategies have been understudied in this context. By connecting ranchers' management strategies to their value systems, our research provides valuable insights to promote sustainable adaptation, conservation, and sustainable food production. Together with feminist movements in the Brazilian rural zones, such as the Movimento das Mulheres Camponesas, we advocate for the implementation of more robust policies that ensure equal rights and protection against violence for the environment and the people living in it.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#195: Performance-Based Incentive schemes for managing trees in agricultural landscapes**

Dr Anja Gassner<sup>1</sup>, Dr Brian Chiputwa<sup>2</sup>, Richard Malingumu<sup>3</sup>, Dr Clement Akais Okia<sup>3</sup>, Godfrey Natwaluma<sup>4</sup>, Dr Erik Acanakwo<sup>4</sup>, Dr Athanase Mukuralinda<sup>5</sup>, Pierre Celestin Ndayisaba<sup>5</sup>

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### **Abstract**

Tree planting is one of the key nature based solutions for both climate-change mitigation and biodiversity conservation. It does however come at a price when farmers plant trees on their land. It involves more than just dropping seeds in the soil. The process requires a long-term commitment, sufficient resources and sound knowledge about the right way to manage trees, especially if trees are planted on the same area as agricultural crops. Most tree planting programs do not sufficiently consider the opportunity costs associated with managing trees, leading to either low survival rate of seedlings or and poorly managed trees in agricultural landscapes, with resulting negative impacts for crop and tree productivity. Most projects and programs provide incentives for tree planting, often in form of seedlings, training or tools, but not for managing the trees. We have developed a Trees on Farms' Investment Scenario Tool through a participatory stakeholder engagement process to estimate the costs associated with managing trees as well as cost benefit ratios from planting to maturity. To mitigate opportunity costs during periods of negative cost benefit ratios we tested performance based contracts with 500 smallholder farmers in Uganda and Rwanda. Incentives or rewards for farmers, both for individual as well as groups of farmers for achieving specific goals related to tree planting and maintenance were developed through a consultative process taking both governmental as well as farmers preferences into consideration, assuring compliance with labor regulations and social safeguards. The results of the performance based contracts, both in terms of farmers satisfaction as well as improvements of tree management, were used in a national engagement process for raising the awareness of the need for incentives in restoration and conservation programs and to identify

opportunities for linking national social protection interventions (such as cash for labour programs) with restoration and conservation objectives.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#196: Where do we restore? An analysis on identifying appropriate areas to realize the pledge of central African countries on restoration**

Dr Richard Sufo Kankeu

CIFOR-ICRAF, Yaoundé, center, Cameroon

### **Abstract**

Landscape and forest restoration has become one of the leading activities of climate-change mitigation since the launch of the Bonn challenge in 2011. over the 100 million ha commitment in Africa, Central Africa alone wants to restore 30.9 million ha representing 27% of the land area of the committed states. This proportion is enormous in relation to the efforts to be made. More than 10 years later, the real problem remains that of the location of restoration areas in the various countries, but also of the restoration activities to be set up without disturbing the livelihood of the local populations.

This contribution aims at proposing a new approach to identify appropriate territories for restoration and to help the targeted countries and even those of the sub-region! to better identify difficulties and opportunities. Based on the choice of three countries DRC, Cameroon and Burundi, investigations on the zoning and the territories suitable for restoration were carried out with the stakeholders, notably the sectoral ministries concerned, the private sector, research institutions and civil society. In addition, a cartographic and spatial analysis of the areas likely to be restored was carried out on the basis of sectoral development documents. In addition to recurring financial and technical difficulties, it was found that states have difficulties in identifying areas to be reforested, but also that restoration options do not always meet with global consensus. These results tend to contradict the fact that there are empty spaces available for restoration. They have also shown that restoration activities are not always welcome in forest environments where landscape transformation is very rapid.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#197: Gendered landscapes: Enhancing equity in Integrative Landscape Approaches (ILA's)**

Dr. Houria Djoudi<sup>1</sup>, Pauliina Upla<sup>2</sup>, Dr. James Reed<sup>1</sup>, Dr. Amy Ickowitz<sup>1</sup>, Malaika Yanou<sup>1</sup>, Sima Fakheran<sup>3</sup>, Dr. Mirjam Ros-Tonen<sup>4</sup>

<sup>1</sup>CIFOR, Bogor, Bogor Barat, Indonesia. <sup>2</sup>Consultant, Rome, Rome, Italy. <sup>3</sup>UBC, Vancouver, British Columbia, Canada. <sup>4</sup>UVA, Amsterdam, Amsterdam, Netherlands

## Abstract

The growing literature on gender, environment and development has revealed that natural resources use, and management are embedded in socio-ecological, political, and gendered processes and shaped by the bundle of rights people have. One of the ten principles of the landscape approach emphasizes the importance of rights. This paper takes a gender perspective to analyze how rights are handled in ILA studies. It is based on an analysis of 120 ILA-related papers selected for full-text screening.

The results identify relevant gender-related dimensions in the context of ILA governance and link specific ILA-related principles with gender domains. Despite existing gender analysis in natural resource governance, work on ILAs continues to ignore structural inequalities and gendered power relations. The ILA's papers pay little if any analytical attention to gender related power relations and very few papers addressed gender perspectives, differences, and challenges. Missed opportunities include landscape stakeholder interviews not being disaggregated by gender, any differences in setting landscape priorities between men and women not being analyzed, and more generally women's increased engagement and their role in landscape management not being reflected. This paper concluded by suggesting an ILA-specific gender framework that should ensure that ILAs address gender inequities.

## Primary FLARE theme

Social Justice in the Forest: Rights, Power, and Collaboration

## #199: Layered interventions for social justice in forest landscapes: Building on community ownership.

Ms. Apurva Duddu, Professor Ashwini Chhatre

Indian School of Business, Hyderabad, Telangana, India

## Abstract

Over 200 million people in India are involved in the collection and sale of Seasonal Forest Products that are supplied to multiple sectors of the industry as raw materials. At present, these products move through a long and invisible network of intermediaries before they enter the formal value chain. The informality in forest-based value chains has three implications. First, since the transactions in the first mile are not recorded, the primary suppliers of Seasonal Forest Products who are experienced at governing forests for their long-term sustainability and have deep knowledge of the forests remain invisible. Second, the scale of operations is highly disaggregated, making aggregation or mechanical interventions costly. Finally, the absence of formal pathways for economic incentives to trickle down to the primary suppliers and ambiguity on the legal status of community ownership on forests results in disincentives for forest protection.

Based on our experience of implementing a three-fold intervention across multiple states in India, we present a design for achieving distributed wealth creation while ensuring the long-term sustainability of forests. First, community ownership of forests aligns economic incentives with forest protection, enabling communities to invest in the productivity of their forests. Second, an aggregation mechanism through large-scale women-led community-owned enterprises enables synergies between conservation

and development. Finally, direct market linkages with large industry buyers through formal partnerships reduce the transaction costs of finding a market for forest products and allow communities to leverage the power of the collective.

An important element of the design is the fusion of digital and mechanical technology in improving efficiency, increasing visibility, and achieving transparency in the forest economy. Our interventions include a specific focus on deploying emerging technologies in ways that allows local communities to control the applications and lead to a levelling of the playing field. Digital technology allows government, industry, and community stakeholders to engage in dialogue based on a common set of data and information, resulting in better communication and governance.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#200: Gaps in Fragmentation: Existing literature on habitat fragmentation ignores social impacts and savanna ecosystems**

Miss Lorena Benitez, Dr. Casey Ryan

University of Edinburgh, Edinburgh, Scotland, United Kingdom

### **Abstract**

Habitat fragmentation, the divisions of contiguous habitat into smaller, separated areas, is a major threat to biodiversity globally. The ecological impacts of fragmentation are well-studied with ~15% of ecological papers in the past two decades having examined fragmentation; social impacts and drivers are much less studied. While fragmentation is a key ecological topic, existing literature largely focuses on forest habitat where it is easier to delineate contiguous habitat. Savanna, woodland, thicket, and dry forest vegetation covers the largest land area in the tropics, but are chronically understudied despite the significant environmental, economic, and cultural value they provide to the hundreds of millions of people who live in and around them. We undertook a systematic review of academic papers on savanna fragmentation to quantify how frequently fragmentation has been studied in savanna ecosystems and identify gaps in the literature. Web of Science returned 509 articles for savanna fragmentation: only 2% of all papers on fragmentation. Comparatively, forest fragmentation has ~18,000 published papers, which is 35x more than savannas. For both habitat types, social aspects of fragmentation are only highlighted in 2% of published articles. This analysis revealed that compared to forests and other habitat types, fragmentation in savannas is vastly understudied. Most studies on fragmentation in savannas emphasize fragmentation as a key concept in conservation of landscapes and fauna, but the majority fail to mention the social aspects of this land use change. The concept that savannas can be fragmented in the same way forests are fragmented is largely a new idea and should be further studied to both to examine its ecological and social impacts to the millions of humans and other organisms who call these ecosystems home. This is especially relevant as area-based conservation and policies to improve connectivity encouraged by 30x30 could be “flying blind” to the social dimension of fragmentation, particularly in savannas.

### **Primary FLARE theme**



Linking research and action for thriving forests, trees, and people

## **#201: Global inventory of tree species to guide investments in forest landscape restoration**

Ms Phani Devarakonda, Ms Apurva Duddu, Professor Ashwini Chhatre

Indian School of Business, Hyderabad, Telangana, India

### **Abstract**

Forest Landscape Restoration (FLR) efforts globally tend to emphasize volume over quality and have focused on a small number of tree species for plantations. Often the focus is to promote the plantation of fast-growing exotic tree species that can survive local conditions. In spite of these choices, a great majority of these efforts suffer from low survival rates. We believe that such failures result from planting species that provide little to no benefits to local people. In the absence of stewardship by local communities to ensure that the saplings survive, future efforts at restoration are likely to remain only partially successful. On the other hand, where local communities are able to link forest restoration to their livelihoods, they are more likely to change behaviors that compromise sapling survival. It is imperative that the incentives for forest conservation or protection are aligned with livelihood benefits.

We use primary data on tree species and use patterns from multiple sources collected across more than 30 countries across Africa, Asia and Latin America to create an inventory of tree species valued by local communities for their contributions to livelihoods. We combine insights from analysis of species use across three scales - household, site and landscape. First, we estimate different uses for each species and intensity of use from the frequency of household use at the local level and total households that use the species to create an index of livelihood importance.

These data present the exciting opportunity to create lists of tree species by agroclimatic zones that have a high congruence between its ecological fit to the context and the incentive it provides to local communities. Such a list will enable donors and implementers of Forest Landscape Restoration projects to select species that benefit local communities and therefore increase the incentive for the protection of saplings. Our work will be of interest to all stakeholders who are keen to improve the fit between the global commitments to restore forests and the challenges in implementation.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#202: Partnerships for creating accountability, transparency, visibility and efficiency in forest-based value chains.**

Mr Abhijeet Parmar, Professor Ashwini Chhatre

Indian School of Business, Hyderabad, Telangana, India

### **Abstract**

Investments in mechanical solutions for processing enable value capture in the first mile of forest-based value chains while also reducing the drudgery involved in the collection and sale of Seasonal Forest Products. Mechanization induces efficiency, increases dignity of labour, and decreases the costs per unit effort, allowing individuals to allocate more time to the most productive activities or devote time to leisure activities.

Advancements in mechanical and digital technologies for industrial application over the last century have enabled optimization in production by reducing costs and drudgery. Most of these innovations are limited to research labs where young scholars develop tools to meet their academic requirements. However, these scholars and academics lack the connection to and feedback from real-world users across social and ecological contexts. While mechanical and digital tools continue to be developed every year by young students, they are often not customized to solve specific local problems in the social sector.

On the other hand, local communities in forest landscapes lack knowledge of and access to technological innovations that would increase efficiency in the first mile of these value chains. Without digital technology, processes in industrial value chains are opaque, the suppliers of raw materials are invisible, and a system of accountability is costly to establish. More critically, the absence of mechanical interventions that reduce the drudgery of local communities in collecting and processing Seasonal Forest Products preclude economies of scale from harnessing market opportunities.

Drawing on our experience of enabling access to digital technology through a stack of mobile applications and introducing mechanical interventions for value addition of forest-based raw materials in three states in India, we demonstrate the impact of bridging the gap between knowledge production and technology adoption in achieving joint outcomes for economic development, local governance, and forest conservation. We show that establishing formal partnerships between local communities and technology development institutes contribute to community mobilization, increasing value retained at the local level, and attracting investments from the government and private sector.

