SilvaCarbon

Research and Development Activities

Land Cover Science Meeting, Netherlands, November 2016

What is SilvaCarbon?

- SilvaCarbon is a U.S. initiative to assist countries with the development of transparent, cost-effective national forest monitoring systems that are appropriate to their needs and circumstances.

- U.S. partners include the Agency for International Development, Department of State, Forest Service, Geological Survey, Environmental Protection Agency, National Aeronautics and Space Administration, as well as the University of Maryland, Boston University, and the World Resources Institute.

SilvaCarbon Program Objectives

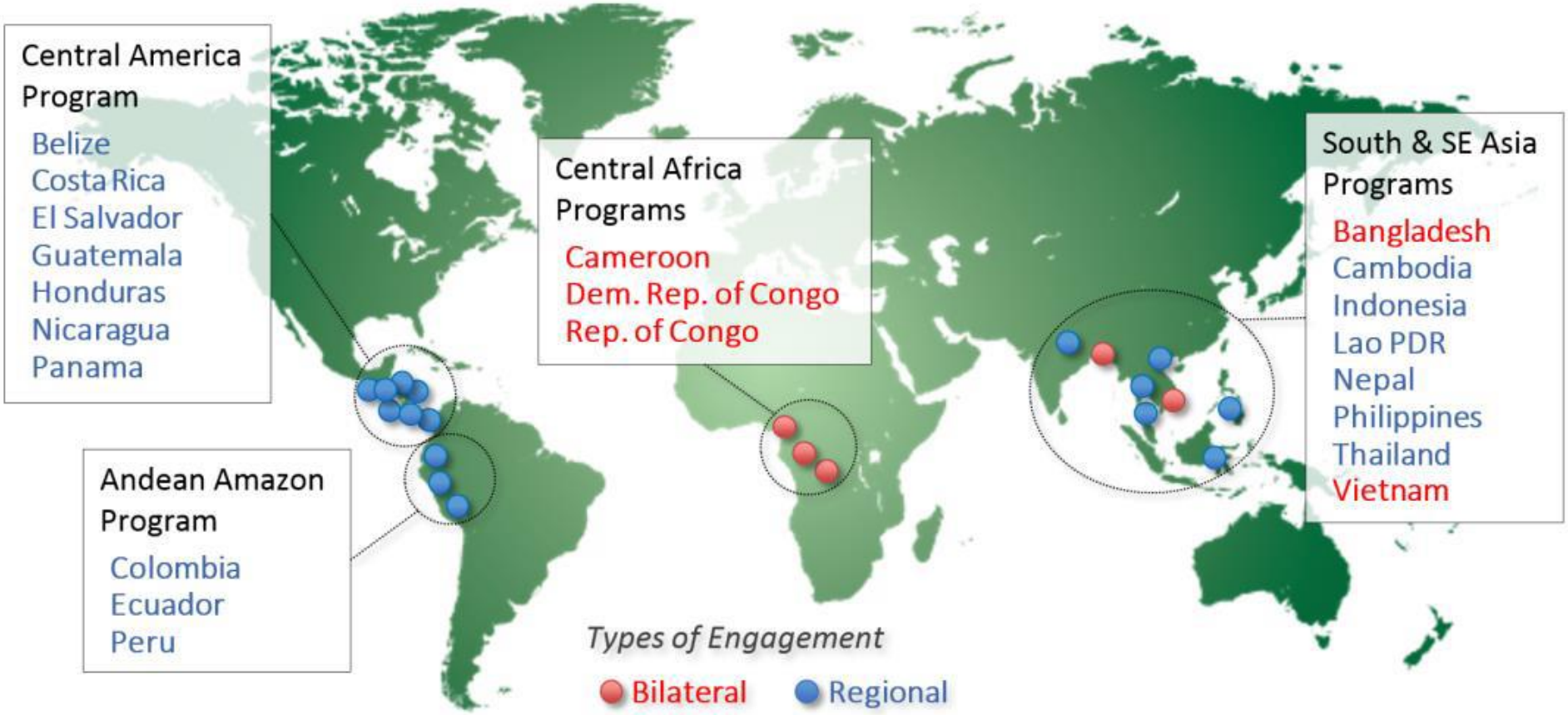
- Develop, demonstrate, and compare forest and terrestrial carbon measurement and monitoring methodologies.

