Monitoring Report Sheet (Input Sheet) [For Verification]

Table 1: Parameters monitored *ex post*

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Monitoring period	Monitoring point No.	Parameters	Description of data	Monitored Values	Units	Monitoring option	Source of data	Measurement methods and procedures	Monitoring frequency	Other comments
12 March 2018 to 31 December 2020	(1)	$CA_{pj\,i\,y}$	(Option 1) Area converted from forest class *i* to non-forest in the project area in year *y*	-	ha	Option A	Cambodia's official forest map (National Land Cover Map published by the Ministry of Environment)	Area of converted forest class to non-forest with error-adjusted area estimates applied as a factor. Calculated by extracting (histogram) of each forest class area from the Government official forest maps (or other approved data sources) at monitoring period start and monitoring period end. The area of forest conversion, from beginning to end of the monitoring period, to non-forest for each forest class is then adjusted based on accuracy as established using best practice methods and formulas as described in Olofsson et al. (2014)	-	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(2)	$CA_{d\,pj\,i\,y}$	(Option 1) Area converted from forest class *i* to non-forest in the displacement belt in year *y*	-	ha	Option A	Cambodia's official forest map (National Land Cover Map published by the Ministry of Environment)	Area of converted forest class to non-forest with error-adjusted area estimates applied as a factor. Calculated by extracting (histogram) of each forest class area from the Government official forest maps (or other approved data sources) at monitoring period start and monitoring period end. The area of forest conversion, from beginning to end of the monitoring period, to non-forest for each forest class is then adjusted based on accuracy as established using best practice methods and formulas as described in Olofsson et al. (2014)	-	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(3)	$FC_{f\,y}$	(Direct method) Quantity of fuel type *f* consumed in year *y*	-	kg	Option B	Invoices, project management record	All purchase records of fuel used for the project activities, and record type and amount of fuel and type of vehicle/equipment were collected.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(4)	$NVE_{j\,f\,y}$	(Indirect method) Number of vehicle or equipment type *j* using fuel type *f* in year *y*	-	unit	Option C	Project management record	Not measured as Direct method was selected.	-	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(5)	$TDU_{j\,f\,y}$	(Indirect method) Total travel distance for vehicle type *j* or use hours for equipment type *j* using fuel type *f* in year *y*	-	km or hour	Option C	Project management record (trip record etc)	Not measured as Direct method was selected.	-	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(6)	$SEC_{j\,f}$	Average specific energy consumption of vehicle or equipment type *j* for fuel type *f*	-	kg km^{-1} or $hour^{-1}$	Option A/C	Manufacturer specifications or measurement	Not measured as Direct method was selected.	-	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(7)	$M_{SN\,c\,y}$	Mass of synthetic fertilizer applied for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*	-	t	Option B	Invoices, project management record	No synthetic fertilizer was used for the project during the monitoring period.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(8)	$M_{ON\,c\,y}$	Mass of organic fertilizer made from materials sourced from outside of the project area and the activity area and applied for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*	-	t	Option C	Invoices, project management record	No organic fertilizer made from materials sourced from outside of the project area and the activity area was applied.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(9)	$NC_{SN\,c}$	Nitrogen content of synthetic fertilizer applied in cropland type *c*	-	tN (t fertilizer)$^{-1}$	Option A	Data from producers of synthetic fertilize	-	Once before the initial verification	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(10)	$NC_{ON\,c}$	Nitrogen content of organic fertilizer applied in cropland type *c*	-	tN (t fertilizer)$^{-1}$	Option A	Published data	-	Once before the initial verification	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(11)	$Crop_{c\,T\,y}$	Harvested annual dry matter yield for N-fixing crop *T* per unit area, introduced for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*	-	t d.m. ha^{-1}	Option A	Published data or Project management record	Published average dry yield data for the N-fixing crop is used.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(12)	$Area_{c\,T\,y}$	Total annual area harvested of N-fixing crop *T*, introduced for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*	-	ha	Option C	Project management record	Area harvested N-fixing crop by interviewing farmers was recorded.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(13)	$R_{AG\,T}$	Ratio of above-ground residues to harvested yield for N-fixing crop *T*	-	t d.m. (t d.m.)$^{-1}$	Option A	Published data or calculation	Calculated based on Table 11.2 of Ch. 11, Vol, 4 of 2006 IPCC Guidelines, published yield data.	Once before the initial verification	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(14)	$R_{BG\,T}$	Ratio of below-ground residues to harvested yield for N-fixing crop *T*	-	t d.m. (t d.m.)$^{-1}$	Option A	Published data or calculation	Calculated based on Table 11.2 of Ch. 11, Vol, 4 of 2006 IPCC Guidelines, published yield data.	Once before the initial verification	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(15)	$N_{AG\,T}$	N content of above-ground residues for N-fixing crop *T*	-	t N (t d.m.)$^{-1}$	Option A	Published data	Table 11.2 of Ch. 11, Vol, 4 of 2006 IPCC Guidelines	Once before the initial verification	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(16)	$N_{BG\,T}$	N content of below-ground residues for N-fixing crop *T*	-	t N (t d.m.)$^{-1}$	Option A	Published data	Table 11.2 of Ch. 11, Vol, 4 of 2006 IPCC Guidelines	Once before the initial verification	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(17)	$Frac_{Renew\,T}$	Fraction of total area under N-fixing crop *T* that is renewed annually	-	dimensionless	Option C	Interview	Interview for local agriculture expert	Once before the initial verification	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(18)	$M_{limestone\,y}$	Mass of calcic limestone ($CaCO_3$) applied for implementation of the project activities in the project area and the activity area in year *y*	-	t	Option B	Invoices, project management record	No calcic limestone was applied during the monitoring period.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(19)	$M_{dolomite\,y}$	Mass of dolomite ($CaMg(CO_3)_2$) applied for implementation of the project activities in the project area and the activity area in year *y*	-	t	Option B	Invoices, project management record	No dolomite was applied during the monitoring period.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet
12 March 2018 to 31 December 2020	(20)	$M_{urea\,y}$	Mass of urea fertilizer applied for implementation of the project activities in the project area and the activity area in year *y*	-	t	Option B	Invoices, project management record	No urea fertilizer was applied during the monitoring period.	Once every year	Input on "MRS(input_PJ_Opt1)" sheet

