

4th Expert workshop on
lessons learned from Accuracy Assessments
in the context of REDD+:
Uncertainties of biomass maps, emission factors and emissions

World Bank, Paris, France
Thursday 27- Friday 28 September 2018

Final workshop report

16-Oct-18

Organized by:

Forest Carbon Partnership Facility/World Bank
Global Forest Observations Initiative (GFOI)
Global Observations of Forest and Land Dynamics (GOFC-GOLD)

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Introductions and background

Several events have been held on this theme, which the R&D component has organized or participated in. More information can be found in the links:

- Expert meeting and technical workshop to discuss assessments for map accuracy purposes versus assessments for unbiased estimation of areas and how the two different objectives can be addressed in country monitoring, hosted by FAO, Rome, April 3-4 2017 (a summary of the workshop can be found in annex 1 of [this document](#))
- [2nd Expert workshop on lessons learned from Accuracy Assessments in the context of REDD+ which focussed on Activity Data \(AD\), in Oslo, Norway, 26-28 June, 2017](#)
- [3rd Expert workshop on lessons learned from Accuracy Assessments in the context of REDD+: Uncertainties of Emission Factors \(EF\) and biomass maps, in Bilbao, Spain, 12-14 February, 2018](#)

Since there is a need for further guidance on several topics, including to strengthen guidance on emission factor bias and uncertainty to a similar level to that provided for activity data, and also to address the challenge of integrating uncertainties from both activity data and emissions factors to produce estimates of overall uncertainty, a 4th workshop has been proposed.

Major outputs from previous workshops

FAQs developed by GFOI on experiences with and options for improving methods used to estimate activity data uncertainty. Led by Carly and available through the REDDcompass: <https://www.reddcompass.org/mgd-material> (see FAQ: Summary of Country experiences and critical issues related to estimation of activity data). This document was conceived at the 2nd workshop, and was finalized at the 3rd workshop.

Topic of “Reference data error”, or the effects of interpreter error on activity area estimates. Led by Ronald McRoberts, this was discussed during the 2nd workshop, and this information will be made available through a paper by McRoberts, Næsset, Sannier, and others on the effects of interpreter error which has been accepted for publication by a peer review journal. In addition, a paper on assessing uncertainties associated with a biomass map has been submitted to a peer review journal (McRoberts et al.).

The role and need of space- based forest biomass data in environmental management and policy. This has been developed as output of workshop 3 and a joint paper by biomass data producers and user paper is about to be submitted, and will be sent to a special issue of the journal Reviews of Geophysics before the deadline which is 15 June 2018. A second paper by McRoberts, Næsset, and others on guidelines for assessing the uncertainties associated with biomass maps will be submitted for the same special issue.

2019 IPCC refinement of IPCC GPG. The IPCC GPG will be updated in May 2019, and a number of the workshop participants are working with IPCC on this. Results from collaborative work and discussions on this topic have been taken up by the revision process with the second order draft being submitted in June 2018 for government review.

Objectives

The overall aim is to provide improved guidance on **accuracy assessments in the context of REDD+**. In particular, building on the discussions of the meeting in Bilbao, the workshop will provide guidance to practitioners to meet the IPCC good practice criteria related to **bias and uncertainty in estimates of emissions factors**.

We aim specifically aim to:

- Review and follow up on progress made at previous workshops (see the [minutes](#) of the 3rd Expert workshop for background):
 - **Case studies of countries who have developed EFs with uncertainties.** Led by Pontus,
 - **Guidance on the use of biomass maps in national assessments:** Led by Ron, Alessandro, Martin, Erik.
 - **Estimates of uncertainties of EF:** Key contributors to developing the idea were Andres, Grant, Luca, Craig, Jerome, Sarah. This would be a general document which addresses aspects of EFs, with a focus on uncertainties related to allometric equations.
- Develop synthesis towards providing more guidance (scientific papers, a MGD module or other form of guidance) on:
 - Approaches and experiences to estimate uncertainties of Emissions Factors (from components such as biomass sources, allometry, BCEF, root/shoot)
 - The integration of uncertainty from activity data and emissions factors (including Monte Carlo)
- If time permits, produce a plan to provide guidance on:
 - Generating uncertainty when using Tier 3 methods
 - Options for reducing uncertainty

