TABLE 3A.2.1A

REPORTING TABLE FOR EMISSIONS AND REMOVALS OF CO_2 AND NON-CO_2 GASES FROM LULUCF IN THE REPORTING YEAR

Land-use Category		*IPCC Guidelines* [1]	Annual change in carbon stocks, Gg CO_2				CH_4 (Gg)	N_2O (Gg)	NO_x [3] (Gg)	CO [3] (Gg)
Initial Land-use	Land-use during reporting Year		Living Biomass A	Dead Organic Matter B	Soils C	CO_2 Emissions/ Removals [2] D = (A+B+C) • (-1) D				
Forest Land	Forest Land	5A								
Cropland	Forest Land	5A, 5C, 5D	$\Delta C_{LF_{LB}}$ [5]	$\Delta C_{LF_{DOM}}$	$\Delta C_{LF_{SOM}}$					
Grassland	Forest Land	5A, 5C, 5D								
Wetlands	Forest Land	5A, 5C, 5D								
Settlements	Forest Land	5A, 5C, 5D								
Other Land	Forest Land	5A, 5C, 5D								
	Sub-Total for Forest Land									
Cropland	Cropland	5A, 5D								
Forest Land	Cropland	5B, 5D								
Grassland	Cropland	5B, 5D								
Wetlands	Cropland	5D								
Settlements	Cropland	5D								
Other Land	Cropland	5D								
	Sub-Total for Cropland									
Grassland	Grassland	5A, 5D								
Forest Land	Grassland	5B, 5D								
Cropland	Grassland	5C, 5D								
Wetlands	Grassland	5C, 5D								
Settlements	Grassland	5C, 5D								
Other Land	Grassland	5C, 5D								
	Sub-Total for Grassland									
Wetlands	Wetlands	5A, 5E								
Forest Land	Wetlands	5B								
Cropland	Wetlands	5E								
Grassland	Wetlands	5B								
Settlements	Wetlands	5E								
Other Land	Wetlands	5E								
	Sub-Total for Wetlands									

(SEE CONTINUATION OF ROWS FOR OTHER CATEGORIES ON BACK PAGE)

TABLE 3A.2.1A (CONTINUED)

REPORTING TABLE FOR EMISSIONS AND REMOVALS OF CO_2 AND NON-CO_2 GASES FROM LULUCF IN THE REPORTING YEAR

Land-use Category		*IPCC Guidelines* [1]	Annual change in carbon stocks, Gg CO_2				CH_4 (Gg)	N_2O (Gg)	NO_x [3] (Gg)	CO [3] (Gg)
Initial Land-use	Land-use during reporting Year		Living Biomass A	Dead Organic Matter B	Soils C	CO_2 Emissions/ Removals [2] D = (A+B+C) • (-1) D				
Settlements	Settlements	5A								
Forest Land	Settlements	5B								
Cropland	Settlements	5E								
Grassland	Settlements	5B								
Wetlands	Settlements	5E								
Other Land	Settlements	5E								
	Sub-Total for Settlements									
Other Land	Other Land	5A								
Forest Land	Other Land	5B								
Cropland	Other Land	5E								
Grassland	Other Land	5B								
Wetlands	Other Land	5E								
Settlements	Other Land	5E								
	Sub-Total for Other Land									
Other [4] (pls. specify)										
	Sub-Total for Other									
Total										

[1] Headings from the *IPCC Guidelines* Reporting Instructions p.1.14 - 1.16: 5A - Changes in Forest and Other Woody Biomass Stocks; 5B - Forest and Grassland Conversion; 5C - Abandonment of Managed Lands; 5D - Emissions and Removals from Soils, and 5E - Other.

[2] For the purpose of reporting, it is necessary to reverse the sign so that the resulting value is expressed as (-) for removal or uptake and (+) for emission. Thus, negative 1 is multiplied to the resulting CO_2 emission or removal.

[3] The *IPCC Guidelines* and this report provide methodology to estimate NO_x and CO emissions for Land Use, Land-Use Change and Forestry for emissions from fires only. If you have reported additional data, you should provide additional information (method, activity data, and emission factors) used to make these estimates.

[4] This may include other non-specified sources or sinks such as HWP, etc.

[5] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

TABLE 3A.2.1B

REPORTING TABLE FOR EMISSIONS AND REMOVALS OF CO_2 AND NON-CO_2 GASES DUE TO CONVERSION OF FOREST LAND AND GRASSLAND TO OTHER LAND CATEGORIES IN THE REPORTING YEAR

Land-use Category		*IPCC Guidelines* [1]	Annual change in carbon stocks, Gg CO_2				CH_4	N_2O	NO_x [3]	CO [3]
Initial Land-use	Land-use during reporting Year		Living Biomass	Dead Organic Matter	Soils	CO_2 Emissions/ Removals [2]	(Gg)	(Gg)	(Gg)	(Gg)
			A	B	C	D = (A+B+C) • (-1) D				
Forest Land	Cropland	5B, 5D								
Forest Land	Grassland	5B, 5D	$\Delta C_{LG_{LB}}$ [4]	$\Delta C_{LG_{DOM}}$	$\Delta C_{LG_{SOM}}$					
Forest Land	Wetlands	5B								
Forest Land	Settlements	5B								
Forest Land	Other Land	5B								
	Sub-Total for Forest Land									
Grassland	Forest Land	5A, 5C, 5D								
Grassland	Cropland	5B, 5D								
Grassland	Wetlands	5B								
Grassland	Settlements	5B								
Grassland	Other Land	5B								
	Sub-Total from Grassland									
Total										

[1] Headings from the *IPCC Guidelines* Reporting Instructions p.1.14 - 1.16: 5A - Changes in Forest and Other Woody Biomass Stocks; 5B - Forest and Grassland Conversion; 5C - Abandonment of Managed Lands; 5D - Emissions and Removals from Soils, and 5E - Other.

[2] For the purpose of reporting, it is necessary to reverse the sign so that the resulting value is expressed as (-) for removal or uptake and (+) for emission. Thus, negative 1 is multiplied to the resulting CO_2 emission or removal.

[3] The *IPCC Guidelines* and this report provide methodology to estimate NO_x and CO emissions for Land Use, Land-Use Change and Forestry for emissions from fires only. If you have reported additional data, you should provide additional information (method, activity data, and emission factors) used to make these estimates.

[4] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

TABLE 3A.2.2A

COMPILATION WORKSHEETS FOR REPORTING CO_2 EMISSIONS AND REMOVALS [1]

Land-use Category [2]		Land Area (ha)	Living Biomass			Dead Organic Matter			Soils[3]		
Initial Land-use	Land-use during reporting Year		Annual increase in carbon stocks (tonnes C yr^{-1}) A	Annual decrease in carbon stocks (tonnes C yr^{-1}) B	Annual change in carbon stocks (Gg CO_2 yr^{-1}) C = (A-B) • 10^{-3} • 44/12 C	Carbon stock change in dead wood (tonnes C yr^{-1}) D	Carbon stock change in litter (tonnes C yr^{-1}) E	Annual change in carbon stock (Gg CO_2 yr^{-1}) F = (D+E) • 10^{-3} • 44/12 F	Carbon stock change in mineral soils (tonnes C yr^{-1}) G	Carbon stock change in organic soils (tonnes C yr^{-1}) H	Annual change in carbon stock (Gg CO_2 yr^{-1}) I = (G+H) • 10^{-3} • 44/12 I
Forest Land	Forest Land										
Cropland	Forest Land		ΔC_{LF_G} [4]	ΔC_{LF_L}	$\Delta C_{LF_{LB}}$	$\Delta C_{LF_{DW}}$	$\Delta C_{LF_{LT}}$	$\Delta C_{LF_{DOM}}$	$\Delta C_{LF_{Mineral}}$	$\Delta C_{LF_{Organic}}$	$\Delta C_{LF_{Soils}}$
Grassland	Forest Land										
Wetlands	Forest Land										
Settlements	Forest Land										
Other Land	Forest Land										
	Sub-total for Forest Land										
Cropland	Cropland										
Forest Land	Cropland										
Grassland	Cropland										
Wetlands	Cropland										
Settlements	Cropland										
Other Land	Cropland										
	Sub-total for Cropland										
Grassland	Grassland										
Forest Land	Grassland										
Cropland	Grassland										
Wetlands	Grassland										
Settlements	Grassland										
Other Land	Grassland										
	Sub-total for Grassland										
Wetlands	Wetlands										
Forest Land	Wetlands										
Cropland	Wetlands										
Grassland	Wetlands										
Settlements	Wetlands										
Other Land	Wetlands										
	Sub-total for Wetlands										

(SEE CONTINUATION OF ROWS FOR OTHER CATEGORIES ON BACK PAGE)

TABLE 3A.2.2A (CONTINUED)

COMPILATION WORKSHEETS FOR REPORTING CO_2 EMISSIONS AND REMOVALS [1]

Land-use Category		Land Area	Living Biomass			Dead Organic Matter			Soils [3]		
Initial Land-use	Land-use during reporting Year	(ha)	Annual increase in carbon stocks (tonnes C yr^{-1})	Annual decrease in carbon stocks (tonnes C yr^{-1})	Annual change in carbon stocks (Gg CO_2 yr^{-1}) C = (A-B) • 10^{-3} • 44/12	Carbon stock change in dead wood (tonnes C yr^{-1})	Carbon stock change in litter (tonnes C yr^{-1})	Annual change in carbon stock (Gg CO_2 yr^{-1}) F = (D+E) • 10^{-3} • 44/12	Carbon stock change in mineral soils (tonnes C yr^{-1})	Carbon stock change in organic soils (tonnes C yr^{-1})	Annual change in carbon stock (Gg CO_2 yr^{-1}) I = (G+H) • 10^{-3} • 44/12
			A	B	C	D	E	F	G	H	I
Settlements	Settlements										
Forest Land	Settlements										
Cropland	Settlements										
Grassland	Settlements										
Wetlands	Settlements										
Other Land	Settlements										
	Sub-total for Settlements										
Other Land	Other Land										
Forest Land	Other Land										
Cropland	Other Land										
Grassland	Other Land										
Wetlands	Other Land										
Settlements	Other Land										
	Sub-total for Other Land										
Other (pls. specify) [2]											
	Sub-total for Other										
Total											

[1] The sign convention for net carbon changes in columns C, F, and I are: net gain (+) and net loss (-).