## **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#203: Understanding the Role of Youth in Indigenous Territorial Governance**

Associate Professor James Robson<sup>1</sup>, Ph.D. Marlene Soriano<sup>2</sup>, M.S. Maria Paula Sarigumba<sup>3</sup>, Lic. Ignacio Quiviquivi<sup>4,2</sup>, M.S. Olga Lidia Cabrera<sup>5</sup>

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## **Abstract**

Indigenous territories cover more than one-fourth of the world's land surface, overlap with distinct ecological areas, and harbour significant cultural and biological diversity; their stewardship provides critical contributions to livelihood, food security, conservation, and climate action. How these territories are accessed, used, and managed is an important question for owner communities, state governments, development agencies, and researchers alike. This extends to how broad community memberships remain invested in territorial use and management, with young people comprising one sub-group often underrepresented in decision-making spaces. We know that internal community norms and structures – often dominated by older, adult males – can limit opportunities for youth to contribute their energy and ideas. We also know that youth can and do leave their home communities to pursue life, work, or education goals and aspirations. Drawing on insights from five years of collaborative research with the Indigenous Territory of Lomerío (ITL), Bolivia, we explore the roles that youth play in territorial governance, their perceptions of current structures and novel engagement strategies, and we consider what lessons from this case could be applied more broadly. Our findings point to the ITL as an atypical yet instructive example of how Indigenous (and other rural and remote) communities might enable young people to participate more fully in territorial governance, highlighting the importance of the underlying socio-cultural context. Based on our work in Bolivia, and lessons from other places, we discuss ways to enhance youth-community-territory linkages to support Indigenous land sovereignty and stewardship and reflect on how research co-design and knowledge co-production can help to deliver more robust, inclusive, and useful (in an applied sense) empirical insights in support of such efforts.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#204: Forest-rights holding gram sabhas: A platform for asserting autonomy and identity in central India?**

Ms. Anuja Date

Ashoka Trust for Research in Ecology and the Environment, Bangalore, Karnataka, India. Manipal Academy for Higher Education, Manipal, Karnataka, India

### **Abstract**

Devolution has been a widely recommended policy to ensure socially just and ecologically sound forest governance. Estimates suggest that over a million villages in India's forested landscape have received community forest rights under the historical Forest Rights Act. While this is a promising turn towards forest devolution, important barriers still remain. Access to lucrative timber remains restricted and investment towards forest-based enterprises and services is deficient or conditional with top-down control. Rapid forest conversion for development projects continues with recentralizing afforestation schemes. Given these persistent challenges, what is the promise of forest rights for forest dwelling communities in India?

In central India, where there has been a surge in claims and transfer of forest rights, I explore whether and how autonomy and forest dwellers' identity become a driving value for communities. In this study I use interviews and participant observation to understand the strengthening of the idea of 'gram sabha' or the forest rights-holding village council as a self-governing, democratic body among its members. I

conducted the study in one rights-holding village in the Gadchiroli District of Maharashtra between 2019-2021. During the study period, the village faced multiple processes of change that directly or indirectly impacted (positively or negatively) their forest use and their identity as forest dwelling communities. Using these examples, I show how the commonly-owned and economically important forest resource became a pillar on which gram sabha autonomy was asserted. Gram sabhas are tightly linked to, but distinct from, traditional systems of community governance. I demonstrate how in face of external agents of change, gram sabhas reproduce, reconfigure and transform their traditional systems in terms of inclusiveness to assert and legitimize their identity as ‘forest-dwelling’ communities.

## **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#205: Untangling the fuzzy boundaries between local indigenous knowledge and scientific knowledge for nature conservation: A case study of sustainable forest practice in Côte d’Ivoire.**

Prof Mike Christie

Aberystwyth University, Aberystwyth, Ceredigion, United Kingdom

## **Abstract**

Indigenous and local knowledge (ILK) is increasingly being promoted as a key input for effective implementation of nature conservation and sustainable development policies (IPBES, 2022). For example, the 2022 Kunming-Montreal Global Biodiversity Framework now acknowledges the contributions of indigenous peoples and local communities as custodians of biodiversity and the importance of recognising their diverse voices, worldviews, values and knowledge systems in nature conservation policies.

Whilst much of the ILK literature tends to focus on traditional knowledge that has been generated over millennia, the on-the-ground reality in many communities in the global south is that increased levels of education has resulted in a higher prevalence of scientific knowledge for understand and manage natural resources. However, understand the dynamics of the interactions between these different knowledge sources is limited. Do different knowledges complement or conflict with each other? Has the prominence of different knowledge systems changed over time?

To address these questions, we conducted 250 household interviews and 10 follow-up community workshops in 10 villages in the tropical southern region of Côte d’Ivoire. Our research collected data on how villagers used different knowledge sources to inform decisions regarding what they grow and gather from nature and their understandings of how natural processes affect these interactions. We then explored in more detail any fuzzy boundaries between the ILK and scientific knowledge source used. Our findings show that whilst these communities are transitioning to focus more on scientific knowledge, this scientific knowledge was more likely to be adopted if it supported traditional practices.

Based on our findings, we conclude by arguing that attaining a better understanding the dynamics across ILK and scientific knowledge systems can help promote sustainable management of natural resources, enhance human well-being, as well as help preserve ILK knowledge and cultural practices.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#206: The indigenous community, their livelihood, and the sustainable use of forest resources; lessons from the Western Ghats, South India**

Dr Siddappa Setty, Dr Made Gowda

Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangaluru, Karnataka, India

### **Abstract**

Non-Timber Forest Products (NTFPs) provide livelihoods to millions of forest dwelling communities. Soligas, the indigenous community in the Western Ghats, earns 30–40% of its cash income from NTFPs. Ashoka Trust for Research in Ecology and the Environment (ATREE) has been working on enterprise-based conservation models for the past 25 years to provide livelihood security and achieve conservation goals. This paper speaks about the experiences and challenges of implementing enterprise-based conservation models through the participation of local NGOs and decentralised NTFP processing units through community participation with tenure under the Forest Right Act.

Enhancing incomes from the sustainable harvest of NTFPs can help maintain local livelihoods and provide economic incentives for conservation. Some of our studies indicated that tenure plays an important role in terms of bringing community participation in conservation, sustainable use of forest resources, and establishing sustainable business models. The Forest Rights Act (FRA) of 2006 was used to empower forest dependent communities with rights to access forests for their wellbeing. Our work has facilitated the provisioning of forest rights to 77 Gram Sabhas which include 83 villages and 5433 families with 21,732 members. These two accomplishments are important milestones under the protected area regime.

ATREE implemented decentralised enterprise-based conservation models with respect to Non-timber forest products and agricultural products that led to an income generation of INR 15 Lakhs to tribal community. The income was distributed within the community as an incentive for sustainable use and monitoring forest resources. Later, additional community decentralised processing units were established in 2022, funded by the government of India, and their annual turnover is around INR 50 Lakhs. We found more ownership and inclusive participation with the decentralised processing units compared to the processing units that were associated with local non-governmental organisations before the Forest Rights Act.

### **Primary FLARE theme**

Circular economy, markets, and forest livelihoods

## **#207: The shadow of social history and biogeography in the success of mapping community forests**

Mr Sandip Chowdhury, Mr Satya Prasanna, Mr Abhijeet Parmar, Professor Ashwini Chhatre

Indian School of Business, Hyderabad, Telangana, India

### **Abstract**

Mapping technology has contributed in a big way on how community forests are mapped across the world for tenure security. The advent of new and continually improving digital and geospatial technology will further increase the uptake of technology in mapping community forests and community forest rights. However, the usefulness of technology in mapping community forest rights is not a given. We demonstrate through our action research that the efficacy of mapping technology heavily depends on the social history of forest rights as well as the ecological variability of those forests. We used advanced digital geospatial technology to map territories for community forest rights claims in three states of India, combining smartphone applications, web-based tracking systems, satellite-based navigation, and community-led ground-truthing. Our efforts across Odisha, Jharkhand, and Himachal Pradesh yielded valuable insights on the role of technology in mapping community territories for making claims. We infer that the long shadow of social and legal history of forest rights has a direct impact on the extent to which technology can be useful to map community forest area. We also find that biogeography and species distribution in the forests influence the nature of access and use rights enjoyed by different sections of the community, which in turn influence how useful technology will be in mapping community forest rights. We recommend that researchers and practitioners first study and establish the two tenets (social history and ecological variability) in the area of interest before proceeding with the mapping technology. A thorough understanding of the socio-ecological profile will not only help in deciding whether to use technology but also the extent to which the mapping technology can be used or adapted. Based on our on-ground experience of mapping community forest rights claim areas in three geographically disparate landscapes, we provide a suggestive list of conditions and factors that can help communities and their partners in making appropriate choices in the use of mapping technology and save valuable resources in terms of time, effort, and funding.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#208: Forests as distributed bioenergy hubs to support climate mitigation and local livelihoods**

Ms Shivani Gupta, Ms Apurva Duddu, Professor Ashwini Chhatre

Indian School of Business, Hyderabad, Telangana, India

### **Abstract**

The forest landscapes of India have immense potential to evolve as hubs for Bioenergy production and can generate large volumes of energy as substitutes for fossil fuels. Government mandates for reducing

emissions from energy production has created demand for plant-based coal substitutes, ethanol, methanol, and biodiesel. At present, industry is sourcing feedstock to produce bioenergy from agricultural lands. Given the urgency of climate change and its threat to food security, substituting agriculture lands to produce energy will create undesirable trade-offs with food supply. The demand for raw material for bioenergy is only expected to increase and the capacity of agriculture to meet this demand is limited, while forests are a perfect substitute to meet the energy demand.

There are multiple opportunities that forests provide in this context. These include briquettes and pellets as coal-alternatives in Power, Cement, and Steel industries, ethanol from forest-based biomass using second-generation technology, biodiesel from seed-derived fats from a variety of tree sources, production of Compressed Biogas, and the concurrent production of biofertilizer as substitute for Urea and other chemical fertilizers. The production of energy from forests has several potential benefits, including reducing dependence on fossil fuels, diversifying the income portfolio of local communities for climate change adaptation, enabling sustainable management of forest resources, and effective restoration of degraded landscapes.

We describe a model being implemented in India that is designed to leverage the provisions that already exist in the institutional and financial frameworks, both in the public and private sector domains to channel investments in the infrastructure that support a bioenergy economy at scale. The model builds on the foundation of community ownership of forests to leverage capital investments in energy production. Pine needles and bamboo for conversion to pellets as coal substitutes in thermal power and Sal seeds for producing biodiesel are examples of implementing this model with current forest resources. However, the potential of the model is greater when combined with forest landscape restoration efforts. This paper outlines the economics of bioenergy production from community forests and the contours of the financial model to realize its benefits.

### **Primary FLARE theme**

Bioeconomy, finance, and innovation for sustainable energy transitions

## **#210: Closing knowledge gaps in integrated landscape research: a critical analysis of power, gender, and scale dynamics**

Dr James Reed

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### **Abstract**

Landscape-scale inclusive governance strategies that attempt to reconcile conservation and development objectives have been variably applied across the tropics for more than 30 years. The extent to which these approaches have been successful in delivering their objectives remains subject to ongoing interrogation. However, the relative lack of objective outcomes or impacts has done nothing to dampen enthusiasm for their application with integrative approaches both enduring and generating renewed support from donors, policymakers, and academics. Indeed, such approaches are central to recent global environmental policy discussions and attract substantial funding. Despite their long evolution and widespread support, an agreed definition, or conceptual framework, for so-called integrated landscape approaches (ILAs) remains lacking. This conceptual ambiguity leaves the approach



open to interpretation and in the realm of subjectivity and uncertainty, greatly enhancing the potential for the concept to be abused, mis-assimilated, or co-opted. Meanwhile, a lack of definition also implies a lack of basic norms and rules to follow with potential for conceptually weak and poorly designed implementation efforts.

We suggest that this has resulted in several knowledge gaps in the evidence base that are broadly related to: an incomplete characterisation of integrated landscape approaches; poor incorporation of gender-related dimensions; an uncritical acceptance of the potential and value of integrative approaches; a lack of attention to deeply embedded socio-political issues; and a poor understanding of cross-scale dynamics and inherent power structures. In this session we will reflect on advances, and gaps, in the literature and share lessons learned from our experiences working with ILAs in Ghana, Zambia, and Indonesia that respond to the knowledge gaps identified above.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#212: Control over livelihood assets among members of community forest enterprises in the Maya Biosphere Reserve, Guatemala: Insights into gendered and joint household decision making**

Dr. Dietmar Stoian<sup>1</sup>, Aruna Kainyande<sup>2</sup>, Aldo Rodas<sup>3</sup>, Dr. Iliana Monterroso<sup>4,5</sup>, Prof. Dr. Lukas Gießen<sup>2</sup>

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### **Abstract**

A growing body of literature sheds light on gendered decision making in rural households, aiming at identifying patterns of inequality, underlying factors, and ways to transform gender relations. Adopting a gender lens for analyzing household decision making over livelihood assets is challenging, given its complexity as well as gender stereotypes affecting researchers and household members alike.

In our survey among members of community forest enterprises (CFEs) in the Maya Biosphere Reserve in Guatemala, we analyzed men's and women's decision making in mixed households across 17 areas linked with natural, human, social, physical and financial capitals. Based on a random sample of 170 households, we sought to identify areas of gender-differentiated decision making and those where decisions are taken jointly. For the purpose of cross-checking, male and female interviewers asked men and women respondents separately about each other's role in decision making.

Results varied across CFEs, households, and assets, both in terms of perceived roles in decision making and decision making as such. Men involvement was perceived particularly strong with regard to decisions on natural, physical, and social capitals. Women involvement was relatively stronger for human capital (health, child education). We found congruence in the perception of each other's role in decision making for some areas, but marked differences for others. This reflects gender norms attributing decision-making power for given areas to either men or women. Despite gendered decision

making across the four capitals mentioned, we found a significantly higher level of joint decision making in relation to financial capital. This is striking as decisions around household income have widely been purported to be male dominated.