Sponsors

Worldbank FCPF
Global Forest Observations Initiative (GFOI) R&D component
European Space Agency (ESA)
GOFC-GOLD Land Cover Office
US Silvacarbon Program
Center for International Forest Research (CIFOR)
Wageningen University

Organizing committee

Andres Espejo (World Bank / FCPF)
Martin Herold and Sarah Carter (GFOI, GOFC-GOLD)

Agenda and presentations

Thursday 27 September 2018		
09:00-09:30	<p>Welcome, coffee and introductions</p> <p>World Bank</p> <p>Summary of the MGD AG discussions</p> <p>Workshop overview and background</p>	<p>Andres Espejo</p> <p>Maria Sanz Sanchez</p> <p>Sarah Carter</p>
09:30-10:30	<p>Summary of working groups, and other discussion points from the previous meeting:</p> <p>Country examples: case studies of countries which have are good examples of how to develop EFs with uncertainties (summary of progress since Bilbao meeting)</p> <p>Country example: Forest carbon accounting work in Nepal – an update</p> <p>General guidance which addresses all aspects of EFs, with a focus on uncertainties related to allometric equations.</p>	<p>Pontus Olofsson</p> <p>Naikoa Aguilar-Amuchastegui</p> <p>Jerome Chave</p>
10:30-10:45	Coffee break	
10:45-11:45	<p>Summary of working groups, and other discussion points from the previous meeting:</p> <p>Updates on 2019 IPCC refinement and Biomass CCI user workshop</p> <p>IPCC-compliant, map-based biomass estimation</p>	<p>Martin Herold</p> <p>Ron McRoberts</p>
11:45-12:45	<p>New developments in biomass mapping from space (presentations 15 mins + 5 mins questions)</p> <p>Biomass related space missions</p> <p>The importance of in situ data for Biomass Model Fitting and Product Validation</p> <p>Advances in mapping forest biomass</p> <p>Assessing biomass maps in Europe with harmonized statistics and plots</p>	<p>Frank Martin Seifert</p> <p>Laura Duncanson</p> <p>Sassan Saatchi</p> <p>Valerio Avitabile</p>
12:35-13:45	Lunch	
13:30-14:50	Updates on biomass mapping from a country perspective (presentations 15 mins + 5 mins questions)	

	<p>What can we learn from the US inventory about biomass maps and international carbon monitoring</p> <p>REDD+ in Guyana: Uncertainties of Biomass maps and Emissions factors</p> <p>Good practice for transparent estimates from forest and land cover surveys</p> <p>Country experiences under FCPF and ISFL</p>	<p>Sean Healey</p> <p>Hansrajie Sukhdeo</p> <p>Luca Birigazzi</p> <p>Andres Espejo</p>
14:50-15:10	Coffee break	
15:10-16:10	<p>Integration of uncertainty from biomass and activity data (presentations 15 mins + 5 mins questions)</p> <p>Building a spatial integration framework for estimating global forest GHG fluxes</p> <p>Comparing the stock-change and the gain-loss approaches for estimating carbon emissions for the AGB pool</p> <p>Uncertainty assessments in UNFCCC national reporting: the present and the future</p>	<p>Mikaela Weisse (& Nancy Harris – remotely)</p> <p>Erik Naesset / Ronald McRoberts</p> <p>Dirk Nemitz</p>
16:10-17:30	<p>Working group discussions: Developing a plan of action, allocation of responsibilities, and preparing a timetable</p> <p>Summary of discussions, working groups, and topics for consideration</p> <p>A space-based biomass data framework: GFOI, CEOS, and space agencies</p>	<p>Martin Herold</p> <p>Slide from Osamu Ochai and others</p>
Friday 28 September 2018		
09:00-12:30 (coffee break mid-morning)	Working group discussions	
12:30-13:30	Lunch	
13:30-15:30 (coffee break mid-afternoon)	Continuation of working group discussions, and feedback to the group	
15:30-16:00	Wrapping up	

Minutes



The meeting started with presentations, which first summarized what was discussed at the last meeting, then presented some new research and developments in biomass monitoring, along with emerging requirements – such as from the IPCC.