- Build capacity of selected developing countries to use forest and terrestrial carbon monitoring and management methodologies and technologies.

SilvaCarbon Program Objectives

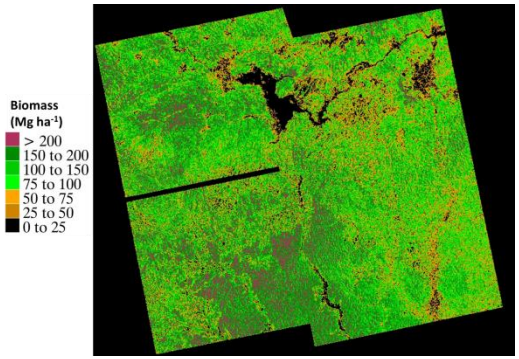
- Improve U.S. interagency coordination, and promote cooperation with other governments and institutions.
- Facilitate the collection and dissemination of earth observation data related to forest carbon monitoring and management, in cooperation with CEOS and GFOI.
- Strengthen the community of forest and terrestrial carbon technical experts.

Where does SilvaCarbon work?



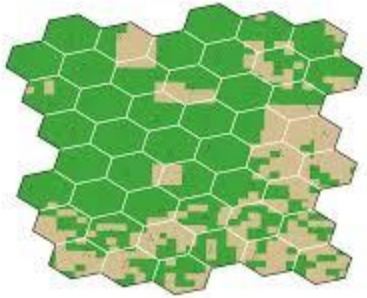
SilvaCarbon provides assistance with:

Classification and mapping of forest cover



Integration of remotely sensed and in situ data

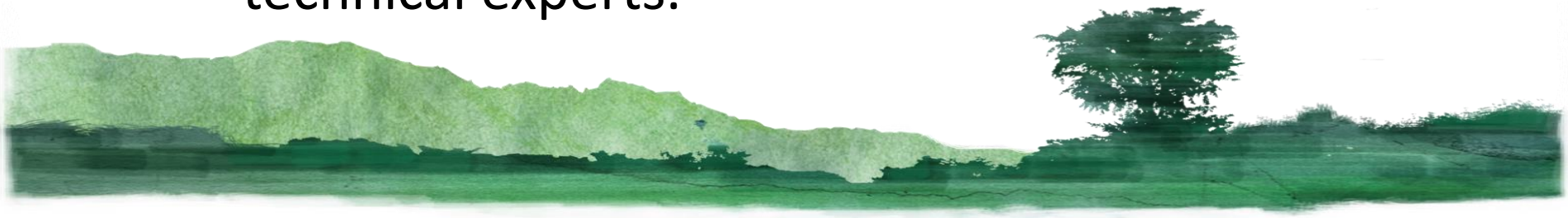
Collection and analysis of in situ data, including involvement of local communities and stakeholders



Sampling protocols and design

SilvaCarbon Research Objectives

- Improve and compare forest carbon monitoring methodologies, with an emphasis on forest degradation.
- Apply research results to the development of forest carbon monitoring and management methodologies and systems.
- Promote transnational cooperation among forest carbon monitoring researchers and technical experts.



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SilvaCarbon Research Program

SilvaCarbon has funded eleven research proposals addressing key issues in forest and terrestrial carbon measurement, monitoring, and management. Proposals were selected based on their applicability to the needs of SilvaCarbon country partners and their potential to contribute to capacity-building. Final research results are expected in 2017.

GFOI Biomass Workshop
2013

Funded in 2014

Jump to project...