[2] May include other non-specified sources or sinks such as HWP, etc.

[3] An additional column can be added to include the change in carbon stock in soils due to liming.

[4] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

TABLE 3A.2.2B

COMPILATION WORKSHEETS FOR REPORTING NON-CO_2 EMISSIONS [1]

Land-use Category		Land Area	CH_4 (Gg)			N_2O (Gg)			NO_x (Gg)			CO (Gg)		
Initial Land-use	**Land-use; reporting Year**	**(ha)**	**Biomass[2]**	**Soils**	**Total**	**Biomass[2]**	**Soils[3]**	**Total**	**Biomass[2]**	**Soils**	**Total**	**Biomass[2]**	**Soils**	**Total**
Forest Land	Forest Land													
Cropland	Forest Land													
Grassland	Forest Land													
Wetlands	Forest Land													
Settlements	Forest Land													
Other Land	Forest Land													
	Sub-total for Forest Land													
Cropland	Cropland													
Forest Land	Cropland													
Grassland	Cropland													
Wetlands	Cropland													
Settlements	Cropland													
Other Land	Cropland													
	Sub-total for Cropland													
Grassland	Grassland													
Forest Land	Grassland													
Cropland	Grassland													
Wetlands	Grassland													
Settlements	Grassland													
Other Land	Grassland													
	Sub-total for Grassland													
Wetlands	Wetlands													
Forest Land	Wetlands													
Cropland	Wetlands													
Grassland	Wetlands													
Settlements	Wetlands													
Other Land	Wetlands													
	Sub-total for Wetlands													

TABLE 3A.2.2B (CONTINUED)

COMPILATION WORKSHEETS FOR REPORTING NON-CO_2 EMISSIONS [1]

Land-use Category		Land Area	CH_4 (Gg)			N_2O (Gg)			NO_x (Gg)			CO (Gg)		
Initial Land-use	**Land-use; reporting Year**	**(ha)**	**Biomass[2]**	**Soils**	**Total**	**Biomass[2]**	**Soils[3]**	**Total**	**Biomass[2]**	**Soils**	**Total**	**Biomass[2]**	**Soils**	**Total**
Settlements	Settlements													
Forest Land	Settlements													
Cropland	Settlements													
Grassland	Settlements													
Wetlands	Settlements													
Other Land	Settlements													
	Sub-total for Settlements													
Other Land	Other Land													
Forest Land	Other Land													
Cropland	Other Land													
Grassland	Other Land													
Wetlands	Other Land													
Settlements	Other Land													
	Sub-total for Other Land													
Other (pls. specify)														
	Sub-total for Other													
Total														

[1] All units should be reported in gigagram (Gg). To convert unit from "kg N_2O-N" to Gg N_2O, multiply the value (from the worksheets) by 44/28 and 10^{-6}. Similar to the convention used in the worksheets, the sign for removal (uptake) is positive (+) and for emission is negative (-).

[2] Disturbances to woody biomass growth may occur only in forest land and grassland. Non-CO2 emissions from prescribed burning of savanna (grassland) are reported in Chapter 4 of the *IPCC Guidelines*.

[3] Fertilisation is practiced in forest land, cropland, and grassland. N_2O emissions from the use of N-fertilisers in cropland are reported in Chapter 4 of the *IPCC Guidelines*.

Module	**Forest Land**								
Sub-module	**Forest Land Remaining Forest Land**								
Worksheet	**FL-1a: Annual change in carbon stocks in living biomass (includes above and below ground biomass)** [1]								
Sheet	**1 of 4**								
Land-use Category [2]		Sub-categories for Reporting Year [3]	Area of forest land remaining forest land (ha)	Average annual net increment in volume suitable for industrial processing (m^3 ha^{-1} yr^{-1})	Basic wood density (tonnes d.m. per m^{-3} fresh volume)	Biomass Expansion factor for conversion of annual net increment (including bark) to above ground tree biomass increment (dimensionless)	Average annual aboveground biomass increment (tonnes d.m. ha^{-1} yr^{-1}) $E = B \bullet C \bullet D$	Root-shoot ratio appropriate to increments (dimensionless)	Average annual biomass increment above and below ground (tonnes d.m ha^{-1} yr^{-1}) $G = E \bullet (1+F)$
Initial Land use	Land-use during reporting Year		A	B	C	D	E	F	G
FL	FL	(a)							
		(b)	**A**	**I_V**	**D**	**BEF_1**	**G_W**	**R**	**G_{TOTAL}**
		(c)							
		Sub-total							
Total									

[1] Calculations are based on default method (see Section 3.2.1.1)

[2] FL stands for forest land. See Chapter 2 for approaches in representing land areas.

[3] Land use should be further divided according to forest type and climatic zones in the country.

Module	**Forest Land**
Sub-module	**Forest Land Remaining Forest Land**
Worksheet	**FL-1a: Annual change in carbon stocks in living biomass (includes above and below ground biomass)**
Sheet	**2 of 4**

Land-use Category		Sub-categories for Reporting Year	Carbon fraction of dry matter (default is 0.5) (tonnes C tonne d.m.$^{-1}$)	Annual increase in carbon due to biomass increment (tonnes C yr^{-1}) $I = A \bullet G \bullet H$	Annually extracted volume of roundwood (m^3 yr^{-1})	Biomass density (tonnes d.m. m^{-3} fresh volume)	Biomass expansion factor for converting volumes of extracted roundwood to total aboveground biomass (including bark) (dimensionless)	Fraction of biomass left to decay in forest (dimensionless)
Initial Land use	Land use during reporting Year		H	I	J	K	L	M
FL	FL	(a)						
		(b)	**CF**	**ΔC_{FF_G}**	**H**	**D**	**BEF_2**	**f_{BL}**
		(c)						
		Sub-total						
Total								

Module	**Forest Land**								
Sub-module	**Forest Land Remaining Forest Land**								
Worksheet	**FL-1a: Annual change in carbon stocks in living biomass (includes above and below ground biomass)**								
Sheet	**3 of 4**								
Land-use Category		Sub-categories for Reporting Year	Annual carbon loss due to commercial fellings (tonnes C yr^{-1}) N = J • K • L • (1-M) • H	Annual volume of fuelwood gathering (m^3 yr^{-1})	Biomass density (tonnes d.m. m^{-3} fresh volume)	Biomass expansion factor for converting volumes of extracted roundwood to total aboveground biomass (including bark) (dimensionless)	Annual carbon loss due to fuelwood gathering (tonnes C yr^{-1}) R = O • P • Q • H	Forest areas affected by disturbances (ha yr^{-1})	Average biomass stock of forest areas (tonnes d.m. ha^{-1})
Initial Land use	Land use during reporting Year		N	O	P	Q	R	S	T
FL	FL	(a)							
		(b)	**$L_{fellings}$**	**FG**	**D**	**BEF_2**	**$L_{fuelwood}$**	**$A_{disturbance}$**	**B_W**
		(c)							
		Sub-total							
Total									

Module	**Forest Land**					
Sub-module	**Forest Land Remaining Forest Land**					
Worksheet	**FL-1a: Annual change in carbon stocks in living biomass (includes above and below ground biomass)**					
Sheet	**4 of 4**					
Land-use Category		Sub-categories for Reporting Year	Fraction of biomass left to decay in forest (dimensionless) U	Annual other losses of carbon (tonnes C yr^{-1}) $V = S \bullet T \bullet (1-U) \bullet H$ V	Annualdecrease in carbon due to biomass loss (tonnes C yr^{-1}) W = N+R+V W	Annual change in carbon stocks in living biomass (tonnes C yr^{-1}) X = I-W X
Initial Land use	Land use during reporting Year					
FL	FL	(a)				
		(b)	f_{BL}	$L_{other\ losses}$	ΔC_{FF_L}	$\Delta C_{FF_{LB}}$
		(c)				
		Sub-total				
Total						

Module	**Forest Land**						
Sub-module	**Forest Land Remaining Forest Land**						
Worksheet	**FL-1b: Annual change in carbon stocks in dead organic matter (dead wood and litter)** [1]						
Sheet	**1 of 3**						
Land-use Category		Sub-categories for Reporting Year	Area of managed forest land remaining forest land	Annual transfer into dead wood	Annual transfer out of dead wood	Carbon fraction of dry matter	Annual change of carbon in dead wood	Reference stock of litter under native, unmanaged forest corresponding to state *i*
Initial Land use	Land use during reporting Year		(ha)	(tonnes d.m. ha^{-1} yr^{-1})	(tonnes d.m. ha^{-1} yr^{-1})	(default is 0.5) (tonnes C (tonne d.m.)$^{-1}$)	(tonnes C yr^{-1}) E = A • (B-C) • D	(tonnes C ha^{-1})
			A	B	C	D	E	F
FL	FL	(a)						
		(b)	**A**	**B_{into}**	**B_{out}**	**CF**	**$\Delta C_{FF_{DW}}$**	**$LT_{ref(i)}$**
		(c)						
		Sub-total						
Total								

[1] The calculation is based on Tier 2 since Tier 1 assumes that the net change in carbon in dead wood and litter is zero.

