YALE CHAPTER INTERNATIONAL SOCIETY OF TROPICAL FORESTERS
18TH ANNUAL CONFERENCE

STRATEGIES FOR LANDSCAPE-SCALE RESTORATION IN THE TROPICS

YALE SCHOOL OF FORESTRY & ENVIRONMENTAL STUDIES
195 PROSPECT ST, NEW HAVEN, CT 06511

KEYNOTE ADDRESSES

Jan McAlpine
United Nations Forum on Forests

Robin Chazdon
University of Connecticut

JAN 26-28 2012

Yale Chapter of the International Society of Tropical Foresters

STRATEGIES FOR LANDSCAPE-SCALE RESTORATION IN THE TROPICS

18th Annual Conference
January 26-28, 2012

Yale School of Forestry & Environmental Studies
Kroon Hall, 195 Prospect Street, New Haven, Connecticut, 06511, USA

www.yale.edu/istf

YALE ISTF

Yale's student chapter of the International Society of Tropical Foresters (ISTF) was first organized in 1989, as part of a network of natural resource professionals concerned with tropical resource management. The annual Yale ISTF conference provides a forum for graduate students with interests and experience in linking natural resource conservation and management with economic development, to engage representatives of governments, universities, and environmental and development organizations in dialogue on emerging issues in the tropics.

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KEYNOTE

Thursday, January 26th

Jan McAlpine
Director, United Nations Forum on Forests

Jan McAlpine is Director of the United Nations Division on Forests and head of the United Nations Forum on Forests (UNFF) Secretariat, based at UN Headquarters in New York. The UNFF is a UN body comprised of all 193 countries in the United Nations. It addresses all aspects of forests – from complete protection on one end of the spectrum to sustainable use on the other end, and everything in-between, including people, climate change, soils, water and biodiversity, among other issues. Ms. McAlpine was appointed by the Secretary-General in November 2008 to head the Secretariat.

Jan McAlpine served previously as the Senior Advisor and lead for Forests in the U.S. Department of State in Washington, DC, and in that role headed the interagency and stakeholder process in the development of the President's Initiative Against Illegal Logging (PIAIL), which was launched by then-Secretary of State Colin Powell. She also led in the development of the Congo Basin Forest Partnership at the Department of State, launched at the World Summit on Sustainable Development (WSSD) in Johannesburg by Secretary Powell in September 2002. Ms. McAlpine also conceived and developed the Asia and Africa Forest Law Enforcement and Governance Ministerial process, working with the World Bank and the governments of Indonesia and Cameroon along with other key donors, notably the United Kingdom's Department for International Development (DFID).

In 2007 and 2008, Ms. McAlpine was a Visiting Scholar and Senior Researcher at the University of Michigan's School for Natural Resources and Environment, where she co-facilitated and chaired the first-ever National Summit on Adaptation to Climate Change and edited the proceedings for the summit. She also helped to establish the Central Africa Forest Research Initiative and now serves as chair of its Advisory Board.

Ms. McAlpine served in the U.S. Government from 1989, first with the Environmental Protection Agency (EPA) focusing on international policy issues, including developing the first advisory committee to the Administrator on trade and environment issues. Subsequently she worked at the White House, first with the President's Council on Sustainable Development and then in the Office of the U.S. Trade Representative as a negotiator on issues relating to international forest and timber trade, as well as on tobacco trade and health policy.

Prior to her career in the U.S. Government, Ms. McAlpine worked for 11 years for the Water Environment Federation, an international educational association in the water quality field, during which she won the U.S. Industrial Film & Video Festival Silver Screen Award as Producer of the video "H20 TV."

KEYNOTE

Friday, January 27th

Robin Chazdon
Professor, University of Connecticut

Robin Chazdon, a plant ecologist, has studied regrowth, or secondary growth tropical forests since 1991. Her recent research, supported by the National Science Foundation, shows that seedlings and saplings of tree species from old-growth tropical forests in Costa Rica are finding suitable habitats in regrowth areas. Her research demonstrates that regrowth areas are important for recovering biodiversity.

Dr. Chazdon's recent honors include the Faculty of the Year award (University of Connecticut 2005), the Provost's Award for Excellence in Research (University of Connecticut 2004), the President's Medal (British Ecological Society 2003), and Fulbright Senior Scholar (2002).

She initiated the Bosques Project in 1997 in northeastern Costa Rica to investigate the factors that influence the spatial and temporal dynamics of seedling, sapling, and tree regeneration in second-growth forests in and around La Selva Biological Station. The project hopes to increase our knowledge of successional vegetation dynamics, and the use of secondary forests for forestry and biodiversity conservation. The project is now starting its 16th year.

The multi-investigator NeoSelvas Project unites four existing projects on successional pathways in wet tropical forests of Latin America. Coordinated annual vegetation censuses in long-term study plots are being conducted to test specific chronosequence predictions for a range of dependent variables. This collaborative project began in 2007 and was funded for 5 years by the US National Science Foundation. Funding has just been renewed for another 5 years.

Since 2008, together with Costa Rican researchers and with support from the blue moon fund, The Osa Project has been monitoring trees in 18 0.5 ha forest monitoring plots in the Osa Biological Corridor in Costa Rica to evaluate changes in carbon storage and biodiversity during forest regrowth.

Dr. Chazdon is also collaborating on a study of neighborhood effects on tree demography during succession in Costa Rica and Puerto Rico, on studies of remote detection of forest biomass change using lidar and radar, and on a new interdisciplinary study of the factors that enable effective governance of tropical forest ecosystems in rural communities of Bolivia and Uganda.

