

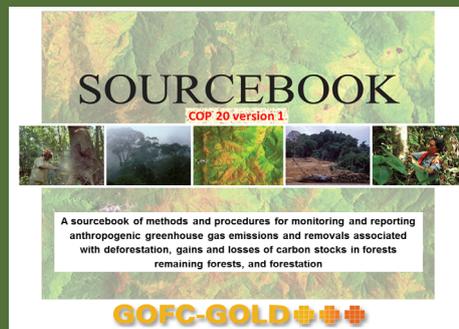
Newsletter N° 32 | May 2015

# LAND COVER AND CHANGE

Newsletter of the GOFC-GOLD Land Cover Project Office

## Release of the GOFC-GOLD / World Bank FCPF training materials for REDD+ monitoring and reporting

GOFC-GOLD has developed a REDD+ curriculum on monitoring and reporting, in partnership with the World Bank Forest Carbon Partnership Facility (FCPF). The training curriculum is based on the REDD Sourcebook and aims to provide learning and teaching material to enable countries to develop capacities and implement REDD+ monitoring and reporting. For more information and to access the training materials go to page 2.



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## Joint GFOI/GOFC-GOLD R&D Expert Workshop on approaches to monitoring forest degradation for REDD+

The Second R&D Expert Workshop of the Global Forest Observations Initiative (GFOI) of the Group on Earth Observations (GEO) took place on 1-3 October 2014 in Wageningen, The Netherlands. It was organised in collaboration with GOFC-GOLD and was focused on forest degradation. Workshop objectives were:

- Assess the evolving needs from the international level and REDD+ countries for monitoring forest degradation;
- Present and share experiences on approaches to identify and as-



sess different types of degradation for REDD+ monitoring using earth observations, ground-based surveys and proxies;

- Discuss important gaps and obstacles and opportunities for future improvements, documented in an action plan for further R&D and demonstration activities;

- Synthesize the findings towards improved guidance to countries and REDD+ practitioners.

A synthesis on evolving requirements for forest degradation monitoring has been made considering key questions including country circumstances, financial aspects, capacity building priorities, timeframe, and priority targets (e.g., drivers, stratification, and quantitative indicators). Monitoring needs (ground and remote sensing approaches) to tackle activity data and emission factors are discussed, along with mapping approaches. Operational readiness of different Earth Observation sensors are

summarized also. Approaches for designing national frameworks for degradation monitoring are presented. The report includes priorities for future work and next steps for the R&D component of the GFOI.

The report includes observation requests for R&D activities

to the [Space Data Coordination Group](#) (SDCG) from the Committee on Earth Observation Satellites (CEOS). New SAR and optical data acquisitions are planned to extend the time-series over already established and still active GEO Forest Carbon Tracking sites and over newly proposed sites. Optical Very High Spatial Resolution data has

been requested also for calibration and validation.

The summary report is available on the [GFOI website](#).

## Release of the GOF-C-GOLD / World Bank FCPF training materials for REDD+ monitoring and reporting



The GOF-C-GOLD Land Cover Project Office is pleased to announce the release of training materials for REDD+ monitoring and reporting developed in partnership with the World Bank Forest Carbon Partnership Facility (FCPF).

The training materials aim to respond to the need for technical assistance and guidance for countries to develop REDD+ MRV systems. The materials were developed based on existing good practice guidance on REDD+ related forest monitoring; in particular on methodological material provided in the GOF-C-GOLD Sourcebook.

The materials were developed by building upon the international GOF-C-GOLD expert network and have undergone an independent review process that resulted in a consolidated set of training materials that is ready for use.

### Intended use and audience

The training materials are intended for different actors involved in capacity development, such as international agencies, donors, country experts, consultants and researchers and can be used in combination and complementary to available guid-

ance documents (i.e. GOF-C-GOLD Sourcebook, GFOI MGD, FCMC MRV manual).

