



vTI
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Satellite data and monitoring systems for REDD+ Working Group III: Satellite data for IPCC reporting

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Institute for World Forestry
October 2012




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Setting the scene


It's only now that we've chopped down
all the trees that we can measure all
the above ground biomass they HAD!



CHRIS MADDEN



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United Nations Framework Convention on Climate Change

IPCC Guidance

The Intergovernmental Panel on Climate Change (IPCC) guidelines and good practice guidance provide methodologies that can form the basis for how developing countries estimate and monitor emission reductions from deforestation and forest degradation and changes in forest carbon stocks.

Web link	
IPCC-NGGIP	IPCC-National Greenhouse Gas Inventories Programme
2006 IPCC Guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories (5 Volumes)
GPG-LULUCF	Good Practice Guidance for Land Use, Land-Use Change and Forestry
Degradation of Forest	Definitions and Methodological Options to Inventory Emissions from Direct Human-induced Degradation of Forests and Devegetation of Other Vegetation Types
GPG2000	Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (accepted and published 2000)
Revised 1996 IPCC Guidelines	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (3 Volumes)(approved in 1996 and published in 1997)
Revised 1996 IPCC Guidelines Software	IPCC Greenhouse Gas Inventory Software for the Workbook (published in 1997; Microsoft Excel 5.0c or later version is necessary)
-	IPCC Guidelines for National Greenhouse Gas Inventories (3 Volumes) (approved in 1994 and published in 1995, out of print, replaced by 1996 Revised Guidelines)

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Components of REDD+

CP3: Baseline / Reference (Emission) Level

CP1: MRV- & NFM-System

Human on (D)


FCCC/CP/2011/9/Add.2; 12/CP.17

“Each developing country Party aiming to undertake the actions listed in decision 1/CP.16, paragraph 70, The information provided should be guided by the most recent **Intergovernmental Panel on Climate Change guidance and guidelines**.”

FCCC/SBSTA/2011/L.25 ; Annex I


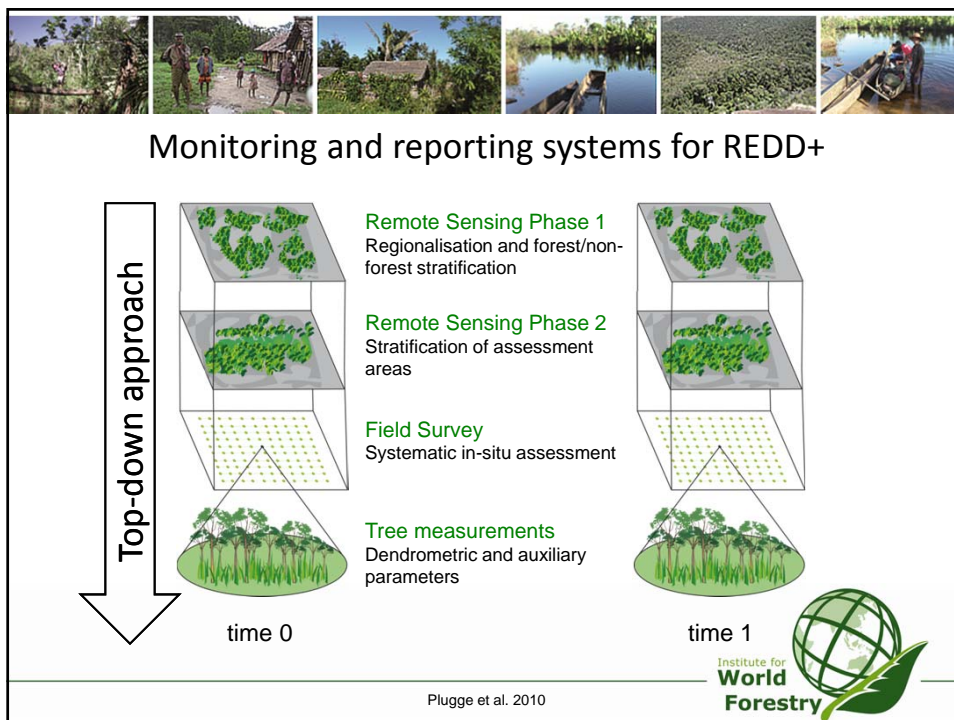
[Modalities for measuring, reporting and verifying “xxx. Invites the **Intergovernmental Panel on Climate Change** to elaborate methods and provide good practice guidance on measuring, reporting and verifying anthropogenic forest-related emissions...”]

Modalities for national forest monitoring systems “ xxx Decides that the development of national forest monitoring systems ... shall take into account the guidance provided in decision 4/CP.15 and be guided by the most recent **Intergovernmental Panel on Climate Change guidance and guidelines**, ...”]



The IPCC guidelines

- Based on five **principles**
- Define the target variables **Activity Data (AD)** and **Emissions Factors (EF)**
- Define the five **forest carbon pools**
- Provide **three tiers** of detail for reporting
- Address how to report on **uncertainties**
- Provide **equations** and **default values**








?? Capabilities of Remote Sensing ??