Module	**Forest Land**
Sub-module	**Forest Land Remaining Forest Land**
Worksheet	**FL-1b: Annual change in carbon stocks in dead organic matter (dead wood and litter)**
Sheet	**2 of 3**

Land-use Category		Sub-categories for Reporting Year	Adjustment factor reflecting the effect of management intensity or practices on $LT_{ref(i)}$ in state *i* (dimensionless)	Adjustment factor reflecting a change in the disturbance regime on $LT_{ref(i)}$ in state *i* (dimensionless)	Stable litter stock under previous state *i* (tonnes C ha^{-1}) I = F • G • H	Reference stock of litter under previous state *j* (tonnes C ha^{-1})	Adjustment factor reflecting the effect of management intensity or practices on $LT_{ref(j)}$ in state *j* (dimensionless)	Adjustment factor reflecting a change in the disturbance regime on $LT_{ref(j)}$ in state *j* (dimensionless)
Initial Land use	Land use during reporting Year		G	H	I	J	K	L
FL	FL	(a)						
		(b)	$\mathbf{f_{mgt\_intensity\ i}}$	$\mathbf{f_{dist\_regime\ i}}$	$\mathbf{C_i}$	$\mathbf{LT_{ref\ (j)}}$	$\mathbf{f_{mgt\_intensity\ j}}$	$\mathbf{f_{dist\_regime\ j}}$
		(c)						
		Sub-total						
Total								

Module	**Forest Land**						
Sub-module	**Forest Land Remaining Forest Land**						
Worksheet	**FL-1b: Annual change in carbon stocks in dead organic matter (dead wood and litter)**						
Sheet	**3 of 3**						
Land-use Category		Sub-categories for Reporting Year	Stable litter stock under previous state *j* (tonnes C ha^{-1}) M = J • K • L	Forest area undergoing a transition from state *i* to *j* (ha)	Time period of the transition from state *i* to *j* Default is 20 yrs (yr)	Annual litter carbon stock change (tonnes C yr^{-1}) P = (M-I) • N / O	Annual change in carbon stocks in dead organic matter (tonnes C yr^{-1}) Q = E+P
Initial Land use	Land use during reporting Year		M	N	O	P	Q
FL	FL	(a)					
		(b)	$\mathbf{C_j}$	$\mathbf{A_{ij}}$	$\mathbf{T_{ij}}$	$\mathbf{\Delta C_{FF_{LT}}}$	$\mathbf{\Delta C_{FF_{DOM}}}$
		(c)					
		Sub-total					
Total							

Module	**Forest Land**								
Sub-module	**Forest Land Remaining Forest Land**								
Worksheet	**FL-1c1: Annual change in carbon stocks in mineral soils [1]**								
Sheet	**1 of 2**								
Land-use Category [2]		Sub-categories for Reporting Year [3]	Forest area undergoing a transition from state *i* to *j* (ha)	Time period of the transition from SOC_i to SOC_j (default is 20 yr) (yr)	Reference carbon stock under native, unmanaged forest on a given soil (tonnes C ha^{-1})	Adjustment factor reflecting the effect of a change from the native forest to the forest type in state *i* (dimensionless)	Adjustment factor reflecting the effect of management intensity or practices on forest in state *i* (dimensionless)	Adjustment factor reflecting the effect of a change in the disturbance regime to state *i* with respect to the native forest (dimensionless)	Stable soil organic carbon stock under previous state *i* (tonnes C ha^{-1}) $G = C \bullet D \bullet E \bullet F$
Initial Land use	Land use during reporting Year		A	B	C	D	E	F	G
FL	FL	(a)							
		(b)	$\mathbf{A_{ij}}$	$\mathbf{T_{ij}}$	$\mathbf{SOC_{REF}}$	$\mathbf{f_{forest\ type_i}}$	$\mathbf{f_{man\ intensity_i}}$	$\mathbf{f_{dist\ regime_i}}$	$\mathbf{SOC_i}$
		(c)							
		Sub-total							
Total									

[1] The calculation is based on Tier 2 since Tier 1 assumes that the net change in carbon in mineral soil, for forest land remaining forest land is zero.

[2] FL stands for forest land. See Chapter 2 for approaches in representing land areas.

[3] Land use may be further divided according to forest type or tree species, national land classification system, or ecological zones.

Module	**Forest Land**							
Sub-module	**Forest Land Remaining Forest Land**							
Worksheet	**FL-1c1: Annual change in carbon stocks in mineral soils**							
Sheet	**2 of 2**							
Land-use Category		Sub-categories for Reporting Year	Reference carbon stock under native, unmanaged forest on a given soil (tonnes C ha^{-1}) H (= C)	Adjustment factor reflecting the effect of a change from the native forest to the forest type in state *j* (dimensionless) I	Adjustment factor reflecting the effect of management intensity or practices on forest in state *j* (dimensionless) J	Adjustment factor reflecting the effect of a change in the disturbance regime to state *j* with respect to the native forest (dimensionless) K	Stable soil organic carbon stock under current state *j* (tonnes C ha^{-1}) L = H • I • J • K L	Annual soil carbon stock change (tonnes C yr^{-1}) M = (L-G) • A /B M
Initial Land use	Land use during reporting Year							
FL	FL	(a)						
		(b)	$\mathbf{SOC_{REF}}$	$\mathbf{f_{forest\ type_j}}$	$\mathbf{f_{man\ intensity_j}}$	$\mathbf{f_{dist\ regime_j}}$	$\mathbf{SOC_j}$	$\mathbf{\Delta C_{FF_{Mineral}}}$
		(c)						
		Sub-total						
Total								

Module	**Forest Land**				
Sub-module	**Forest Land Remaining Forest Land**				
Worksheet	**FL-1c2: Annual change in carbon stocks in organic soils**				
Sheet	**1 of 1**				
Land-use Category		Sub-categories for Reporting Year	Area of drained organic forest soils (ha)	Emission factor for CO_2 from drained organic forest soils (tonnes C ha^{-1} yr^{-1})	CO_2 emissions from drained organic forest soils (tonnes C yr^{-1}) $C = A \bullet B$
Initial Land use	Land use during reporting Year		A	B	C
FL	FL	(a)			
		(b)	$A_{Drained}$	$EF_{Drainage}$	$\Delta C_{FF_{Organic}}$
		(c)			
		Sub-total			
Total					

Module	**Forest Land**
Sub-module	**Forest Land Remaining Forest Land**
Worksheet	**FL-1c3: Annual change in carbon stocks in soils (summary worksheet)**
Sheet	**1 of 1**

Annual change in carbon stock change in mineral soils (tonnes C yr^{-1}) A	CO_2 emissions from drained organic soils (tonnes C yr^{-1}) B	Annual change in carbon stock in soils (tonnes C yr^{-1}) C = A+B C
$\Delta C_{FF_{Mineral}}$	$\Delta C_{FF_{Organic}}$	$\Delta C_{FF_{Soils}}$

Module	**Forest Land**
Sub-module	**Forest Land Remaining Forest Land**
Worksheet	**FL-1d: Non-CO_2 emissions from vegetation fires**
Sheet	**1 of 1**

Land-use Category		Sub-categories for Reporting Year	Area burnt (ha)	Mass of available fuel (kg d.m. ha^{-1})	Combustion efficiency or fraction of biomass combusted (dimension-less)	Emission factor for each GHG (g /kg d.m.)	CH_4 Emissions from fires (tonnes CH_4) $E = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	CO Emissions from fires (tonnes CO) $F = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	N_2O Emissions from fires (tonnes N_2O) $G = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	NO_x Emissions from fires (tonnes NO_x) $H = A \bullet B \bullet C \bullet D \bullet 10^{-6}$
Initial Land use	Land use during reporting Year		A	B	C	D	E	F	G	H
FL	FL									
		(a)	**A**	**B**	**C**	**D_{CH_4}**	**CH_4**			
						D_{CO}		**CO**		
						D_{N_2O}			**N_2O**	
						D_{NO_x}				**NO_x**
		(b)								
		(c)								
		Sub-total								
Total										

Module	**Forest Land**
Sub-module	**Land Converted to Forest Land**
Worksheet	**FL-2a: Annual change in carbon stocks in living biomass (includes above and below ground biomass)**
Sheet	**1 of 1**

Method follows Worksheet FL-1a: Annual change in carbon stocks in living biomass (includes above and below ground biomass) in Forest Land Remaining Forest Land	**Method follows Worksheet FL-1a: Annual change in carbon stocks in living biomass (includes above and below ground biomass) in Forest Land Remaining Forest Land**	Annual change in carbon stocks in biomass from land-use conversion to forest land (tonnes C yr^{-1}) C = A+B
A	B	C
ΔC_{LF_G}	ΔC_{LF_L}	$\Delta C_{LF_{LB}}$

Module	**Forest Land**
Sub-module	**Land Converted to Forest Land**
Worksheet	**FL-2b: Annual change in carbon stocks in dead organic matter (dead wood and litter)** [1]
Sheet	**1 of 2**

Land-use Category [2]		Sub-categories for Reporting Year [3]	Area of land converted to forest land through natural regeneration (ha)	Standing biomass stock in terms of carbon in naturally regenerated forest (tonnes d.m. ha^{-1})	Mortality rate in naturally regenerated forest (dimension-less)	Annual transfer into dead wood for naturally regenerated forest area (tonnes d.m. ha^{-1} yr^{-1}) D = B • C	Annual transfer out of dead wood for naturally regenerated forest area (tonnes d.m. ha^{-1} yr^{-1})	Area of land converted into forest land through establishment of plantations (ha)	Standing biomass stock in terms of carbon in artificially regenerated forest (tonnes d.m. ha^{-1})	Mortality rate in artificially regenerated forest (dimensionless)	Annual transfer into dead wood for artificially regenerated forest area (tonnes d.m. ha^{-1} yr^{-1}) I = G • H
Initial Land use	Land use during reporting Year		A	B	C	D	E	F	G	H	I
CL	FL	(a)									
		(b)	A_{NatR}	$B_{standingNatR}$	M_{NatR}	$B_{intoNatR}$	$B_{outNatR}$	A_{ArtR}	$B_{standingArtR}$	M_{ArtR}	$B_{intoArtR}$
		(c)									
		Sub-total									
GL	FL	(a)									
		(b)									
		(c)									
		Sub-total									
WL, SL, OL	FL	(a)									
		(b)									
		(c)									
		Sub-total									
Total											

[1] The calculation is based on Tier 2 since Tier 1 assumes that the net change in carbon in dead wood and litter is zero.

[2] FL stands for forest land; CL for cropland; GL for grassland; WL for wetlands, SL settlements, and OL for other lands. See Chapter 2 for approaches in representing land areas.

[3] Land use may be further divided according to forest type or tree species, national land classification system, or ecological zones.