The materials are self-explanatory and can also be used by individuals who wish to learn more about a certain topic.

To make the materials useful for different levels of knowledge and capacity needs, each module includes a lecture, concrete country examples and short tutorials or exercises to respond to the broad scope of capacity needs ranging from basic knowledge on the theoretical underpinnings to sharing

practical experiences and understanding implications of monitoring choices and costs.

The materials are accessible now in English on the website of the [GOF-C-GOLD Land Cover Office](#). French and Spanish versions are expected to be released in June 2015. You can follow us on [Twitter](#) and [Facebook](#) to be informed on this upcoming release.

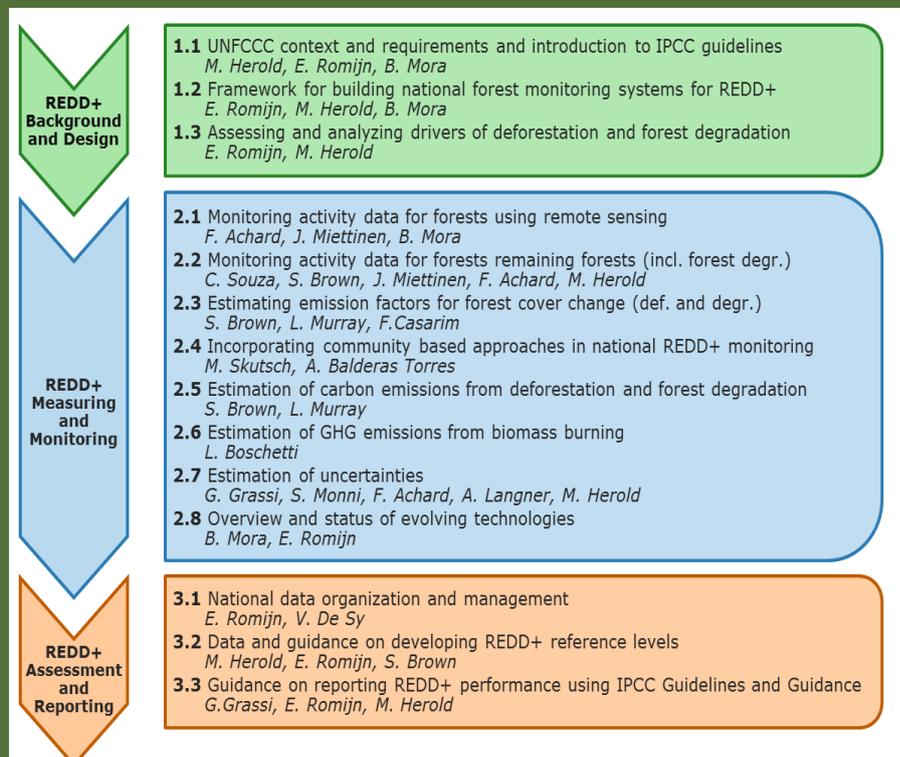


Figure 1: Set of training modules of the REDD+ curriculum

# Stakeholder survey on data needs for AFOLU GHG monitoring and reporting

This survey aims to comparatively analyze the ongoing initiatives of global monitoring systems on greenhouse gas (GHG) emissions and removals from the agriculture, forestry and other land use (AFOLU) sector. The focus of the survey is on user needs. The survey supports a study on the usefulness of various datasets and the importance and utility of diverse data characteristics for different types of stakeholder groups. This is part of the EU funded research project: “Strengthening Independent Monitoring of GHG Emissions from

Land Activities for Publishing, Comparing and Reconciling Estimates”, which is a collaboration of Oeko Institut, Wageningen University, IIASA and CIFOR, under project N° CLIMA.A.2/ETU/2014/0008.

Your input in this survey can help us define the different stakeholder views and needs. This will enable us to derive recommendations for more efficient and effective monitoring systems which often need to be tailored to multiple uses, stakeholders and users. We estimate that it will take you approximately 20 minutes to complete the survey.