Table 2: Project-specific parameters fixed *ex ante*

(a) Parameters	(b) Description of data	(c) Estimated	(d) Units	(e) Source of data	(f) Other comments
$A_{i\,0}$	Area of forest class *i* in the project area at the inception of the project	-	ha	Cambodia's official forest map	Input on "MPS(input_RL_Opt1)" sheet
$A_{d\,i\,0}$	Area of forest class *i* in the displacement belt at the inception of the project	-	ha	Cambodia's official forest map	Input on "MPS(input_RL_Opt1)" sheet
d_y	Number of operating days in year *y*	-	days	Decided based on starting date of project operation and expected operational lifetime of project	Input on "MPS(input_RL_Opt1)" sheet
$d_{0\,y}$	Number of days in year *y*	-	days	Automatically decided by number of year y	Input on "MPS(input_RL_Opt1)" sheet
P_E	Annual transition probability from Evergreen forest (E) to non-forest within the reference area	0.0249	dimensionless	Automatically decided by number of year y	Input on "MPS(input_RL_Opt1)" sheet
P_{SE}	Annual transition probability from Semi-evergreen forest (SE) to non-forest within the reference area	0.0309	dimensionless	Cambodia's official forest reference level (FRL)	
P_P	Annual transition probability from Pine forest (P) to non-forest within the reference area	0.0000	dimensionless	Cambodia's official forest reference level (FRL)	
P_D	Annual transition probability from Deciduous forest (D) to non-forest within the reference area	0.0345	dimensionless	Cambodia's official forest reference level (FRL)	
P_B	Annual transition probability from Bamboo (B) to non-forest within the reference area	0.0141	dimensionless	Cambodia's official forest reference level (FRL)	
P_M	Annual transition probability from Mangrove (M) to non-forest within the reference area	0.0100	dimensionless	Cambodia's official forest reference level (FRL)	
P_{MR}	Annual transition probability from Rear Mangrove (MR) to non-forest within the reference area	0.0417	dimensionless	Cambodia's official forest reference level (FRL)	
P_{FF}	Annual transition probability from Flooded forest (FF) to non-forest within the reference area	0.0506	dimensionless	Cambodia's official forest reference level (FRL)	
P_{FR}	Annual transition probability from Forest regrowth (FR) to non-forest within the reference area	0.0972	dimensionless	Cambodia's official forest reference level (FRL)	
P_{TP}	Annual transition probability from Tree plantation (TP) to non-forest within the reference area	0.1169	dimensionless	Cambodia's official forest reference level (FRL)	
P_{PP}	Annual transition probability from Pine plantation (PP) to non-forest within the reference area	0.0000	dimensionless	Cambodia's official forest reference level (FRL)	
$P_{d\,E}$	Annual transition probability from Evergreen forest (E) to non-forest within the displacement belt	0.0249	dimensionless	Cambodia's official forest maps	
$P_{d\,SE}$	Annual transition probability from Semi-evergreen forest (SE) to non-forest within the displacement belt	0.0309	dimensionless	Cambodia's official forest maps	
$P_{d\,P}$	Annual transition probability from Pine forest (P) to non-forest within the displacement belt	0.0000	dimensionless	Cambodia's official forest maps	
$P_{d\,D}$	Annual transition probability from Deciduous forest (D) to non-forest within the displacement belt	0.0345	dimensionless	Cambodia's official forest maps	
