



Development of a Comprehensive Landscape Methodological Approach for the ISFL

Background Paper and Analysis of Country Data

Workshop on ISFL Methodological Approach

December 9-10, 2016

Dupont Circle Hotel, Washington DC

- 1. IPCC GUIDELINES**
- 2. DATA AVAILABILITY**
- 3. DECISIONS AND OPTIONS**

1. IPCC GUIDELINES

1.1 Guidelines for AFOLU and LULUCF Good Practice Guidance

1.2 IPCC key concepts

1.3 Additional concepts

1.1 Guidelines for AFOLU and LULUCF Good Practice Guidance

- Approaches for national GHG accounting
- Aim to support the development of inventories that are:
 - Transparent;
 - Consistent;
 - Comparable;
 - Complete; and
 - Accurate

1.2 IPCC key concepts

- Managed land
- Land use and land management categories
- Key category analysis
- Representation of land areas
- Accounting approaches
- Accounting tiers
- Carbon pools and emission sources
- Uncertainty

1.2 IPCC key concepts

Managed land

- GHG emissions and removals from 'managed land' considered as being the result of human activities
- Need clear criteria for defining 'managed land'

1.2 IPCC key concepts

Land-use and land management categories

- Six land-use categories: Forest Land; Grassland; Cropland; Wetlands; Settlements; and Other Land
 - Livestock: Enteric fermentation; Manure management
 - Soil management: Fertiliser, Liming, Urea, Rice cultivation
 - Harvested wood products
- Adopting IPCC categories helps maintain consistency with national inventory, but prevents use of datasets that cannot be stratified according to these categories

1.2 IPCC key concepts

Carbon pools and emission sources

- Carbon pools: Above-ground biomass; Below-ground biomass; Dead wood; Litter; Soil organic matter
- Non-CO₂ gases: Methane (CH₄); Nitrous oxide (N₂O)
- IPCC decision trees can be used to determine which carbon pools and emission sources are prioritised

1.2 IPCC key concepts

Key category analysis

- *Significant* categories cumulatively account for 95% of total emissions/removals
 - *Particularly significant* subcategories cumulatively account for 60% of category emissions/removals
 - Qualitative criteria: categories positively affected by climate change mitigation technologies, or expected to be negatively affected in the future
- Criteria needed that help ensure that categories affected by ISFL interventions are included

1.2 IPCC key concepts

Accounting approaches

- Gain-Loss method: Emissions = AD • EF
 - Stock-Change method
 - Activity indicator • Emission rate
- Approaches adopted will depend on data availability, and should provide a sufficient level of certainty

1.2 IPCC key concepts

Representation of land areas

- Approach 1: land-use area totals within a defined spatial unit
 - Approach 2: land-use conversions within a defined spatial unit
 - Approach 3: spatially-explicit observations of land-use categories and conversions
- Approach 3 most appropriate if spatial data are available; Approaches 1 and 2 require data for the focal jurisdiction

1.2 IPCC key concepts

Uncertainty

- Uncertainty should be reduced as far as is practicable
- Causes of uncertainty: Lack of completeness; Bias or errors in models; Lack of data; Lack of representativeness of data; Statistical random sampling error; Measurement error; Misreporting or misclassification; Missing data
- Level of uncertainty will determine whether emission reductions and removals can be reliably detected

1.2 IPCC key concepts

Accounting tiers

- Tier 1: Global datasets and emission factors
 - Tier 2: Country specific data
 - Tier 3: Models and inventory measurement systems
- Tier 1 and 2 may be adequate for obvious and significant land-use changes, Tier 3 could be needed for changes in land management

1.3 Additional concepts

- Consistency with national GHG inventory
- Baseline emissions
- Non-permanence and displacement

1.3 Additional concepts

Consistency with national GHG inventory

- National GHG inventories cannot usually be disaggregated to jurisdictional level
- Consistency with national GHG inventory is possible for:
 - Definition of 'managed land'
 - Categories
 - Carbon pools and non-CO₂ gases
- ISFL approach should use consistent or more detailed data and approaches

