2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands

Chapter 4 Coastal Wetlands!

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Scope

- The overall aim of this work is:

  To develop additional national-level inventory methodological guidance, including default emission factor values, on wetlands to address the gaps identified in the 2006 IPCC Guidelines.

Chapters

OVERVIEW

1 -INTRODUCTION

2– CROSS-CUTTING GUIDANCE ON ORGANIC SOILS

3 – REWETTING AND RESTORATION OF PEATLANDS

4 – COASTAL WETLANDS (organic + mineral)

5 - OTHER FRESHWATER WETLANDS (mineral)

6 - CONSTRUCTED WETLANDS – Wastewater Treatment

7 – GOOD PRACTICE AND IMPLICATIONS FOR REPORTING

Annexes

Appendixes

Guidance

Guidelines should be understandable and easy to implement. Balance the comprehensive self-contained report with reasonable limits to the length and detail of the guidance. In particular:

- **Should follow a "cookbook" approach by providing clear step by step instructions.**
- It should not try to be a textbook.
- Detailed background information is generally referenced rather than included.
- Consider all recent scientific developments and national methods
- Substantial changes should only be introduced if they can be justified on sound scientific and technical grounds.
- The target audience is a diverse group of readers who are primarily concerned with the elaboration of national inventories.

Guidance Structure

- Methodological Issues
  - Choice of Method, including decision trees and definition of tiers.
  - **Choice of Emission Factor**
  - **Choice of Activity Data**
  - Completeness
  - Developing a Consistent Time Series
- Uncertainty Assessment
  - Emission Factor Uncertainties
  - Activity Data Uncertainties
- Quality Assurance/Quality Control, Completeness, Reporting and Documentation

TABLE 4.2
Classification of Known Human Impacts on Coastal Wetlands, Their Land-Use Change, and The Corresponding Section in This Chapter for Guidance

Activity	*Sub-category*	*Land-Use Change*	*Chapter Section*
Aquaculture	Fish or Shrimp Ponds; Fish Cages	Coastal Wetland remaining coastal wetland	4.2
	Rice Cultivation	W → W	See Chapter ?????
Agriculture	Arable Grass; Pasture	*Drainage of coastal Wetlands*	4.4
Salt Production		W → W	4.2
		*Drainage of coastal wetlands*W → D	4.4
Draining and Filling	Settlement; Urbanization	W → D	4.4
Extraction	Dredging, Ports, Harbors; Beach Nourishment;	W → W	4.2
		W → D	4.4
Ditching	Vector Control; Access Regulation	W → D	4.4
Nutrient Enrichment		W → W	4.2
Hydrological/Sediment Diversion	Impoundments; Barriers	W → W	4.2
		W → D	4.4
		Re-wetting of coastal wetlandsD → W	4.3
Revegetation	Afforestation/Reforestation; Reseeding; Alteration of Vegetation	W → W	4.2
		W → D	4.4
		D → W	4.3
Restored Hydrology	Tidal (frequency), Connectivity; Sediment Removal; Ditch Filling	W → W	4.2
		W → D	4.4
Sediment Resupply		W → W	4.2
Nutrient Management	Addition; Removal	W → W	4.2
Fire Management		W → W	4.2
Harvesting	Fish, Shellfish; Wood and Non-Wood Products; Grass/Forbs	W → W	4.2
Recreation	Boast Anchoring, Mooring; Boating; Hunting	W → W	4.2

Ch4 Coastal Wetland Sections

- Management changes in coastal wetlands
  - Aquaculture, impoundments, sediment diversion, nutrient enrichment
- Drainage of Coastal Wetlands
  - Arable, agriculture, settlement, hydrological barriers.
- Rewetting of Coastal wetlands
  - Restoration , management creation activities

(all activity based)