$P_{d\,B}$	Annual transition probability from Bamboo (B) to non-forest within the displacement belt	0.0141	dimensionless	Cambodia's official forest maps	
$P_{d\,M}$	Annual transition probability from Mangrove (M) to non-forest within the displacement belt	0.0100	dimensionless	Cambodia's official forest maps	
$P_{d\,MR}$	Annual transition probability from Rear Mangrove (MR) to non-forest within the displacement belt	0.0417	dimensionless	Cambodia's official forest maps	
$P_{d\,FF}$	Annual transition probability from Flooded forest (FF) to non-forest within the displacement belt	0.0506	dimensionless	Cambodia's official forest maps	
$P_{d\,FR}$	Annual transition probability from Forest regrowth (FR) to non-forest within the displacement belt	0.0972	dimensionless	Cambodia's official forest maps	
$P_{d\,TP}$	Annual transition probability from Tree plantation (TP) to non-forest within the displacement belt	0.1169	dimensionless	Cambodia's official forest maps	
$P_{d\,PP}$	Annual transition probability from Pine plantation (PP) to non-forest within the displacement belt	0.0000	dimensionless	Cambodia's official forest maps	
EF_E	Emission factor applicable for Evergreen forest (E)	91.3000	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_{SE}	Emission factor applicable for Semi-evergreen forest (SE)	135.1100	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_P	Emission factor applicable for Pine forest (P)	56.5400	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_D	Emission factor applicable for Deciduous forest (D)	48.2100	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_B	Emission factor applicable for Bamboo (B)	0.0000	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_M	Emission factor applicable for Mangrove (M)	84.1500	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_{MR}	Emission factor applicable for Rear Mangrove (MR)	92.4000	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_{FF}	Emission factor applicable for Flooded forest (FF)	39.8600	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_{FR}	Emission factor applicable for Forest regrowth (FR)	42.6500	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_{TP}	Emission factor applicable for Tree plantation (TP)	56.5400	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
EF_{PP}	Emission factor applicable for Pine plantation (PP)	56.5400	$tC\ ha^{-1}$	Cambodia's official forest reference level (FRL)	
NCV_f	Net calorific value of fuel *f*	-	$GJ\ kg^{-1}$	2006 IPCC Guidelines Tables 1.2	Input on "MPS(input_PJ_Opt1)" sheet
$EF_{fuel\,f}$	CO_2 emission factor of the fuel type *f* combusted	-	$tCO_2\ GJ^{-1}$	2006 IPCC Guidelines Tables 2.5 and 3.2.1	Input on "MPS(input_PJ_Opt1)" sheet

Table3: *Ex-post* calculation of CO_2 emission reductions to be credited

Monitoring period	CO_2 emission reductions			Units
12 March 2018 to 31 December 2020	during period *p*		900,770	tCO_2/p
	Year	2018	278,017	tCO_2/y
		2019	323,988	tCO_2/y
		2020	298,765	tCO_2/y
		2021	0	tCO_2/y
		2022	0	tCO_2/y
		2023	0	tCO_2/y
		2024	0	tCO_2/y
		2025	0	tCO_2/y
		2026	0	tCO_2/y
		2027	0	tCO_2/y
		2028	0	tCO_2/y
		2029	0	tCO_2/y

[Monitoring option]

Option A	Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)
Option B	Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipments (Data used: measured values)