SCHEDULE OF EVENTS

Thursday, January 26th

4.00 pm **Conference registration opens**

5.30 pm **Preliminary remarks** (*via live video feed*)

David Lamb, University of Queensland
Large-scale tropical forest restoration – necessary policies and important research questions

6.30 pm **Introductory remarks**

Sir Peter Crane, Carl W. Knobloch, Jr. Dean of the School of Forestry & Environmental Studies

6.45 pm **Keynote address**

Jan McAlpine, United Nations Forum on Forests
Reshaping the landscape for forests and people

7.45 pm **Opening reception, photography contest exhibit and voting, poster display**

Friday, January 27th

8.30 am **Breakfast, registration**

9.00 am **Opening remarks**

9.15 am **Keynote address**

Robin Chazdon, University of Connecticut
Making tropical forest succession successful

10.15 am **Panel 1: Forest regeneration in human-modified landscapes**

Moderator: **Alder Keleman - Cullman Fellow, Yale School of Forestry & Environmental Studies**

10.20-10.50 **Zoraida Calle, Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria**
A strategy for scaling-up intensive silvopastoral systems in Colombia

10.50-11.20 **Aerin Jacob, Department of Biology, McGill University**
Long-term patterns in restoring forest diversity and structure after burning, farming, and logging in Kibale National Park, Uganda

11.20-11.50 **Laura Snook, Bioversity International**
Subsistence agriculture can foster forest restoration in the tropics: Commercially valuable multispecies stands result from slash and burn in Quintana Roo, Mexico

11.50-12.10 **Panel discussion**

12.10 pm **Lunch**

1.00 pm **Panel 2: Private sector engagement in forest restoration**

Moderator: **Jeff Stoike - Cullman Fellow, Yale School of Forestry & Environmental Studies**

1.05-1.35 **Chris Meyer, Planting Empowerment**
Private sector investment model in mixed native species agroforestry plantations with indigenous communities and small landowners

1.35-2.05 **Ricardo Lujan, Brinkman y Asociados Reforestadores de Centro América**
Restoration initiatives in the lowland tropics of Central America

2.05-2.25 **Panel discussion**

2.25 pm **Coffee break**

2.40 pm **Panel 3: Economic viability of landscape-scale initiatives**

Moderator: **Chadwick Dearing Oliver - Pinchot Professor of Forestry & Environmental Studies and Director of Yale's Global Institute of Sustainable Forestry**

2.45-3.15 **Matheus Couto, Instituto de Manejo e Certificação Florestal e Agrícola**
Certified cocoa as a strategy for ecosystem restoration in the Amazon forest of São Felix do Xingu, Pará, Brazil

3.15-3.45 **J.P.B. Lillesø, Forest & Landscape Denmark/University of Copenhagen**
The role of old maps and nursery entrepreneurs in restoration of forests in Eastern and Southern Africa

3.45-4.05 **Panel discussion**

4.05 pm **Poster session and coffee break**

4.30 pm **Workshop session A**

4.35-5.15 **Workshop A-1:** ***Research methods for collecting ethnobotanical forest-related knowledge***
Ina Vandebroek, New York Botanical Garden
Kroon Hall - Burke Auditorium

4.35-5.15 **Workshop A-2:** ***Community-based forest monitoring: A case study of Agave harvest in tropical dry forests of Guerrero, Mexico***
Meredith Martin, Yale School of Forestry & Environmental Studies
Kroon Hall - Room G01

5.15 pm **Workshop transition**

5.25 pm **Workshop session B**

5.25-6.10 **Workshop B-1:** ***Intellectual property rights and ethics in ethnobotanical research***
Ina Vandebroek, New York Botanical Garden
Kroon Hall - Burke Auditorium

5.25-6.10 **Workshop B-2:** ***Practical tools for community-based forest management***
Scott Landis, GreenWood
Kroon Hall - Room G01

6.10 pm **Workshop summary remarks**

6.30 pm **Reception, poster display, photo contest winner announcement**

Saturday, January 28th

8.30 am **Breakfast, registration**

9.00 am **Panel 4: Scaling up - Applying lessons learned**

Moderator: **Tim Rollinson - Chair, Global Partnership on Forest Landscape Restoration**

9.05-9.35 **Pedro Brancalion, Departamento de Ciências Florestais, ESALQ, Universidade de São Paulo**
The Atlantic Forest Restoration Pact - A major effort by Brazilian society to restore and transform its most threatened biome

9.35-10.05 **Eduardo Malta Campos Filho - Instituto Socioambiental**
Mechanized planting of forests: Innovation and scale in the Xingu, Central Brazil

10.05-10.35 **Pipa Elias, Union of Concerned Scientists**
Opportunities and challenges of policies for tropical forest restoration

10.35-11.05 **Cora van Oosten, Global Partnership on Forest Landscape Restoration**
Restoring landscapes, governing space

11.05-11.30 **Panel discussion**

11.30 am **Coffee break**

11.40 am **Emerging resources**

Gillian (Paul) Bloomfield - Web-Based Training Program Coordinator, Environmental Leadership and Training Initiative
Introduction to a new educational tool in the field of tropical forest restoration

11.55 am **Working lunch and joint panel discussion**

Moderator: Tim Rollinson - Chair, Global Partnership on Forest Landscape Restoration,
The road ahead: Scaling-up restoration successes to the landscape level

1.15 pm **Concluding remarks**

POSTERS

Kyra Busch, Yale School of Forestry & Environmental Studies
Making an American Apple Pie: Cross-Cultural Lessons for Food Justice

Manuel Gerardo Chávez-Angeles, Instituto Politécnico Nacional, CIIDIR-Oaxaca and Universidad de la Sierra Sur
Information commons and climate change: The gap between Mexico's national forestry information systems and community's information needs

Marina Melo Duarte, ESALQ/USP
Opportunities of deforestation: using the inevitable deforestation to dramatically increase the restoration of tropical forests

Scott Francisco, Pilot Projects
Brooklyn Bridge Forest: Preserve a landmark. Protect a rainforest. Cultivate a global partnership.

