

Overview of relevant methodologies in IPCC Guidelines and Good Practice Guidance



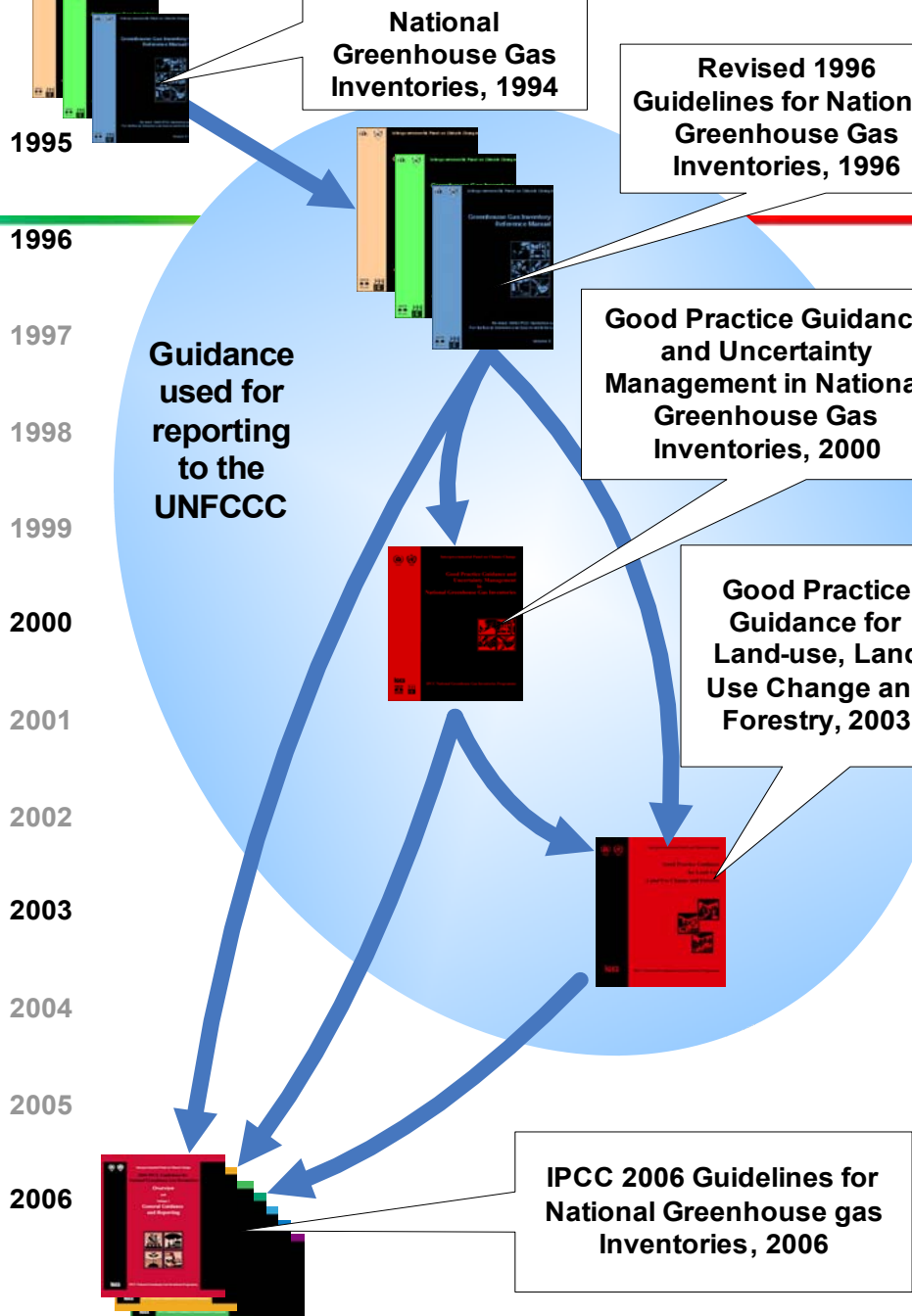
Simon Eggleston
IPCC

Outline of Presentation

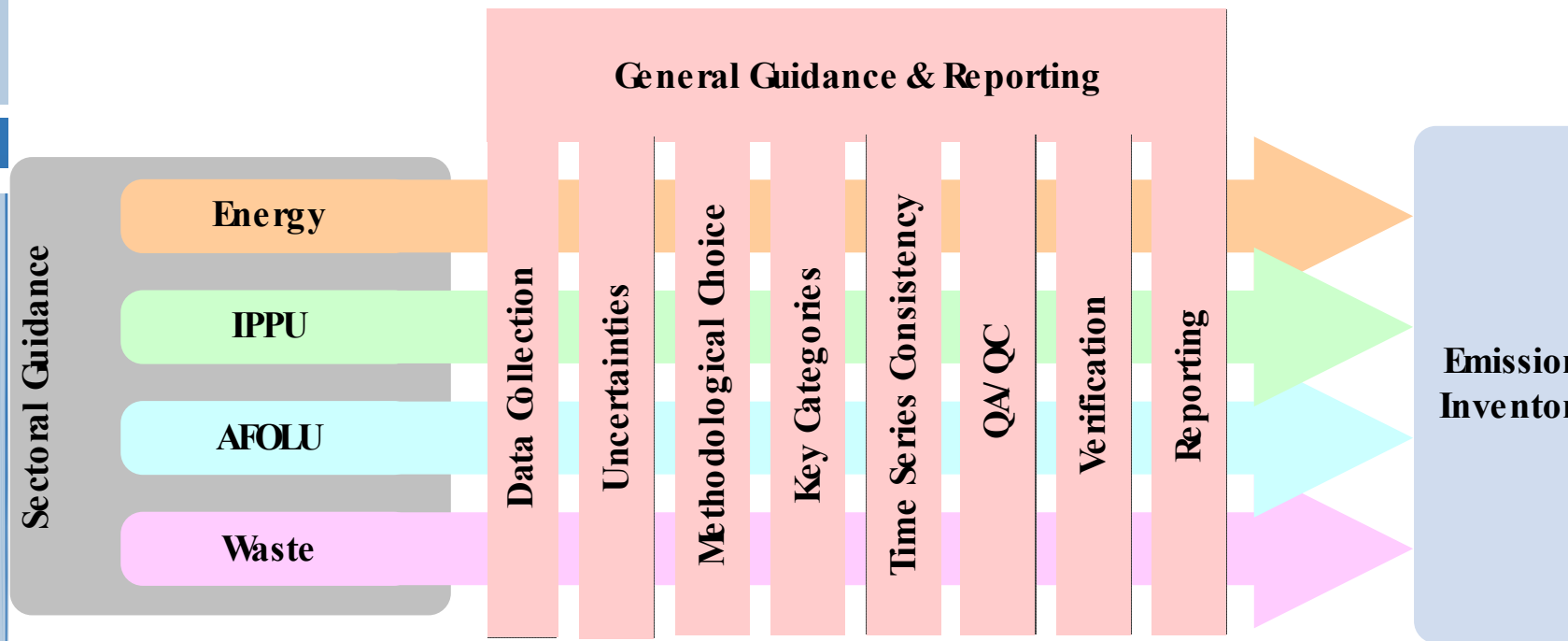
- Evolution of Guidelines from 1996 to 2006
 - Guidelines have developed and improved as knowledge and experience increases
- Some basics
 - Basic principles and ideas remain unchanged
 - Major change is from 1996 Guidelines LUCF to LULUCF
 - 1996 Guidelines focus on main processes, GPG-LULUCF focus on all land-use types.
 - Changes from GPG-LULUCF to 2006 Guidelines (AFOLU) are small
- Specific improvements between AFOLU (2006) and GPG LULUCF

History

- Revised 1996 Guidelines
 - Land-Use Change and Forestry (LUCF)
 - Identifies major likely land use sources
- 2000 GPG
 - Defines GPG and applies it to Agriculture
- GPG LULUCF
 - Expanded Guidance covering all land types and carbon pools
 - Area based NOT process based
 - Guidance on the representing Land Areas
- 2006 IPCC Guidelines
 - Now Agriculture, Forestry and Other Land Use (AFOLU)
 - Essentially the same as to GPG LULUCF but integrating Agriculture and LULUCF sectors
 - Extended default values & some improved methods



Relationship of GPG and Sectoral Guidance



- Good Practice inventories are defined as ***“those that contain neither over- nor under-estimates so far as can be judged, and in which uncertainties are reduced as far as is practical”***
- GPG retains consistency with Revised 1996 Guidelines
- GPG guidance updated and expanded in the 2006 Guidelines

