Comparison of Methods for the Measurement and Assessment of Carbon Stocks and Carbon Stock Changes in Terrestrial Carbon Pools: a Systematic Review

The topic of the systematic review is:

How do current methodologies compare in their ability to measure and assess terrestrial carbon stocks and changes in carbon stocks with accuracy, precision and repeatability?

Within the UN-REDD Programme, FAO is facilitating the development of a systematic review of the existing evidence on methods to measure and assess terrestrial carbon stocks and carbon stock changes.

The systematic review is a powerful analytical tool for the critical appraisal, summary and dissemination of results from a large volume of research and one which can support decision making by providing an objective, independent, and unbiased assessment of the best available evidence.

It is very widely used in medicine to inform policy decisions, but this is the first attempt to introduce this robust evidence-based process to a question of such high urgency for current global land management policy – measurement, reporting and verification of carbon in the terrestrial system.

The review will lend scientific credibility to the guidance given to countries who aspire to participate in future REDD and land management mechanisms, and will provide scientific underpinning of the many approaches to carbon measurement and assessment which exist.

An international team of review authors has been assembled with expertise in forest, cropland, soil and peatland, carbon stock estimations using both ground-based and remote sensing methodologies. They will be working closely with the Centre for Evidence-Based Conservation which has pioneered systematic reviewing in nature conservation management.

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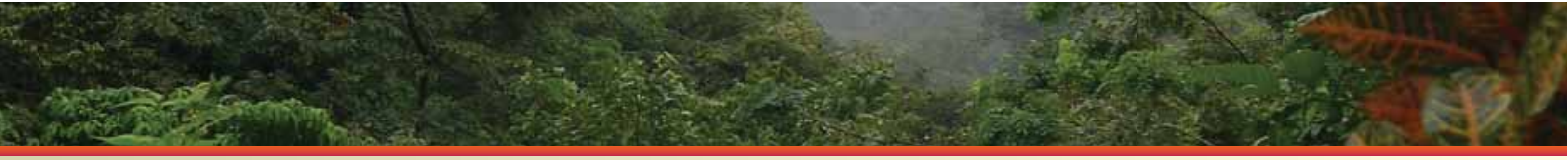

It is clearly a topic of huge importance but also of very broad scope. In order to bring focus and enable evaluation of the existing evidence in a comparative way, the review will address three linked questions.

1. How accurate, precise and repeatable are methodologies used for the conversion of in situ measurements into carbon stock estimates at the site level?

2. How accurate, precise and repeatable are methodologies for generating carbon stock estimates for larger geographical areas (landscape level) from site-level data?

3. How accurate, precise and repeatable are direct remote sensing methodologies for estimating carbon stocks?

The team is led by principal author **Scott Goetz**, who is Senior Scientist at the Woods Hole Research Center, with considerable research experience in the analysis of environmental change, including monitoring and modelling the links between land use change of various types, forest productivity, biological diversity, water quality, and epidemiology.

Other review authors are:

- **Frédéric Achard**
  Joint Research Centre of the European Commission
  Tropical and boreal forest cover monitoring and implications on the global carbon budget

- **Hans Joosten**
  Greifswald University, Germany
  Peatlands

- **Hideki Kanamaru**
  Natural Resources Management and Environment Department, FAO
  Climate change, REDD and carbon in the terrestrial system

- **Aleksi Lehtonen**
  Finnish Forest Research Institute
  GHG inventories of LULUCF sector and modelling of biomass, litter and soil

- **Mary Menton**
  University of Oxford, UK
  Effects of degradation (fire, logging) on carbon budgets in tropical forests

- **Gillian Petrokofsky**
  University of Oxford, UK
  Global forestry information and evidence-based frameworks for forestry

- **Andrew Pullin**
  Centre for Evidence-Based Conservation, Bangor University, UK
  Systematic review for conservation and environmental management

- **Martin Wattenbach**
  University of Aberdeen, UK
  Global change impacts on agricultural systems with a focus on process modeling of green house gas emissions

A draft Protocol has been available for consultation and peer-review for three months on the website of the Collaboration for Environmental Evidence (http://www.environmentalevidence.org/SR77.html).

The Protocol will be updated to take account of feedback and review comments and the review work will start in earnest in January, 2010. At all stages of the work, feedback and comment will be actively encouraged from stakeholders in the forestry, agriculture and land management communities. The review will be completed by late summer, 2010. The output from this important and timely work will be a thorough and robust analysis of the current state of knowledge on carbon stock measurement and assessment methodologies. The key findings of the work will be made available not only in peer-reviewed research journal(s), but, importantly, in a variety of appropriate formats and media targeted at different end users of the information, which will be disseminated widely.

Further information is available from:
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In addition to the systematic review website, more information and resources are available on the project web site:
www.fao.org/climatechange/58448