Genevieve Giddy & Tom Gode, Cloudbridge Nature Reserve
Reforestation of a Costa Rica cloud forest

Israel Makau, Kenya Wildlife Service
Mid-term achievements and lessons from livelihood plantation and carbon sequestration benefit sharing models for restoration of Mt Elgon forest ecosystem under a redesigned phase 2009-2011

Sarah Otterstrom & Kim Williams-Guillén, Paso Pacifico
Reforestation for multiple ecosystem services in Nicaragua

Erica Pohnan & Tina Schneider, Yale School of Forestry & Environmental Studies
Assessing Rainforestation: The social and ecological effects of smallholder-based native species reforestation in the Philippines

David Ross, Campbell Moore & Ian Starr, Yale School of Forestry & Environmental Studies
Agroforestry and its carbon sequestration potential on pasture lands in Pará, Brazil

Sarah Wilson, McGill University
Can community tree planting projects restore cloud forest biodiversity? A case study from Andean Ecuador

Sylvia Wood, McGill University
Legacies of social inequity on tropical fallow forest restoration in agricultural landscapes of the Peruvian Amazon

ABSTRACTS

in order of presentation

Thursday, January 26th

David Lamb, University of Queensland

Large-scale tropical forest restoration – necessary policies and important research questions

Considerable reforestation was undertaken around the world in the second half of the twentieth century. Nonetheless, very large areas of degraded land and forest still remain present across the tropics. Indeed, these areas continue to increase. Several countries do have experience in undertaking large-scale reforestation including Japan, Korea, China and Vietnam. There are lessons to be learned from their experiences but not simple recipes for others to follow. Ecological and socio-economic differences mean that those undertaking reforestation must adjust their approaches to suit the circumstances present in particular locations.

The task is made even more difficult because the conditions under which future reforestation might be undertaken are changing. For example, there is uncertainty about the availability of land (because of the need for increased food production), the impact of urbanization, the future markets for forest products and ecosystem services and about how to establish forests able to adapt to a changing climate.

Given this background, several policy issues need resolution if reforestation is to be undertaken on a large scale. These include deciding (i) how much reforestation should be undertaken in particular landscapes, (ii) just where in these landscapes this should be done, (iii) the types of reforestation to be carried out in these different areas, (iv) who should make these decisions, and (v) how reforestation should be implemented.

All of this means there is a rich field of study for silviculturalists wishing to look beyond establishing simple monocultures of fast-growing exotic species. Silvicultural systems designed for industrial timber plantations are not necessarily those suited to overcoming forest and land degradation where a variety of stakeholders are involved and where these stakeholders are interested in the provision of ecosystem services as well as (or instead of) goods such as timber. It also means that foresters will have to bridge the divide between the natural or physical sciences and the social sciences rather better than has been done in the past. I will highlight some of the key questions (though not necessarily the answers) that I think deserve more attention than they have received hitherto.

Jan McAlpine, United Nations Forum on Forests

Reshaping the landscape for forests and people

Forests are the cornerstone of the entire landscape, which includes wetlands, agriculture, mountains, drylands, rivers, biodiversity and people. Landscape restoration and sustainable forest management can only be achieved

when all stakeholders, including governments, private institutions and local communities, work together using a cross-sectoral, cross-institutional strategy at a landscape level. The challenge is to explore institutional arrangements that are better suited to each country's dynamic conditions, as there is no one-size-fits-all solution.

At the global launch of the International Year of Forests in 2011, Rwanda announced its plan and commitment for achieving border-to-border landscape restoration over the next 25 years. This would be the first time that such a project encompasses an entire country - and the "landscape" includes not only forests, but trees as part of agriculture, subsistence agriculture planning, including terracing, protection of water resources, and the importance of wetlands and other ecosystem planning for all these purposes, including hydrology. This comprehensive landscape approach is the future.

In China's Loess Plateau, innovative action regenerated a barren landscape that had been degraded from centuries of unsustainable agriculture. Communities worked to replace overgrazing with terrace-building and tree planting practices. Within a decade, the dry, dusty plateau has become a mixed green landscape of forests and fields, an incredible feat of recovery for an area the size of Belgium, approximately 640,000 square kilometers. Moreover, this restoration contributed to lifting 2.5 million people out of poverty.

"Forests for People" was the theme of the International Year of Forests 2011 (Forests 2011) and continues to be the focus of the UNFF secretariat's outreach activities. This year has inspired afforestation and reforestation projects worldwide, including changes to agricultural practices in rural communities and forest management.

Friday, January 27th

Robin Chazdon, University of Connecticut

Making tropical forest succession successful

Tropical forest succession follows distinct pathways depending on prior land use, post-abandonment disturbance, faunal diversity, and the dynamics of the surrounding landscape. These distinct pathways determine rates of change in species composition, forest structure, and ecosystem processes. Metrics of "success" during forest regrowth are largely determined by values of different stakeholders. Conservation biologists value regrowth as habitats for endemic species and forest specialists. Local people value regrowth for numerous ecosystem products and services. Ecotourists value regrowth forests for recreation and viewing wildlife. Today, most successional forests in the tropics were not planned and few are being actively managed. Expanding the future value of successional forests for conserving biodiversity, providing ecosystem services, and supporting rural livelihoods will require developing new insights into the socio-ecological drivers of forest regrowth across different regions of the tropics.