Module	**1B - Land Converted to Forest Land**							
Sub-module	**Land Converted to Forest Land**							
Worksheet	**FL-2b: Annual change in carbon stocks in dead organic matter (dead wood and litter)**							
Sheet	**2 of 2**							
Land-use Category		Sub-categories for Reporting Year	Annual transfer out of dead wood for artificially regenerated forest area (tonnes d.m. ha^{-1} yr^{-1})	Carbon fraction of dry matter (default is 0.5) (tonnes C (tonne d.m.)$^{-1}$)	Annual change in carbon stocks in dead wood (tonnes C yr^{-1})	Annual change in litter carbon for naturally regenerated forest (tonnes C ha^{-1} yr^{-1})	Annual change in litter carbon for artificially regenerated forest (tonnes C ha^{-1} yr^{-1})	Annual change in carbon stocks in litter (tonnes C yr^{-1})	Annual change in carbon stocks in dead organic matter (tonnes C yr^{-1})
Initial Land use	Land use during reporting Year		J	K	L = [A • (D-E) + F • (I-J)] • K	M	N	O = (A • M)+ (F • N)	P= L+O
			J	K	L	M	N	O	P
CL	FL	(a)							
		(b)	$B_{out\ ArtR}$	CF	$\Delta C_{LF_{DW}}$ [1]	ΔC_{NatR}	ΔC_{ArtR}	$\Delta C_{LF_{LT}}$	$\Delta C_{LF_{DOM}}$
		(c)							
		Sub-total							
GL	FL	(a)							
		(b)							
		(c)							
		Sub-total							
WL, SL, OL	FL	(a)							
		(b)							
		(c)							
		Sub-total							
Total									

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land use category as an example.

Module	**Forest Land**
Sub-module	**Land Converted to Forest Land**
Worksheet	**FL-2c1: Annual change in carbon stocks in mineral soils [1]**
Sheet	**1 of 1**

Land-use Category		Sub-categories for Reporting Year	Total afforested land derived from former cropland or grassland (ha)	Reference carbon stock under native, unmanaged forest on a given soil, SOC_{ref} (tonnes C ha^{-1})	Stable soil organic carbon on previous land use, either cropland or grassland, $SOC_{Non\text{-}forest\ Land}$ (tonnes C ha^{-1})	Duration of the transition from $SOC_{Non\text{-}forest\ Land}$ to SOC_{ref} (yr)	Change in carbon stock in mineral soils (tonnes C yr^{-1}) $E = (B\text{-}C) \bullet A / D$
Initial Land use	Land use during reporting Year		A	B	C	D	E
CL	FL	(a)					
		(b)	$\mathbf{A_{AFF,x}}$	$\mathbf{SOC_{ref}}$	$\mathbf{SOC_{Non\text{-}forest\_land}}$	$\mathbf{T_{AFF}}$	$\mathbf{\Delta C_{LF_{Mineral}}}$ [2]
		(c)					
		Sub-total					
GL	FL	(a)					
		(b)					
		(c)					
		Sub-total					
Total							

[1] This *LULUCF Good Practice Guidance* provides default values only for cropland and grassland converted into forest land.

[2] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land use category as an example.

Module	**Forest Land**				
Sub-module	**Land Converted to Forest Land**				
Worksheet	**FL-2c2: Annual change in carbon stocks in organic soils**				
Sheet	**1 of 1**				
Land-use Category		Sub-categories for Reporting Year	Area of drained organic soils in land converted to forest land (ha) A	Emission factor for CO_2 from drained organic forest soils (tonnes C ha^{-1} yr^{-1}) B	CO_2 emissions from drained organic soils (tonnes C yr^{-1}) C = A • B C
Initial Land use	Land use during reporting Year				
CL	FL	(a)			
		(b)	$\mathbf{A_{Drained}}$	$\mathbf{EF_{Drainage}}$	$\mathbf{\Delta C_{LF_{Organic}}}$ [1]
		(c)			
		Sub-total			
GL	FL	(a)			
		(b)			
		(c)			
		Sub-total			
WL, SL, OL	FL	(a)			
		(b)			
		(c)			
		Sub-total			
Total					

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land use category as an example.

Module	**Forest Land**	
Sub-module	**Land Converted to Forest Land**	
Worksheet	**FL-2c3: Annual change in carbon stocks in soils (summary worksheet)**	
Sheet	**1 of 1**	
Annual soil carbon stock change in mineral soils (tonnes C yr^{-1}) A	CO_2 emissions from drained organic soils (tonnes C yr^{-1}) B	Annual change in carbon stocks in soils (tonnes C yr^{-1}) C = A+B C
$\Delta C_{LF_{Mineral}}$	$\Delta C_{LF_{Organic}}$	$\Delta C_{LF_{Soils}}$

Module	**Forest Land**									
Sub-module	**Land Converted to Forest Land**									
Worksheet	**FL-2d: Non-CO_2 emissions from vegetation fires**									
Sheet	**1 of 1**									
Land-use Category		Sub-categories for Reporting Year	Area burnt (ha)	Mass of available fuel present (kg d.m. ha^{-1})	Combustion efficiency or fraction of biomass combusted (dimension-less)	Emission factor for each GHG (g /kg d.m.)	CH_4 Emissions from fires (tonnes CH_4)	CO Emissions from fires (tonnes CO)	N_2O Emissions from fires tonnes (N_2O)	NO_x Emissions from fires (tonnes NO_x)
Initial Land use	Land use during reporting Year						E = A • B • C • D • 10^{-6}	F = A • B • C • D • 10^{-6}	G = A • B • C • D • 10^{-6}	H = A • B • C • D • 10^{-6}
			A	B	C	D	E	F	G	H
CL	FL	(a)	**A**	**B**	**C**	**D_{CH_4}**	**CH_4**			
						D_{CO}		**CO**		
						D_{N_2O}			**N_2O**	
						D_{NO_x}				**NO_x**
		(b)								
		Sub-total								
GL	FL	(a)								
		(b)								
		Subtotal								
Total										

Module	**Cropland**					
Sub-module	**Cropland Remaining Cropland**					
Worksheet	**CL-1a: Annual change in carbon stocks in living biomass [1]**					
Sheet	**1 of 1**					
Land-use Category [2]		Sub-categories for Reporting Year [3]	Annual area of cropland with perennial woody biomass (ha)	Annual growth rate of perennial woody biomass (tonnes C ha^{-1} yr^{-1})	Annual carbon stock in biomass removed (removal or harvest) (tonnes C ha^{-1} yr^{-1})	Annual change in carbon stocks in biomass (tonnes C yr^{-1}) $D = A \bullet (B-C)$
Initial Land use	Land use during reporting Year		A	B	C	D
CL	CL	(a)				
		(b)	**A**	**G**	**L**	$\Delta C_{CC_{LB}}$
		(c)				
		Sub-total				
Total						

[1] The change in biomass is only estimated for perennial woody crops. For annual crops, increase in biomass stocks in a single year is assumed equal to biomass losses from harvest and mortality in that same year – thus there is no net accumulation of biomass carbon stocks.

[2] CL stands for cropland. See Chapter 2 for approaches in representing land areas.

[3] Land use should be further divided according to type of perennial woody vegetation and climate zones.

Module	**Cropland**						
Sub-module	**Cropland Remaining Cropland**						
Worksheet	**CL-1c1: Annual change in carbon stocks in mineral soils**						
Sheet	**1 of 2**						
Land-use Category		Sub-categories for Reporting Year	Land area of each parcel[1] (ha)	Inventory time period (default is 20 yr)	Reference carbon stock (tonnes C ha^{-1})	Stock change factor for land use or land-use change type in the beginning of inventory year (dimensionless)	Stock change factor for management regime in the beginning of inventory year (dimensionless)	Stock change factor for input of organic matter in the beginning of inventory year (dimensionless)
Initial Land use	Land use during reporting Year		A	B	C	D	E	F
CL	CL	(a)						
		(b)	**A**	**T**	**SOC_{ref}**	**$F_{LU(0-T)}$**	**$F_{MG(0-T)}$**	**$F_{I(0-T)}$**
		(c)						
		Sub-total						
Total								

[1] Major cropland system in the country should be covered.

Module	**Cropland**							
Sub-module	**Cropland Remaining Cropland**							
Worksheet	**CL-1c1: Annual change in carbon stocks in mineral soils**							
Sheet	**2 of 2**							
Land-use Category		Sub-categories for Reporting Year	Soil organic carbon stock at T years (beginning of inventory year) (tonnes C ha^{-1}) G = C • D • E • F	Stock change factor for land use or land-use change type in current inventory year (dimensionless)	Stock change factor for management regime in current inventory year (dimensionless)	Stock change factor for input of organic matter in current inventory year (dimensionless)	Soil organic carbon stock in current inventory year (tonnes C ha^{-1}) K = C • H • I • J	Annual change in carbon stocks in mineral soils (tonnes C yr^{-1}) L = [(K-G) • A] / B
Initial Land use	Land use during reporting Year		G	H	I	J	K	L
CL	CL	(a)						
		(b)	$\mathbf{SOC_{(0-T)}}$	$\mathbf{F_{LU(0)}}$	$\mathbf{F_{MG(0)}}$	$\mathbf{F_{I(0)}}$	$\mathbf{SOC_0}$	$\mathbf{\Delta C_{CC_{Mineral}}}$
		(c)						
		Sub-total						
Total								

Module	**Cropland**				
Sub-module	**Cropland Remaining Cropland**				
Worksheet	**CL-1c2: Annual change in carbon stocks in organic soils**				
Sheet	**1 of 1**				
Land-use Category		Sub-categories for Reporting Year	Land area of organic soils in climate type c	Emission factor for climate type c	CO_2 emissions from cultivated organic soils
Initial Land use	Land use during reporting Year		(ha)	(tonnes C ha^{-1} yr^{-1})	(tonnes C yr^{-1}) $C = A \bullet B$
			A	B	C
CL	CL	(a)			
		(b)	**A**	**EF**	$\Delta C_{CC_{Organic}}$
		(c)			
		Sub-total			
Total					