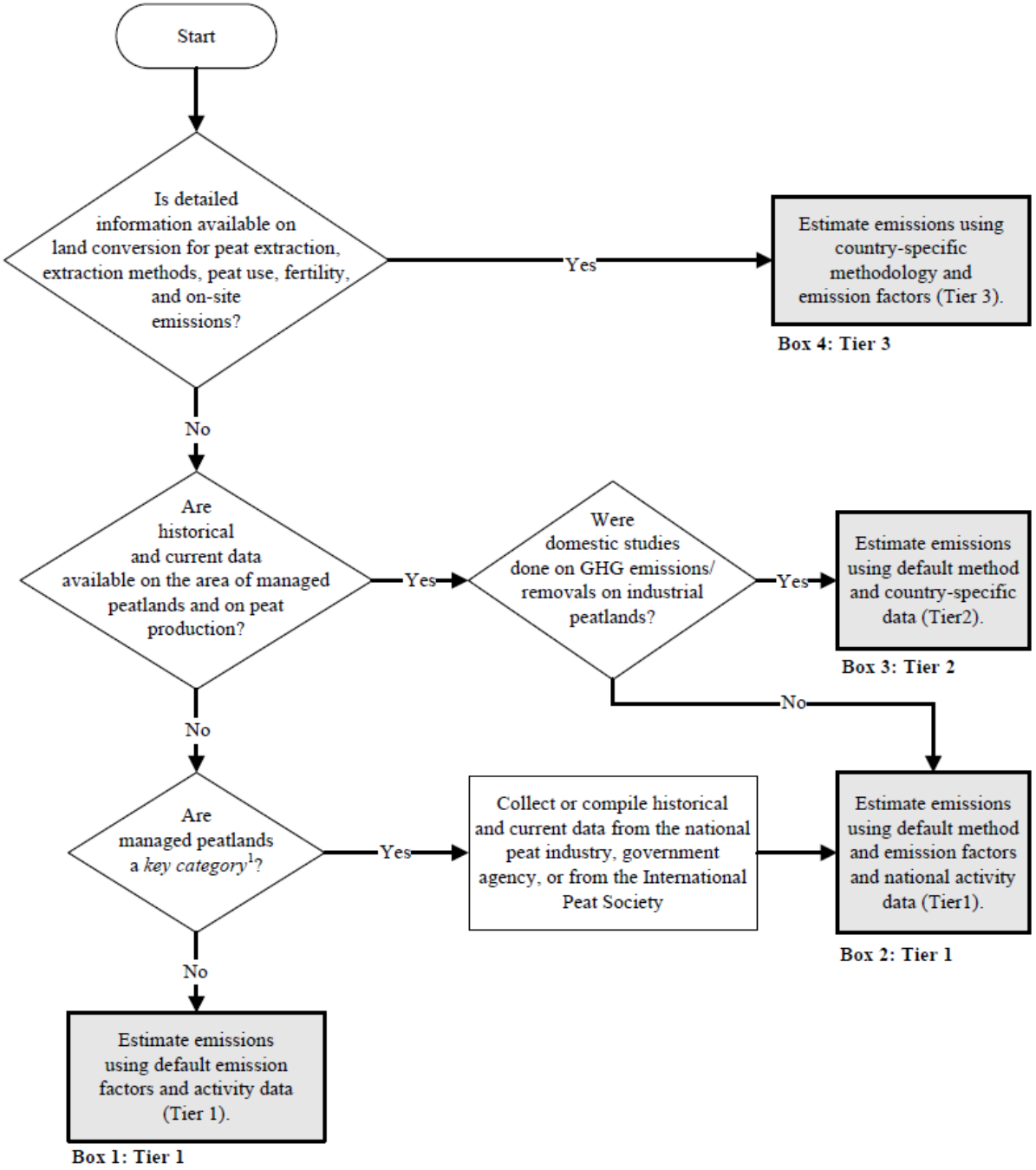
Main Challenges

- Limited data on emissions from converted wetlands.
- EF for $C0_2$ based upon change in storage not direct flux
- Understanding role of salinity in CH_4 emissions
- Unknown fate of carbon eroded from wetlands
- Magnitude and fate of DIC, DOC from drained soils is poorly constrained
- (Mapping of land use change and soil types – organic, mineral)

Emission factors and methods (1)

- Authors should provide default values of emission factors and other parameters where possible.
  - Each default value should be accompanied by its default uncertainty range expressed as 95% confidence interval.
  - All new default data should be evaluated for scientific and technical appropriateness, and should be clearly referenced.

Decision Tree



Appendix 2. 2006 Data Documentation

This form should be used to document all data used in the 2006 Guidelines. This gives the minimum information that should be considered by the authors.