LULUCF

Land Use Change and Forestry

1996 Revised IPCC Guidelines

Changes in woody biomass stocks

Forest & Grassland Conversion

Abandonment of managed lands

Changes in Soil Carbon

Harvested Wood Products

Agriculture

Land Use Change and Forestry

1996 Revised IPCC Guidelines

Agricultural Soils

Prescribed Burning of Savannas

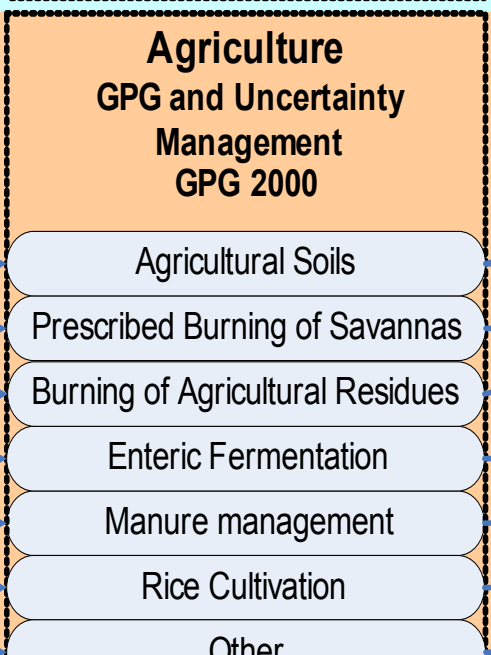
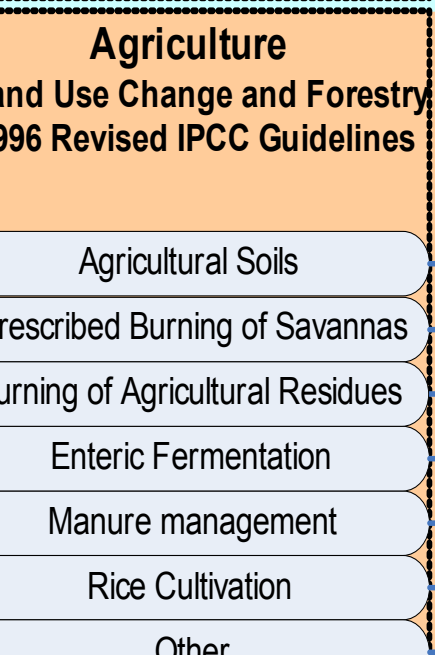
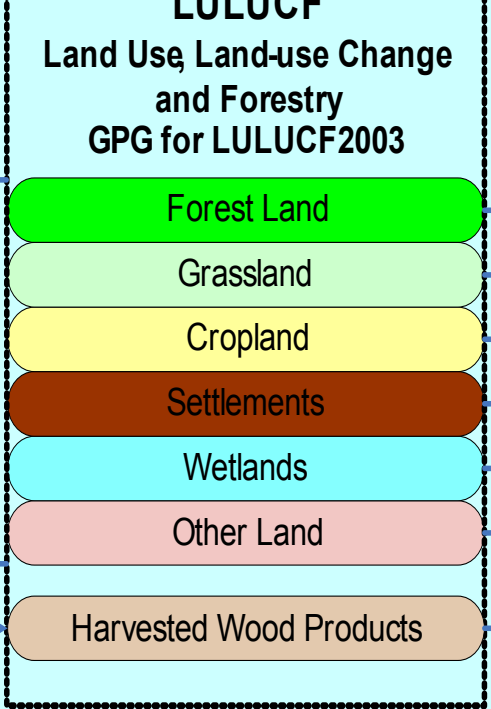
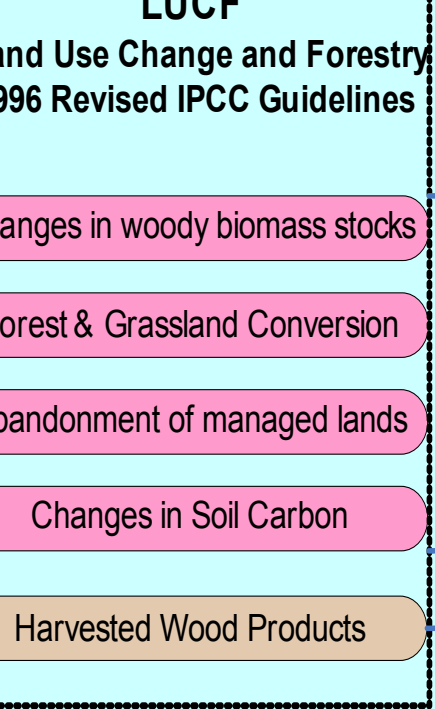
Burning of Agricultural Residues