1.3 Additional concepts

Baseline emissions

- Emission reductions and removals estimated by comparing monitored to baseline emissions and removals
- Baseline approaches:
 - Historic average
 - Base year
 - Modelling
- Baseline approach likely to be determined by availability of data

1.3 Additional concepts

Non-permanence and displacement

- % of emission reductions and removals typically set aside as insurance against risk of reversals
 - Potential displacement of emissions outside the jurisdiction as a result of ISFL activities
 - Should be accounted for by national accounting (for countries that ratify Paris Agreement)
- Accounting/Deductions may not be necessary, and could instead requiring that activities are developed to minimise risks

2. DATA AVAILABILITY

2.1 Methodology

2.2 Land-use change

2.3 Land use and land management

2.4 Non-CO₂ gases

2.1 Methodology - checklist

AD1 Forest area Area of forest present in the jurisdiction, classified by:	AD1.1 Ecological zone
	AD1.2 Forest management
	AD1.3 Forest disturbance regime
	AD1.4 Soil type
AD2 Cropland area Area of cropland in the jurisdiction classified by:	AD2.1 Cropland management
	AD2.2 Soil type and Climate zone
	AD2.3 Drainage history
AD3 Grassland area Area of grassland in the jurisdiction classified by:	AD3.1 Grassland type
	AD3.2 Grassland management
AD4 New wetland area Area of land in the jurisdiction used for:	AD4.1 Peat extraction, including total area and area on i) nutrient rich and ii) nutrient poor organic soils
	AD4.2 Artificial reservoirs
AD5 Settlements and other land area Area of other land in the jurisdiction:	AD5.1 Settlements
	AD5.2 Other land (not forest, cropland, grassland, wetland, or settlements)

2.1 Methodology - checklist

AD6 Wood extraction Amount of wood extracted from the jurisdiction as:	AD6.1 Roundwood
	AD6.2 Fuelwood
AD7 Fertiliser application Annual fertilizer applied in the jurisdiction as:	AD7.1 Calcic limestone and dolomite applied to cropland
	AD7.2 Synthetic fertilizer applied to newly planted and old forest
	AD7.3 Organic fertilizer applied to forest soil
	AD7.4 Synthetic fertilizer applied to cropland and grassland
	AD7.5 Compost, sewage and other organic amendments (e.g. rendering waste, guano, brewery waste, etc.)
AD8 Livestock Number of livestock present in the jurisdiction classified by:	AD8.1 Species
	AD8.2 Feed intake type
AD9 Burned area Area of land in the jurisdiction that is burned, classified by:	AD9.1 Cropland management type
	AD9.2 Ecological zone

2.1 Methodology - checklist

CS1 Forest biomass Biomass stocks and changes in different Forest types (and different Forest management and Forest disturbance regimes) in the jurisdiction for:	CS1.1 Above-ground biomass stocks and increment
	CS1.2 Litter stocks and changes
	CS1.3 Dead wood stocks
CS2 Wood perennial biomass	Carbon stocks and biomass increment in Woody perennial crops for different Cropland management types in the jurisdiction
CS3 Grassland biomass	Biomass stocks and rates of growth and loss in different types of grassland present in the jurisdiction (including different Grassland management regimes)
CS4 Soil organic carbon Reference soil organic carbon stock data for:	CS4.1 Major native unmanaged Forest types on main Soil types
	CS4.2 Non-forest land

2.1 Methodology – land representation

	Level I	Level II	Level III
Environmental conditions			
Climate zone	IPCC climate zones	Regional variations	Local variations
Soil type	IPCC soil class	Soil type	Local variations
Ecological zone	FAO global ecozones	WWF ecoregions	Local variations
Forest land			
Forest management	Management category (Intensive/Extensive)	Management type	Management practices
Forest disturbance	Disturbance category (Stand replacing/Non-stand replacing)	Disturbance type	Disturbance intensity
Cropland management	Management category (Annual/Perennial)	Management type	Management practices
Grassland management	Management category (Intensive/Extensive)	Management type	Management practices