- Measuring Forest Degradation for REDD+: A Synthesis Study Across Five SilvaCarbon Countries
- Biomass in Degraded Forests in Peru and Brazil: Evaluation Using Airborne Lidar Remote Sensing
- A Prototype MRV System for a Sub-region in Colombia Compliant with IPCC Approach for Securing Activity Data
- Addressing Carbon Emissions and Removals from Selective Logging In Support of MRV System Capabilities in Gabon
- Integration of Remote Sensing Data with Ground Plot Information for MRV
- Integrating Earth Observation and Forest Inventory Data in Quantifying Biomass in

Innovative Solutions for Monitoring Forest Carbon: Advancing Climate Action through Improved Information

September, 2016

Workshop Objectives:

- Present SilvaCarbon research findings, including new methods and approaches, and discuss their application to national monitoring systems.

- Identify gaps, inconsistencies, uncertainties, and other obstacles to the effective integration of global, national, and subnational monitoring efforts.

Workshop Objectives:

- Discuss the implications of the research for:

1. Guidance to countries regarding the design of forest carbon monitoring systems.
2. Capacity-building efforts to improve national forest landscape monitoring.
3. Additional research needs, and opportunities for partnerships through GFOI's Research and Development component.

Session 1: Setting the Stage – Understanding Forest Degradation

A Synthesis of Tropical Forest Degradation Scenarios in Carbon Emissions Trajectories for REDD+

Rafael Andrade, Sapienza Università di Roma

Lidar-Assisted Estimation of Degradation Parameters

Ronald McRoberts, U.S. Forest Service

Session 2: LiDAR – Adding Value to MRV

Investigating the Influence of Airborne LiDAR Data Density on the Ability to Detect Low-Intensity Forest Degradation in Kalimantan, Indonesia

Hans-Erik Andersen, U.S. Forest Service

Using Terrestrial Laser Scanning to Estimate Biomass and Impacts of Forest Degradation: A Case Study Across 5 SilvaCarbon Countries

Martin Herold, Wageningen University

Experimental Application: Biomass in Degraded Forests in Peru and Brazil: Evaluation Using Airborne LiDAR Remote Sensing

Maiza Nara, Brazilian Agricultural Research Corporation

Session 3: Scaling Up Carbon Estimation – Integrated Remote Sensing and Ground Observations

Integrated Earth Observation and Forest Inventory Data in Quantifying Biomass in Degraded Forests of the Republic of Congo

Matt Hansen, University of Maryland

Integration of Remote Sensing Data with Ground Plot Information of MRV

Beth Stein, Digital Globe

Session 4: Measuring Trends – Time-Series Analysis

Detecting and Monitoring Tropical Forest Degradation in Vietnam using Landsat Time Series Analysis

Jim Vogelmann , U.S. Geological Survey

A Prototype MRV System for a Sub-Region in Colombia Compliant with IPCC Approach 3 for Securing Activity Data

Pontus Olofsson, Boston University

Mapping Deforestation and Degradation in Mexico, Colombia and Peru using Time Series of Sentinel-1 Radar Data

Pontus Olofsson for Josef Kellndorfer, Woods Hole Research Institute

Observations & Recommendations

Monitoring forest degradation is difficult, but important in many countries if they expect to control carbon emissions, participate in REDD+, and achieve their nationally determined contribution to the Paris Agreement.

Counties may wish to make initial estimates of degradation to determine whether to include it in their monitoring systems, and focus their effort where degradation is most likely to occur.

"This work is crucial because we just don't know the portion of emissions that comes from degradation. Various ideas are out there, but we don't really know, because we don't have either the field data or the remote sensing-derived estimates."

– Matt Hansen, University of Maryland

Observations & Recommendations

Managers and researchers need to establish clear definitions of degradation. These may vary depending on national needs and circumstances, but they should be explicit and consistent.

To keep monitoring consistent, measurement thresholds must be selected, adjustments for classification errors made, and variance estimated.