Our results show that, despite decisions over certain livelihood assets being dominated by one gender or the other, financial capital stood out as an area of joint decision making. Being an integral part of a household's economic base, gender-equitable control over financial capital underscores a prominent role of women in household decision making in the CFEs surveyed. The methodological approach pursued and the results have implications for policies and livelihoods development aimed at transforming gender relations in forest-dependent households in support of social justice.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#213: The roles of forests for livelihoods during crisis in two African countries – impacts of COVID-19 in Kenya and Niger**

Dr. Chemuku Wekesa<sup>1</sup>, Dr. Doris Mutta<sup>2</sup>, Professor Larwanou Mahamane<sup>3</sup>, Dr. Daud Kachamba<sup>2</sup>, Dr. Vincent Oeba<sup>1</sup>, Professor Anders Roos<sup>4</sup>

<sup>1</sup>Kenya Forestry Research Institute, Nairobi, Nairobi, Kenya. <sup>2</sup>Africa Forest Forum, Nairobi, Nairobi, Kenya. <sup>3</sup>Abdou Moumouni University of Niamey, Niamey, Niamey, Niger. <sup>4</sup>Swedish University of Agricultural Sciences, Department of Forest Economics, Uppsala, Uppsala, Sweden

### **Abstract**

The COVID-19 pandemic is global, but its impacts differ between regions and income groups. The pandemic is affecting the livelihoods of both the rich and the poor households in Africa who are in many cases more dependent on incomes from forest and natural resources. This study investigated how low-income households in Africa used forests and forest-based products to compensate for income losses due to the COVID-19 pandemic - in both urban and rural contexts. Quantitative household surveys, key informant interviews and focus group discussions were conducted in urban and rural areas in Southern Niger and Coastal Kenya. The study also connected the pandemic impacts with livelihoods-affecting episodes such as climate change, insecurity, and inflation. The findings describe how COVID-19 has impacted on urban and rural populations in multiple aspects, and the role of forests during the period. Restrictions instituted to contain the spread of COVID-19 disrupted commodity supply chains and resulted in reduced opportunities to earn income. Farmers were prevented from transporting and marketing their products from forests including non-timber forest products. Urban citizens were generally more affected with a prompted exodus out to the villages which increased dependency for subsistence activities. Forest and tree products played an important role in livelihoods of both rural and urban populations even if their trade met obstacles. The study furthermore investigated the livelihood impacts and subsequent trends, such as insecurity, climate change/drought, and inflation. The findings showed that forests and trees outside forests provide multiple uses during unexpected adverse events. It may for this reason be advisable to maintain and protect forest areas for provision of alternative livelihood support system during pandemics.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#215: What Determines the Adoption of Agroforestry Practices in Farmlands and Public Lands in Nepal? A Case Study from the Terai Region of Nepal**

Mr Asmit Neupane

Institute of Forestry, Pokhara, Gandaki, Nepal

#### **Abstract**

While agroforestry has been well acknowledged for its influential role and benefits in integrated resource management in the global south, its adoption in forest-rich countries with existing community conflict situations is under explored. Through structured questionnaire surveys and stakeholder discussions, this study explored patterns and factors influencing agroforestry adoption and promotion in farmlands and public lands in Terai region of southern Nepal. Results suggested for more effective and widespread agroforestry development, promotion, and implementation in this region. The key determinants of agroforestry adoption on private land were found to be accessibility, land tenure, and land size. For public land, however, adoption was negatively related with economic well-being, highlighting the importance of agroforestry practices on public lands to the poor community. Strong integration, coordination, and cooperation between agroforestry initiatives and local institutions such as forest user groups and local governments are warranted for widespread agroforestry adoption in similar resource-use conflict regions.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#217: Forest, Livelihood and Co-management in Western Ghats, South India**

Dr Siddappa Setty R, Dr Made Gowda C, Dr Harisha R P

Centre for Environment and Development at ATREE, Bengaluru, Karnataka, India

#### **Abstract**

Over the last few decades, many countries around the globe have tried different ways to incorporate local communities into forest management and conservation activities. Protected areas in India have had significant impacts on local communities, primarily through the physical removal of people.

The indigenous Soliga tribal community has been living in the forest for centuries, and they are known as the people of the bamboo. In the case of Biligiri Rangaswamy Temple Tiger Reserve (BRT) a protected area where Soligas reside and are dependent on the forest for livelihood and subsistence needs. Efforts to integrate local communities in the management and enhance community benefits from the forests have been undertaken, including participatory resource monitoring, value addition for forest products,

and co-management. The reasons for it have been the implementation of the Forest Rights Act (2006) and BRT Wildlife Sanctuary's reassignment to a Tiger Reserve in 2011.

The Forest Rights Act (FRA) of 2006 was used to empower forest dependent communities with rights to access forests for their wellbeing. Our work has facilitated the provisioning of forest rights to 77 Gram Sabhas which include 83 villages and 5433 families with 21,732 members. These two accomplishments are important milestones under the protected area regime. To develop an inclusive co-management plan, seven community meetings have been conducted, in which 341 community members participated. Meetings were focused on encouraging the community to develop co-management plans for conservation and livelihood enhancements under FRA.

They felt that Lantana (invasive species) spread was a major problem for the forest. It won't allow other native species to grow/regenerate. Lantana furniture making is one of the solutions to controlling the weed. Control of traditional forest fires is contributing to canopy fires, and we need to think about litter fires that do not damage the forest. The community felt that they needed grama sabha (decentralised community governance system) at the village level, and it could go well under the Forest Rights Act. They felt that they needed awareness about forest management, cooperation, and support from the forest department and other stakeholders.

### **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#218: What does music have to do with forest restoration?**

Dr Rose Pritchard<sup>1</sup>, Dr Rachel Johnson<sup>2</sup>

<sup>1</sup>University of Manchester, Manchester, Manchester, United Kingdom. <sup>2</sup>Royal Northern College of Music, Manchester, Manchester, United Kingdom

### **Abstract**

There are regular calls for greater collaboration between the arts and sciences in responses to environmental challenges. But the framing of such art-science collaborations often becomes reductive, treating the arts as a simple medium for 'scientific' messages. Here, we draw on a systematic review of literature on music and forest restoration to illustrate the complexity of entanglements between the arts and environmental action. We discuss how music and the music industry can support achievement of restoration goals, for example by altering relational values and environmental worldviews, or by contributing new methods and technologies. We then reflect on conceptualisations of music and landscape as co-constituted and inseparable, in which music is integral to knowledge systems and landscape identities. Finally, we discuss how music can inhibit restoration or otherwise alter the distribution of benefits and harms from restoration actions, whether through dependency on resource inputs and production of environmental pollutants, through being part of increasingly human-dominated soundscapes, or through the interplay between music and the broader politics of restoration. Our review demonstrates the importance of a nuanced perspective on relationships between the arts and forest restoration, in which we recognise the rich potentials for collaboration but are also conscious of the ways that the arts can reinforce environmental harm or social injustice. We

conclude with a brief reflection on the rewards and challenges of art-science interactions, and on the diverse acts of translation required in such multidisciplinary researcher-practitioner collaborations.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#219: Common Future Priorities for Achieving Climate and Biodiversity Goals: A Systematic Review of Participatory Approaches**

Mariana Hernández-Montilla<sup>1</sup>, Dr. Marcus Collier<sup>2</sup>, Ph.D. Maike Hamann<sup>3</sup>

<sup>1</sup>The University of Manchester, Manchester, England, United Kingdom. <sup>2</sup>Trinity College, Dublin, Leinster, Ireland. <sup>3</sup>University of Exeter, Exeter, Devon, United Kingdom

### **Abstract**

As urbanization, climate change, and economic instability pose challenges to cities' livability, health, and food security, finding innovative solutions becomes increasingly difficult, especially in developing countries. Our study focuses on identifying common future priorities across multiple sectors, including nature conservation and forestry, which are crucial for achieving climate and biodiversity goals. We explore how Nature-based solutions can address the challenges facing cities in the global south by examining 20 participatory visionary approaches through a systematic review. The review found 70 narratives that covered the next 10 to 60 years. To effectively plan and implement Nature-based solutions, it is essential to understand the different paths to environmental, economic, and social development and how they impact ecosystem services and societal well-being. Therefore, using content analysis and archetypal methods, we identified four significant alternative trajectories or archetypes: Market Forces, Policy Reform, Fortress World, and Local Sustainability. Our analysis revealed common future priorities across sectors such as farming, water management, nature conservation, forestry, tourism, and energy. This enables us to identify key drivers of change, significant uncertainties, and feedback that could affect desirable future trajectories. We found that utilizing data from multiple participatory processes can help understand the potential risks and benefits of transformative adaptation and facilitate effective planning and implementation of Nature-based solutions. Our study highlights the need for innovative, Nature-based solutions to address challenges and foster sustainable development in the global south. Our findings support the power of scenario/storyline analysis in understanding common future priorities and enriching policy debates involving voices from different worldviews. Furthermore, our findings emphasize the significance of prioritizing co-creation and co-benefits in the design and implementation of Nature-based solutions interventions, as it is crucial for ensuring their success and sustainability. Nature-based solutions can be a valuable strategy for addressing the challenges facing the global south, particularly in Africa. Ensuring that Nature-based solutions deliver multiple benefits is critical, and involving stakeholders and participatory visionary approaches in their design and implementation can help achieve this goal.

### **Primary FLARE theme**

Joining climate and biodiversity goals through forests and trees

## #220: Applying the IUCN Red List of Ecosystems to assess the collapse status of the Burullus Protected Area

Somaya Ghoraba<sup>1</sup>, Marwa Halmy<sup>2</sup>, Boshra Salem<sup>3</sup>, Nadia Badr<sup>3</sup>

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### Abstract

Ecosystems are fundamental to policy frameworks and international legislation for the environment; sustaining ecosystems maintains nature's contribution to humans and enhances livelihood. Therefore, the IUCN has developed the Red List of Ecosystems (RLE) framework, which is now a headline indicator in the monitoring framework of the Kunming-Montreal Global Biodiversity Framework. It applies standard criteria and categories to assess the conservation status of ecosystems due to environmental changes and human activities using five main criteria that measure the changes in the area and integrity of ecosystems. In our research, we applied the RLE to a wetland, sand plain, and salt marshes of the Burullus Protected Area as human activities have deteriorated the general status of these ecosystems. To conduct the assessment, we acquired remotely-sensed data at different dates to tackle the changes in the study area over time. In addition, we defined and collected data for biotic and abiotic variables responsible for ecosystem deterioration to estimate the relative severity of ecosystem degradation based on standard calculations. We found that sand plains and salt marshes were identified as Critically Endangered, and the Wetland ecosystem was categorized as Endangered. The assessment also produced a complete ecosystem description of key processes and interactions, a diagnostic model, and meta-data of spatial and ecological variables. The metadata associated with the assessment can guide legal frameworks and conservation plans in protected areas and when nominating new biosphere reserves by identifying the most deteriorated areas for creating zonation maps and prioritizing restoration. The outcomes can be used in testing and evaluating policies for achieving sustainable development and guiding the implementation of national and international conservation strategies such as the Sustainable Development Goals and Global Biodiversity Framework. Generally, ecosystem assessments support linking ecosystem health with ecosystem services and the security of livelihoods and highlights best practices for achieving sustainability.

### Primary FLARE theme

Linking research and action for thriving forests, trees, and people

## #223: Food Security and Forest Access in the Colombian and Peruvian Amazon

Mr. Alex Buritica<sup>1</sup>, Ms. Martha Vanegas<sup>1</sup>, Ms. Deborah Pierce<sup>1,2</sup>

<sup>1</sup>The International Center for Tropical Agriculture, Cali, Valle del Cauca, Colombia. <sup>2</sup>The University of British Columbia, Vancouver, BC, Canada

### Abstract

Food security is one of the basic tenets of a decent life. It is especially important in early childhood development and has implications for a range of developmental and health impacts in adulthood. While many factors impact food security, forests have historically played an important role in maintaining food security by providing both essential ecosystem services as well as acting as a direct source of nutrient rich, diverse foods and medicines. In this paper, we surveyed rural households in the Colombian and Peruvian Amazon to analyze four dimensions of food security with relation to forests: availability, stability, access, and use. We found that families with access to forests and who live closer to the forest have higher food security. However, we found that the magnitude of this effect differs by country and by ethnicity. Access to forests had a higher impact on food security in Colombia; however, this phenomenon can be partially explained by the quality of forest cover and local practices. Households surveyed in the Colombian Amazon have access to less degraded forests compared to those surveyed in Peru. Furthermore, a higher percentage of households surveyed in Colombia were Indigenous than those surveyed in Peru. A much higher percentage of households surveyed in Peru were mestizo, and among these households there was no difference in the level of food security between households that had access to a forest and those that did not. These findings suggest that the impact of forests on food security depends on the quality of the forest, the local practices of those accessing the forest, and the proximity and ease of accessing the forest. The local practices of some Indigenous peoples in the Amazon implies that many of these peoples are dependent on forests with low levels of degradation for their food security. This has implications for ensuring that Indigenous people can readily and easily access forests for hunting, Indigenous agricultural practices, and the gathering of wild foods.

### **Primary FLARE theme**

Circular economy, markets, and forest livelihoods

## **#224: Women fuelwood retailers: insights into gender dimensions of fuelwood access in Northern Nigeria**

Mr Abubakar Tanimu<sup>1</sup>, Professor Aliyu Barau<sup>1</sup>, Professor Lindsay Stringer<sup>2</sup>, Professor Robert Marchant<sup>2</sup>, Mr Banki Chunwate<sup>2</sup>

<sup>1</sup>Bayero University Kano, Kano, Kano, Nigeria. <sup>2</sup>University of York, UK, YORK, YORK-AC-UK, United Kingdom

### **Abstract**

In Nigeria, women play a crucial role in fuelwood use and distribution, especially in rural areas where women predominate some aspects of the fuelwood market. Fuelwood vending has become a major livelihood option for women living in areas close to forests where fuelwood is extracted. This study investigates the role of women retailers in the northern Nigerian fuelwood market by characterising the socio-economic status of women vendors and also the species and amount of fuelwood they sell to other women. Data were gathered from surveys and interviews conducted with 26 women retailers and other participants in the fuelwood supply chain in rural communities in three states of northern Nigeria comprising Abuja, Kaduna and Nasarawa. Women vendors who sell fuelwood to households, restaurants, and bakeries play a significant role in the fuelwood supply chains. They offer local women in their communities improved access to energy by reducing time that they spend searching for fuelwood themselves. By implication, fuelwood is no longer easily accessible to women as it becomes scarcer and



its trade is increasingly dominated by men. Other considerations include women's choices of species and challenges and risk they are exposed to as they use fuelwood. The paper concludes by exploring some options for transitioning to clean sources of energy for cooking for women.