2.1 Methodology – assessment criteria

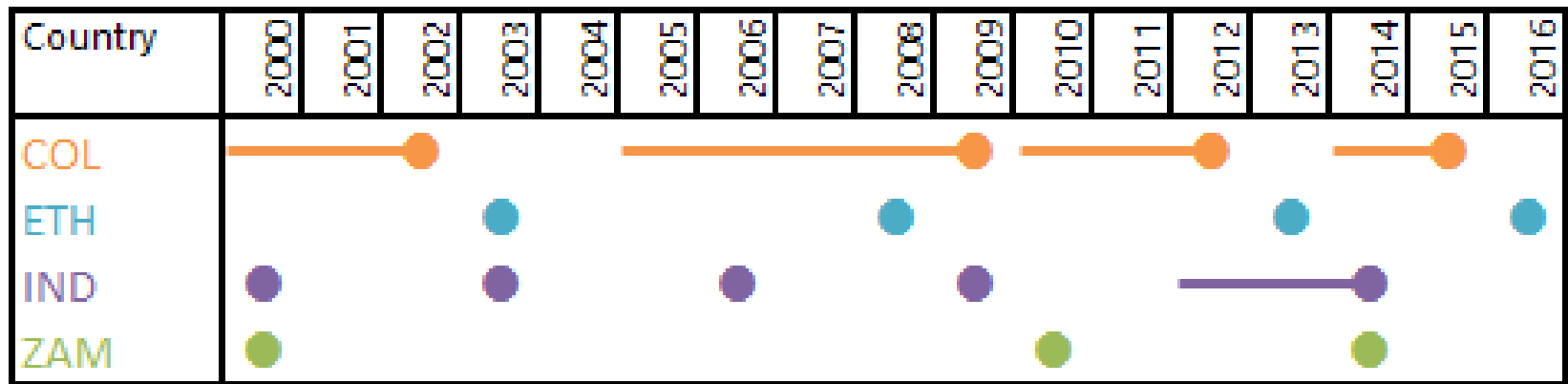
Criteria	Score		
	1	2	3
Detail	Dataset can be used to distinguish broad land use or land management categories (Level I)*	Dataset can be used to distinguish land use or land management types (Level II)*	Dataset gives details of land use or land management practices (Level III)*
Temporal extent	No time series of historical data available	Data available from 2 or more of the last 10 years, but not for all years	Data available for all of the last 10 years
Future availability	Production of comparable datasets for is unlikely over the next 10 years	Comparable datasets are likely to be available within the next 10 years, but at less than annual intervals	Comparable datasets are likely to be available for all of the next 10 years at annual or more frequent intervals

2.1 Methodology – assessment criteria

Criteria	Score		
	1	2	3
Methodology	Methodological approach questionable or unclear	Sound methodological approach but uncertainty is not quantified	Sound methodological approach including quantification of uncertainty
Complexity	Data require specialist skills to collect and interpret	Data require specialist skills to collect but is straightforward to interpret	Data require no specialist skills to collect or interpret

2.2 Land-use change

National LU/LC maps



- Data for all jurisdictions that can be used to describe historical change between IPCC LU categories

2.2 Land-use change

Parameter type	Parameter	Focal jurisdiction*			
		COL	ETH	IND	ZAM
AD1 Forest area Area of forest present in the jurisdiction, classified by:	AD1.1 Ecological zone	2	2	3	2
	AD1.2 Forest management	2	0	2	0
	AD1.3 Forest disturbance regime	2	0	3	0
	AD1.4 Soil type	2	2	3	2
AD2 Cropland area Area of cropland in the jurisdiction classified by:	AD2.1 Cropland management	2	2	2	2
	AD2.2 Soil type and Climate zone	3	2	3	2
	AD2.3 Drainage history	0	0	0	1
AD3 Grassland area Area of grassland in the jurisdiction classified by:	AD3.1 Grassland type	3	1	1	1
	AD3.2 Grassland management	0	0	0	0

- Level of disaggregation may not be sufficient to determine impacts of ISFL interventions