Module	**Cropland**					
Sub-module	**Cropland Remaining Cropland**					
Worksheet	**CL-1c3: Carbon emissions from agricultural lime application**					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	Type of lime	Total Annual amount of lime applied (tonnes lime yr^{-1})	Emission Factor (carbonate carbon contents of the materials) (tonnes C/tonne lime)	Annual CO_2 emissions from agricultural lime application (tonnes C yr^{-1}) $D = B \bullet C$
Initial Land use	Land use during reporting Year		A	B	C	D
CL	CL	(a)				
		(b)	**type**	**Amount**	**EF**	$\Delta C_{CC\ Liming}$
		(c)				
		Sub-total				
Total						

Module	**Cropland**
Sub-module	**Cropland Remaining Cropland**
Worksheet	**CL-1c4: Annual soil carbon stock change in croplands**
Sheet	**1 of 1**

Annual soil carbon stock change in mineral soils (tonnes C yr^{-1}) A	CO_2 emissions from cultivated organic soils (tonnes C yr^{-1}) B	CO_2 Emissions from liming (tonnes C yr^{-1}) C	Annual change in carbon stocks in soils (tonnes C yr^{-1}) C = A-B-C D
$\Delta C_{CC_{Mineral}}$	$\Delta C_{CC_{Organic}}$	$\Delta C_{CC_{Liming}}$	$\Delta C_{CC_{Soils}}$

Module	**Cropland**
Sub-module	**Land Converted to Cropland**
Worksheet	**CL-2a: Annual change in carbon stocks in living biomass**
Sheet	**1 of 1**

Land-use Category [1]		Sub-categories for Reporting Year [2]	Annual area of land converted to cropland	Carbon stocks in biomass immediately after conversion to cropland	Carbon stocks in biomass immediately before conversion to cropland	Carbon stock change per area for that type of conversion when land is converted to cropland	Change in carbon stock from one year of cropland growth	Annual change in carbon stocks in living biomass in land converted to cropland
Initial Land use	Land use during reporting Year		(ha yr^{-1})	(tonnes C ha^{-1})	(tonnes C ha^{-1})	(tonnes C ha^{-1}) D = B-C	(tonnes C ha^{-1})	(tonnes C yr^{-1}) F = A • (D+E)
			A	B	C	D	E	F
FL	CL	(a)						
		(b)	$A_{Conversion}$	C_{After}	C_{Before}	$L_{Conversion}$	ΔC_{Growth}	$\Delta C_{LC_{LB}}$ [3]
		(c)						
		Sub-total						
GL	CL	(a)						
		(b)						
		(c)						
		Sub-total						
WL, SL, OL	CL	(a)						
		(b)						
		(c)						
		Sub-total						
Total								

[1] FL stands for forest land; CL for cropland; GL for grassland; WL for wetlands, SL settlements, and OL for other land. See Chapter 2 for approaches in representing land areas.

[2] Land use should be further divided according to type of perennial woody vegetation and climate zones.

[3] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land use category as an example.

Module	**Cropland**						
Sub-module	**Land Converted to Cropland**						
Worksheet	**CL-2c1: Annual change in carbon stocks in mineral soils**						
Sheet	**1 of 2**						
Land-use Category		Sub-categories for Reporting Year	Area of land converted to a cropland system[1] (ha)	Inventory time period (default is 20 yr)	Reference carbon stock (tonnes C ha^{-1})	Stock change factor for land use or land-use change type in the initial year (pre-conversion) (dimensionless)	Stock change factor for management regime in the initial year (pre-conversion) (dimensionless)	Stock change factor for input of organic matter in the initial year (pre-conversion) (dimensionless)
Initial Land use	Land use during reporting Year		A	B	C	D	E	F
FL	CL	(a)						
		(b)	**A**	**T**	**SOC_{ref}**	**$F_{LU(0-T)}$**	**$F_{MG(0-T)}$**	**$F_{I(0-T)}$**
		(c)						
		Sub-total						
GL	CL	(a)						
		(b)						
		(c)						
		Sub-total						
WL, SL, OL	CL	(a)						
		(b)						
		(c)						
		Sub-total						
Total								

[1] Major cropland system in the country should be covered.

Module	**Cropland**
Sub-module	**Land Converted to Cropland**
Worksheet	**CL-2c1: Annual change in carbon stocks in mineral soils**
Sheet	**2 of 2**

Land-use Category		Sub-categories for Reporting Year	Soil organic carbon stock in the initial year (pre-conversion) (tonnes C ha^{-1}) G = C • D • E • F	Stock change factor for land use or land-use change type in current inventory year (dimensionless)	Stock change factor for management regime in current inventory year (dimensionless)	Stock change factor for input of organic matter in current inventory year (dimensionless)	Soil organic carbon stock in current inventory year (tonnes C ha^{-1}) K = C • H • I • J	Annual change in carbon stocks in mineral soils (tonnes C yr^{-1}) L = [(K-G) • A] / B
Initial Land use	Land use during reporting Year		G	H	I	J	K	L
FL	CL	(a)						
		(b)	$SOC_{(0-T)}$	$F_{LU(0)}$	$F_{MG(0)}$	$F_{I(0)}$	SOC_0	$\Delta C_{LC_{Mineral}}$ [1]
		(c)						
		Sub-total						
GL	CL	(a)						
		(b)						
		(c)						
		Sub-total						
WL, SL, OL	CL	(a)						
		(b)						
		(c)						
		Sub-total						
Total								

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Cropland**				
Sub-module	**Land Converted to Cropland**				
Worksheet	**CL-2c2: Annual change in carbon stocks in organic soils**				
Sheet	**1 of 1**				
Land-use Category		Sub-categories for Reporting Year	Land area of organic soils in climate type c which are converted to cropland (ha) A	Emission factor for climate type c (tonnes C ha^{-1} yr^{-1}) B	CO_2 emissions from cultivated organic soils (tonnes C yr^{-1}) C = A • B C
Initial Land use	Land use during reporting Year				
FL	CL	(a)			
		(b)	**A**	**EF**	$\Delta C_{LC_{Organic}}$ [1]
		(c)			
		Sub-total			
GL	CL	(a)			
		(b)			
		(c)			
		Sub-total			
WL, SL, OL	CL	(a)			
		(b)			
		(c)			
		Sub-total			
Total					

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Cropland**					
Sub-module	**Land Converted to Cropland**					
Worksheet	**CL-2c3: Carbon emissions from agricultural lime application**					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	Type of lime	Total Annual amount of lime applied (tonnes lime yr^{-1})	Emission Factor (carbonate carbon contents of the materials) (tonnes C/tonne lime)	Annual CO_2 emissions from agricultural lime application (tonnes C yr^{-1}) $D = B \bullet C$
Initial Land use	Land use during reporting Year		A	B	C	D
FL	CL	(a)				
		(b)	**type**	**Amount**	**EF**	$\Delta C_{LC_{Liming}}$ [1]
		(c)				
		Sub-total				
GL	CL	(a)				
		(b)				
		(c)				
		Sub-total				
WL, SL, OL	CL	(a)				
		(b)				
		(c)				
		Sub-total				
Total						

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Cropland**		
Sub-module	**Land Converted to Cropland**		
Worksheet	**CL-2c4: Annual soil carbon stock change in croplands**		
Sheet	**1 of 1**		
Annual soil carbon stock change in mineral soils (tonnes C yr^{-1}) A	Carbon emissions from cultivated organic soils (tonnes C yr^{-1}) B	CO_2 Emissions from liming (tonnes C yr^{-1}) C	Annual change in carbon stocks in soils (tonnes C yr^{-1}) C = A-B-C D
$\Delta C_{LC_{Mineral}}$	$\Delta C_{LC_{Organic}}$	$\Delta C_{LC_{Liming}}$	$\Delta C_{LC_{Soil}}$

Module	**Cropland**					
Sub-module	**Land Converted to Cropland**					
Worksheet	**CL-2d: Annual emissions of N_2O from mineral soils**					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	IPCC default emission factor used to calculate emissions from agricultural land caused by added N, whether in the form of mineral fertilisers, manures, or crop residues ($kg\ N_2O\text{-}N/\ kg\ N$) A	N released annually by net soil organic matter mineralisation as a result of the disturbance (See Note 1 below) ($kg\ N\ yr^{-1}$) B	Additional emissions arising from the land-use change ($kg\ N_2O\text{-}N\ yr^{-1}$) C = A • B C	N_2O emissions as a result of the disturbance associated with land-use conversion of forest, grassland or other land to cropland ($kg\ N_2O\text{-}N\ yr^{-1}$) D = C D
Initial Land use	Land use during reporting Year					
FL	CL	(a)				
		(b)	**EF_1**	**$N_{net\text{-}min}$**	**$N_2O_{net\text{-}min}$-N**	**$N_2O\ Emission_{LC}$** [2]
		(c)				
		Sub-total				
GL	CL	(a)				
		(b)				
		(c)				
		Sub-total				
WL, SL, OL	CL	(a)				
		(b)				
		(c)				
		Sub-total				
Total						

[1] Column C = value of Column A in Worksheet CL-2c4 divided by the C:N ratio (see Equation 3.3.15). The default value for the C:N ratio is 15.

[2] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Grassland**					
Sub-module	**Grassland Remaining Grassland**					
Worksheet	**GL-1a: Annual change in carbon stocks in living biomass [1]**					
Sheet	**1 of 2**					
Land-use Category [2]		Sub-categories for Reporting Year [3]	Area of grassland covered with perennial woody biomass (ha)	Average annual biomass growth of perennial woody biomass (tonnes d.m. ha^{-1} yr^{-1})	Average annual biomass loss of perennial woody biomass (tonnes d.m. ha^{-1} yr^{-1})	Change in above- and belowground living perennial woody biomass (tonnes d.m. yr^{-1}) $D = A \bullet (B-C)$	Area of grassland covered with grasses (ha)
Initial Land use	Land use during reporting Year		A	B	C	D	E
GL	GL	(a)					
		(b)	$\mathbf{A}_{perennial}$	$\mathbf{G}_{perennial}$	$\mathbf{L}_{perennial}$	$\Delta\mathbf{B}_{perennial}$	$\mathbf{A}_{grasses}$
		(c)					
		Sub-total					
Total							

[1] The worksheet is based on Tier 2 method. The Tier 1 assumption is no change in living biomass carbon stocks.