### **Primary FLARE theme**

Joining climate and biodiversity goals through forests and trees

## **#226: Decentralized Tenure System and Community Forestry: Challenges and Opportunity in Northern Uganda**

Dr David Olanya

Gulu University, Gulu, Uganda, Uganda

### **Abstract**

The Uganda's forest policy of 1948 had emphasized capital accumulation, environmental protection and conservation at the expense of the community participation in forest management. This policy was extended and upheld during post-colonial forest policy (1962-1980s). Furthermore, the forest policy review of 1988 had excluded local communities adjacent to forests and was also silent on the role of private and rural communities in forestry. However, the 2001 National Forestry Policy provides a direction for sustainable management of forestry, calling for partnership and collaboration in forestry management with the local communities, the private sector, local and central government, civil society organizations and other players. The logic is that access to forestry can help in improving rural livelihoods and in overcoming poverty. With climate change and carbon sinking gaining ground in development agenda, issues of access, use and management of forests and the impacts on rural communities need to be reconsidered. However, with the increasing demand for community forest, its vulnerability to government biasness toward revenues in which private individuals is licensed to cut down trees is problematic. The rate of deforestation in Uganda is more than 73, 000 ha of private forests and over 7, 000 ha of protected forest reserved are destroyed annually. The increasing demand for energy is putting significant pressure on community forestry. Commercial charcoal dealers from Kampala now buy forests per hectare at around US \$ 600 in Northern Uganda. Besides charcoal, community forest faces competing uses from population growth, increasing demand for agricultural land, poverty and inadequate knowledge on the values of natural forest to the community. The practice of leasing community forests to commercial charcoal dealers presents a serious challenge for community forest management. This article therefore explores the prospects and challenges of REDD and REDD+ in Northern Uganda as a necessary alternative for sustainable livelihoods and to empower the communities with information on the values of standing forests in their surroundings.

Keywords: community forest, governance, land tenure, livelihoods, REDD+

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#227: Land Cover and Land Use (LULC) Transitions in Malawi after the Bonn Challenge pledge**

Miss Tonthoza Uganja, Dr Eefke Mollee, Dr James Gibbons

Bangor university, Bangor, Gwynned, United Kingdom

### **Abstract**

Many African countries pledged millions of hectares for forest landscape restoration (FLR). To ensure that FLR is being achieved as designed, monitoring of cover gain and loss becomes a significant tool to determine whether FLR targets are being met. With the pledge to restore 4.5 M. ha of degraded and deforested lands by 2030, Malawi is one of the countries with determined FLR targets. This commitment aligns well with transitioning towards a Climate Resilient Green Economy (CRGE) with zero net greenhouse gas emissions and corresponding plans for large-scale afforestation and reforestation. Land and forest degradation are seen as key obstacles to socio-economic development, linked closely with low agricultural productivity, food insecurity, and rural poverty. This study is aimed at determining land cover and land use after the pledge in 2016 while also projecting current trends toward meeting objectives set for 2030 with respect to achieving FLR policy targets within Malawi and its implications on policy objectives. We performed a land cover change analysis for Malawi covering 2017 to 2022 using sentinel 2 images to understand the extent of land cover gain/ loss in Malawi. To analyse the current trends in land cover change to determine if they are consistent with achieving the 2030 restoration targets, we used a regression analysis to identify trends in the data. We used the rate of land cover loss/ gain to inform required adjustments to focus on to maintain cover gains. Preliminary results reveal a total net loss of cover. However, positive transitions exist and are significant, showing increased trees on croplands. The land use transitions reveal pathways to enhancing gain and provide pathways to bridging the gaps in current research on FLR in the dry tropics.

### **Primary FLARE theme**

Reforestation challenges and opportunities

## **#230: Leveraging Grassroots Data to Advance Local Livelihoods and Strengthen Community Tenure and Governance**

David Kroeker-Maus

Rights and Resources Initiative, Montreal, QC, Canada

### **Abstract**

Introduction: The presentations in this panel will provide multiple perspectives on emerging experience, opportunities, and challenges for community-led, data-driven initiatives to improve the social and environmental performance of livelihoods interventions and investments in the traditional territories of Indigenous Peoples and local communities.

Context: There is increased recognition of the centrality of secure Indigenous, community, and Afro-descendant land and forest tenure rights – including the rights of community women - to the achievement of 2030 climate and biodiversity targets.

Following the unprecedented \$1.7 billion forest tenure pledge during CoP26 in Glasgow, new rightsholder-led funding mechanisms have emerged to channel more global support directly to community-based organizations to manage and conserve forests and rural landscapes. Leading companies and investors are making Forest Positive commitments to eliminate deforestation from supply chains while ensuring that operations contribute to rural livelihoods and strengthen community land tenure. So too do efforts to recognize new protected areas, including the 30x30 initiative, acknowledge the importance of rights-based conservation and livelihoods. However, there remain few vehicles to reliably ensure that community perspectives are informing these global initiatives and to assess impacts on local livelihoods.

Community monitoring comprises the self-determined efforts of local communities to monitor and collect data relevant to their own governance. Monitoring arrangements may be in partnership with or independent of external stakeholders, and there are well documented examples of grassroots data being used to advance the rights and livelihoods of communities in Latin America, Africa, and Southeast Asia. Community monitoring represents a key pathway to empower communities to engage with global stakeholders to influence the discussions, operations, and capital that are impacting local rights and livelihoods.

(Indicative) Panel Composition + Discussion Points:

- Lawrence Kiplagat, Kerio Valley Community Association – Community monitoring of oil exploration in Kerio Valley, Kenya
- TBD, Indigenous Livelihoods Enhancement Partners, Kenya – Monitoring impacts of global direct funding mechanisms and conservation in East Africa
- Mina Beyan, SESDev, Liberia or Andiko Mancayo, AsM Law Offices, Indonesia (in person or virtual) – Leveraging community data to influence Forest Positive supply chains and advance local livelihoods in Indonesia OR Liberia
- TBD, FLARE – Monitoring community forestry outcomes

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#231: Community Land Tenure and Livelihoods in Kenya**

David Kroeker-Maus

Rights and Resources Initiative, Montreal, QC, Canada

### **Abstract**

Purpose: Panelists from civil society, academia, and the impact investment communities in Kenya reflect on opportunities, challenges, and needs to advance community livelihoods in the context of the Community Land Act 2016.

Context: This panel will provide a spotlight on the opportunities and challenges facing forest-dependent communities in the host country for this year's FLARE Annual Meeting. Kenya has taken a lead in recognizing the collective land tenure rights of Indigenous Peoples and local communities through the historic passage of the 2016 Community Land Act (CLA 2016). Under the CLA 2016, up to 38 million hectares of rural lands and forests across 24 of Kenya's 26 counties, currently held in trust, will be recognized for Indigenous peoples and local communities in Kenya. As community organizations, civil society, government, and others mobilize to support the process of recognition and registration, stakeholders are now looking ahead to the livelihoods dimensions of the land rights recognition. How will new rightsholders in Kenya leverage tenure and realize livelihoods and economic benefits while maintaining forests, rangelands, and biodiversity?

(Indicative) Panel Composition:

- Moderator, TBD
- Isaac Tobiko, Chair, Community Land Action Now (CLAN) – Emerging opportunities and challenges for local livelihoods under CLA 2016.
- Stephanie Bishop, E&S Associate Director, New Forests – Investor + Community partnerships in East Africa.
- TBD, CLAN – Opportunities and challenges for livelihoods of women and girls in Kenya.
- TBD, [To be suggested by FLARE]

### Primary FLARE theme

Social Justice in the Forest: Rights, Power, and Collaboration

## #233: The role of forests and trees in poverty alleviation in Africa

Dr Doris Mutta<sup>1</sup>, Prof Daniel Miller<sup>2</sup>, Ms Dikshya Devkota<sup>3</sup>, Dr Gillian Kabwe<sup>4</sup>, Dr Etotépé Sogbohossou<sup>5</sup>, Dr Stephanie Mansourian<sup>6</sup>, Dr Christoph Wildburger<sup>3</sup>

<sup>1</sup>African Forest Forum, Nairobi, Nairobi, Kenya. <sup>2</sup>University of Notre Dame, Notre Dame, Indiana, USA.

<sup>3</sup>IUFRO, Vienna, Austria, Austria. <sup>4</sup>Copperbelt University, Kitwe, Zambia, Zambia. <sup>5</sup>Université Senghor, Alexandrie, Egypt, Egypt. <sup>6</sup>Consultant Environment and Development, Crassier, Switzerland, Switzerland

### Abstract

Poverty eradication is a critical priority of African governments and forests and tree-based systems could play a pivotal role in poverty alleviation strategies as countries advance green growth pathways to sustainable development. This paper presents results from consultations with more than 200 diverse stakeholders from nine countries across Africa in 2021 combined with an in-depth review of scientific literature on the potential role of forests and trees in poverty alleviation. We find that forests and trees can contribute to the well-being of the poor in Africa as they face profound global changes such as climate change and global economic shocks. The analysis reveals that for up to 250 million forest-proximate people, many of whom are living below national poverty lines, forests and trees contribute a substantial proportion of income and provide valuable assets for managing risk, coping with shocks and, in some cases, moving out of poverty. However, these contributions often occur outside formal markets, and so are excluded from national income accounts, and overlooked in development policy discussions. Evidence shows that forests and trees are assets that should be more widely recognized and

mainstreamed in national development processes. Formalising their contributions can better ensure their value is reflected in decision-making processes, reforms in forest-related commodity supply chains and more participatory approaches to land use planning promise improved outcomes for the rural poor. The evidence also suggests that the distribution of benefits from forests and trees for human well-being is inequitable. The poorest are rarely able to capture the bulk of benefits. Elite capture is an ongoing problem and income flows tend to favour owners of land and capital without reaching low-income communities. Strengthening property rights, gender equality, and supporting community groups to access improved technology can help redress inequitable benefit flows. Overall, our findings help advance knowledge of the status and future potential of forests and trees for poverty alleviation in Africa and have important implications for policymakers. Strengthened policy that recognises the key role of forests and trees in livelihoods is needed to enable poor, rural people to access benefits in a sustainable, equitable and fair manner.

## Primary FLARE theme

New directions in understanding forest-poverty dynamics

### #236: Cultural practices and forest-based livelihood in the advent of calamities

Dr Joyce Mnyazi Jefwa<sup>1</sup>, Dr Esther Kioko<sup>2</sup>, Dr Emma Mbua<sup>2</sup>, Dr Beryl Bwong<sup>2</sup>, Dr John Kochey<sup>2</sup>, Mr John Musina<sup>2</sup>, Dr Doris Mutta<sup>3</sup>

<sup>1</sup>Pwani University, Kilifi, Kilifi, Kenya. <sup>2</sup>National Museums of Kenya, Nairobi, Nairobi, Kenya. <sup>3</sup>African Forest Forum, Nairobi, Nairobi, Kenya

## Abstract

Traditional Cultural practices are crucial to the sustenance of livelihoods in Africa. Forests are major sources of livelihoods in rural communities with the role of traditional practices management pronounced in Africa. Loss of cultural knowledge is associated with the degradation of forest ecosystems and subsequently livelihoods. The coastal Kenya Sacred Kaya Forests have stood the times due to traditional cultural belief systems, and are of significant support to the communities. The forests are however threatened by the loss of traditional cultural knowledge systems.

A survey was conducted, during the covid pandemic period, in the sacred Kaya Kauma forest fragment, one among the eight UNESCO heritage sites, out of 52 smaller sacred forest fragments along a 200 km coastline. It is located on the low hills of the Jaribuni area in Kilifi County, 3°37.821S and 39°44.189E, 120m above sea level, 100 ha. The forest slopes down to “Ndzovuni” river which flows into the Kilifi Creek. Kaya Kauma is surrounded by scattered villages and farmlands and about 417 households.

The forest is an important feature of cultural identity, it is of historical and preserved ancestral lineages of the communities, a spiritual and inner place of prayer, a place promoting peace and co-existence, a place for conflict resolution, aesthetics and recreation, cultural ceremonies and a water catchment. The forest is rich in iron ore, and species of plants (93), birds (74), reptiles (18), amphibians (8), mammals (12), aquatic invertebrates (362), aquatic invertebrates (53), fish (5), prawns (1) and crabs (2), among them are edible and of commercial values. The community assigned 77 indigenous plant names used for food, medicinal, constructional, fuelwood, aesthetics, household and cultural items. A total of 30 animal species were assigned local names among them hunted for food. The forests are significant for eco- and

cultural tourism, education and research. Cultural practices present untapped opportunities in Africa for alternative livelihoods and nature-based solutions. The IUCN CEM Cultural Practices and Ecosystem Management Thematic Group aims to provide expert knowledge and guidance to maximize on the benefits of culture and livelihoods.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#237: The role of biosphere reserves in improving people's livelihoods in Central and West Africa.**

Mrs. Parfait Tchuenfo Teto

IUCN, Douala, Littoral, Cameroon

### **Abstract**

A biosphere reserve is a tool to promote the well-being of humans and nature; it is not a title, nor is it an ordinary designation aimed at nature conservation; a biosphere reserve must benefit people and the environment. Sub-Saharan Africa has 64 biosphere reserves in 28 countries with an estimated rural population of nearly 25 million. The livelihoods of these populations depend directly on the well-being of these biospheres, hence the importance of presenting the role of biosphere reserves in improving the livelihoods of the populations. Our study is a compilation of field results from eight scientists and is intended to be a supporting document on the results of community involvement in the development and management of biosphere reserves in Central and West Africa. To carry out this study, we conducted a literature review on the relationship between humans and nature and consulted five case studies from three countries. We mainly sought to identify the activities of the people identified by the studies prior to the improvement or advent of one of the four thematic sub-groups: zoning; governance; policy, management, and development plan; and monitoring and evaluation. We then evaluated human activities after the implementation of one of the four sub-thematic groups to determine their impacts on the basic needs of the communities living in the biosphere reserves. The results of our study show that in 70% of the cases studied, after the implementation of inclusive and participatory management strategies and policies, there was a clear improvement in the livelihoods of the communities. Also, there is an improvement in the state of biodiversity and the environment.