2.2 Land-use change – new wetland area

Parameter type	Parameter	Focal jurisdiction*			
		COL	ETH	IND	ZAM
AD4 New wetland area Area of land in the jurisdiction used for:	AD4.1 Peat extraction, including total area and area on i) nutrient rich and ii) nutrient poor organic soils	0	0	0	0
	AD4.2 Artificial reservoirs	0	0	0	1

- Peatland drainage not recorded
- Data on artificial reservoirs likely to be available from relevant Government Departments and Ministries or global datasets

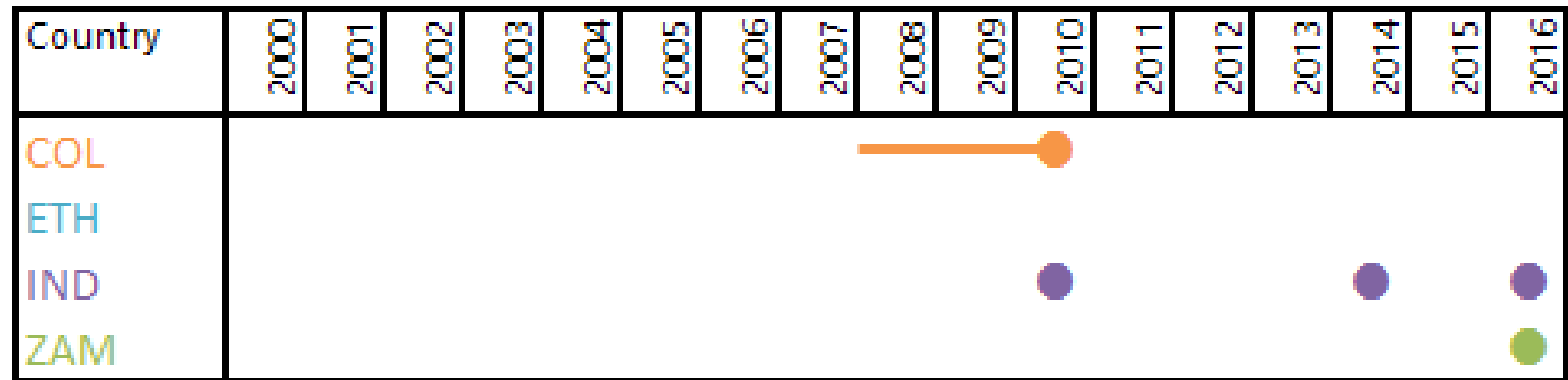
2.2 Land-use change – soil organic carbon

Parameter type	Parameter	Focal jurisdiction*			
		COL	ETH	IND	ZAM
CS4 Soil organic carbon Reference soil organic carbon stock data for:	CS4.1 Major native unmanaged Forest types on main Soil types	0	0	3	2
	CS4.2 Non-forest land	0	1	0	2

- Detailed forest soil carbon maps for Indonesia
- Less detailed soil carbon maps for forest and non-forest soils in Zambia
- Soil carbon stock data for some types of cropland in Ethiopia

2.3 Land use and land management – forest land

Forest management



- Indonesia has a time series of data on forest management types
- Limited data available for other jurisdictions

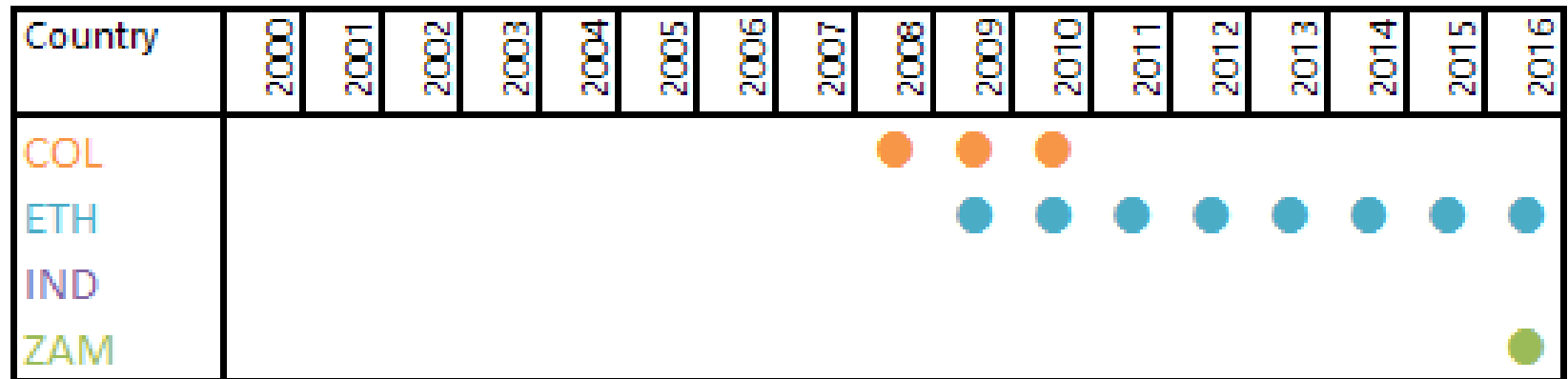
2.3 Land use and land management – forest land