Panel 1: Forest regeneration in human-modified landscapes

Zoraida Calle, Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria

A strategy for scaling-up intensive silvopastoral systems in Colombia

Silvopastoral systems (SPS) enhance milk and meat production, reduce costs and are instrumental for the productive rehabilitation of degraded lands. Intensive silvopastoral systems (ISS) combine fodder shrubs planted at high densities (> 10,000 plants ha-1), trees and improved pastures. The scaling-up of such systems requires incentives to address financial and knowledge barriers, as demonstrated by the Regional Integrated Silvopastoral Approaches to Ecosystem Management pilot project. The lessons learned from this project are now being applied in the Mainstreaming Biodiversity in Sustainable Cattle Ranching Project, which will scale-up the adoption of SPS in Colombia in order to improve natural resource management, enhance environmental services, and raise productivity in participating farms. The five regions targeted by the project were selected for their proximity to strategic ecosystems and protected areas, and it is expected that increasing connectivity within them will safeguard globally important biodiversity. Two main components of the project aim at: (1) improving productivity in participating farms by establishing SPS, and (2) increasing connectivity and reducing land degradation through differentiated payment for environmental services (PES) schemes. Short-term PES will be given to land uses with high biodiversity that are profitable in the medium and long term (i.e. live fences, windbreaks, and trees in pastures). Land uses that foster high biodiversity but are not profitable (i.e. forests, connectivity corridors and wetlands) will receive short term payments by the project, and additional funding sources will be explored to guarantee long-term PES. The direct payment through the project is intended to increase tree cover in pasture landscapes and stimulate the maintenance and restoration of native forests. The project expects to preserve 5,000 ha of forests within farms, and to establish 15,750 ha of connectivity corridors and 45,000 ha of SPS, including 12,000 ha of ISS promoted through credit, technical assistance and economic incentives.

Aerin Jacob, McGill University

Long-term patterns in restoring forest diversity and structure after burning, farming, and logging in Kibale National Park, Uganda

Despite increasing loss and degradation of tropical rainforest, conservationists frequently overlook the ability of disturbed forest to conserve biodiversity. Restoring degraded forest requires understanding how land-use history and management affects forest succession and regrowth. The purpose of this study was to evaluate long-term forest dynamics in Kibale National Park, Uganda to 1) examine patterns in forest change and 2) evaluate how regenerating forest can provide food for primates. We collected data on tree species and size in four unlogged sites and eight degraded sites regenerating after burning, farming, logging, or reforesting with native or exotic trees. We calculated changes in tree species diversity and structure within and between sites, using statistical clustering to identify similarities. We used existing relationships between tree size and the abundance of leaves and fruit to calculate to what degree forests with different land use histories can provide food for primates. Lightly logged

forest had more similar levels of species diversity and structure to unlogged forest than burned, farmed, heavily logged, or reforested sites.

Surprisingly, some regenerating forest can support substantial primate populations: at present, sites excluded from fire for 17 years provide more primate food than those replanted with native trees 15 years ago. Forty years after harvest, lightly logged forest provides equal food to unlogged forest while heavily logged forest does not. Taken together, our results indicate that land managers can use a variety of passive and active strategies to direct succession in degraded tropical forest and accelerate restoration. The foresight to plant food trees will be particularly important to conserve target or endangered animal populations.

Laura Snook, Bioversity International

Subsistence agriculture can foster forest restoration in the tropics: Commercially valuable multispecies stands result from slash and burn in Quintana Roo, Mexico

The state of Quintana Roo, Mexico is more than 70% forested and harbors important populations of jaguar, tapir, monkeys and pumas. Most forestland is held communally, through ejidos (land grants to groups) that range in size from about 4000 ha to more than 70,000 ha. More than 150 ejidos manage their forests, harvesting mahogany (*Swietenia macrophylla*) and other species to sell as timber. Outside their forest areas, communities practice slash and burn agriculture to produce subsistence crops. Sustaining the forest and its biodiversity depends on sustaining its value, so regenerating commercial species is vital to forest conservation. However, selective timber harvesting does not create favorable regeneration conditions for sun-loving species like mahogany. To evaluate silvicultural options for forest regeneration, 24 half-hectare experimental clearings were created in community forests using slash and burn agriculture, mechanical clearing or clear felling, and mahogany seeds and seedlings were planted within them. Results 10 years later revealed that slash and burn was the best treatment for mahogany, favoring the highest growth rates. Seed fall from neighboring trees of other species has transformed these former clearings into diverse young forests. An evaluation at 11 years revealed that 80 tree species had become established on former slash and burn clearings, where 39% of the basal area was made up of commercial hardwoods. These species accounted for only 6% of the basal area on the clearings created through clear felling alone, where less valuable softwoods accounted for 20% of the basal area. This demonstrated that slash and burn agriculture can be compatible with forestry and contribute to the restoration of diverse and valuable timber stands. The challenges are convincing forest managers that agriculture can be integrated into forest management, and a sufficient land area to allow for long enough fallows that the trees can grow to harvestable size.