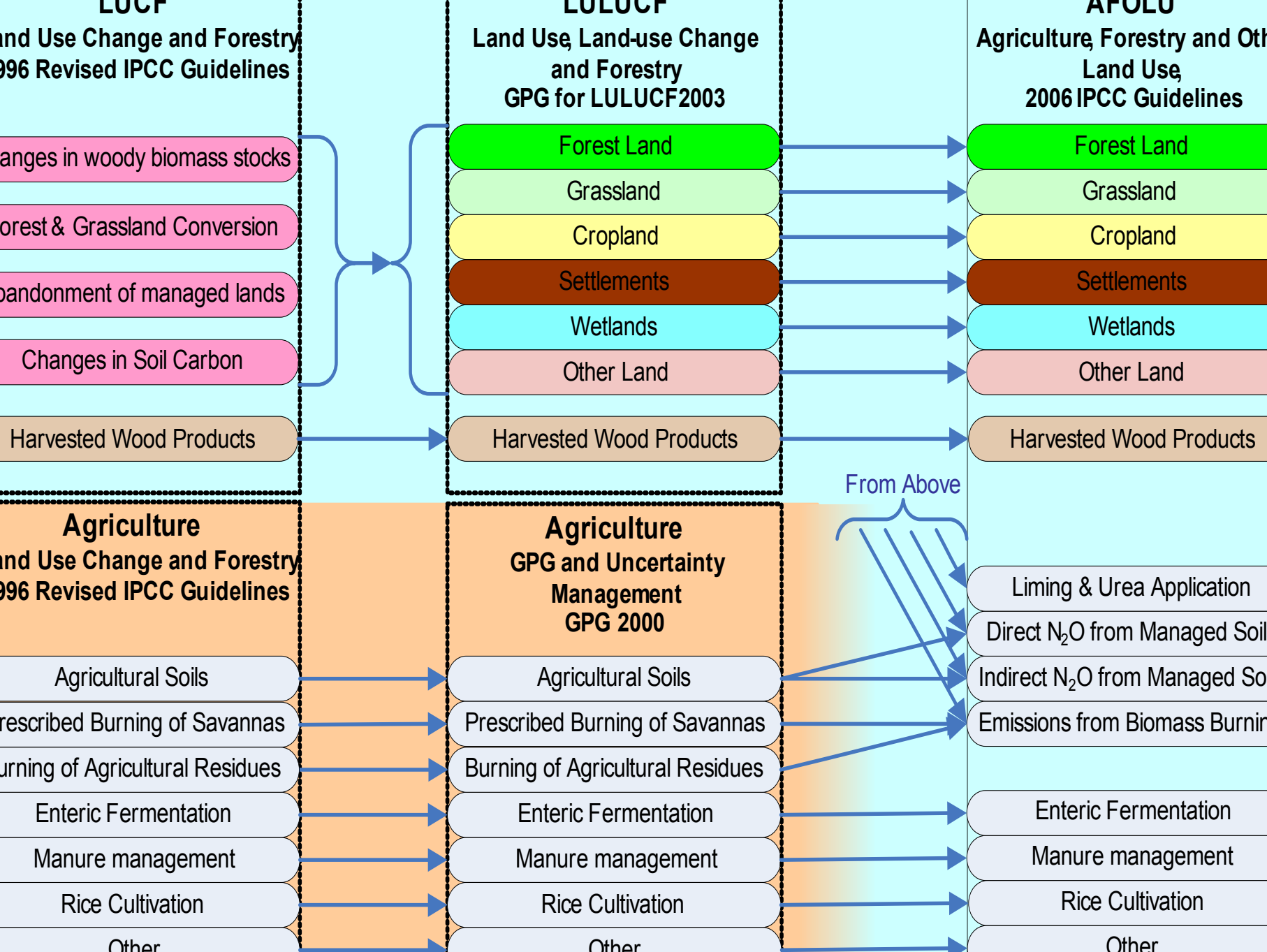
Enteric Fermentation

Manure management

Rice Cultivation

Other





Why integrate Agriculture & LULUCF?

- *The emissions from both sectors have been integrated into this new framework in order to resolve inconsistencies and avoid double counting:*
 - Removes the somewhat arbitrary distinction between these categories in the previous guidance, and promotes consistent use of data between them, especially for more detailed methods.
 - Makes consistent the treatment of gases in the Agriculture and LULUCF Sectors and so allows for more consistent treatment of land conversions;

Some Unchanging Basics

Underlying approach remains unchanged

General Method

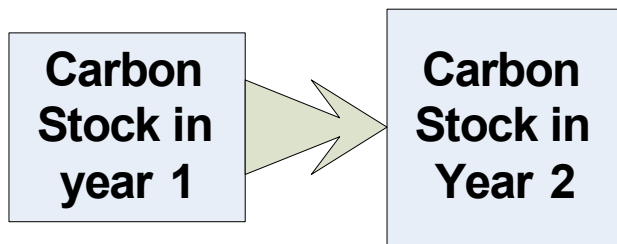
- There are large uncertainties in estimating fluxes of CO₂.
- Direct measurements are extremely difficult (small differences of large numbers) and inherent heterogeneity.
- A practical first order approach is to make assumptions about effects of land use change on carbon stocks and the subsequent biological response to a given land use.

Flux of C assumed = changes in carbon stocks in existing biomass and soils.

- Note: Carbon stocks in HWP, landfills etc. Some Carbon emitted as CH₄, CO etc.
- Remains general approach from 1996 Guidelines, through the GPG LULUCF to the 2006 Guidelines & AFOLU