The survey can be accessed via this link: [https://www.surveymonkey.com/s/independent\\_monitoring](https://www.surveymonkey.com/s/independent_monitoring)

Your participation in the survey is greatly appreciated and we are looking forward to your response, **by June 15 preferably**. Your responses will be kept strictly confidential and will only be used for the purpose of this research project.

If you have any questions or technical difficulties accessing or submitting the survey, please contact Erika Romijn from Wageningen University at: [erika.romijn@wur.nl](mailto:erika.romijn@wur.nl).

## Earth Observation Monitor: Interoperable time-series tools and web services for local land monitoring

Access to global Earth Observation time-series data is a complex task. Scientists and other users have to conduct a set of processing commands to get data for a specific study area. However, when data is available using programming languages, it is possible to automate time-series data access, analysis, and monitoring tasks. The Google Earth Engine (GEE) brings two necessary requirements together: 1) an archive of multi-source Earth Observation data (e.g., Landsat, MODIS), and 2) an application programming interface (API) not only for data access, but also for on-the-fly data processing and algorithm execution within the Google server infrastructure. The Earth Observation Monitor makes use of the GEE-API to provide global daily to bi-weekly data for vegetation time-series access, analysis, and monitoring. Until now GEE is being used to provide global data access availability to the MODIS vegetation product. Furthermore the integration of Landsat data is being evaluated at the moment. An open-source Python-package (pyEOM) is being developed to make

the automated time-series data access tools available for other users beyond the provided web services. This tool can be used with multiple data sources like NASA LPDAAC and NSIDC DAAC for MODIS data and Google Earth Engine for specific MODIS products and Landsat data. Global data access combined with time-series analysis tools can lead to a wide range of new applications, e.g., for land change monitoring, land disturbance classifications based on expert knowledge, that can be used

on a global coverage. As an example, the EOM web processing capabilities are being integrated in several African Earth observation initiatives, such as for analyzing deforestation history in tropical Afrotropical forests in Nigeria (Figure 1) within the Nigerian Montane Forest Project. Additionally, a fully-automated identification of selected change processes (logging, fire events, and storm damage) in Boreal forest ecosystems was implemented using a random forest machine learning based classification framework.