### **Primary FLARE theme**

Circular economy, markets, and forest livelihoods

## **#242: Comparing Protection Types in The Peruvian Amazon: Multiple-Use Protected Areas Did No Worse for Forests**

Jimena Rico-Straffon<sup>1</sup>, Zhenhua Wang<sup>2</sup>, Alexander Pfaff<sup>3</sup>

<sup>1</sup>UC Santa Barbara, Santa Barbara, CA, USA. <sup>2</sup>U. of Missouri, Columbia, MO, USA. <sup>3</sup>Duke U., Durham, NC, USA

## Abstract

Protected areas (PAs), which restrict economic activities, are the leading land and marine policy for ecosystem conservation. Most contexts feature different types of protection that vary in their stringency of management. Using spatially detailed panel data for 1986-2018, we estimate PAs' impacts upon forests in the Peruvian Amazon. Which type of protection has greater impacts on the forest is ambiguous, theoretically, given potential for significant differences by type in siting and enforcement. We find that the less strict multiple-use PAs, that allow local livelihoods, do no worse for forests than strict PAs: each PA type holds off small loss spikes seen in unprotected forests; and multiple use, if anything, do a bit better. This adds to evidence on the coexistence of private activities with conservation objectives.

## Primary FLARE theme

Social Justice in the Forest: Rights, Power, and Collaboration

## #243: Negotiating Divergences and Bridging Divides: An Interculturally Respectful Methodology with Amazonian Indigenous Peoples

Andrea Vasquez-Fernandez<sup>1,2</sup>, Maria Shuñaqui Sangama<sup>3</sup>, Miriam Perez Pinedo<sup>4</sup>, Raul Sebastian Lizardo<sup>5</sup>, Dr. Robert Kozak<sup>1</sup>

<sup>1</sup>The University of British Columbia, Vancouver, BC, Canada. <sup>2</sup>SHARE-Amazonica, Lima, Lima, Peru.

<sup>3</sup>Universidad Católica Sedes Sapientiae - NOPOKI, Atalaya, Ucayali, Peru. <sup>4</sup>Indigenous Women Federation of the Atalaya Province, Atalaya, Ucayali, Peru. <sup>5</sup>Escuela de Bufe Pozo, Atalaya, Ucayali, Peru

## Abstract

Respecting each other's ways becomes a challenge in current pluri-paradigmatic engagements with Amazonian Indigenous Peoples. Prevalent colonial impositions combined with global environmental and health threats are provoking violent collisions and death between Amazonian Indigenous Peoples and external agents (including public, private, non-governmental, and academic institution as well as individuals).

For certain paradigms (set of ways of thinking, ways of doing, ways of being, and the values involved), "culture" and "nature" are enmeshed in a holistic worldview, which is not the case in certain western paradigms. For instance, in the natural sciences we are primarily trained to deal with "nature" as separate from "culture". Such divisions could be costly in the endeavor of interacting with Amazonian Indigenous Peoples as well as with forests hindering with it developing more adequate public policies, programs, and projects for/with Amazonian realities. Yet, diverging paradigms between Amazonian Peoples and western agents do not prevent interculturally respectful encounters. One way to address this paradox is exploring methodological interactions that are more attuned to Amazonian Indigenous contexts.

**In this presentation we distill an eleven-year process of negotiating divergences and bridging divides between Indigenous and western paradigms to co-create a methodology called by Indigenous Amazonian Peoples as a "respectful way to relate with them and the places called home."** In this



community-based experience the research team centered Indigenous paradigms, braided ethical protocols, and shared power in decision-making processes to co-produce community-based suggestions to pursue communities' desired-futures and address their concerns. In this study an Indigenous research team entrusted to co-design, co-conduct, and co-mobilize a community-based project, **developed a “methodological approach” that is relationality and interconnectedness beyond the topic of investigation, it is context- and place-sensitive, and is not anthropocentric.**

The purpose of this presentation is to share with natural science practitioners and academics how Amazonian Indigenous Peoples **request to see implemented a methodological approach that is interculturally respectful, so that follows (also) their paradigms.**

## **Primary FLARE theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#244: Linking Education Science Policy and Society - Agroecology Tree Planting Case Study**

Prof Pierluigi Bozzi<sup>1,2</sup>, Mr Brian Seroney<sup>3,4</sup>

<sup>1</sup>University of Antananarivo - Department of Economics, Antananarivo, Madagascar, Madagascar.

<sup>2</sup>International University Network on Cultural and Biological Diversity (IUNCBD), Antananarivo, Madagascar, Madagascar. <sup>3</sup>Kenya Interuniversity Environmental Students Association (KIUESA), Nairobi, Kenya, Kenya. <sup>4</sup>International University Network on Cultural and Biological Diversity (IUNCBD), Nairobi, Kenya, Kenya

## **Abstract**

Linking Education Science Policy and Society' is the systemic methodology developed by the International University Network on Cultural and Biological Diversity (IUNCBD) to foster a transformative evolution of mindset, values, attitudes and individual-societal behaviours, needed to change the systemic root causes of deforestation, biodiversity loss and climate change, interconnected with the challenges of poverty, livelihood, health and equity in society.

Our holistic approach goes beyond the limited perspectives of science/policy interface and use of actionable research outcomes. The science/policy reductionism doesn't consider the multiplicity of human-nature interactions, shaped by the complexity of the fabric of society, with its cultural-social-economic-institutional feedback loops, barriers and conceptual and sectorial silos.

The processes of generation of science as well as policy making and implementation are embedded in the functioning of this societal system and can't be analysed and structured separated from it.

Therefore we include in our methodological framework the whole society. Within this context education – foundation of society – is the driver force of transformative evolution of mindset, values, attitudes and behaviours. Education can also enables the upgrade of skills and a constant co-generation of knowledge for a life-long-wide learning society, capable to partner science and policy in the accelerated dynamics of the modern society.

Our methodology identifies universities as facilitating drivers which can offer an integrated teaching-research-outreach space of inclusive dialogue and co-creation of endogenous partnerships initiatives between universities students associations, academics, primary-secondary schools, local and indigenous communities, households, NGOs and experts, decision and policy makers.

The methodology is applied in an agroecology-tree planting case study developed in Kenya with the aim to increase the impact on the ground, setting in motion a collective action multiplier of education, communication, awareness, research and applied local knowledge, implementation of policy with special regards to the CBD Kunming-Montreal Global Biodiversity Framework 2030, the UN Decade on Ecosystems Restoration, the agenda of UNFCCC and FAO-CFS.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#246: Co-learning at science-policy interface to catalyze change in forest governance: the case of the AgroFor project in Peru in support of Agroforestry Concession policy**

PhD Valentina Robiglio<sup>1</sup>, PhD Jose Luis Capella<sup>2</sup>

<sup>1</sup>CIFOR-ICRAF, Lima, Lima, Peru. <sup>2</sup>SPDA, Lima, Lima, Peru

### **Abstract**

This study describes a case of effective use of research in policy and practice that is currently leading to a change in land governance schemes to reconcile deforestation reduction and promotion of restoration and social inclusion of family farmers in Peru.

Science has become an obligatory point of passage towards policy. Formulating adequate responses to pressing global environmental challenges connecting biodiversity climate and societal benefits can be achieved by shifting the relationship between knowledge and decision-making from a linear model of science-policy relations towards co-production of alternatives through multiple interactions across nested governance and institutional levels. These are based on understanding the needs for knowledge by categories of decision makers that depend on the type of decisions and how they get enforced as defined roles across governance levels and sectors.

This paper showcases the collaboration of World AgroForestry (CIFOR-ICRAF) and two civil society partners in Peru, members of the consortium AgroFor. It describes the knowledge-based engagement process they have been promoting with the national Forest service of Peru on one side and subnational agencies, including from sectors like Agriculture and Environment, to examine how a mission-oriented engagement with clear roles and competencies for researchers, partners as well as policy actors across sectors and levels can generate alignment and catalyze system-level results. The project supports the collaborative construction of the legal and socio-technical context for the Agroforestry Concessions in the Amazon to be enforced at scale. This can contribute to the inclusion of 125 thousand families in the forest sector of Peru with the sustainable management of about 1.5 Million Ha of land, including benefits for conservation, mitigation food security and livelihoods. The process of translation and

integration of multiple types of knowledge and its use to build co-learning first within the consortium and then as a basis for the multi-level engagement is presented, and the results generated are illustrated.

## **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#252: Integrating collaborative learning into multi-stakeholder approaches at commodity-forest frontiers**

Dr. Emily Gallagher<sup>1</sup>, Mr. Reuben Ottou<sup>2</sup>, Dr. Kai Mausch<sup>3</sup>, Mr. George Sarpong<sup>2</sup>, Mr. Mawuli Sevor<sup>4</sup>

<sup>1</sup>CIFOR-ICRAF, Nairobi, Nairobi, Kenya. <sup>2</sup>SNV-Ghana, Accra, Accra, Ghana. <sup>3</sup>CIFOR-ICRAF, Bonn, Bonn, Germany. <sup>4</sup>CIFOR-ICRAF, Accra, Accra, Ghana

## **Abstract**

Farmer extension, value chain development and forest management have long been siloed into different resource domains which discourage more integrated landscape and livelihood approaches. While the climate crisis has given new urgency to transform production systems and reduce commodity-driven deforestation, rigid systems have been slow to adapt to the demands for more collaborative management and climate-smart solutions at commodity-forest frontiers. The cocoa-forest frontier in Western Ghana is an exceptional hotspot for commodity-driven deforestation and forest degradation where development donors and non-state actors have poured resources into piloting multistakeholder platforms (MSPs) to enhance public-private-civil society partnerships. And while these MSPs have been effective for scaling community-based resource management, they have yet to coordinate cocoa and forestry staff on the ground effectively to address on-farm practices. Despite years of targeted piloting, farmer adoption of climate-smart practices in the Western Region remains low.

Climate-smart agriculture integrates adaptation and mitigation strategies to respond to changing climate conditions. In cocoa production systems, climate-smart cocoa practices further avoid deforestation and forest degradation at forest frontiers whilst promoting rehabilitation of declining cocoa farms, natural regeneration and planting of economic trees. Our approach to scaling farmer adoption of climate-smart cocoa practices and forest management is through Collaborative Learning Platforms which bring together forest users from Community Resource Management Areas (CREMAs) under the Forestry Commission and cocoa cooperatives organized by the Cocoa Health and Extension Division (CHED) to evaluate learning modules developed by various landscape actors, pilot climate-smart cocoa and community-based forest management practices, and co-design pathways for improved service delivery and value chain development to enhance farmer adoption. We show that a collaborative learning approach which includes farmers, cocoa extension and forestry officers in data collection, learning module development and evaluation, and on-farm training to probe adoption barriers across different farmer typologies enhances the integration of resource management agency activities at the farm-forest boundary where farmer practices continue to drive deforestation. This study contributes to the operationalization of landscape approaches at commodity-forest frontiers and collaborative learning approaches for scaling farmer adoption of climate-smart practices.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#255: Linking Climate, Forests, and People: Forest conservation incentives and benefit-distribution in IPLC-focused programming -- a case from Peru**

Ms. Lauren Cooper<sup>1</sup>, Dr. Rowenn Kalman<sup>1</sup>, Ms. Cristina Miranda<sup>2</sup>, Dr. Deborah Delgado<sup>2</sup>

<sup>1</sup>Michigan State University, East Lansing, MI, USA. <sup>2</sup>Pontificia Universidad Católica del Perú, Lima, Lima, Peru

#### **Abstract**

Major climate negotiations decisions prominently feature forest protection as one of the most important mechanisms to reduce emissions from the land sector, specifically by the release of greenhouse gases from deforestation and degradation of forested landscapes. However, despite an estimated USD 12 billion pledged to address tropical deforestation, best practices to distribute incentives for conservation activities by Indigenous peoples and local communities (IPLCs) are not well-defined and are generally under-researched.

Peru holds the second largest share of Amazon Forest – locally and globally important for biodiversity, climate regulation, and carbon storage. Communal landholders make decisions over more than 65% of this ecosystem. As part of an ambitious plans to conserve 79% of its tropical forest (54 out of 68 million hectares), Peru Ministry of the Environment (MINAM) has pursued a strategy of using incentives to shape behavior and decision-making to stop deforestation. The mechanism, called Conditional Direct Transfers (TDC, in Spanish), has signed conservation agreements communities overseeing 2.9 million hectares in its first 10 years, with plans for continued scaling.

While some communities conserve forests successfully under the rubric of the program, others decline to participate or are suspended for non-compliance. Further, how the program influences cultural values, decision making, and well-being is largely unknown. Considering the persistent pressure anticipated on Amazonian forests, we ask: How can TDCs be improved to achieve long-term conservation and development objectives?

We combined an analysis of Peru's TDC implementation practices with broader institutional and community contexts. Our research assessed current performance and interactions of the program, including implications for long-term outcomes. To inform the next phase of implementation, our study produced practical guidance to MINAM to inform scaling, with implications for other countries and programs.