Parameter type	Parameter	Focal jurisdiction			
		COL	ETH	IND	ZAM
AD1 Forest area Area of forest present in the jurisdiction, classified by:	AD1.2 Forest management	2	0	2	0
	AD1.3 Forest disturbance regime	2	0	3	0
CS1 Forest biomass Biomass stocks and changes in different Forest types (and different Forest management and Forest disturbance regimes) in the jurisdiction for:	CS1.1 Above-ground biomass stocks and increment	3	1	3	2
	CS1.2 Litter stocks and changes	0	1	3	2
	CS1.3 Dead wood stocks	0	1	3	2

- Columbia and Indonesia have maps of forest disturbance
- All jurisdictions have some data on forest biomass

2.3 Land use and land management – wood extraction

Parameter type	Parameter	Focal jurisdiction			
		COL	ETH	IND	ZAM
AD6 Wood extraction Amount of wood extracted from the jurisdiction as:	AD6.1 Roundwood	3	3	0	0
	AD6.2 Fuelwood	3	3	0	0



2.3 Land use and land management – cropland

Parameter type	Parameter	Focal jurisdiction			
		COL	ETH	IND	ZAM
AD2 Cropland area Area of cropland in the jurisdiction classified by:	AD2.1 Cropland management	2	2	2	2
CS2 Wood perennial biomass	Carbon stocks and biomass increment in Woody perennial crops for different Cropland management types in the jurisdiction	1	0	0	0

- Few spatial data on crop management practices available
- Data mainly from agricultural censuses or other sampling

2.3 Land use and land management – grassland

Parameter type	Parameter	Focal jurisdiction			
		COL	ETH	IND	ZAM
AD3 Grassland area Area of grassland in the jurisdiction classified by:	AD3.2 Grassland management	0	0	0	0
CS3 Grassland biomass	Biomass stocks and rates of growth and loss in different types of grassland present in the jurisdiction (including different Grassland management regimes)	1	0	0	0

- Details of grassland management practices (beyond broad grassland types) were not available for any of the focal jurisdictions
- Few data on grassland biomass