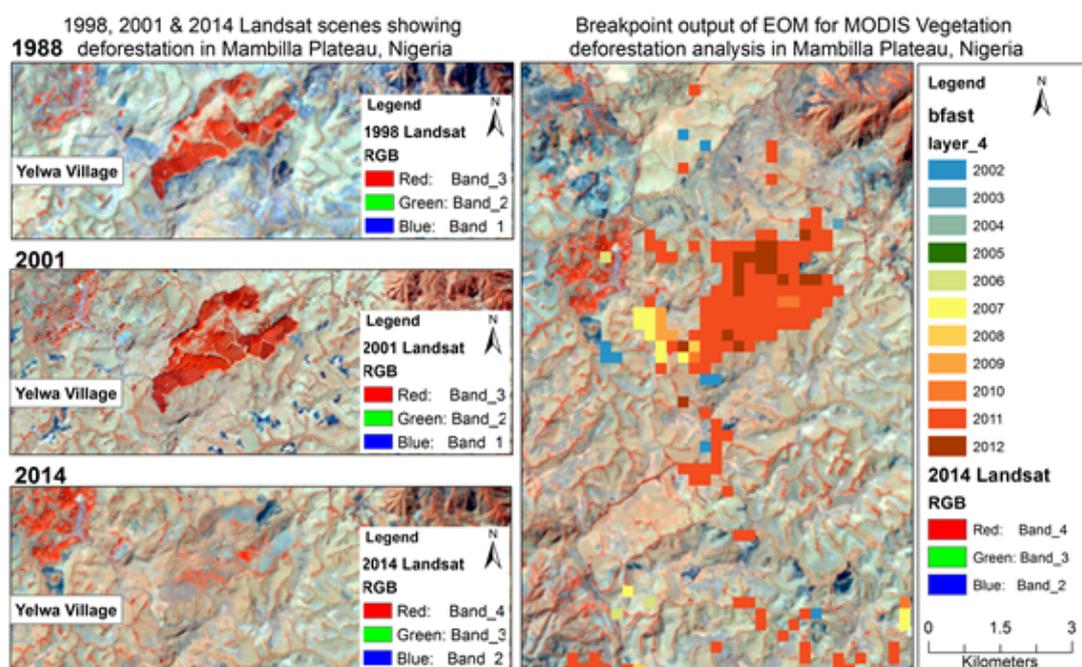


Figure 2: Backtracking of Afrotropical forest loss through population increase and land use pressure in the Mambilla plateau region in Nigeria using MODIS/Landsat data and EOM-implemented BFAST method for change event (breakpoint) detection.

# High-resolution satellite imagery improves forest monitoring in Ethiopia

*BlackBridge, GIZ, and RSS GmbH have come together to bring REDD+ MRV capabilities to Ethiopia.*

BlackBridge and Remote Sensing Solutions GmbH (RSS), both experts in satellite imagery and remote sensing, have been working with the Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) since 2013 on a project to support Ethiopia's expansion of technical capabilities for earth observation within its national institutions. The Federal Ministry for Economic Cooperation and Development (BMZ) has partly financed the project through the develoPPP.de Programme.

According to reports by The World Bank, forests make up roughly twelve percent of Ethiopia's landscape. This number is significantly smaller than in previous decades and is decreasing each year as urbanization and the demand for resources increase. To pre-

vent the remaining forests from diminishing further, the Ministries of Forest and Environment use satellite imagery to monitor and manage these resources. Until now, monitoring forests in Ethiopia, especially smaller wooded areas has proven difficult. Ministries have been using Landsat imagery, which cannot provide the level of detail needed to accurately depict forest change.

BlackBridge, together with GIZ and RSS have supplied Ethiopian forest specialists with 30,000 square kilometers of high-resolution RapidEye satellite imagery and a set of baseline forest maps. With this higher-resolution imagery, twelve land-cover classes are now identifiable, including forest, plantation, woodland, scrubland, crop, wetland, and urban areas.

To help integrate the new imagery into the workflows of Ethiopian foresters, Blackbridge, GIZ, and RSS have completed three workshops to date, with a

fourth scheduled for early autumn of 2015. Eighteen Ethiopian forest authorities and five forest authorities from Kenya, Uganda, Tanzania, Zambia, and Ghana attended the last workshop. Attendees have the opportunity to learn about the benefits of using high-resolution satellite data for measuring, reporting, and verifying forest cover in the context of the REDD+ MRV program.

This joint venture also provides the Ministries of Forestry and Environment with the processing chains and processing environment necessary for extracting information from the imagery.

At the conclusion of the final workshop, Ethiopia will have the trained specialists, technical infrastructure, and initial data needed to apply for funds under the REDD+ program.

## Release of REDD+ Measurement, Reporting and Verification (MRV) Manual, Version 2.0

The USAID-funded Forest Carbon, Markets and Communities (FCMC) program recently released version 2.0 of the FCMC REDD+ MRV Manual.

This Manual is intended for use by multiple audiences including those tasked with the overall development, including planning and design, of an MRV system, as well as managers, analysts, and technicians involved in developing a specific component of the system. The Manual, first released at COP19 in Warsaw, Poland, has been updated in version 2.0 to capture user feedback and key REDD+ decisions that have occurred post-release of version 1. Technical modifications have also been made throughout.

The Manual is divided into six main chapters that provide a discussion of the main elements of an MRV system including: national arrangements required by the UNFCCC (Chapter 2); estimating greenhouse gas emissions and removals (Chapter 3); Field-based inventories (Chapter 4); remote sensing of land cover change (Chapter 5);

and reporting and verification processes (Chapter 6). In addition, three thematic reviews are included to provide an overview of the history of REDD+ under the UNFCCC, as well as considerations for both community-based and near real-time monitoring activities.