Author[1]					
IPCC Source/Sink Category					
Fuel[2] (applicable only in the Energy Sector):					
Gas[3]:	CO_2	CH_4	N_2O		
Value:					
Unit:					
Uncertainty (as +/% or 2.5 and 97.5 percentiles)[4]					
Applicability[5] – fill in as necessary if data not generally applicable. Describe appropriate Technologies, Practices, Abatement Technologies, Region, and/or Regional Conditions					
Source of data (chose one)	Measurement - Scientific Literature Other Measurement National Inventory Report Calculated Based on fuel quality Expert Judgement				
Reference[6]					

Note:

Tier 1: Simplifying assumptions

type	salinity	Soil stock (proportion of land area)	AG biomass stock (incl props)-	BG biomass stock-
Deltaic (CH4)	salinity gradient	50% organic-50%mineral		
Oceanic (no Ch4)	Open coastal, no FW	50% organic-50%mineral		

Tier 2: Questions

- Can we establish a typology for wetlands that can be mapped as a land-cover class to inform estimates of GHG emissions and removals?

Schedule

Proposed Date	Meeting	Comment
31 Oct – 3 Nov 2011	1st Author Meeting Japan	To develop zero order draft CLAs meet for 1 days 31 Oct CLAs and LAs meet for 3 days 1 Nov - 3 Nov
24 – 26 Jan 2012	1st Science Meeting Scotland, UK	To consider state of science Participation is Steering Committee and all CLAs.
14 – 16 Feb 2012	2nd Author Meeting Zimbabwe	To finalise first order draft for review
July 2012	3rd Author Meeting Ireland	To consider comments and produce second order draft for review
Jan 2013???	2nd Science Meeting	To consider state of science Participation is Steering Committee and all CLAs.
Feb 2013	4th Author Meeting Brazil	To consider comments and produce final draft
2013 (tbc)	IPCC 36	Final draft submitted to IPCC Panel for adoption/acceptance

Methods of Analysis

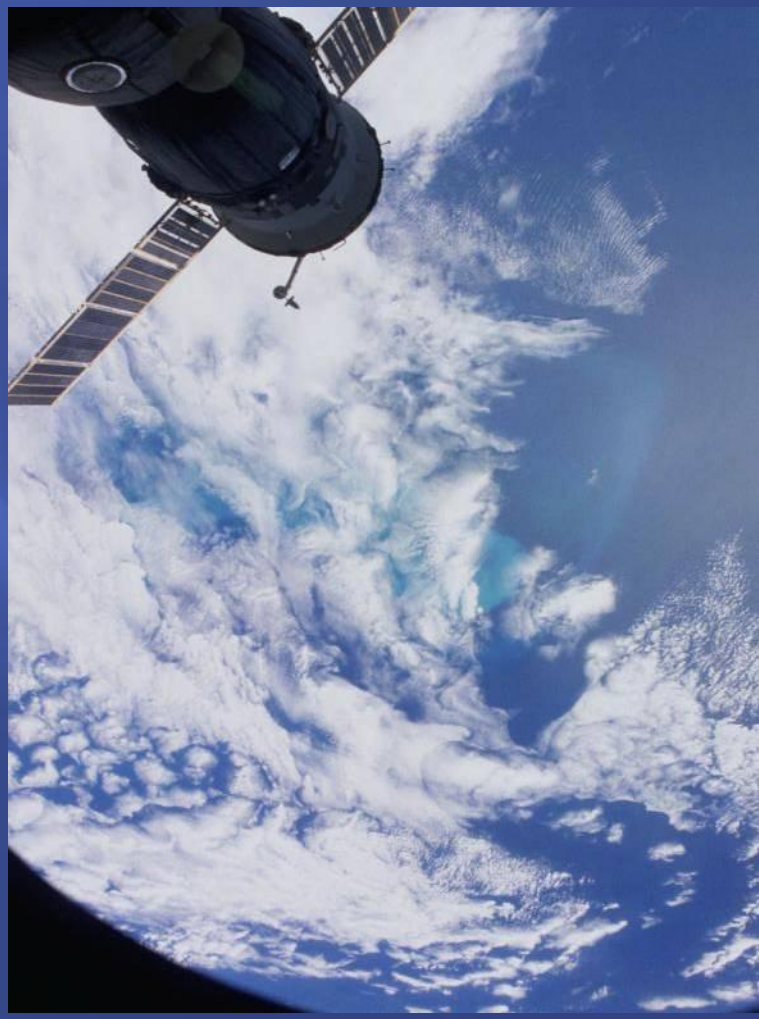
- ***Gain-Loss Method:*** This method involves estimating the area of each type of land conversion and the average annual transfer into and out of biomass stocks. This requires: (i) an estimate of the area converted *Land* in difference climate regimes, disturbance regime, management regime, or other factors significantly affecting biomass carbon pools and GHG emissions; (ii) the quantity of biomass accumulating in the biomass stocks; and (iii) the quantity of biomass lost from the biomass stocks on per hectare basis according to different wetland types.