Here, we share these results to argue that a systematic assessment of the following categories--- Governance, Economics, Participation, and Social Impacts---can effectively identify characteristics necessary for equitable and scalable incentive programs pursuing nature-based solutions (NBS). Our framework provides generalizable recommendations with an assessment of program implementer responsibility and best practices. In this way, we offer a strong foundation for implementation and subsequent monitoring of incentive programs around the world.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#260: Reckoning with landscape and jurisdictional approaches: Blueprints, roadmaps and detours across Ghana**

Dr. Emily Gallagher<sup>1</sup>, Dr. George Schoneveld<sup>1</sup>, Mr. Mawuli Sevor<sup>2</sup>

<sup>1</sup>CIFOR-ICRAF, Nairobi, Nairobi, Kenya. <sup>2</sup>CIFOR-ICRAF, Accra, Accra, Ghana

#### **Abstract**

The gospel of landscape and jurisdictional approaches to environmental resource governance has been praised from the academic circles where it originated to the development community, technocrats and donors who have generously funded projects to collectively innovate, pilot, and harvest lessons learned for the greater good of global forest and livelihoods research. After nearly a decade of trial and error in implementation, the time has come to compare notes, share lessons, roadmaps and missteps, and advance promising models for scaling. This study introduces a jurisdictional approach to zero-deforestation commodities piloted in the eastern foothills of the greater Atewa Range Forest Reserves in Ghana within the context of a national learning exchange about landscape/jurisdictional approaches implemented by projects and mega programs across the country. In this lightning talk, we introduce the Governing Multifunctional Landscapes (GML) jurisdictional approach to deliberative planning for tree crop commodity landscapes (cocoa, oil palm, rubber) which balance environmental, economic and equity goals. Our approach to jurisdictional planning centers on the public sector mandated to steward forest resources, as well as those responsible for commodity development, local government, and traditional leaders to convene stakeholders to deliberate sectoral level development strategies and jurisdictional level coordination embedded in existing structures. We compare this approach to more conventional landscape approaches which establish new governance regimes and accountability structures to manage emerging institutional arrangements. We discuss the trade-offs in structure and function of various approaches on the ground, and our roadmap for blueprinting, piloting and scaling to context.

## Primary FLARE theme

Linking research and action for thriving forests, trees, and people

### **#261: Overview on Research, innovation, valorisation and governance of African baobab in West-Africa**

Prof Achille Assogbadjo<sup>1</sup>, Prof Flora Chadare<sup>2</sup>

<sup>1</sup>University of Abomey-Calavi, Abomey-Calavi, Atlantique, Benin. <sup>2</sup>National University of Agriculture, Porto Novo, Oueme, Benin

#### **Abstract**

The African baobab (*Adansonia digitata* L.) is a multipurpose orphan tree species of the semi-arid and sub humid Sub-Saharan Africa where it plays an important role in rural livelihoods. Its wide distribution and dense nutrition properties make it an important species for food and nutrition security in Africa. However, despite the increasing interest in the species over the past two decades, the full potential of baobab remains underexploited. This review highlights strides made over the past 20 years (2001–2020) towards harnessing and unlocking the potential values of baobab in West Africa, to contribute to food and nutrition security. Challenges and threats are identified, and next steps suggested to guide research and development initiatives for orphan tree fruit species like baobab to address hunger and malnutrition in Africa.

### **Primary FLARE theme**

Linking research and action for thriving forests, trees, and people

## **#262: Is circular economy the key to halting biodiversity loss in Africa?**

Prof Achille Assogbadjo, Dr Gracias Avakoudjo

University of Abomey-Calavi, Abomey-Calavi, Atlantique, Benin

### **Abstract**

World population is projected to rise from 7.7 billion to 9.7 billion by 2050. Moreover, an estimated 2°C rise in global temperature by the end of the century may lead to the extinction of a third of all life on the planet. In such context, there is more advocacy to shift from linear to circular economy by creating industrial systems that are restorative by design ensuring sustainable development by restoring natural habitats and conserving biodiversity. This will enable to build a resilient, low carbon and sustainable economy. In this study online and offline resources (research paper, video, press article, web site, book, report, factsheet), and field visits were examined to understand how circular economy model can improve the effort of biodiversity conservation in the world. Case studies and success stories from West Africa were used to highlight how the production system based on circularity (where the slightest waste is transformed into new products to be reinjected into the production cycle as raw material thus limiting wastage as much as possible) works. Findings showed that for circular economy integration into biodiversity conservation policies, it is important to optimize the uses of biodiversity, matter and energy and limit consumption and wastage; knowing that biomimicry, ecosystem service valuation, bioeconomy and renewable energy are key concepts about biodiversity associated with circular economy loop. Among others, practical actions to be taken to limit biodiversity loss in the frame of circular economy include: production systems amelioration, plastic collection and recycling, raising awareness about changing consumption behavior, water reuse and recycling and changing the way of thinking agriculture.

### **Primary FLARE theme**

Circular economy, markets, and forest livelihoods

## **#264: A conceptual framework to assess contestation within social-ecological systems: the case of Kalomo Hills Local Forest Reserve in Zambia**

Kaala B. Moombe, James Reed, Terry Sunderland, Bravedo M. Mwaanga, Yves Laumonier and Davison Gumbo

CIFOR-ICRAF

## **Abstract**

Forest and agricultural landscapes are at the heart of livelihoods in much of Kalomo district in southern Zambia. Despite this, the two have shared a relationship of tension and conflicts whereby political and socio-economic development is often pursued through agricultural expansion and/or intensification at the expense of forest encroachment and conversion. Integrated landscape approaches (ILAs) are a prominent contemporary strategy that seek to reconcile such conflicting objectives. While ILAs are conceptually attractive, there remains uncertainty as to their applicability and functionality in practice, particularly within contexts that have a history of poor cross-sectorial engagement and/or land-use conflicts. Implementation therefore often inadequately considers deeply embedded socio-political dynamics and historical contestation.

In this research we explored how contestation, or the interaction of politics, power and culture contributed to the evolution of the Kalomo Hills (KFR13) landscape, influences contemporary practices and how such contestation can be overcome to visualize and reorient the future of the landscape. We applied a hybridized conceptual framework of the DPSIR Environmental Model and the Weiner Contestation Framework, to investigate landscape scale social-ecological dynamics, emphasising the contestations therein. We then tested the framework in the KFR13 landscape using mixed methods (generative interviews, focus group meetings, key informant interviews, life histories, workshops, GIS/RS, Free listing, etc.) to capture the existing land-use dynamics and governance arrangements and assess the potential for ILA implementation as a strategy to mitigate contested landscapes access. Our findings show 'live' power struggles among different actors especially between state and local-level institutions that oppose the State's a single sector-based KFR13 model. There is, inter alia, high levels of mistrust, a fragmented approach to development that is devoid of strategic dialogue, ignorant of local histories and realities, and believes in unrealistic application of law. Since these factors constrain the potential for landscape approaches, we propose a framework to mitigate landscape conflicts. This work contributes to the overall debate about making landscape approaches functional at forest management unit level within a chiefdom jurisdiction by generating evidence-based knowledge that helps to understand and narrow the gaps between strong scientific theory and weak implementation.

## **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

## **#265: Integrating bottom up and top-down research pathways in Integrated Landscape Approaches**

Yves Laumonier, Gemasakti Adzan, Trifosa Simamora

CIFOR-ICRAF

## **Abstract**



Landscapes are complex systems that require a multiscale approach to fully understand, manage, and predict their behavior. Scale is a concept that applies to environmental issues, but also to livelihood and governance. How scale affects ecological processes and biodiversity patterns is crucial to address, notably in helping to identify the correct scale for decision-making. From global to local, remote sensing methods can inform integrated landscape approaches. On one hand, global studies have generated multiple outcomes, including carbon stocks, biodiversity patterns, but also livelihoods and economics modelling. On the other, the burgeoning development of drones has brought new fine-grained data that can be used to support biodiversity inventories, assess ecosystem health, and inform community-based interventions.

How to match bottom up and top-down approaches in landscape research? From global to local, we analysed Asia-Pacific forests, then zoomed to various Indonesian landscapes at district or watershed level – where research on the effects on biodiversity from landscape management options remains limited. We used ancillary data to supplement remote sensing analysis, but also generate ground level participatory observations for three groups of organisms that are known to be good indicators of environmental change: trees, birds, and invertebrates. Our modelling results showed how the scale at which observations are made influences the level of detail and patterns that are observed and included in the analysis, which can significantly impact how the landscape is perceived and managed. Therefore, we should continue to further collect large scale ecological data in different land managements with a multiscale perspective, looking at multispecies interrelationships.

Where possible, real-time monitoring and reporting of biodiversity through citizen science can improve knowledge and understanding of ecosystems and better orient land use planning, management, and conservation efforts. It can also contribute to increased ownership across sectors and actors and inform policy and decision-making. When pursuing landscape research, it remains essential to effectively integrate bottom-up and top-down approaches. Utilizing both approaches in the same research programme can significantly enhance understanding of contextual complexities. The process, however, is challenging, requiring a deep understanding of the local and global influences on a landscape and how they interact.

### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

## **#270: Connected Conservation: rethinking conservation for a telecoupled world**

Rachael Carmenta

University of East Anglia

### **Abstract**

This talk introduces Connected Conservation (Carmenta et al, 2023, Biol Cons, 282)- a dual-branched conservation model that calls for the conservation community to embrace novel actions to tackle distant wealth-related drivers of biodiversity decline, while enhancing site-level conservation to empower biodiversity stewards. I will give an overview of the diverse literatures that outline the need for this shift in conservation practice and show how centres of tropical biodiversity - a major focus of conservation efforts, tend to be delivered in predominantly site-level interventions. Yet, a focus on site-level

intervention is ill-equipped to address the disproportionate role of (often distant) wealth in biodiversity collapse (including through flammability). Further site-level approaches often attempt to ‘resolve’ natural resource management problems with externally derived fixes, and thereby risk overlooking local communities as the living locus of multiple solutions to the biodiversity crisis. Connected Conservation counters this conventional model, and instead works to enhance and amplify those site-based flows and values consonant with nature, and disrupt and diminish the negative flows stemming from centres of wealth that are largely responsible for environmental decline. I illustrate the need for connected conservation through the example of tropical fire governance, which has proven a stale-mate for multiple reasons, including a lack of engagement with the lived experience of flammability, prohibitive approaches to local practices, and low engagement with the external drivers creating flammability. I draw on new findings that help extend the dominant discourse of tropical fire from one centred on carbon and biodiversity harms, to one that recognizes the lived experience of flammability for forest proximate people. I present longitudinal data that assesses the impacts of wildfires on forest food availability, and forecasting projections that evaluate the likely threat of flammability for forest proximate peoples along different climate scenarios. I highlight some of the gaps in knowledge and action in the tropical fire context and explain how they can impede effective and equitable fire governance. This talk thus provides a useful starting point for the context of the panel.

### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

## **#274: Energy transitions in sub-Saharan Africa – an inside look at Uganda’s clean cooking strategy**

Rob Bailis

Stockholm Environment Institute

### **Abstract**

Roughly one billion people in sub-Saharan Africa lack access to clean cooking fuels and rely on fuelwood, charcoal, or other biomass fuels. The fuels are burned in open fires or simple devices that emit household air pollution (HAP), which contributes to nearly one million avoidable deaths each year. The same pollutants worsen ambient air quality and contribute to climate change. Unsustainable woodfuel harvesting degrades landscapes and the burden of collection often falls on women and young children, which exacerbates existing gender inequalities. These impacts have persisted for decades despite countless policies and programs attempting to induce a transition to cleaner, healthier cooking options. In addition, though they are often unstated, woodfuels are associated with numerous benefits. They contribute to regional energy security and make positive contributions to the livelihoods of millions involved in woodfuel supply chains that exist in nearly every African country.

Woodfuels remain deeply entrenched in sub-Saharan Africa’s energy mix. WHO projects that 400 million more people will use woodfuels by 2050 and access to cleaner options will be limited to a small subset of the region’s population. Uganda exemplifies this trend, with very little recent uptake of cleaner fuels and no change expected under the current policy regime. However, Ugandan policymakers have expressed a desire to shift regimes and induce a transition. In this presentation, we examine the process

through which this transition will occur. Our team is supporting the Ugandan government's development of a new "clean cooking strategy". Through this process, we are co-developing new policy instruments including standards for novel cooking technologies, verifiable targets for adoption of those technologies, financial instruments to address affordability gaps for businesses and end-users, and, most relevant for forests and livelihoods, regulations that seek to limit access to woodfuels like charcoal. We are deploying a range of methods to shape these policy instruments including interviews, focus group discussions, and participatory design workshops as well as comparative analyses of comparable policies in countries with similar objectives. Lessons from this work will be broadly applicable as dozens of African countries seek to induce similar energy transitions.