The Manual complements other available resources focused on REDD+ MRV and readers are encouraged to utilize all available resources.

Version 2.0 of the Manual is accompanied by a Summary for Policymakers, which introduces key MRV concepts and focuses on essential and fundamental components of an MRV system. An Overview, designed to accompany the Manual, has also been developed. The Overview captures the main elements of developing an MRV system with less technical detail than is included in the full Manual chapters, but is more com-



prehensive than the Summary for Policymakers. The Overview also includes a proposed checklist for use by countries to facilitate tracking of progress toward such a system within a country.

Version 2.0 of the Manual will also be translated to both French and Spanish to

increase the accessibility of this resource. All elements are currently available from the FCMC program page, <http://www.fcmcglobal.org/mrvmanual.html>, Conservation International, [http://www.conservation.org/publications/Documents/CI\\_REDD-MRV-Manual.pdf](http://www.conservation.org/publications/Documents/CI_REDD-MRV-Manual.pdf), a partner on the FCMC program, and will shortly

be available from the following Natural Resources Management & Development Portal, <http://www.rmportal.net/projects/fcmc/task-orders/mrv>

## Calendar of Upcoming Events

Event	Date	Venue	Information
Sentinel-3 for Science Workshop	June 2-5 2015	Venice, Italy	<a href="http://seom.esa.int/S3forScience2015/">http://seom.esa.int/S3forScience2015/</a>
ISPRS/GEO/ICA Workshop on Trust in Spatial Data and Validation of Global Land Cover Products	June 5-7 2015	Shanghai, China	<a href="http://celiang.tongji.edu.cn/trust2015/Home.html">http://celiang.tongji.edu.cn/trust2015/Home.html</a>
GOFC-GOLD / ESA / World-bank side event at UNFCCC SBSTA: "REDD+ training materials and support for forest monitoring and MRV"	June 8 2015	Bonn, Germany	<a href="https://seors.unfccc.int/seors/reports/events_list.html?session_id=SB42">https://seors.unfccc.int/seors/reports/events_list.html?session_id=SB42</a>
International Workshop on Supporting Future Earth with Global Geo-information	June 9-10 2015	Beijing, China	<a href="http://ngcc.sbsm.gov.cn/article/en/GLC2015/">http://ngcc.sbsm.gov.cn/article/en/GLC2015/</a>
Our Common Future Under Climate Change Conference	July 7-10 2015	Paris, France	<a href="http://www.commonfuture-paris2015.org/">http://www.commonfuture-paris2015.org/</a>
SCERIN-3 Capacity Building Workshop	July 13-17 2015	Brasov, Romania	<a href="http://www.csebr.cz/scer-in2015/">http://www.csebr.cz/scer-in2015/</a>
IEEE IGARSS Conference	July 26-31 2015	Milano, Italy	<a href="http://www.igarss2015.org/">http://www.igarss2015.org/</a>
ESA Workshop on Mapping Urban Areas from Space	November 4-5 2015	Frascati, Italy	<a href="http://due.esrin.esa.int/muas2015/">http://due.esrin.esa.int/muas2015/</a>
UNFCCC COP 21	Nov. 30 - Dec. 11 2015	Paris, France	<a href="http://www.cop21paris.org/">http://www.cop21paris.org/</a>

Table 1: Upcoming events

## Acknowledgements

The GOFC-GOLD LC PO thanks Dr. Christian Hüttich (University Jena, Germany) for providing information on the Earth Observation Monitor initiative, and Jenny Hewson (Conservation International, USA) for providing information on the FCMC REDD+ MRV Manual.

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<http://www.gofcgold.wur.nl/sites/letter.php>

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*If you have any suggestions or recommendations for future contributions to this newsletter please feel free to contact us.*



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