A number of tools were presented, and these can potentially be put through the CALM tool to determine their operability:

- Biomass tool
- Quest (for Monte Carlo)

Additional references and materials

Guidelines for documenting and reporting tree allometric equations. Cifuentes Jara et al. Annals of Forest Science 2014 DOI 10.1007/s13595-014-0415-z

Overcoming obstacles to sharing data on tree allometric equations. Cifuentes Jara et al. Annals of Forest Science 2014 DOI 10.1007/s13595-015-0467-8

Recommendations for the use of tree models to estimate national forest biomass and assess their uncertainty. Henry et al. Annals of Forest Science 2015 DOI 10.1007/s13595-015-0465-x

Proposed outputs

Following discussions in the plenary session, it was decided to focus on two outputs, which would be closely linked and would reference each other:

“Estimates of uncertainties of emissions factors”

A guidance document “Estimates of uncertainties of emissions factors”, which would complement the FAQ document <https://www.reddcompass.org/mgd-material> (see FAQ: Summary of Country experiences and critical issues related to estimation of activity data) on AD uncertainty.

The aim is to have a workshop to finalize the guidelines, do invitees will be limited to active authors.

The document will be divided into two parts:

Part 1: an umbrella document that introduces both the FAQ on AD and the FAQ on EFs.

Uncertainty of GHG emissions and removals [Andres, Ron, Randy, Martin]

- How to conduct an uncertainty analysis: continuous improvement process
- How to address systematic and random errors
- What are the main sources of error to consider
- What to take into consideration when integrating activity data and emission/removal factors
- How to combine uncertainties of AD and EF

Part 2 A FAQ on EFs

Emission and Removal factors [Randy]

- What are the main sources of uncertainty of emission and removal factors [Andres, Ron]
- How to address measurement uncertainty [Oswaldo, Grant, Craig]
- How to address tree level prediction uncertainty [Craig, Jerome, Ron, Laura]
 - o What are the sources of error to consider
 - o The right allometric model – how to choose it
 - o How to estimate uncertainties of basic wood density
 - o What to do when the data is out of the range of validity of the allometric model
- How to address the uncertainty in estimation of carbon densities [Maria and Grant, contributors indicated below]
 - o What to do when by sampling design is non-probabilistic [Ron, Erik, Laura, Martin, Sean, Sassan, Alessandro]
 - o What to do when by sampling design is non-probabilistic [Ron, Erik, Laura, Martin, Sean, Sassan, Alessandro]
 - o How to use biomass maps and estimate its uncertainty [Ron, Erik, Laura, Martin, Sean, Sassan, Alessandro]
 - o How to deal with non-observations, e.g. plots fall on non-forest [Craig, Luca]
 - o What to do when I have a pre-stratification and then I want to post-stratify [Luca]
 - o What requirements are needed for plots to calibrate remote sensing products [Laura, Sassan, Sean, Andres]
- How to estimate Emission Factors [Andres, Maria]
- Combination of uncertainties [Ron, Craig, Sean, Andres, Oswaldo, Erik, Qi]
 - o What to do when by sampling design is non-probabilistic
 - o What to do when by sampling design is probabilistic
 - o Why transparency in reporting is important [Luca]

In addition to this, some changes / updates to the AD FAQ are required:

Activity Data [Erik, Ron]

- How to estimate the measurement uncertainty and address i

A 'trello' has been set up to aid collaborative editing. Carly Green can input into this task, and her input is being discussed. Randy will also take a leading role – exact roles are to be defined.