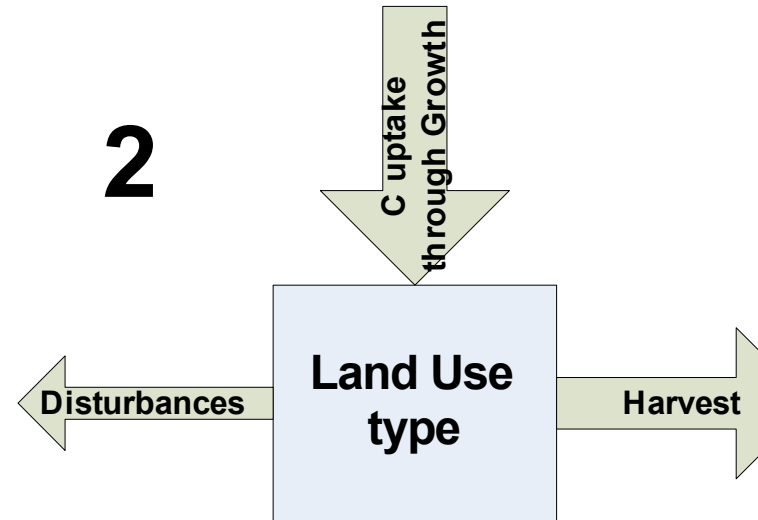
Estimating Carbon Stock Changes

1



Difference between carbon stocks gives emission/removal

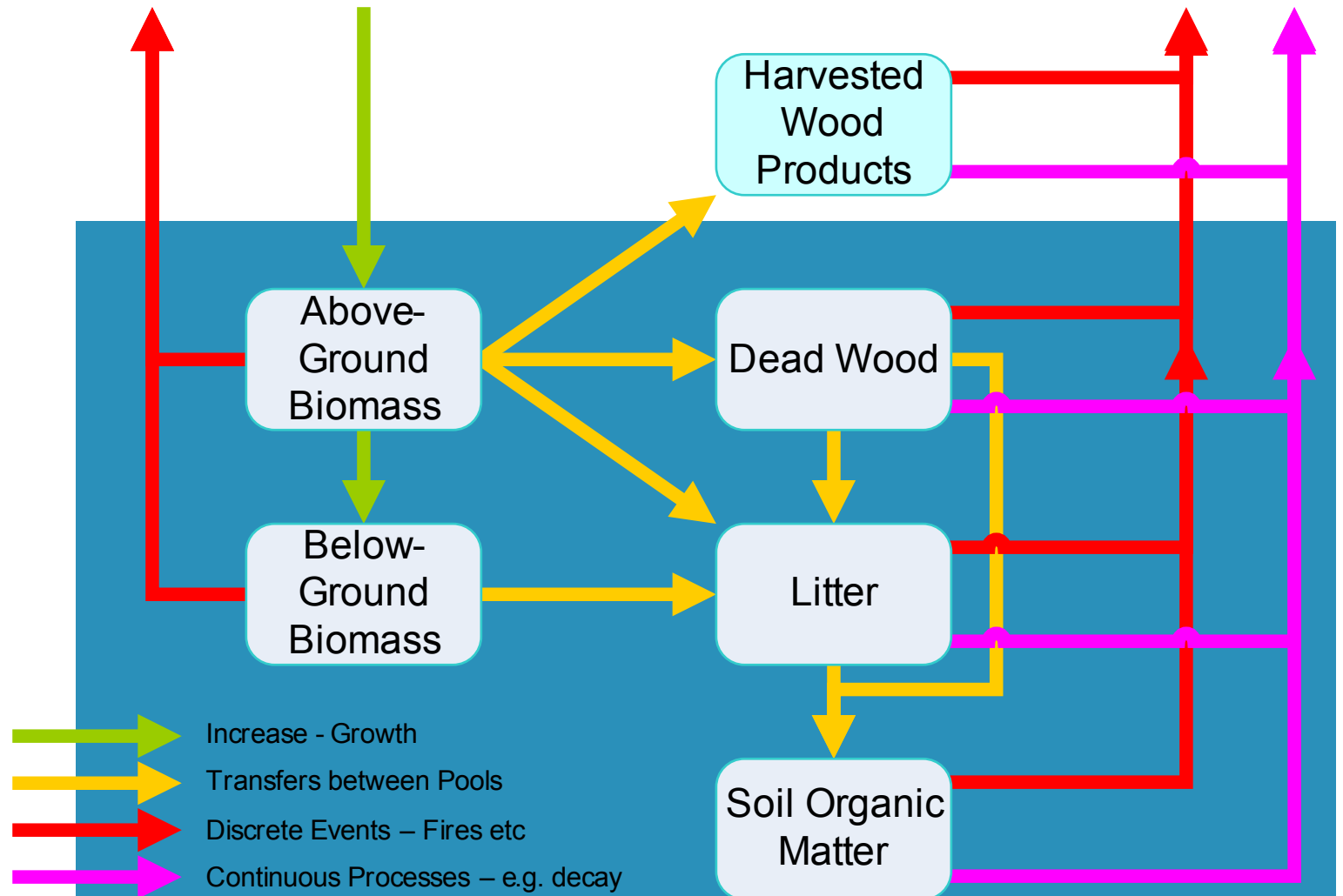
2



Emission/removal from sum losses and gains

1996 Guidelines, through the GPG LULUCF to the 2006 Guidelines & AFOLU

Carbon Pools and Flows (LULUCF & AFOLU)



Classifying Forests

- In 1996 Guidelines identified **three** significant forest types:
 - Natural, undisturbed forest - assumed to be in equilibrium
 - Forests re-growing on abandoned land.
 - All other forests.
- GPG LULUCF introduced “**managed land**” as a proxy for **anthropogenic emissions**.
 - Only emissions from managed land reported
 - “Managed land is land where human interventions and practices have been applied to perform production, ecological or social functions.”
 - definitions ... should be specified at the national level, described in a transparent manner, and be applied consistently over time.
 - Consistent with 1996 Guidelines

- Make estimates for both:

- *Forest Land Remaining Forest Land*
- *Forest Land Converted to other land uses*