[2] GL stands for grassland. See Chapter 2 for approaches in representing land areas.

[3] Land-use should be further divided according to grassland type and climate zone.

Module	**Grassland**						
Sub-module	**Grassland Remaining Grassland**						
Worksheet	**GL-1a: Annual change in carbon stocks in living biomass**						
Sheet	**2 of 2**						
Land-use Category		Sub-categories for Reporting Year	Average annual biomass growth of grasses (tonnes d.m. ha^{-1} yr^{-1})	Average annual biomass loss of grasses (tonnes d.m. ha^{-1} yr^{-1})	Change in belowground biomass of grasses (tonnes d.m. yr^{-1}) $H = E \bullet (F-G)$	Carbon fraction of dry matter (default is 0.5) (tonnes C tonne $d.m.^{-1}$)	Change in carbon stocks in living biomass (tonnes C yr^{-1}) $J = (D+H) \bullet I$
Initial Land use	Land use during reporting Year		F	G	H	I	J
GL	GL	(a)					
		(b)	$\mathbf{G_{grasses}}$	$\mathbf{L_{grasses}}$	$\mathbf{\Delta B_{grasses}}$	**CF**	$\mathbf{\Delta C_{GG_{LB}}}$
		(c)					
		Sub-total					
Total							

Module	**Grassland**							
Sub-module	**Grassland Remaining Grassland**							
Worksheet	**GL-1c1: Annual change in carbon stocks in mineral soils**							
Sheet	**1 of 2**							
Land-use Category		Sub-categories for Reporting Year	Land area of each parcel (ha)	Inventory time period (default is 20 yr)	Reference carbon stock (tonnes C ha^{-1})	Stock change factor for land use or land-use change type in the beginning of inventory year (dimensionless)	Stock change factor for management regime in the beginning of inventory year (dimensionless)	Stock change factor for input of organic matter in the beginning of inventory year (dimensionless)
Initial Land use	Land use during reporting Year		A	B	C	D	E	F
GL	GL	(a)						
		(b)	**A**	**T**	**SOC_{ref}**	**$F_{LU(0-T)}$**	**$F_{MG(0-T)}$**	**$F_{I(0-T)}$**
		(c)						
		Sub-total						
Total								

Module	**Grassland**							
Sub-module	**Grassland Remaining Grassland**							
Worksheet	**GL-1c1: Annual change in carbon stocks in mineral soils**							
Sheet	**2 of 2**							
Land-use Category		Sub-categories for Reporting Year	Soil organic carbon stock at T years (beginning of inventory year) (tonnes C ha^{-1}) G = C • D • E • F	Stock change factor for land use or land-use change type in current inventory year (dimensionless)	Stock change factor for management regime in current inventory year (dimensionless)	Stock change factor for input of organic matter in current inventory year (dimensionless)	Soil organic carbon stock in current inventory year (tonnes C ha^{-1}) K = C • H • I • J	Annual change in carbon stocks in mineral soils (tonnes C yr^{-1}) L = [(K-G) • A] / B
Initial Land use	Land use during reporting Year		G	H	I	J	K	L
GL	GL	(a)						
		(b)	$\mathbf{SOC_{(0-T)}}$	$\mathbf{F_{LU(0)}}$	$\mathbf{F_{MG(0)}}$	$\mathbf{F_{I(0)}}$	$\mathbf{SOC_0}$	$\mathbf{\Delta C_{GG_{Mineral}}}$
		(c)						
		Sub-total						
Total								

Module	**Grassland**				
Sub-module	**Grassland Remaining Grassland**				
Worksheet	**GL-1c2: Annual change in carbon stocks in cultivated organic soils**				
Sheet	**1 of 1**				
Land-use Category		Sub-categories for Reporting Year	Land area of organic soils in climate type c	Emission factor for climate type c	CO_2 emissions from cultivated organic soils
Initial Land use	Land use during reporting Year		(ha)	(tonnes C ha^{-1} yr^{-1})	(tonnes C yr^{-1})
					$C = A \bullet B$
			A	B	C
GL	GL	(a)			
		(b)	**A**	**EF**	$\Delta C_{GG_{Organic}}$
		(c)			
		Sub-total			
Total					

Module	**Grassland**					
Sub-module	**Grassland Remaining Grassland**					
Worksheet	**GL-1c3: Annual carbon emissions from agricultural lime application**					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	Type of lime	Total Annual amount of lime applied (tonnes lime yr^{-1})	Emission Factor (carbonate carbon contents of the materials) (tonnes C/tonne lime)	Annual carbon emissions from agricultural lime application (tonnes C yr^{-1}) $D = B \bullet C$
Initial Land use	Land use during reporting Year		A	B	C	D
GL	GL	(a)				
		(b)	**type**	**Amount**	**EF**	$\Delta C_{GG_{Liming}}$
		(c)				
		Sub-total				
Total						

Module	**Grassland**
Sub-module	**Grassland Remaining Grassland**
Worksheet	**GL-1c4: Annual soil carbon stock change in grassland**
Sheet	**1 of 1**

Annual soil carbon stock change in mineral soils (tonnes C yr^{-1}) A	CO_2 emissions from cultivated organic soils (tonnes C yr^{-1}) B	Annual carbon emissions from agricultural lime application (tonnes C yr^{-1}) C	Annual change in carbon stocks in soils (tonnes C yr^{-1}) C = A-B-C D
$\Delta C_{GG_{Mineral}}$	$\Delta C_{GG_{Organic}}$	$\Delta C_{GG_{Liming}}$	$\Delta C_{GG_{Soils}}$

Module	**Grassland**
Sub-module	**Grassland Remaining Grassland**
Worksheet	**GL-1d: Non-CO_2 emissions from vegetation fires**
Sheet	**1 of 1**

Land-use Category		Sub-categories for Reporting Year	Area of grassland burned (ha)	Mass of available fuel (kg d.m. ha^{-1})	Combustion efficiency or fraction of biomass combusted (dimension-less)	Emission factor for each GHG (g /kg d.m.)	CH_4 Emissions from fires (tonnes CH_4) $E = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	CO Emissions from fires (tonnes CO) $F = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	N_2O Emissions from fires tonnes (N_2O) $G = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	NO_x Emissions from fires (tonnes NO_x) $H = A \bullet B \bullet C \bullet D \bullet 10^{-6}$
Initial Land use	Land use during reporting Year		A	B	C	D	E	F	G	H
GL	GL	(a)	**A**	**B**	**C**	**D_{CH_4}**	**CH_4**			
						D_{CO}		**CO**		
						D_{N_2O}			**N_2O**	
						D_{NO_x}				**NO_x**
		(b)								
		(c)								
		Sub-total								
Total										

Module	**Grassland**						
Sub-module	**Land Converted to Grassland**						
Worksheet	**GL-2a: Annual change in carbon stocks in living and dead biomass**						
Sheet	**1 of 1**						
Land-use Category [1]		Sub-categories for Reporting Year [2]	Area of land converted to grassland from some initial use (ha yr^{-1})	Carbon stocks in biomass immediately after conversion to grassland (tonnes C ha^{-1})	Carbon stocks in biomass immediately before conversion to grassland (tonnes C ha^{-1})	Carbon stock change per area for that type of conversion (tonnes C ha^{-1}) D = B-C	Carbon stocks from one year of growth of grassland vegetation after conversion (tonnes C ha^{-1})	Annual change in carbon stocks in living biomass (tonnes C yr^{-1}) F = A • (D+E)
Initial Land use	Land use during reporting Year		A	B	C	D	E	F
FL	GL	(a)						
		(b)	$A_{Conversion}$	C_{After}	C_{Before}	$L_{Conversion}$	ΔC_{Growth}	$\Delta C_{LG_{LB}}$ [3]
		(c)						
		Sub-total						
CL	GL	(a)						
		(b)						
		(c)						
		Sub-total						
WL, SL, OL	GL	(a)						
		(b)						
		(c)						
		Sub-total						
Total								

[1] FL stands for forest land; CL for cropland; GL for grassland; WL for wetlands, SL settlements, and OL for other lands. See Chapter 2 for approaches in representing land areas.

[2] Land use should be further divided according to grassland type and climate zone.

[3] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land use category as an example.

Module	**Grassland**						
Sub-module	**Land Converted to Grassland**						
Worksheet	**GL-2c1: Annual change in carbon stocks in mineral soils**						
Sheet	**1 of 2**						

Land-use Category		Sub-categories for Reporting Year	Area of land converted to grassland from some initial use (ha)	Inventory time period (default is 20 yr)	Reference carbon stock (tonnes C ha^{-1})	Stock change factor for land use or land-use change type in the initial year (pre-conversion) (dimensionless)	Stock change factor for management regime in the initial year (pre-conversion) (dimensionless)	Stock change factor for input of organic matter in the initial year (pre-conversion) (dimensionless)
Initial Land use	Land use during reporting Year		A	B	C	D	E	F
FL	GL	(a)						
		(b)	**A**	**T**	**SOC_{ref}**	**$F_{LU(0-T)}$**	**$F_{MG(0-T)}$**	**$F_{I(0-T)}$**
		(c)						
		Sub-total						
CL	GL	(a)						
		(b)						
		(c)						
		Sub-total						
WL, SL, OL	GL	(a)						
		(b)						
		(c)						
		Sub-total						
Total								