#### **Primary FLARE Theme**

Bioeconomy, finance, and innovation for sustainable energy transitions

### **#275: Transitory sustainability effects of behavioral changes: Short-term benefits of COVID-19 lockdowns reversed over time, resulting in more forest fires in the Amazon**

Wenman Liu<sup>a</sup>, Inés Ibáñez<sup>a</sup>, Yang Chen<sup>b</sup> and Arun Agrawala

University of Michigan

#### **Abstract**

To control the COVID-19 pandemic, governments worldwide deployed unprecedented policies. Mandatory lockdowns, mobility restrictions, and calls for social distancing and voluntary individual constraints were among the key interventions to reduce exposure risks. The resulting global reductions in human mobility constitute a massive natural experiment on whether and how changes in human activities affect natural ecosystems and sustainability. Our study focuses on the relationship between human activities and forest fires. Human activities contribute to forest fires, both directly and indirectly, threatening ecological, environmental, and climatic stability, as well as human health. Prior research of the effects of lockdowns on natural systems report beneficial outcomes due to the lack on human activities data. In our analysis we relied on the rapid change of human mobility rate to model its relationship with forest fires in Amazon basin countries during the initial COVID-19 lockdown in March 2020. Our analysis reveals that constraining human mobility significantly reduced fires in the Amazon regions of Bolivia, Brazil, Colombia, Ecuador, and Brazil during a brief initial period, but the effects dissipated after 30 days. After controlling for environmental conditions, at 60 days the number of fires was higher than previous years' average. The unintended sustainability effects of behavioral changes after COVID-19 were short-lived and we document a compensatory effect that resulted in higher forest fire incidence. By highlighting how rapidly societies returned to business-as-usual practices and overcompensated for opportunity loss, our analysis points towards the need for durable institutional and policy changes for effective shifts in human behaviors towards longer-term sustainability outcomes, especially for those most affected by forest fires and forest degradation.

#### **Primary FLARE Theme**

New directions in understanding forest-poverty dynamics

### **#277: Dynamics of forest cover change in eastern and Southern Africa: A Review**

Lizzie Mujuru

Bindura University of Science Education

### **Abstract**

Forest ecosystems provide important goods and services that support human survival, yet they are being converted to other land uses. A study was conducted in different forest types in eastern and southern Africa to determine the dynamics of forest cover loss and associated drivers; gender dynamics relative to forest cover change; and alternative livelihood options that have potential to reduce forest cover loss. Data were collected from literature, complemented by questionnaires administered to 160 respondents from five countries. Results showed that all forest types suffered from deforestation although rates varied from 0- 24% per year. Miombo woodlands suffered the most from deforestation followed by moist forests, mangroves and plantation forests, all driven by direct and indirect drivers. Agriculture was the main driver of deforestation, followed by wood energy, settlements and infrastructure development, and logging. Indirect drivers included poverty, population growth, markets, governance and institutional arrangements. Woodfuel and infrastructure were drivers in all countries while mining was mainly in Zambia and Zimbabwe. Tobacco, maize, sesame drove most agricultural deforestation. Forest based programmes that reduce poverty, conserve and preserve forests, improve governance, promote gender equality and create awareness on importance of trees and forests are important.

### **Primary FLARE Theme**

New directions in understanding forest-poverty dynamics

## **#278: Sustainability of land management approaches and practices applied in mangrove forests in Eastern Africa**

Rukia Kitula

University of Dar es Salaam, Institute of Marine Sciences

### **Abstract**

Various sustainable land management approaches and practices are being promoted in the Eastern African countries to enhance crop productivity and environmental conservation. However, information linking their sustainability levels and mangrove forest protection are unknown especially in this sub region. This article aimed to assess the sustainability of land management approaches and practices applied in mangrove forests in order to inform the adoption of land use systems that enable land users to maximize the economic, social and ecological benefits from the land while protecting mangrove ecosystem in the Eastern African Sub-region. The study was carried out in Kenya, Mozambique and Tanzania. Data were collected through focus group discussions, household questionnaire, key informant interviews, participant observations and literature review. The study revealed that sustainable land management practices used by farmers were associated with agronomic, vegetative, structural and management measures. They were applied on farms to address problems related to soil erosion, biodiversity loss, climate variability, loss of soil fertility, mangrove forest degradation and deforestation. Own innovations, Farmer Field School, field visits, contact farmers, meetings, demonstration plots and Participatory Forest Management were the approaches used to promote best sustainable land

management practices in the study countries. Of these, own innovations, contact farmers and field visits were the most common cited land management approaches applied in all study countries. Land management practices such as creating mangrove forest reserves, trees planting, ecotourism, traditional practices and agricultural practices were the best in promoting mangrove forests protection, addressing the problem of soil and land degradation and they were sustainable. Farmer Field School, Participatory Forest Management and own innovations were found to be the best approaches in enhancing crop productivity and mangrove forest protection and they were sustainable. The study concludes that Participatory Forest Management and Farmer Field School approaches should be supported and maintained in the study areas as models for technology transfer. Also, establishment of more woodlots using fast growing tree species should be promoted in the study areas to help relieve pressure in the mangrove forests.

### **Primary FLARE Theme**

New directions in understanding forest-poverty dynamics

## **#281: Traditional forest related knowledge and its preservation for sustainable livelihoods in Africa**

Doris Mutta, Alfred Oteng-Yeboah, Dominic Byarugaba, and William Armand Mala

African Forest Forum

### **Abstract**

The rich body of traditional forest-related knowledge in Africa has been widely acknowledged as important for its contribution to current global efforts towards sustainable forest management and biodiversity conservation. Many communities throughout Africa are still living in or near the continent's diverse range of forest ecosystems and continue to depend on these forests for their livelihoods. A documentation of how communities have successfully managed these forests to provide for their needs until the present day can serve many useful purposes, including for evidence-based sharing of experiences or case studies, knowledge transfer, research adoption and uptake for informed policy and decision-making processes. While many rural communities in Africa continue to observe their age-old traditions in relation to forests to ensure the provision of their livelihoods, other communities especially those in urban settings and youth have lost their traditions for many reasons, including their forced or voluntary cultural alienation from forests, reduced dependence on forests for rural livelihoods, and extensive urbanization. Nonetheless, in this paper, we provide a general background on traditional forest-related knowledge in Africa; its historical and present contributions to food security and rural livelihoods; the present challenges faced by the holders and users of this knowledge; and opportunities for its preservation, enhancement, and application to help solve pressing environmental, economic, and social challenges.

### **Primary FLARE Theme**

Joining climate and biodiversity goals through forests and trees

## **#282: Revitalizing Nepal's community forestry in the changing socioeconomic context**

Rahul Karki<sup>1</sup>, Naya Sharma Paudel<sup>1</sup>, Hemant Ojha<sup>2</sup>, Ian Nuberg<sup>3</sup>, Mani Ram Banjade<sup>1</sup>

<sup>1</sup> ForestAction Nepal, Kathmandu, Nepal, <sup>2</sup> Australian National University, Canberra, Australia, <sup>3</sup> University of Adelaide, Adelaide, Australia

Nepal's community forestry is highly acclaimed case of collective action in forest commons. However, rapid urbanisation, increasing rural outmigration and associated remittance has substantially changed the rural economy and people-forest relations. In fact, with the changing socio-economic conditions, people's reliance over forest products is declining in the recent years. This paper draws on the lessons learnt from an action research project entitled, Enhancing livelihoods from improved forest management in Nepal (EnLiFT2). It is based on 10 years of action research in 30 community forest user groups in mid-hills, a household survey involving 600 households, review of secondary data, and insights of authors during their active involvement in community forestry in the past decade. This paper investigates and explains the proximate and underlying causes of weakening collective action in forest commons taking community forestry as a case. Findings show that there is a massive and continued rural out-migration usually for foreign employment. The combined effect of labour out-migration and incoming remittance has resulted in abandonment of traditional farming in rural areas. While the need for forest resources has generally decreased, few specific groups continue to, or even increasingly rely on particular biomass from forests. Also, lack of needed labour availability and declining incentives for forest management have changed community forests into jungles. Even maintaining the basic institutional functions of community forest user groups have become a challenge. This calls for an active and equitable forest management that maximises production and distributes benefits to needed communities and households. The paper suggests specific strategies for revitalising community forestry so that the programme becomes relevant in the current socio-ecological contexts in Nepal.

Keywords: community forestry, rural dynamics, migration, remittance, benefits

### **Primary FLARE Theme**

New directions in understanding forest-poverty dynamics

### **#284: Data challenges in assessing impacts of community forests**

Reem Hajjar, Alexander Cuthbert Smith, Jamon van den Hoek, Robert Kennedy, Samuel Bell, Lok Mani Sapkota, Matt Betts, Jessica Hightower

Oregon State University

### **Abstract**

Community forests, a mode of forest governance where communities engage in forest governance and receive benefits from their management, have proliferated globally in the last 40 years. While case study research on community forests has been extensive and informative, in recent years a few studies have aimed to quantitatively and rigorously assess, at larger scales than case studies, the impacts that community forests have had on forests and local livelihoods. To do so, these studies have used widely available global forest cover change data sets and

existing national socio-economic surveys. Yet, a number of challenges exist in getting the right data for these approaches, namely, having centralized, up to date, accurate data at the right scales of analysis – ideally, social and ecological data on each community and its forest. Here, we highlight some of the issues we have encountered in studying impacts of community forests in Southeast Asia. We focus primarily on the need for accurate community forest boundary data and associated metadata, the likelihood that existing boundary data are in many cases inaccurate, and the potential implications of these inaccuracies in impact estimations. We call for more attention to be paid to data accuracy and accessibility, to ensure that impact assessment research is made more credible and relevant for action.

### **Primary FLARE Theme**

New directions in understanding forest-poverty dynamics

## **#285: Wild Foods in Zambia: Evidence from the first national survey of wild food collection**

Amy Ickowitz, Muhammad Pratama, Ashley Steel, Lubomba Bwembelo, Kaala Moombe

CIFOR-ICRAF

### **Abstract**

#### **Introduction**

The dietary importance of wild foods in most countries is not well understood. Most of the information that we have on wild foods and diets is qualitative and the little quantitative data that exists tends to be from case studies in a single site. In 2021, the Center for International Forestry Research in partnership with the Zambian National Statistics Agency carried out a nationally representative survey of wild food collection and consumption across Zambia. As far as we know, this is the first national survey of its kind anywhere.

#### **Methods**

The population was stratified by province and then by rural and urban areas. Fifteen enumeration areas were randomly selected in each province and households were randomly selected within each EA with a ratio of 70:30 rural to urban. Focus group discussions were held in the rural enumeration areas to identify the most important wild foods commonly collected in eight food group categories (fruits, vegetables, mushrooms, tubers, insects, fish, aquatic plants. This information was then used in a follow-up household survey where households were asked about the collection and consumption of the top five area-specific wild foods for each food type that were identified in the focus group discussions. A total of 102 focus group discussions and 2,893 household surveys were carried out across the country. Because most products are only available seasonally, we used a one-year recall period for collection. We also used an innovative method to measure household collecting containers enabling us to accurately



convert quantities collected to standardized units. We converted volume to weight and then estimated the average consumption in adult male equivalents for the different foods.

## Findings

Participation rates for collection of all wild food types was quite high overall and varied substantially across both provinces and products. 90% of rural households collected at least one wild food in 2021; in Western province, the province with the highest rate of collection, 97% of households collected wild foods, but even in Luapulu, the province with the lowest participation, 72% of rural households collected wild foods in 2021. Wild fruits and wild leaves were the most widely collected and nuts and seeds were the least collected of the food groups that we asked about. Households reported collecting 350 products of which we have been able to identify 263 unique products so far.

We compared the average intake of wild fruits and vegetables collected and consumed by rural individuals to the WHO recommendation of 400 grams for fruit and vegetable intake. We found that the average rural individual could meet more than half of the WHO recommendation (221 grams) for fruit and vegetable consumption from wild foods alone. Given that most people do not meet WHO recommendations for fruit and vegetable intake globally, this is quite an amazing contribution to diets.

## Conclusions

While it is often claimed that wild foods are widely consumed in Zambia, there has been a lack of evidence showing how important these foods are for diets and thus this contribution is not considered in national development and land use policies. This study shows the importance of quantifying this contribution and sharing with policy makers across sectors. If forests were to be converted to other land uses, diets in Zambia could become significantly worse.

## Primary FLARE Theme

New directions in understanding forest-poverty dynamics

## #286: Collective Forest Land Rights Facilitate Cooperative Behavior

Krister Andersson, Kimberlee Chang, Komal Preet Kaur

University of Notre Dame

## Abstract

The introduction of formal collective property rights to forest lands appears to have improved both environmental and economic outcomes, but there is limited evidence on how these reforms affect cooperative behavior among local resource users. We propose that when national governments issue collective land rights, they strengthen the collective psychological ownership among co-owners and produce increased levels of cooperative behavior. Analyzing data from 213 forest user groups in 10 countries, and a framed field experiment in a subset of sites, we find that collective land titling is associated with significantly higher levels of cooperative behavior including increased levels of trust, more frequent interpersonal interactions related to both forestry and non-forestry activities, more self-governing institutions, and greater equality in resource extraction patterns.

## Primary FLARE Theme

## **#287: Poverty, adaptive capacity and natural resource reliance in northern Botswana**

Lin Cassidy<sup>1</sup>, Andrea Gaughan<sup>2</sup>, Forrest R. Stevens<sup>2</sup>, Narcisa Pricope<sup>3</sup>, Jonathan Salerno, Mike Murray-Hudson<sup>1</sup>, David Parry<sup>5</sup>, Joel Hartter<sup>6</sup>

Okavango Research Institute, University of Botswana<sup>1</sup>, Department of Geographic and Environmental Sciences, University of Louisville<sup>2</sup>, Department of Earth and Ocean Sciences, University of North Carolina Wilmington<sup>3</sup>, Department of Human Dimensions of Natural Resources, Graduate Degree Program in Ecology, Colorado State University<sup>4</sup>, Ecosurv (Pty) Ltd<sup>5</sup>, Department of Environmental Studies, University of Colorado Boulder<sup>6</sup>

### **Abstract**

Natural resources (NRs) are important for diversifying rural livelihoods. But households that rely heavily on NRs may have lower adaptive capacity (AC) and higher vulnerability to climate and environmental stressors. Understanding the difference between high levels of NR use and proportional reliance on NRs is critical for identifying household vulnerability.