e.g. Forest Degradation

e.g. Deforestation

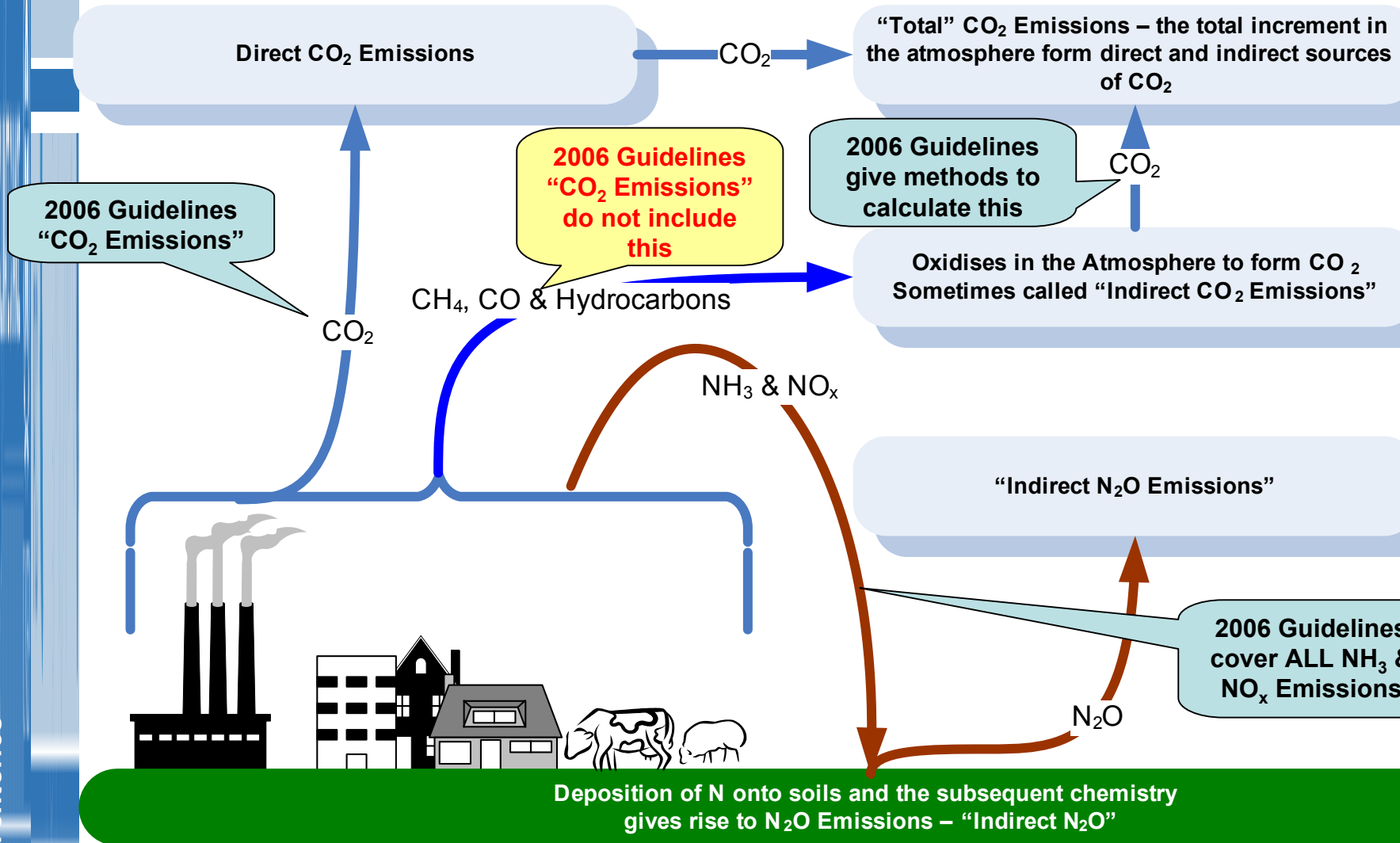
Why use Managed Land as a Proxy?

- The preponderance of anthropogenic effects occurs on managed lands and, from a practical standpoint, the information needed for inventory estimation is largely confined to managed lands.
- By definition, all direct human-induced effects on greenhouse gas emissions and removals occur on managed lands only.
- While local and short-term variability in emissions and removals due to natural causes can be substantial the natural ‘background’ of greenhouse gas emissions and removals by sinks tends to average out over time and space. This leaves the greenhouse gas emissions and removals from managed lands as the dominant result of human activity.