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Capabilities of Remote Sensing




Activity Data:
Areas of
Deforestation
in Amazonia
2000-2010




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Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's
Terra satellite




Capabilities of Remote Sensing




REDD+ Safeguards:
Differentiate between Natural Forests and Plantations




Capabilities of Remote Sensing




Activity Data:
Areas of Deforestation in Rodonia







Capabilities of Remote Sensing



Biomass Stock time 1




Biomass Stock time 2
Not detectable by passive remote sensing




Biomass Stock time 3
Detectable by passive remote sensing

=> Suitability of sensors

Plugge et al. 2010






Capabilities of Remote Sensing

Tropical Forests						
	Wet P > 2000	Moist with Short Dry Season 2000 > P > 1000	Moist with Long Dry Season P < 1000	Dry P > 1000	Montane Moist P < 1000	Montane Dry P < 1000
Africa	310 (131-513)	260 (159-433)	123 (120-130)	72 (16-195)	191	40
Asia & Oceania:						
Continental	275 (123-683)	182 (10-562)	127 (100-155)	60	222 (81-310)	50
Insular	348 (280-520)	290	160	70	362 (330-505)	50
America	347 (118-860)	217 (212-278)	212 (202-406)	78 (45-90)	234 (48-348)	60


Note: Data are given in mean value and as range of possible values (in parentheses)
P: Annual Precipitation

IPCC 2003

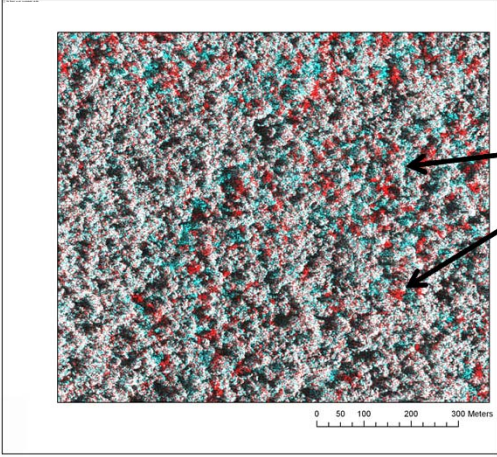


Synthetic Aperture RADAR

L-Band saturation level 60–100 t/ha




Capabilities of Remote Sensing



Activity Data:


- Forest degradation
- Selective Logging

TerraSAR-X
SpotLight Mode

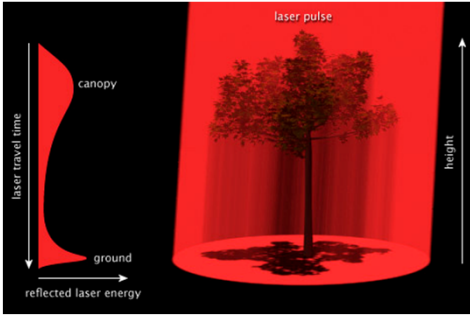


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Baldauf & Kuhl 2009




Capabilities of Remote Sensing



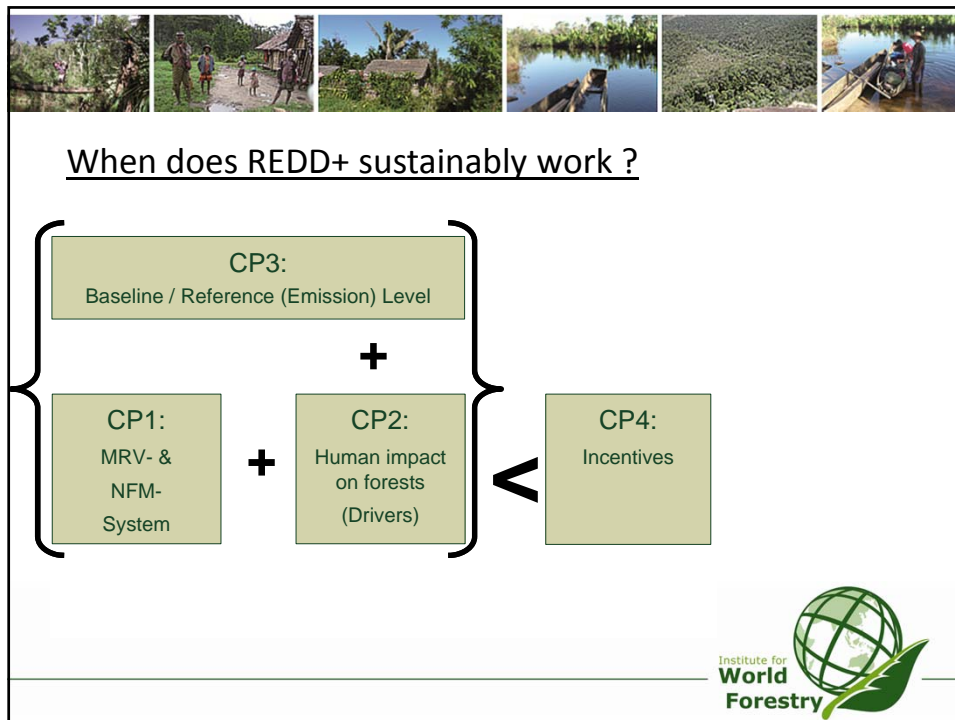
Emission factors:

Eco-3D mission: "giving a sense of the biomass density"



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NASA 2012; image by Robert Simmon




THANK YOU

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Key questions for the discussion

- Which remote sensing data are available and which monitoring platforms exist for REDD+?
- How can they be used for IPCC reporting?
 - Activity data & Emission factors
 - Approaches 1 / 2 / 3 & Tiers 1 / 2 / 3

- Experiences
- Challenges