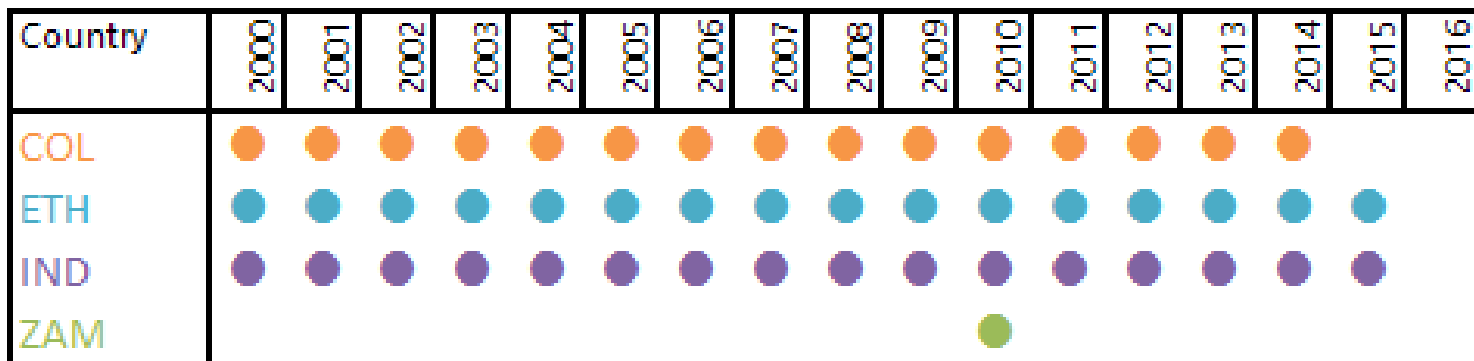
2.4 Non-CO₂ gases - fertiliser

Parameter type	Parameter	Focal jurisdiction			
		COL	ETH	IND	ZAM
AD7 Fertiliser application Annual fertilizer applied in the jurisdiction as:	AD7.1 Calcic limestone and dolomite applied to cropland	0	0	0	1
	AD7.2 Synthetic fertilizer applied to newly planted and old forest	0	0	0	0
	AD7.3 Organic fertilizer applied to forest soil	0	0	0	0
	AD7.4 Synthetic fertilizer applied to cropland and grassland	3	0	0	1
	AD7.5 Compost, sewage and other organic amendments (e.g. rendering waste, guano, brewery waste, etc.)	0	0	0	0

- Some data on synthetic fertiliser use in Columbia and Zamia

2.4 Non-CO₂ gases - livestock

Parameter type	Parameter	Focal jurisdiction			
		COL	ETH	IND	ZAM
AD8 Livestock Number of livestock present in the jurisdiction classified by:	AD8.1 Species	3	3	3	3
	AD8.2 Feed intake type	3	0	0	0



- Data on feed intake type only available in Colombia

2.4 Non-CO₂ gases – biomass burning

Parameter type	Parameter	Focal jurisdiction			
		COL	ETH	IND	ZAM
AD9 Burned area Area of land in the jurisdiction that is burned, classified by:	AD9.1 Cropland management type	2	1	2	1
	AD9.2 Ecological zone	2	1	3	1

- Global datasets available for coarse scale burned area mapping
- Burn scar maps available for Indonesia and Colombia

3. DECISIONS AND OPTIONS

3.1 Definitions and categories

3.2 Scope

3.3 Emissions baseline

3.4 Monitoring and calculation of emission reductions

3.5 Non-permanence and displacements

3.1 Definitions and categories

- I. Consistency with national GHG accounting:
 - A. Full consistency
 - B. Consistent approaches
 - C. Comparable categories and definitions
 - D. Independent

3.2 Scope

- II. Consistency of scope among jurisdictions:
 - A. Fully fixed
 - B. Partially fixed
 - C. Not fixed

3.2 Scope

III. Criteria for deciding which categories to account:

- A. All 'significant' categories
- B. Include categories expected to be affected by ISFL intervention
- C. Include categories expected to be negatively affected

3.3 Emissions baseline

IV. Baseline approach:

- A. Historical average
- B. Base year
- C. Modelling

3.3 Emissions baseline

V. Data quality criteria:

- A. Prescribed historical period/base year
- B. Data from a minimum number of years within the historical averaging period
- C. Geographical coverage of activity data
- D. Disaggregation of activity data
- E. Minimum precision/accuracy

3.4 Monitoring and calculation of emission reductions

VI. Uncertainty deduction:

- A. Quantitative assessment of uncertainty linked to discount thresholds
- B. Qualitative assessment of uncertainty linked to discount thresholds
- C. No assessment of uncertainty, and nominal discount

3.5 Non-permanence and displacements

VII. Addressing the risk of leakage

- A. Leakage is monitored and deducted
- B. Qualitative assessment of the risk of leakage linked to leakage deduction
- C. Leakage is not monitored nor estimated, no deductions

3.5 Non-permanence and displacements

VII. Addressing the risk of non-permanence

- A. Buffer linked to risk of non-permanence
- B. Nominal buffer
- C. No buffer



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