Panel 2: Private sector engagement in forest restoration

Chris Meyer, Planting Empowerment

Private sector investment model in mixed native species agroforestry plantations with indigenous communities and small landowners

Two of the main barriers to adoption of small-scale forestry by smallholders and indigenous communities in Panama are 1. The lack of revenue generated by the stands early on, and 2. Resistance to new management models. Planting Empowerment (PE) partners with indigenous communities and individual smallholders to cultivate mixed-species plantations that generate short-term economic benefits and preserve traditional practices.

In 2006 PE piloted a land-leasing model with an indigenous community, Arimae, and an individual landowner from a Latino community. Through a rigorous consultation process, PE secured 25-year leases on these partners' land for forestry projects. The lease payments made to partners provide short-term income while the trees grow and reach harvestable size. Consistent with the land ownership structure of the respective partner, PE pays an upfront lease to Arimae, and monthly payments to the individual smallholder. As part of the contract, partners also share in the profit generated by the future timber sales. Partners and communities learn sustainable forestry management, and have the opportunity to receive financial support from PE for continuing education in forestry.

Understanding that social norms can slow the adoption of new ideas, PE works closely with partners to integrate forestry into their existing paradigm. Partners lease only small amounts (<5%) of their land to PE for forestry, leaving them sufficient space for traditional activities. The leasing structure is based on the existing practice of leasing land for single crop cycles (3-6 months), but extended to accommodate the longer forestry cycle. PE also uses 70% native species trees which locals are familiar with. Planting Empowerment's model enables partners to benefit from sustainable forestry in the short and long terms, and ultimately aims to increase the adoption of sustainable forestry by providing locals the experience they need to be successful.

Ricardo Lujan, Brinkman y Asociados Reforestadores de Centro América

Restoration initiatives in the lowland tropics of Central America

BARCA was founded in 1995 as an innovative tropical reforestation and restoration company working in the Central American tropics. From its beginnings, BARCA has experimented and implemented restoration projects through the designing, planting and managing of mixed native valuable forest species planted in mosaic patterns and mixed planting designs. For example, "the BIRDS project" was established in the years of 1995 to 2000 in the Central Pacific Region of Costa Rica.

With an NGO in the Osa Peninsula of Costa Rica, BARCA has also participated in restoration through "enrichment strips" of native commercially valuable forest species. In 2011, in the Darien Region of Panama, BARCA is establishing a restoration project in the Comarca Kuna de Madugandí, an autonomous indigenous area. In this Comarca, the restoration must satisfy several necessities for its habitants (firewood, sawn wood etc.), and a "polycyclic harvesting" of planted and regenerated forest species approach was designed.

For restoration to be economically and socially viable, it must fulfill best practices in silvicultural management and human relations, including: i) using best available genetic stock for reproduction, ii) good site and micro-site/species correlations, iii) excellent management (silvicultural and of human resources), iv) knowledge of forest species to be utilized, especially understanding their tolerance to shade or direct solar radiation, v) incorporation of non-timber forest products, vi) work at the grass-roots level, with understanding of laws and traditions of the

region, vii) search for "buffer areas", areas with low intensity land use, communal areas; and work through "environmental service payments", viii) the use of natural regeneration is a key factor, and the following aspects are vital: distance to native forests or forest patches that directly influence seed source availability; and past history of the restoration site and present soil fertility.

Panel 3: Economic viability of landscape-scale initiatives

Matheus Couto, Forest and Agriculture Management and Certification Institute/IMAFLORA

Certified cocoa as a strategy for ecosystem restoration in the Amazon forest of São Felix do Xingu, Pará, Brazil

The municipality of São Felix do Xingu, in the southeastern part of the Brazilian Amazon is considered a "deforestation hotspot" due to the expansion and low efficiency of cattle ranching. According to the Brazilian forest law, farms in the Amazon must have at least 80% of area covered by native forest. On the other hand, agroforestry systems based on cocoa are one option to decrease deforestation and recover degraded lands. IMAFLORA's objective is to use the cocoa system to build a productive forest to restore and protect the ecosystem, aiming to raise the percentage of forest cover and contribute to the compliance of the forest law by smallholders. It has been done by building capacity in smallholders of the local cooperative (CAPPRU). The goal is to improve production, conservation and organization practices by following the standards of the Sustainable Agriculture Network/Rainforest Alliance Certified. The farmers were trained on structuring programs for conservation and restoration of native ecosystem on their land and on quality improvement of the cocoa beans. Certification may lead to an economic premium paid for certified quality cocoa, which will be an incentive for making forest restoration viable. IMAFLORA's project is impacting 2356.26 hectares on 37 smallholder properties, with 53.8% of the land used as pasture, 33.1% as conservation areas and 12.3% as cocoa fields.

J.P.B. Lillesø, Forest & Landscape Denmark/University of Copenhagen

The role of old maps and nursery entrepreneurs in restoration of forests in Eastern and Southern Africa

In this paper we discuss two specific inputs aimed to increase restoration success in Eastern and Southern Africa. While deforestation in this part of Africa has been severe, it is also an area that is blessed with old maps and nursery entrepreneurs. Obviously successful restoration requires that a whole range of technical and socioeconomic conditions are fulfilled, but here we will concentrate on two neglected areas that could have profound influence on restoration success.

Restoration of ecosystems and ecological communities requires development of a strong theoretical base. But most often landscapes are described by ecoregional classification with little possibility to transfer the general knowledge to physical landscapes, while detailed knowledge of small areas are not generalized to an understanding of how the

ecological conditions vary across landscapes. However, old botanical maps produced around the time of independence of many African countries can provide this link between the general and the specific, providing an understanding of successional pathways, alternative stable states, and ecotones.