A fairly large sample size may be necessary to produce precise estimates of degradation emission factors.

"Any direct, anthropogenically-induced and persistent loss in carbon density over time, but still maintaining sufficient canopy cover to meet the threshold for the definition of forest and with no change in land use."
– Ron McRoberts, USFS

Observations & Recommendations

To ensure accuracy and control costs, the integration of satellite, aerial and ground monitoring methodologies is essential, particularly for monitoring degradation.

The exact mix of technologies must be tailored to the specific needs of individual countries, influenced by such factors as forest size and diversity, the nature of forest carbon loss, and national priorities and resources.

"It is important for us to learn how to use new tools that can reduce forest monitoring costs in Central Africa. Collecting field data is expensive, and some areas are very difficult to access. Tools like LiDAR can be useful for minimizing field data collection."

– Dr. Landing Mane , Observatoire Satellital des Forêts d'Afrique Centrale

Observations & Recommendations

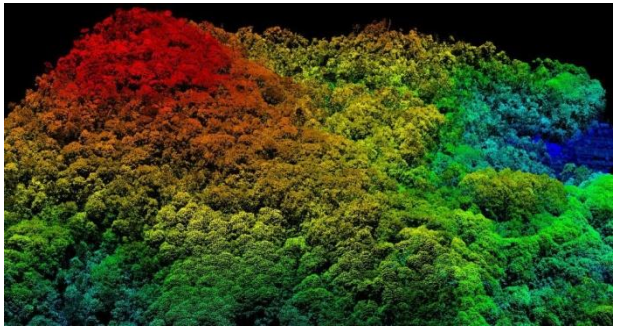
Additional research is needed on the optimal integration of multiple data sources in MRV systems at regional to national scales. The integration of field and RS information is especially important in countries developing national forest inventories.

Specific topics include optimal plot size and shape, and the mix of permanent and temporary plots, to integrate remote sensing and field data.

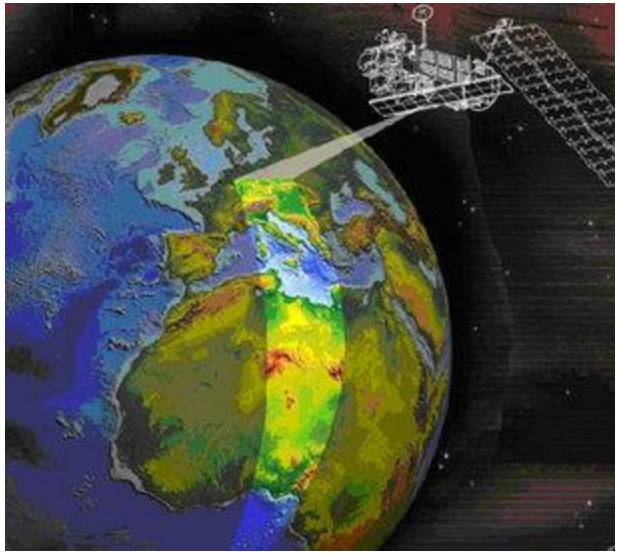
Statistical tools to combine data at different levels of precision and accuracy acceptable to the IPCC are also needed.

Observations & Recommendations

LiDAR data varies widely regarding source and product specifications. Developing common parameters related to biomass that can be derived from different types of LiDAR data would reduce confusion and allow for comparisons across projects.



Increased free access to earth observation data, especially radar, and the development of analytical tools using open source or free software, is highly encouraged to reduce economic obstacles to capacity building and implementation.



Observations & Recommendations

Forest degradation is not uniform – some forms result in recovery, while others lead to deforestation and severe carbon loss.

The long-term outcome of degradation depends on both biophysical and socioeconomic factors. Integrating information about the drivers of degradation into monitoring systems is encouraged.

Long-term studies are needed to improve estimates of emissions factors for various disturbances, as well as the time-scales for which effects of disturbance are significant.

Thank You

The next generation of forest monitoring experts