Timeline:

- Draft by **mid-December**
- Writing meeting (small group only those actively writing the document) **February 2019** – Sylvia offered to host in Reston
- Final document in **April 2019**

“Examples of estimation of emission factors in GFOI/SilvaCarbon partner countries”

This document aims to provide examples including data used, workflow, issues and how they were addressed, and also feedback and comments from GFOI which link to the guidance material. The aim is to demonstrate examples and success stories which can inform other countries who are experiencing similar situations. Countries which cover a range of approaches (rather than focussing on geographical variation) were selected. These are Mexico, Indonesia, Colombia, Peru, Nepal, Nicaragua, Paraguay, Guyana, Democratic Republic of the Congo, and Chile.

This document is in progress, and will be drafted (Pontus Olofsson) as lead author. The countries which should be included in the document were discussed. Chile and DRC were added, and in the case of Chile this illustrates the use of biomass maps for degradation emissions factors. The potential to include Costa Rica was discussed, but they use a similar method to Nicaragua (and Honduras), they might not be included. The guidance document team might prepare an example using Costa Rica however. Other countries will be added where they illustrate a good example, and the information is available.

Each case study includes information on the country contact, and data sources, the workflow of how the data were collected, to the calculation of emissions, the issues that they encountered, and then comments from GFOI. Comments from GFOI should be useful to other countries that are experiencing the same scenario, and will provide links to the guidance document (the first output).

In order to ensure that country needs are reflected, and also to increase the likelihood for guidance to be taken up by countries, we will involve the countries in the writing process. All the country examples need to come from and be approved by countries anyway. This can be organized by Sylvia in one of the SilvaCarbon countries. The workshop will explore the case study, and this platform will be used to gather details such as challenges which cannot be found in the literature.

A google doc. has been set up for collaborative editing.

Timeline:

- Draft by **mid-December**
- Writing meeting (1-2 representatives per country) **Spring 2019** – can be organized in a SilvaCarbon country with their support.
- Final document in **April 2019**

Discussion on future workshops

Several issues emerged during discussions, and from the presentations which would warrant a workshop in the future. Concrete examples are listed:

- Moving away from the assumption that all carbon is lost following deforestation. This would require a driver analysis for remaining biomass assessments.
- Monitoring of ‘difficult’ forest biomes (dryland / mountainous)
- Integrated monitoring to capture multiple project impacts related to REDD+ mitigation actions

- Guidance on how tools and methods transition from pre-operational to operational and how this relates to MGD guidance
- Guidance on moving from land cover to land use
- Examples of reporting REDD+ activities consistently through time and their relationship to GHGI categories
- Additional guidance on how to incorporate all carbon pools and other non-CO₂ gases

Participants

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Logistics and venue

The meeting will be held at the Paris Conference Center:
World Bank Group Paris Office
66, avenue d'Iéna,
75116 Paris,
France.

Please bring your photo ID, and register at the reception, where they will direct you to the meeting room.

Travel support

We expect most attendees to support their own travel. We have very limited funding for this, and priority will be given to those from developing countries. Please get in touch with sarah.carter@wur.nl for information.

If you need an invitation letter, please also email: sarah.carter@wur.nl.

Arriving in Paris

Information on getting to the office can be found here:
<http://siteresources.worldbank.org/INTCFPDONFOR/4752132-1205186614710/21761552/Directions.pdf>

The map in the next section shows how to get from the recommended hotel to the meeting venue. From the hotel, walk approximately 160m to the Cambronne metro station. Take line 6 to Kléber station (7 stops, approx. 7 minutes), then walk approx. 450m to the World Bank offices.

Accommodation

We recommend the Ibis hotel, which is around half way between the venue for this meeting, and the venue for the CCI Biomass meeting (for those who are attending both) – see map on next page:

Ibis Paris Tour Eiffel Cambronne 15ème
2 Rue Cambronne, 15e Arrondissement, 75015

Otherwise, this hotel is close to the meeting venue:

Hôtel Palais De Chaillot
35 Avenue Raymond Poincaré, 16e Arrondissement, 75016