Restoration can be implemented as centralized restoration of protected areas or as part of decentralized collaborative forest management schemes. In both types of schemes seeds and seedlings need to be procured and distributed. Two practical requirements for implementation of restoration based on experience from agroforestry can inform on how this could be done on a large scale: (i) identifying suitable seed sources based on understanding potential provenance areas for species that have never been tested (basically all indigenous species), and (ii) public/private collaboration with decentralized small-scale private nursery entrepreneurs procuring and distributing seeds and seedlings for dispersed planting agents.

An example of how the tools could be used for the "five water towers" in Kenya illustrates our points and references to maps and documentation of tree species distributions (on Google Earth platform) for a wider area is provided.

Workshop: Indigenous knowledge and participatory research

Ina Vandebroek, Ethnomedical Research Specialist, New York Botanical Gardens

Research methods for collecting ethnobotanical forest-related knowledge

This workshop will start with a 25 min presentation on ethnobotanical field methods, including research planning, methodological do's and don'ts, and involvement of local communities. Following the presentation the floor will be opened for discussion.

Intellectual property rights and ethics in ethnobotanical research

Any research involving collaboration with local communities should adhere to ethics set out by the ethnobotanical community. A 25-min presentation about intellectual property rights issues that can arise in ethnobotanical research will be followed by an open discussion about these topics.

Meredith Martin, Yale School of Forestry & Environmental Studies

Community-based forest monitoring: A case study of Agave harvest in tropical dry forests of Guerrero, Mexico

This workshop will begin with an overview of basic forest monitoring techniques, continue to describe a case study of successful community-based forest monitoring in Guerrero, Mexico and end with a discussion of the benefits and challenges to community-based monitoring and research. This case study focuses on the community of Acateyahualco in the mountains of Guerrero, where collaborations with researchers from the New York Botanical Garden and a local NGO led to the implementation of community-based monitoring of Agave populations. Many rural communities in Mexico harvest wild Agave from tropical dry forests and other habitats for the

production of a traditional liquor, mescal. In some areas unrestricted harvesting has led to overexploitation and "tragedy of the commons" situations, but in other communities Agave populations are maintained through strong management traditions. The community of Acateyahualco has been doing Agave monitoring for four years, and are now using the data to inform harvesting and management decisions.

Scott Landis, GreenWood

Practical Tools for Community-Based Forest Management

Many of the same criteria apply to forest restoration and community-based forest management--particularly in vulnerable tropical forests where the two are often closely intertwined. For GreenWood, these are best addressed through a suite of flexible tools that include: 1) Value-added markets; 2) Appropriate harvesting and production technologies; 3) Transparent, legal chain-of-custody; 4) Extensive consultation with local partners; and 5) Practical research that responds to local priorities. There is no cookie-cutter solution to every situation, but GreenWood applies a few basic principles that can help guide successful interventions.

Saturday, January 28th

Panel 4: Scaling up - Applying lessons learned

Pedro Brancalion, Universidade de São Paulo

The Atlantic Forest Restoration Pact - A major effort by Brazilian society to restore and transform its most threatened biome

The Brazilian Atlantic Forest is one of the five top priority conservation areas in the world, due to its exceptional biological diversity, very high levels of endemism, and equally high levels of human pressure, hence a very threatened future. In this scenario, conservation will not be enough to save most of the indigenous species of the Atlantic Forest, nor to maintain the flow and quality of ecosystem services. Consequently, ecological restoration will be required, and at a large scale. To achieve the expected targets, restoration efforts must be integrated with stakeholders and a fully mobilized society. Today, less than three years later after it was launched, the Atlantic Forest Restoration Pact (AFRP), has almost 200 members including national and international NGOs, government, private companies, and research institutions.

The AFRP's mission is to integrate people and organizations to restore and reconnect the Atlantic Forest at a very large scale, and to protect the remaining forest fragments. The ambitious goal is to contribute to the restoration of 15 million hectares of Atlantic Forest by 2050 in order to recover at least 30% of the biome's original area, with annual targets to be met, and on-going monitoring, evaluation, outreach, and reporting of results to be carried out. Currently, more than 40,000 ha of restoration projects are registered in the AFRP website. We have also produced i) a book describing the practical guidelines for restoring Brazilian Atlantic Forest, based on previous experiences and current scientific knowledge; ii) thematic maps to guide restoration efforts; as well as iii) a monitoring

protocol. The spirit of cooperation and mobilization of the AFRP, combined with pragmatism, and technical, science-based methodologies developed in-situ, provide a template that could be adapted to other forest biomes in Brazil and, possibly, to other mega-diverse countries around the world.

Eduardo Malta Campos Filho, Instituto Socioambiental

Mechanized planting of forests: Innovation and scale in the Xingu, Central Brazil

The Xingu is famous worldwide, not only for the Amazon forest and its border with the Brazilian savannah (called "Cerrado"), but for the cultural richness of its oldest inhabitants: 24 distinct indigenous ethnicities, who still live, drink, bathe and fish in Xingu's water. The spread of soy and beef production during the last decades has left 300,000 hectares of degraded areas around rivers and water springs in the Xingu basin, threatening the survival of its original people and their health, as well as the economic viability of these new businesses. These areas are legally protected in Brazil: where native vegetation was cut, it must be restored. However, that is not what usually happens, mainly because seeds, seedlings and technology are still not available.