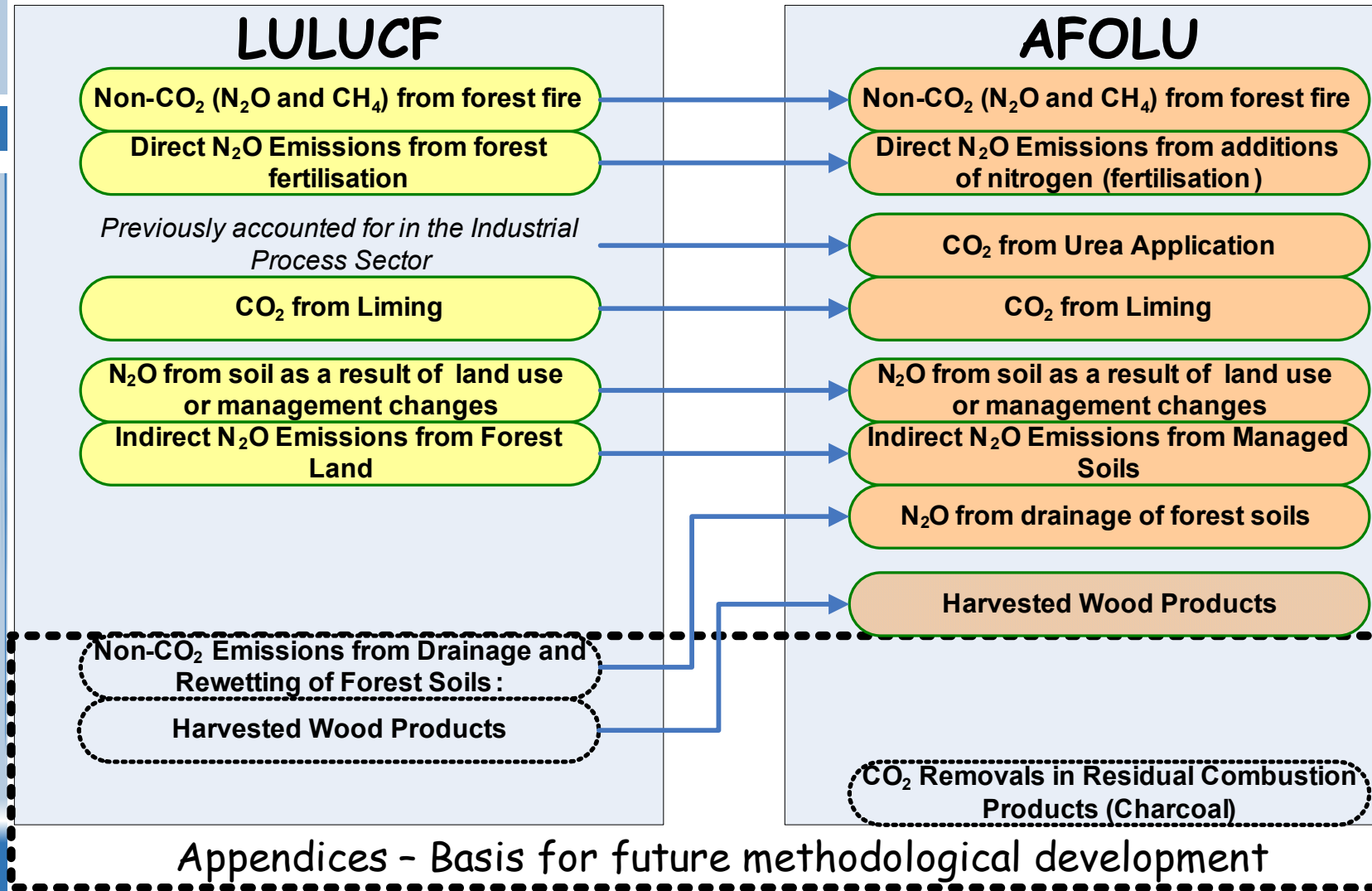
Improvements and Clarifications

The 2006 Guidelines contain improvements and clarifications to ease inventory compilation and include the latest scientific and technical knowledge