We compared primary data from 1995 and 2017 household surveys in northern Botswana. We created four indices: wealth, NRs harvested, proportional contribution of NRs to total livelihood, and AC; indices were compared and assessed across wealthiest and poorest household groups.

In 1995, poorer households harvested fewer NR types, but also pursued fewer other livelihood strategies, so their proportional reliance on NRs was higher than wealthier households. In 2017, poorer households collected more NR types, but their proportional reliance on NRs remained higher.

In both 1995 and 2017, AC was positively correlated with the number of NR types harvested. In 1995 proportional reliance on NRs was negatively correlated with AC, but in 2017, this correlation was unexpectedly positive, suggesting that the way NRs contributed to livelihoods had shifted.

By 2017, mean income for households selling NRs more than doubled from 1995. In 1995, wealthier households, proportionally relying less on NRs, made more money from NRs. By 2017, poor households now sold more NRs than in 1995, though still fewer than wealthy households, and NRs still formed a higher proportion of their livelihood. The sale of NRs switched from being negatively correlated with proportional reliance on NRs in 1995, to positively in 2017.

Households are vulnerable because of how much NRs count toward total livelihood, not because of how many NRs they harvest. In our smallholder system, focusing on proportional reliance on NRs highlights which households are most at risk from environmental shocks. Commercial harvesting of NRs appears to be an important source of income for those with NR as a large livelihood proportion. Increasing market access for selling sustainably harvested NRs could increase income for poor rural households, but interventions would need to be carefully targeted to ensure the most vulnerable are beneficiaries.

Keywords: adaptive capacity; livelihoods; natural capital; natural resource reliance; rural poverty; vulnerability; semi-arid drylands; woodland-savanna-wetland ecosystems

### **Primary FLARE Theme**

New directions in understanding forest-poverty dynamics

## **#288: Gender transformative approaches to strengthen women's land and resource rights: From concepts to practice**

Miranda Morgan, [Anne M. Larson](#), Sabrina Trautman, Elisabeth Garner, Marlène Elias, Ruth Meinzen-Dick

CIFOR-ICRAF

### **Abstract**

In light of the importance of inclusive forest and landscape governance, it is vital to address the multiple and overlapping barriers underpinning gender inequality and women's limited land rights. Mainstream gender approaches are not proving to be up to the task. A growing body of research and practice is advocating instead for innovation: integrating gender transformative approaches (GTAs) in rural development programs, with a focus on identifying and addressing systemic, underlying drivers of gender inequality to enable deep and lasting change. Nevertheless, the understanding and application of GTAs – particularly as a way to promote gender equality in resource tenure systems – remain limited. This paper aims to fill this gap by exploring what such an approach means in relation to women's land and resource rights. It draws on the experience of a consortium of CGIAR research centers, led by CIFOR-ICRAF with funding from the International Fund for Agricultural Development (IFAD), in six countries. The paper focuses on defining key concepts – specifically the conceptualization of gender and transformation in relation to land and resource tenure security – and what these mean in practical terms for implementation. Using a modified Gender@Work framework, the paper proposes what those changes would look like in relation to women's land and resource tenure rights, from informal and customary to formal systems, from individuals to collectives to systemic change; it suggests a series of principles and actions that would be enabled by supportive land policies and how these could be implemented in practice.

### **Primary FLARE Theme**

Social Justice in the Forest: Rights, Power, and Collaboration

## **#291: Turning complex data into compelling stories**

[Beverly Ndifoin](#)

University of Notre Dame

### **Abstract**

You have completed your research and put together relevant findings. Now what? I guess you may want to share your research work as widely as possible, and in a meaningful way that will help your target audience make informed decisions. Researchers value data, facts and statistics, I get it! Perhaps, not everyone shares the same enthusiasm. Hence, the need to transform data into engaging narratives, and storytelling is the way to go.

Stories have a unique ability to ignite imaginations, evoke empathy, and inspire action. Effective storytelling does not only preserve history and culture, but also serve as a catalyst for change, as they steer public discourse, shape beliefs, and influence how we relate with each other and the environment. It is vital that researchers get a grip of this power in engaging broader communities with their research findings.

Join me to explore how storytelling can be harnessed as a transformative tool, transcending research data to influencing government policies and engaging communities for forest conservation. At the end of this session, participants will:

Know the components/structure that make up a good story

Learn about different media outlets to share these stories besides journals

Understand how to translate research into impactful stories without distorting the facts

Draw from practical examples of narratives that have influenced policy

Beverly Ndifoin brings a wonderful blend of skill sets in journalism, environment, leadership and advocacy. As a multimedia environmental journalist, she has previously worked for Cameroon's National Radio Television (The CRTV) as weather news anchor. She is the founding President of an environmental non-profit organization known as Game Changers'. She is committed to telling environmental stories that shine light on people, ideas and innovations that are moving the Planet Forward. Beverly is currently pursuing a second master's degree in Global Affairs at the University of Notre Dame. Her session will expand your mind and elevate your skills in shaping worldview via storytelling without distorting the facts.

We are excited to see what you have been working on. So, you are invited to come along with your research work and share with fellow participants.

### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

## **#271: Intercultural fire management: knowledge exchange fueled by innovative methods – art, theatre, film**

Bibiana Bilbao

COBRA Collective

### **Abstract**

Under conditions of increasingly extreme climate changes and rapid and dramatic transformations in land use, the occurrence of wildfire mega-events of great severity in Latin America and has become a critical problem, affecting local communities, populations at urban- rural interfaces, forest firefighters, ecosystem biodiversity and carbon sequestration capacity. Despite costly investment in human resources and high technical deployment, dominant fire suppression policies have not been sufficiently effective to control and extinguish and reduce the risks and impacts of the most severe and extensive wildfires increasing throughout the region. Extensive fires now affect more vulnerable ecosystems such as primary tropical rainforests and wetlands (e.g., Delta del Paraná River, Argentina). Co-developing new

visions and capacities for integrated and intersectoral management of wildfires instead of just fighting them requires the inclusion of multiple perspectives and actors and rescuing the knowledge and adaptive practices of Indigenous peoples and local communities that inhabit natural spaces. There are inspiring initiatives from which essential lessons can be learned and identify challenges and barriers to overcome through collaboration, both at the regional level and in other regions that share similar challenges. However, co-production or co-management experiences include many problems: struggles for recognition, overcoming historical power and knowledge inequalities, organisation issues, financial restrictions, dominant rules, and technocratic processes. This talk will share different experiences and knowledge systems related to fire management in Latin America to contribute to the debate on the opportunities and challenges of dialogue and learning between scientific, fire practitioners' expertise, and traditional knowledge.

### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

## **#272: Health benefits of forest conservation and fire governance through reduced forest and peatland fires**

Dominic Spracklen

University of Leeds

### **Abstract**

Actors across scales drive deforestation, forest degradation and drainage in tropical landscapes, leaving them more susceptible to uncontrolled fires. Deforestation causes local heating and drying, heat stress and increased flammability of the surrounding landscape. Deforestation and subsequent fires emit large quantities of smoke and other air pollutants resulting in adverse health effects for local and regional populations. We focus on Indonesia and Amazonia, two fire sensitive regions, and discuss recent research exploring links between land-use, climate, fire, smoke exposure and health impacts. We show that deforestation (between 2020 and 2050) may induce flammability by contributing to regional surface warming (of 0.4 to 0.95 °C) in the South Western Amazon. Further, we demonstrate that spatial and temporal patterns of fire are strongly coupled to deforestation in Amazonia. Notably, deforestation and associated fires are also linked to deaths from smoke exposure, which can be averted through fire mitigation. For instance, our models show that meeting targets in the National Policy on Climate Change would have reduced fire counts by 32%, and resulted in 2,300 fewer deaths due to reduced exposure to smoke. Similar patterns are found for Indonesia's peat landscapes. We estimate that peatland restoration planned by the Indonesian government has the potential to reduce uncontrolled fires by 6%, reduce smoke emissions by 24% and thereby prevent 12,000 premature mortalities. Techniques to assess the health impacts of smoke exposure have limitations and we present new work in Indonesia that improves these measures by better assessing differentiated levels of smoke exposure across society. Overall, our work helps to quantify the benefits of forest conservation and fire governance for human health at local to regional scales. Our interviews with a range of local and national environmental non-governmental organisations working across the tropics suggests that emphasizing the health impacts of tropical fire is an important evidence base that may help drive change towards improved fire governance. We discuss the outcomes of these discussions and recommendations for how a health

focused approach could reduce drivers of deforestation. We hope that increased recognition of the health benefits can bring wider support for forest conservation and fire governance.

#### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

### **#290: Views of citizens and local politicians on root causes of deforestation: reflections from recent experience in Machakos**

**Chair:** Ana Maria Vargas, PhD, Director of the Knowledge Centre of ICLD

#### **Participants:**

<sup>1</sup>Professor Winnie Mitullah, <sup>2</sup>Mercy Njagi, <sup>3</sup>Nicholus Nzioka, <sup>4</sup>Dr. Quinton Mayne, <sup>5</sup>Professor Jesse Ribot

<sup>1</sup>Director, *Institute for Development Studies*, University of Nairobi; <sup>2</sup>Machakos County Councillor (opposition); <sup>3</sup>Machakos County Councillor (majority); <sup>4</sup>Director of Research at the Bloomberg-Harvard City Leadership Initiative, Harvard University; <sup>5</sup>Department of Environment, Development and Health, American University in Washington

#### **Abstract**

Kenya has the ambitious goal of increasing tree coverage to 30% by 2050. The country has recently surpassed 10% tree coverage, reflecting its serious commitment. In this novel pursuit, can citizens guide this top-down goal – so that while reducing atmospheric carbon the program enhances livelihoods and security. The local government of Machakos county is trying to engage citizens in this forest-cover goal as part of a project on citizen participation and accountability in local democracy. Combining the results of citizen report cards survey, focus groups and transect walks, we will reflect on the root causes of deforestation and slow afforestation from the perspective of citizens and local government officials and politicians. We hope this panel brings new insights into the role of local democracy in achieving substantial carbon-sequestering afforestation and reforestation globally.

#### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

### **#293: International perspective – an overview of the importance of tropical peatlands, fire, haze and health**

Dianna Kopansky

Global Peatlands Initiative at UNEP

#### **Abstract**

The UN Environment Programme ([UNEP](#)) and [GRID-Arendal](#) report - *Spreading like Wildfire: The Rising Threat of Extraordinary Landscape Fires* stresses that climate change and land-use change are projected

to make wildfires more frequent and intense, and we are already seeing it. Wildfires and climate change are mutually exacerbating. Wildfires are made worse by climate change through increased drought, high air temperatures, low relative humidity, lightning, and strong winds resulting in hotter, drier, and longer fire seasons. At the same time, climate change is made worse by wildfires, mostly by ravaging sensitive and carbon-rich ecosystems like peatlands and rainforests. Despite having lived with fires throughout our history, we still need to better understand it's behaviour and how we can take actions to manage, prevent and recover from them.

#### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

### **#294: The Dialogue of Knowledge: a way forward to promote integrated fire management**

Lara Steil

Food and Agriculture Organization

#### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people

### **#295: Working with FLARE's CommFor tool to address local to global challenges - Workshop**

**Facilitators:** Ashwini Chhatre<sup>1</sup>, Apurva Duddu<sup>2</sup>, Abhijeet Parmar<sup>1</sup>

Indian School of Business<sup>1</sup> & Yale University<sup>2</sup>

#### **Abstract**

Over the last 30 years, data collection using IFRI instruments was driven by the research community. The IFRI research program enabled the scientific community to contribute knowledge on forest commons and the impact of local governance on social, ecological, economic, and political outcomes. However, IFRI was designed at a time when the scope for leveraging digital technology to create a global database was limited.

Researchers using the IFRI methodology and instruments pushed the envelope on our understanding of forest commons around the world. The attention has now shifted to understanding the ways in which communities can govern forests to produce joint positive outcomes. At the same time, digital technology has advanced to a stage where it can be customized to create smartphone applications to capture transactions and outcomes data from the local to landscape level. This has the potential to reduce the burden of collecting data and producing meaningful real-time insights.

For community-based institutions in forest landscapes to make informed choices on forest use and governance, it is critical that the institutions have access to information on forest indicators and outcomes at local and landscape levels and are equipped to translate it into insights. At the same time,



while the use of forest products is often limited to the local scale, outcomes of forest management require a landscape lens. Communities that have secure tenure on forest lands and a formal institutional mechanism for governance often also organize themselves as federations at a landscape level. Moreover, indicators like carbon sequestration and biodiversity richness are meaningful to capture at a landscape level as compared to individual forest patches. Finally, innovation in the application of digital technologies enables integration of satellite datasets and analytics based on machine learning to produce useful real-time insights for forest governance.

This workshop will introduce participants to a suite of tools – IFRI-CommFor – developed to translate this vision into action. IFRI-CommFor leverages digital technology to capture data at high and varying frequencies, reduce the burden of capturing data, and generate real-time insights for use by local communities in forest management. Some of the functionalities of IFRI-CommFor are: (1) Digital boundary mapping to enable integration with satellite data, (2) Inventory mapping to estimate distribution and abundance of valuable forest products, (3) Carbon stock assessment to evaluate sequestration potential, and (4) Management planning to achieve community objectives.

IFRI-CommFor presents multiple advantages to support community-based forest governance. First, insights from data will become available in near real time and directly usable by local communities and their federations in making decisions. Second, the data can be shared with external actors and agencies to build trust in community institutions for forest governance. Finally, IFRI-CommFor will enable visibility of landscape-level outcomes for recognition of community contributions to global challenges, such as forest landscape restoration, biodiversity conservation, and climate mitigation.

### **Primary FLARE Theme**

Linking research and action for thriving forests, trees, and people