Module	**Grassland**						
Sub-module	**Land Converted to Grassland**						
Worksheet	**GL-2c1: Annual change in carbon stocks in mineral soils**						
Sheet	**2 of 2**						
Land-use Category		Sub-categories for Reporting Year	Soil organic carbon stock in the initial year (pre-conversion) (tonnes C ha^{-1}) G = C • D • E • F	Stock change factor for land use or land-use change type in current inventory year (dimensionless)	Stock change factor for management regime in current inventory year (dimensionless)	Stock change factor for input of organic matter in current inventory year (dimensionless)	Soil organic carbon stock in current inventory year (tonnes C ha^{-1}) K = C • H • I • J	Annual change in carbon stocks in mineral soils (tonnes C yr^{-1}) L = [(K-G) •A] / B
Initial Land use	Land use during reporting Year		G	H	I	J	K	L
FL	GL	(a)						
		(b)	$\mathbf{SOC_{(0-T)}}$	$\mathbf{F_{LU(0)}}$	$\mathbf{F_{MG(0)}}$	$\mathbf{F_{I(0)}}$	$\mathbf{SOC_0}$	$\mathbf{\Delta C_{LG_{Mineral}}}$ [1]
		(c)						
		Sub-total						
CL	GL	(a)						
		(b)						
		(c)						
		Sub-total						
WL, SL, OL	GL	(a)						
		(b)						
		(c)						
		Sub-total						
Total								

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Grassland**				
Sub-module	**Land Converted to Grassland**				
Worksheet	**GL-2c2: Annual change in carbon stocks in cultivated organic soils**				
Sheet	**1 of 1**				
Land-use Category		Sub-categories for Reporting Year	Land area of organic soils in climate type c which are converted to grassland (ha)	Emission factor for climate type c (tonnes C ha^{-1} yr^{-1})	CO_2 emissions from cultivated organic soils (tonnes C yr^{-1}) $C = A \bullet B$
Initial Land use	Land use during reporting Year		A	B	C
FL	GL	(a)			
		(b)	**A**	**EF**	$\Delta C_{LG_{Organic}}$ [1]
		(c)			
		Sub-total			
CL	GL	(a)			
		(b)			
		(c)			
		Sub-total			
WL, SL, OL	GL	(a)			
		(b)			
		(c)			
		Sub-total			
Total					

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Grassland**					
Sub-module	**Land Converted to Grassland**					
Worksheet	**GL-2c3: Annual carbon emissions from agricultural lime application**					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	Type of lime	Total annual amount of lime applied (tonnes lime yr^{-1})	Emission Factor (carbonate carbon contents of the materials) (tonnes C/tonnes lime)	Annual carbon emissions from agricultural lime application (tonnes C yr^{-1}) $D = B \bullet C$
Initial Land use	Land use during reporting Year		A	B	C	D
FL	GL	(a)				
		(b)	**type**	**Amount**	**EF**	$\Delta C_{LG_{Liming}}$ [1]
		(c)				
		Sub-total				
CL	GL	(a)				
		(b)				
		(c)				
		Sub-total				
WL, SL, OL	GL	(a)				
		(b)				
		(c)				
		Sub-total				
Total						

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Grassland**		
Sub-module	**Land Converted to Grassland**		
Worksheet	**GL-2c4: Annual soil carbon stock change in grassland**		
Sheet	**1 of 1**		
Annual change in carbon stocks in mineral soils (tonnes C yr^{-1}) A	CO_2 emissions from cultivated organic soils (tonnes C yr^{-1}) B	Annual carbon emissions from agricultural lime application (tonnes C yr^{-1}) C	Annual change in carbon stocks in soils (tonnes C yr^{-1}) C = A-B-C D
$\Delta C_{LG_{Mineral}}$	$\Delta C_{LG_{Organic}}$	$\Delta C_{LG_{Liming}}$	$\Delta C_{LG_{Soils}}$

Module	**Grassland**								
Sub-module	**Land Converted to Grassland**								
Worksheet	**GL-2d: Non-CO_2 emissions from vegetation fires**								
Sheet	**1 of 1**								
Land-use Category		Sub-categories for Reporting Year	Area of grassland burned (ha)	Biomass of available fuel present (kg d.m. ha^{-1})	Combustion efficiency or fraction of biomass combusted (dimension-less)	Emission factor for each GHG (g /kg d.m.)	CH_4 Emissions from fires (tonnes CH_4) $E = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	CO Emissions from fires (tonnes CO) $F = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	N_2O Emissions from fires tonnes (N_2O) $G = A \bullet B \bullet C \bullet D \bullet 10^{-6}$	NO_x Emissions from fires (tonnes NO_x) $H = A \bullet B \bullet C \bullet D \bullet 10^{-6}$
Initial Land use	Land use during reporting Year		A	B	C	D	E	F	G	H
FL	GL	(a)	**A**	**B**	**C**	**D_{CH_4}**	**CH_4**			
						D_{CO}		**CO**		
						D_{N_2O}			**N_2O**	
						D_{NO_x}				**NO_x**
		(b)								
		Sub-total								
CL	GL	(a)								
		(b)								
		Subtotal								
Total										

Module	**Wetlands**
Sub-module	**Wetlands Remaining Wetlands (Organic soils managed for peat extraction)**
Worksheet	**WL-1c: Annual carbon stock change in soil [1]**
Sheet	**1 of 1**

Land-use Category		Sub-categories for Reporting Year	Area of nutrient rich organic soils managed for peat extraction, including abandoned areas in which drainage is still present (ha)	Emission factor for CO_2 from nutrient rich organic soils managed for peat extraction (tonnes C ha^{-1} yr^{-1})	Area of nutrient poor organic soils managed for peat extraction, including abandoned areas in which drainage is still present (ha)	Emission factor for CO_2 from nutrient poor organic soils managed for peat extraction (tonnes C ha^{-1} yr^{-1})	CO_2 emissions from organic soils managed for peat extraction (tonnes C yr^{-1}) $E = (A \bullet B) + (C \bullet D)$
Initial Land use	Land use during reporting Year		A	B	C	D	E
WL	WL	(a)					
		(b)	$\mathbf{A_{peatNrich}}$	$\mathbf{EF_{peatNrich}}$	$\mathbf{A_{peatNpoor}}$	$\mathbf{EF_{peatNpoor}}$	$\mathbf{\Delta C_{WW\ peat_{Soils}} = \Delta C_{WW\ peat_{Soils\ extraction}}}$
		(c)					
		Sub-total					
Total							

[1] CO_2 emissions occurring from peat stockpiles and restoration operations are not well understood. Hence, only method and data for estimating the change in soil carbon stock associated with peat extraction (essentially emissions due to enhanced oxidation at the production fields) are given.

Module	**Wetlands**						
Sub-module	**Wetlands Remaining Wetlands (Organic soils managed for peat extraction)**						
Worksheet	**WL-1d1: N_2O emissions from peatland drainage**						
Sheet	**1 of 1**						
Land-use Category		Sub-categories for Reporting Year	Area of nutrient rich drained organic soils	Emission factor for N_2O for nutrient rich organic soils	Area of nutrient poor drained organic soils	Emission factor for N_2O for nutrient poor organic soils	N_2O emissions from drained organic soils
Initial Land use	Land use during reporting Year		(ha)	(kg N_2O-N ha^{-1} yr^{-1})	(ha)	(kg N_2O-N ha^{-1} yr^{-1})	(Gg N_2O yr^{-1}) $E = [(A \bullet B) + (C \bullet D)] \bullet 44/28 \bullet 10^{-6}$
			A	B	C	D	E
WL	WL	(a)					
		(b)	**$A_{peat\ Nrich}$**	**$EF_{2peat\ Nrich}$**	**$A_{peat\ Npoor}$**	**$EF_{2peat\ Npoor}$**	**$N_2O\ Emissions_{WW\ peat}$**
		(c)					
		Sub-total					
Total							

Module	**Wetlands**					
Sub-module	**Wetlands Remaining Wetlands (Flooded Land Remaining Flooded Land)**					
Worksheet	**WL-1d2: CO_2 Emissions from flooded lands**[1]					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	Total flooded surface area, including flooded land, flooded lake and flooded river surface area (ha) A	Flooding period (days per year)[2] B	Average daily diffusive emissions Gg CO_2 ha^{-1} day^{-1}) C	Total CO_2 emissions from flooded lands (Gg CO_2 yr^{-1}) D = A • B • C D
Initial Land use	Land use during reporting Year					
WL	WL	(a)				
		(b)	$A_{flood,\ total\ surface}$	**P**	$E_{(CO_2)diff}$	**CO_2 Emissions $_{WW\ flood}$**
		(c)				
		Sub-total				
Total						

[1] The default assumption is that the CO_2 emission would be limited to approximately 10 years and land flooded > 10 years ago need not be included.

[2] Usually 365 days for annual inventory estimates.

Module	**Wetlands**						
Sub-module	**Wetlands Remaining Wetlands (Flooded Land Remaining Flooded Land)**						
Worksheet	**WL-1d3: CH_4 emissions from flooded lands**						
Sheet	**1 of 1**						
Land-use Category		Sub-categories for Reporting Year	Total flooded surface area, including flooded land, flooded lake and flooded river surface area (ha) A	Flooding period (days per year)[1] B	Average daily diffusive emissions ($Gg\ CH_4\ ha^{-1}\ day^{-1}$) C	Average daily bubble emissions ($Gg\ CH_4\ ha^{-1}\ day^{-1}$) D	Total CH_4 emissions from flooded lands ($Gg\ CH_4\ yr^{-1}$) $E = A \bullet B \bullet (C + D)$ E
Initial Land use	Land use during reporting Year						
WL	WL	(a)					
		(b)	**$A_{flood,\ total\ surface}$**	**P**	**$E_{(CH4)diff}$**	**$E_{(CH4)bubble}$**	**CH_4 Emissions $_{WW\ flood}$**
		(c)					
		Sub-total					
Total							

[1] Usually 365 days for annual inventory estimates.

Module	**Wetlands**
Sub-module	**Wetlands Remaining Wetlands (Flooded Land Remaining Flooded Land)**
Worksheet	**WL-1d4: N_2O emissions from flooded lands**
Sheet	**1 of 1**

Land-use Category		Sub-categories for Reporting Year	Total flooded surface area, including flooded land, flooded lake and flooded river surface area (ha)	Flooding period (days per year)[1]	Average daily diffusive emissions (Gg N_2O ha^{-1} day^{-1})	Total N_2O emissions from flooded lands (Gg N_2O yr^{-1})
Initial Land use	Land use during reporting Year					D = A • B • C
			A	B	C	D
WL	WL	(a)				
		(b)	**$A_{flood,\ total\ surface}$**	**P**	**$E_{(N_2O)diff}$**	**$N_2O\ Emissions_{WW\ flood}$**
		(c)				
		Sub-total				
Total						

[1] Usually 365 days for annual inventory estimates.