- ***Stock-Difference Method:*** This method involves estimating the area of *Land Converted* and the biomass stocks at two periods of time, t1 and t2. The biomass stock changes for the inventory year are obtained by dividing the stock changes by the period (years) between two measurements.
- The Stock-Difference Method is feasible for countries that have periodic inventories, and is more suitable for countries adopting Tier 3 methods. This method may not be well suited to regions with very variable climates

Estimating Areas

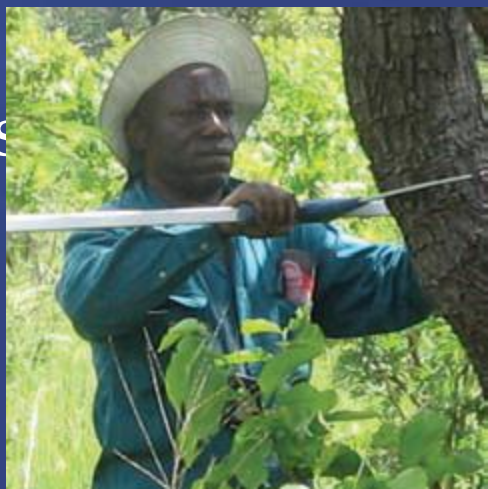
Remote Sensing

- Covers large areas
- Uncertainties due to resolution and image processing
- Measures areas well
- Limited capability for biomass and carbon stocks
  - Radar systems may improve this in future
- Cannot cover all pools



Ground Based

- Accurate
- Small Areas
- Can check Remote Sensing
- Can measure
  - Biomass (and Carbon stock)
  - All Pools (maybe!), Living Biomass, Dead Wood and Soil Carbon
- Identify local activities and processes



Representing Land Areas (LULUCF & AFOLU)

- Approach 1 identifies the total area for each individual land-use category,
  - but does not provide detailed information on changes of area between categories
  - and is not spatially explicit other than at the national or regional level.
- Approach 2 introduces tracking of land-use changes between categories.
  - National land use change matrix
- Approach 3 extends Approach 2 by allowing land-use changes to be tracked on a spatial basis.

Approach 1

	Initial area	Final Area
Forest Land (unmanaged)	12	12
Forest Land (managed, rain forest)	55	43
Forest Land (managed, peat bog)	8	6
Forest land (Mangrove)	61	61
Forest Land (managed, plantation)	18	29
Grassland	29	29
Cropland	2	3
Wetlands	5	5
Settlements	2	4
Other Land	2	2

Approach 2

Final Land Areas	Initial Land Areas: Forest Land (unmanaged)	Forest Land (managed, rain forest)	Forest Land (managed, peat bog)	Forest land (Mangrove)	Forest Land (managed, plantation)	Grassland	Cropland	Wetlands	Settlements	Other Land	Final Area
Forest Land (unmanaged)	12										12
Forest Land (managed, rain forest)		43									43
Forest Land (managed, peat bog)			6								6
Forest land (Mangrove)				61							61
Forest Land (managed, plantation)		10	1		17		1				29
Grassland						29					29
Cropland		1	1				1				3
Wetlands								5			5
Settlements		1			1				2		4
Other Land										2	2
Initial area	12	55	8	61	18	29	2	5	2	2	
Net change	0	-12	-2	0	11	0	1	0	2	0	

Approach 3