The campaign Y Ikatu Xingu ("Save the Good Water of the Xingu", in the local Kamaiura language) has been uniting indigenous peoples' organizations, small farmers settled by agrarian reform, larger-scale farmers, governmental and non-governmental institutions since 2005 in one great effort for the restoration of riparian forests aiming for the conservation of the Xingu's water. By working in a participatory way with different actors, new solutions for tropical forest restoration at the landscape-scale were developed: indigenous sowing techniques were associated with modern large-scale agricultural machinery. The technique is called "Muvuca", or mechanized direct sowing. It uses the very same machines conventionally used to sow pasture grass, corn, millet, rice, beans or soybeans in monocultures. We use them to plant dozens of native species, from all successional phases, intermixed with green manure and crop seeds such as pigeon peas and crotalaria in a polycultural system. Planting at one time 300,000 seeds of native trees and 100,000 seeds of crops and green manure species per hectare, after 5 years of annual monitoring we found 1,700 stems per hectare, at a cost of US$600-1,000/ha. This method produces highly varied biomass, flowers and fruit from the first months and creates good soil cover, which better mimics the dense structure found in the initial stages of secondary succession, as well as biological interactions and water-soil-plant dynamics. The growth of a dense net of different root systems promotes soil decompaction and nutrient cycling. Since damage to the root system is avoided in direct sowing (hard to avoid with nursery-grown seedlings), the surviving trees are more resistant to drought. By using direct sowing, the costs of establishing and managing nurseries, of seedling transportation, planting, and control of ants and grasses are eliminated, while people who preserve native forest remnants and who maintain traditional knowledge associated with local biodiversity are remunerated. This method is cheaper by two-thirds, is less labor-intensive, and is much faster and practical than conventional planting of seedlings. By utilizing the farmers' machines, we engage with them in their own language and make them collaborators in our research.

Our work has been communicated on national and local television channels, in newspapers and on the radio, as well as in local events promoted by churches, clubs, unions, schools and agribusiness companies, always including the local farmers who support "Muvuca". This new way of forest restoration is becoming popular in the region, expanding steadily by 30-50% per year in planting area and metric tons of seeds planted. For making this amount

of native seeds available, we helped create the Xingu Seeds Network, which brings together indigenous people and smallholders as seed collectors, selling native seeds from the Cerrado and Amazonia to farmers who need to restore riparian vegetation on their farmland. The Xingu Seeds Network has annual meetings to discuss maintenance and impacts of seed collection, storage techniques, organization and seed prices. The network is four years old and has generated US$250,000 in income for 300 local families, organized in 15 groups spanning a 400 kilometer radius, producing 53 tons of seeds of 203 different native species. To date, over 2,400 hectares in 21 municipalities have been restored through this campaign. Of those, 400 hectares were planted with seedlings, 1,000 hectares through exclusion and management of natural regeneration, and 1,000 hectares through mechanized direct sowing. The next challenges for the campaign now include the development of the native forest technology, legislation and economy, such as the organization of local productive systems, access to credit, infrastructure and marketing.

Pipa Elias, Union of Concerned Scientists

Opportunities and challenges of policies for tropical forest restoration

There is a great deal of political momentum behind policy incentives to reduce deforestation and restore tropical ecosystems. New mechanisms, such as Reducing Emissions from Deforestation and Degradation and other pro-forest activities (REDD+), may provide many opportunities for improved land use practices in the tropics. These policies and mechanisms could provide additional incentives for long-standing approaches such as community forestry, or may create new paradigms in economic development while avoiding deforestation.

Before full implementation of REDD+ and other incentives can be achieved, scientific, political, and social challenges will need to be addressed. For example, the funding necessary for implementation must be generated. As these monetary incentives to implement REDD+ emerge, estimates of the extent of and which practices should be implemented where would help move political negotiations forward. Also, balancing development, the drivers of deforestation, and restoration opportunities will be critical for achieving social and environmental change in tropical countries. We will present analyses of secondary forests in the Amazon and our proposal for balancing the relationship between the drivers of tropical deforestation to contribute to this discussion.

Finally, while the scope of REDD+ is set, it is unclear how many aspects of implementation will occur. We will provide an up-to-date report on progress of REDD+ at the Durban meeting of the United Nations climate negotiations.

Cora van Oosten, Global Partnership on Forest Landscape Restoration

Restoring landscapes, governing space

Forest landscape restoration seems to have become a new hype. Driven by climate change, there currently are many efforts to establish restoration projects across the globe. Biophysical and economic potentials are assessed, innovative financial mechanisms are developed, and ambitious targets are set to restore the world's lost forests.

However, landscape restoration is nothing new. People have always been constructing, re-constructing and restoring their landscapes, to safeguard their lives and livelihoods. A better understanding of these localized practices will help to better perceive, plan, and implement new restoration initiatives, and potentially scale up to higher levels of policy making.

Understanding localized practice means firstly to understand how landscapes are historically shaped by people, through their sense of belonging, and deep attachment to their place. It is this sense of identity and ownership that forms the basis for agency and collective action, for landscape inhabitants to restore their degraded landscapes. Secondly, it means to understand how these endogenous landscape dynamics relate to governance. Landscapes are often cut across by administrative boundaries, not having a formal position in the political-administrative scaling of governance. This means that administratively steered planning processes do not make use of the endogenous agency of landscape inhabitants to govern their place. Thinking of governance from a landscape perspective however allows for a 'specialization' of governance, as a means to re-connect governance to landscape, citizenship to place. Adopting a landscape perspective to governance allows to cross administrative and political boundaries. It also allows a broader group of actors not only at the local level, but also at higher politics of scale to engage in governance and decision-making processes concerning their landscape.