Module	**Wetlands**						
Sub-module	**Land converted to peat extraction**						
Worksheet	**WL-2a1: Annual change in carbon stocks in living biomass**						
Sheet	**1 of 1**						
Land-use Category		Sub-categories for Reporting Year	Area of land converted annually to peat extraction from original land use i (ha yr^{-1}) A	Aboveground biomass immediately following conversion to peat extraction (tonnes d.m. ha^{-1}) B	Aboveground biomass immediately before conversion to peat extraction (tonnes d.m. ha^{-1}) C	Carbon fraction of dry matter (default = 0.5) [tonnes C (tonnes d.m.)$^{-1}$] D	Annual change in carbon stocks in living biomass in land converted to peat extraction (tonnes C yr^{-1}) $E = A \bullet (B-C) \bullet D$ E
Initial Land use	Land use during reporting Year						
FL	WL	(a)					
		(b)	$\mathbf{A_i}$	$\mathbf{B_{After}}$	$\mathbf{B_{Before}}$	**CF**	$\mathbf{\Delta C_{LW\ peat_{LB}}}$ [1]
		(c)					
		Sub-total					
CL	WL						
GL	WL						
Total							

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land use category as an example.

Module	**Wetlands**						
Sub-module	**Land converted to peat extraction**						
Worksheet	**WL-2c: Annual carbon stock change in soil [1]**						
Sheet	**1 of 1**						
Land-use Category		Sub-categories for Reporting Year	Area of nutrient rich organic soils converted to peat extraction (ha)	Emission factor for changes in carbon stocks in nutrient rich organic soils converted to peat extraction (tonnes C ha^{-1} yr^{-1})	Area of nutrient poor organic soils converted to peat extraction (ha)	Emission factor for carbon stocks in nutrient poor organic soils converted to peat extraction (tonnes C ha^{-1} yr^{-1})	Annual change in carbon stocks in soil due to drainage of organic soils converted to peat extraction (tonnes C yr^{-1}) $E = (A \bullet B) + (C \bullet D)$
Initial Land use	Land use during reporting Year		A	B	C	D	E
FL	WL	(a)					
		(b)	A_{Nrich}	EF_{Nrich}	A_{Npoor}	EF_{Npoor}	$\Delta C_{LW\ peat_{Soils}}$ [2] $= \Delta C_{drainage}$
		(c)					
		Sub-total					
CL	WL						
GL	WL						
Total							

[1] In the case of land converted to peat extraction, only the effect of peat drainage is considered.

[2] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Wetlands**					
Sub-module	**Land converted to flooded land (Reservoirs)**					
Worksheet	**WL-2a2: Annual change in carbon stock in living biomass[1]**					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	Area of land converted annually to flooded land from land use i	Living biomass immediately following conversion to flooded land	Living biomass in land immediately before conversion to flooded land	Carbon fraction of dry matter	Annual change in carbon stocks in living biomass in land converted to flooded land
Initial Land use	Land use during reporting Year		(ha yr^{-1})	(default = 0) (tonnes d.m. ha^{-1})	(tonnes d.m. ha^{-1})	(default = 0.5) [tonnes C (tonnes d.m.)$^{-1}$]	(tonnes C yr^{-1}) E = A • (B-C) • D
			A	B	C	D	E
FL	WL	(a)					
		(b)	$\mathbf{A_i}$	$\mathbf{B_{After}}$	$\mathbf{B_{Before}}$	**CF**	$\mathbf{\Delta C_{LW\ flood_{LB}}}$ [2]
		(c)					
		Sub-total					
CL	WL						
GL	WL						
Total							

[1] Only carbon stock changes in living above-ground biomass due to conversion to flooded land are considered assuming the carbon stock prior to the conversion is lost the first year after the conversion (Tier 1).

[2] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land use category as an example.

Module	**Settlements**					
Sub-module	**Settlements Remaining Settlements**					
Worksheet	**SL-1a: Annual carbon stock change in living biomass [1]**					
Sheet	**1 of 1**					

Land-use Category		Sub-categories for Reporting Year	Total crown cover area (ha)	Crown cover area-based growth rate [tonnes C (ha crown cover)$^{-1}$ yr^{-1}]	Annual biomass growth (tonnes C yr^{-1}) C = A • B	Annual biomass loss [2] (tonnes C yr^{-1})	Changes in carbon stocks in living biomass (tonnes C yr^{-1}) E = C-D
Initial Land use	Land use during reporting Year		A	B	C	D	E
SL	SL	(a)					
		(b)	A_{CROWN}	**CRW**	ΔB_{SS_G}	ΔB_{SS_L}	$\Delta C_{SS_{LB}}$
		(c)					
		Sub-total					
Total							

[1] There are two options for a Tier 1 estimation of changes in carbon stock in living biomass: a) crown cover area method; and b) tree growth rate method. This worksheet is based on crown cover area method.

[2] Carbon stock change in biomass loss set to zero if the average age of the tree population is less than or equal to 20 years; otherwise assume that carbon stock change in biomass growth is equal to loss.

Module	**Settlements**					
Sub-module	**Land Converted to Settlements (Forest Land Converted to Settlements)**					
Worksheet	**SL-2a: Annual carbon stock change in living biomass**					
Sheet	**1 of 1**					
Land-use Category		Sub-categories for Reporting Year	Area of land converted annually from forest land to settlements (ha yr^{-1}) A	Carbon stock in living biomass immediately following conversion to settlements (tonnes C ha^{-1}) B	Carbon stock in living biomass in forest immediately before conversion to settlements (tonnes C ha^{-1}) C	Annual changes in carbon stocks in living biomass due to conversion of forest land to settlements (tonnes C yr^{-1}) D = A • (B-C) D
Initial Land use	Land use during reporting Year					
FL	SL	(a)				
		(b)	**A**	$\mathbf{C_{After}}$	$\mathbf{C_{Before}}$	$\mathbf{\Delta C_{FS_{LB}}}$ [1]
		(c)				
		Sub-total				
Total						

[1] The subscript FS means "forest land converted to settlements".

Module	**Other Land**
Sub-module	**Land Converted to Other Land**
Worksheet	**OL-2a: Annual change in living biomass**
Sheet	**1 of 1**

Land-use Category		Sub-categories for Reporting Year	Area of land converted annually to "Other Land" from some initial land uses in the reporting year (ha yr^{-1})	Amount of living biomass immediately after conversion to "Other Land" (tonnes d.m. ha^{-1})	Amount of living biomass immediately before conversion to "Other Land" (tonnes d.m. ha^{-1})	Carbon fraction of dry matter (default is 0.5) [tonnes C (tonnes d.m.)$^{-1}$]	Annual change in carbon stocks in living biomass in land converted to "Other Land" (tonnes C yr^{-1}) $E = A \bullet (B-C) \bullet D$
Initial Land use	Land use during reporting Year		A	B	C	D	E
FL,CL,GL ,WL	OL	(a)					
		(b)	$A_{Conversion}$	B_{After}	B_{Before}	**CF**	$\Delta C_{LO_{LB}}$ [1]
		(c)					
		Sub-total					
Total							

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.

Module	**Other Land**						
Sub-module	**Land Converted to Other Land**						
Worksheet	**OL-2c1: Annual change in carbon stocks in mineral soil**						
Sheet	**1 of 2**						
Land-use Category		Sub-categories for Reporting Year	Reference carbon stock (see Table 3.3.3) (tonnes C ha^{-1})	Stock change factor for land use or land-use change type in the inventory year (see Table 3.3.4) (dimensionless)	Stock change factor for management regime in the inventory year (see Table 3.3.4) (dimensionless)	Stock change factor for input of organic matter in the inventory year (see Table 3.3.4) (dimensionless)	Soil organic carbon stocks in the inventory year (tonnes C ha^{-1}) E=A • B • C • D
Initial Land use	Land use during reporting Year		A	B	C	D	E
FL,CL,GL ,WL	OL	(a)					
		(b)	**SOC_{Ref}**	**$F_{LU(0)}$**	**$F_{MG(0)}$**	**$F_{I(0)}$**	**SOC_0**
		(c)					
		Sub-total					
Total							

Module	**Other Land**								
Sub-module	**Land Converted to Other Land**								
Worksheet	**OL-2c1: Annual change in carbon stocks in mineral soil**								
Sheet	**2 of 2**								
Land-use Category		Sub-categories for Reporting Year	Time period for the conversion (default is 20) (yrs)	Land area converted to "Other Land" (ha)	Reference carbon Stock (see Table 3.3.3) (tonnes C ha^{-1})	Stock change factor for land use or land-use change type T years prior to the inventory year, (see Table 3.3.4) (dimensionless)	Stock change factor for management regime T years prior to the inventory year (see Table 3.3.4) (dimensionless)	Stock change factor for input of organic matter T years prior to the inventory year (see Table 3.3.4) (dimensionless)	Soil organic carbon stocks T years prior to the inventory year (tonnes C ha^{-1}) L = H • I • J •K	Annual change in carbon stocks in soil organic matter in mineral soils (tonnes C yr^{-1}) M = [(E-L) • G] / F
Initial Land use	Land use during reporting Year		F	G	H (= A)	I	J	K	L	M
FL, CL, GL, WL	OL	(a)								
		(b)	**T**	**A**	**SOC_{Ref}**	**$F_{LU(0-T)}$**	**$F_{MG(0-T)}$**	**$F_{I(0-T)}$**	**$SOC_{(0-T)}$**	**$\Delta C_{LO_{Mineral}}$** [1]
		(c)								
		Sub-total								
Total										

[1] Symbols are provided to show the relationship among the worksheets, compilation worksheets, reporting table, and the equations in the main body of the report. Please note that symbols are provided for only one land-use category as an example.