Direct & Indirect Emissions: CO₂ and N₂O



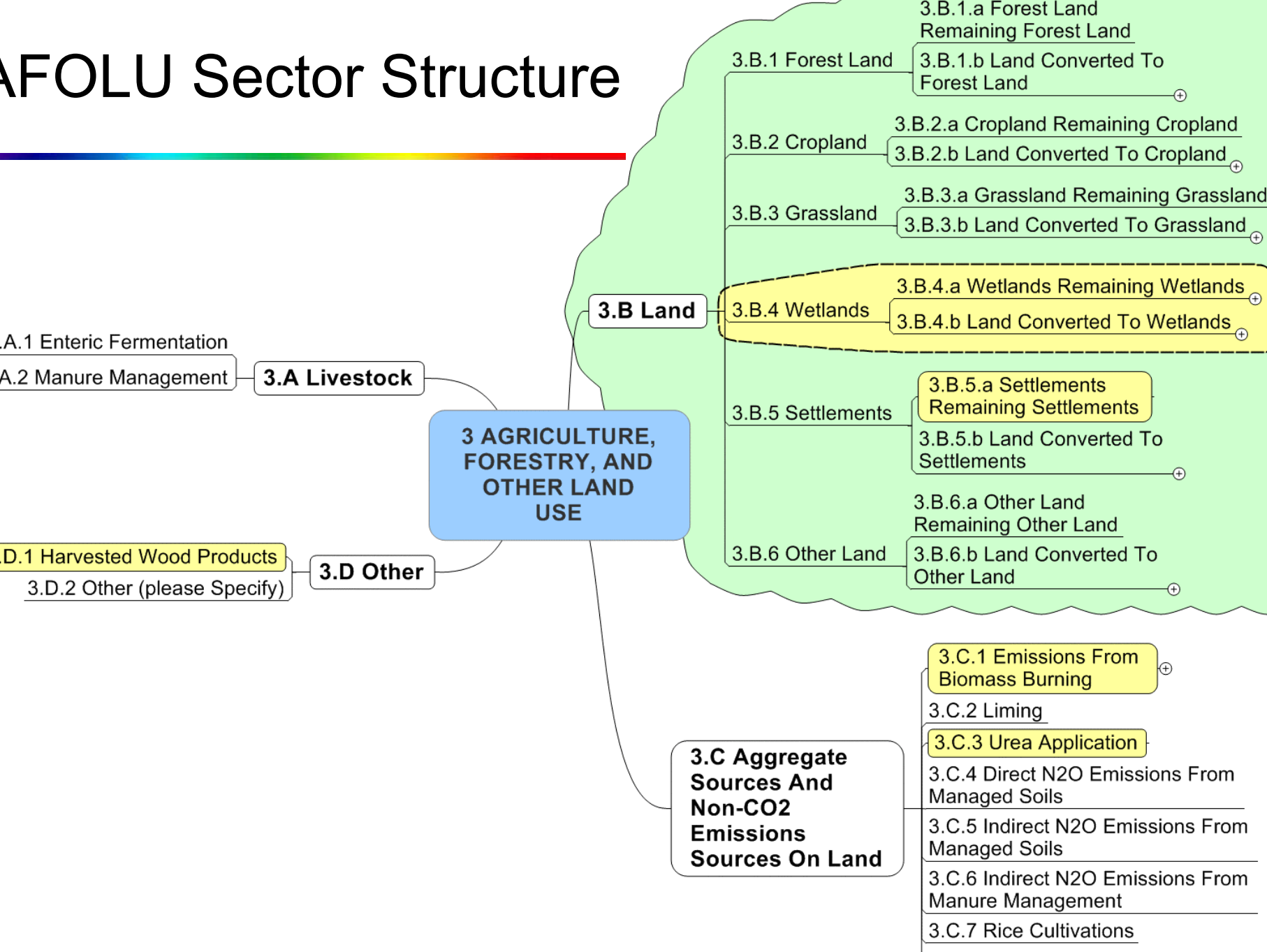
LULUCF & AFOLU – other forest emissions



Harvested Wood Products

- Now a chapter in 2006 Guidelines
 - previously an appendix “basis for future methodological development”
- Currently, there is no decision under the UFCCC on which approach to use to report these emissions and/or removals
 - approaches differ in the allocation between wood producing and consuming countries, and what processes (atmospheric fluxes or stock changes) they focus on
- The IPCC has not selected any of the proposed approaches. Instead it:
 - Provides methods to estimate 5 underlying parameters based on the assumption of first order decay
 - Provides a spreadsheet to estimate these 5 parameters that is based on FAO data for each country
 - Allows optional linkage with the waste sector spreadsheet for decay of HWP in landfill sites.
 - Gives help on combining these parameters to estimate any of the proposed approaches

AFOLU Sector Structure



3.A.1 Enteric Fermentation

3.A.2 Manure Management

3.A Livestock

3 AGRICULTURE, FORESTRY, AND OTHER LAND USE

3.B Land

3.B.1 Forest Land

3.B.1.a Forest Land Remaining Forest Land

3.B.1.b Land Converted To Forest Land

3.B.2 Cropland

3.B.2.a Cropland Remaining Cropland

3.B.2.b Land Converted To Cropland

3.B.3 Grassland

3.B.3.a Grassland Remaining Grassland

3.B.3.b Land Converted To Grassland

3.B.4 Wetlands

3.B.4.a Wetlands Remaining Wetlands

3.B.4.b Land Converted To Wetlands

3.B.5 Settlements

3.B.5.a Settlements Remaining Settlements

3.B.5.b Land Converted To Settlements

3.B.6 Other Land

3.B.6.a Other Land Remaining Other Land

3.B.6.b Land Converted To Other Land

3.D.1 Harvested Wood Products

3.D.2 Other (please Specify)

3.D Other

3.C Aggregate Sources And Non-CO2 Emissions Sources On Land

3.C.1 Emissions From Biomass Burning

3.C.2 Liming

3.C.3 Urea Application

3.C.4 Direct N2O Emissions From Managed Soils

3.C.5 Indirect N2O Emissions From Managed Soils

3.C.6 Indirect N2O Emissions From Manure Management

3.C.7 Rice Cultivations

Data Needs

- Guidelines use “Tiers” and “Key Categories” to focus resources
 - **Key Categories** are the largest categories that cumulatively account for 95% of the total.
 - **Tiers** are levels of complexity and detail.
 - Tier 1: Defaults given in the Guidelines
 - Tier 2: Same method as Tier 1 but use nationally specific data. May have more stratification and can account for abatement
 - Tier 3: More sophisticated and detailed modeling approaches – results compatible with Tier 1 & 2.
- In general **GPG inventories need Tier 2 or 3 for key categories NOT Tier 1**
- IPCC Guidelines focus on Tier 1
- National data:
 - May need to be local surveys - e.g. fuel wood is often an informal sector. Management practices can vary...
 - Significant data requirement is areas of each land use and areas of transitions.

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.

Summary

- ✓ **Basic methodological approach continued from 1996 Guidelines, GPG LULUCF to 2006 Guidelines AFOLU:**
 - Stock changes \Rightarrow Emissions/Removals
 1. Inputs (e.g. growth) - outputs (e.g. decay, harvest)
 2. Total Stock at end minus Total stock at beginning

- ✓ **GPG LULUCF & AFOLU consider all carbon pools**
 - Improved completeness implies both more accurate and reliable results and increased data needs over 1996 Guidelines

- ✓ **The AFOLU Guidance in the 2006 Guidelines maintains the basic structure, definitions and methods of the GPG LULUCF**
 - Improved guidance in some areas
 - More and improved default data
 - Integration of Agriculture reduces chance of double counting or omissions – some simplification of categories
 - Do not pre-empt accounting choices - all the information needed is retained
 - Mapping between the GPG LULUCF classification and the AFOLU classification is straightforward.
 - Effort and data requirements much the same as for LULUCF

Thank you

百岳三十六景
東海道紅尾
田子の浦晴景

茶の湯のついで