Such landscape governance does not mean adding an extra scale of formal political-administrative decision-making. But it does offer the opportunity to construct multiple scale networks within and between landscapes, for landscape learning to take place. This is the rationale behind the learning network, which is currently being constructed by the Global Partnership on Forest Landscape Restoration.

Emerging Resources

Gillian (Paul) Bloomfield, Environmental Leadership and Training Initiative

Introduction to a new educational tool in the field of tropical forest restoration

The Environmental Leadership & Training Initiative (ELTI) is a joint program of the Yale School of Forestry & Environmental Studies (F&ES) and the Smithsonian Tropical Research Institute (STRI), whose mission is to enhance environmental management and leadership capacity in the Neotropics and tropical Asia by offering capacity-building and networking opportunities to individuals whose decisions and actions influence the management of forests in working landscapes. A key mission of the Environmental Leadership & Training Initiative (ELTI) is to help environmental leaders and practitioners learn about and engage in reforestation of degraded tropical lands. Unlike the industrial scale use of exotic tree species for reforestation, restoration of tree species native to a given region can promote greater biodiversity and ecosystem services. Individuals engaging in and researching native species reforestation are highly spread out around the world and work in many different capacities. The objective of the Tropical Native Species Reforestation Information Clearinghouse (TRIC) is to combine the information gleaned from different sectors throughout Latin America and tropical Asia into a single searchable database. These entries provide information about literature and projects for use by environmental practitioners, scientists, and leaders worldwide.

http://reforestation.elti.org

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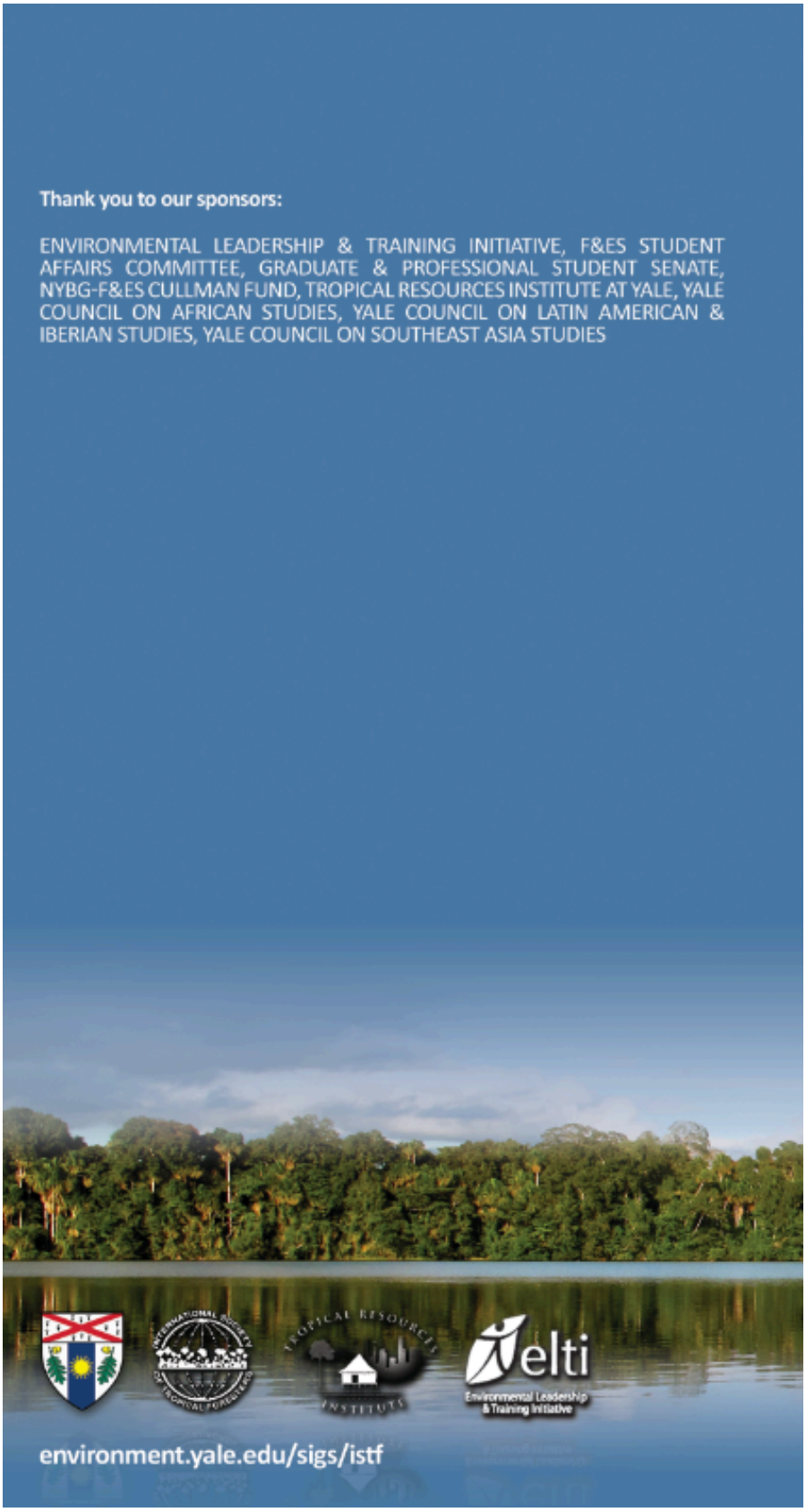
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