Monitoring Spreadsheet: JCM_KH_AM004_ver01.1
Reference Number: KH005

Parameters		$A_{i,y}$												$\Delta CS_{ref\ y}$												RL**y**	d_y	d_{0y}
Description of data		Area of forest class *i* in the project area in year *y*												Projected carbon stock change in the project area in year *y*												Project reference level in year *y*	number of operating days in year *y*	number of days in year *y*
Units		ha												tC												$tCO_2\ y^{-1}$	*days*	*days*
Forest class *i*		Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation	non forest	Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation	non forest	-	-	-
Inception of the project	2018	57850	16819	0	8638	1014	0	0	0	2418	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Year	2018	56,686	16,399	0	8,397	1,002	0	0	0	2,228	0	0	2,027	106,293	56,750	0	11,611	0	0	0	0	8,100	0	0	0	670,101	295	365
	2019	55,275	15,892	0	8,107	988	0	0	0	2,011	0	0	4,465	128,868	68,463	0	13,966	0	0	0	0	9,235	0	0	0	808,618	365	365
	2020	53,898	15,401	0	7,827	974	0	0	0	1,816	0	0	6,822	125,659	66,347	0	13,484	0	0	0	0	8,338	0	0	0	784,038	366	366
	2021	52,556	14,925	0	7,557	960	0	0	0	1,639	0	0	9,100	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2022	51,247	14,464	0	7,297	947	0	0	0	1,480	0	0	11,303	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2023	49,971	14,017	0	7,045	933	0	0	0	1,336	0	0	13,435	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2024	48,727	13,584	0	6,802	920	0	0	0	1,206	0	0	15,499	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2025	47,514	13,164	0	6,567	907	0	0	0	1,089	0	0	17,497	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2026	46,331	12,757	0	6,341	895	0	0	0	983	0	0	19,432	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2027	45,177	12,363	0	6,122	882	0	0	0	888	0	0	21,306	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2028	44,052	11,981	0	5,911	869	0	0	0	801	0	0	23,123	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2029	42,955	11,611	0	5,707	857	0	0	0	723	0	0	24,884	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,262,758	-	-

Emission from carbon stock change in the project area

Parameters	$CA_{pj\,i\,y}$												$\Delta CS_{pj\,i\,y}$												$\Delta CS_{pj\,y}$
Description of data	Area converted from forest class *i* to non-forest in the project area in year *y*												Carbon stock change in area converted from forest class *i* to non-forest in the project area in year *y*												Carbon stock change in the project area in year *y*
Units	ha												tC												tC
Forest class *i*	Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation	non forest	Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation	non forest	total
Year 2018	0	146	0	605	291	0	0	0	212	0	0	0	0.00	19,759.98	0.00	29,157.45	0.00	0.00	0.00	0.00	9,031.17	0.00	0.00	0.00	57,949
2019	0	181	0	748	361	0	0	0	262	0	0	0	0.00	24,448.78	0.00	36,076.16	0.00	0.00	0.00	0.00	11,174.16	0.00	0.00	0.00	71,699
2020	0	181	0	750	362	0	0	0	263	0	0	0	0.00	24,515.77	0.00	36,175.00	0.00	0.00	0.00	0.00	11,204.77	0.00	0.00	0.00	71,896
2021													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2022													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2023													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2024													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2025													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2026													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2027													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2028													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
2029													0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	201,543

Emissions from fossil fuel combustion (Direct and Indirect methods)

Parameters	NCV_f					$EF_{fuel\,f}$				
Description of data	Net calorific value of fuel *f*					CO_2 emission factor of the fuel type *f* combusted				
Units	GJ kg^{-1}					tCO_2 GJ^{-1}				
Fuel type *f*	Gas/diesel oil	Motor gasoline	Crude oil			Gas/diesel oil	Motor gasoline	Crude oil		
Value	0.0430	0.0443	0.0423			0.0741	0.0693	0.0733		

Emissions from fossil fuel combustion (Direct method)

Parameters	$FC_{f\,y}$					$E_{fuel\,f\,y}$					$E_{fuel\,y}$ (direct)
Description of data	Quantity of fuel type *f* consumed in year *y*					CO_2 emissions from combustion of fossil fuel type *f* in year *y*					CO_2 emissions from fossil fuel combustion in year *y* due to the project activities (direct method)
Units	kg					tCO_2					tCO_2
Fuel type *f*	Gas/diesel oil	Motor gasoline	Crude oil			Gas/diesel oil	Motor gasoline	Crude oil			-
Year 2018		3,577				0.0	11.0	0.0	0.0	0.0	11.0
2019		4,596				0.0	14.1	0.0	0.0	0.0	14.1
2020		5,255				0.0	16.1	0.0	0.0	0.0	16.1
2021						0.0	0.0	0.0	0.0	0.0	0.0
2022						0.0	0.0	0.0	0.0	0.0	0.0
2023						0.0	0.0	0.0	0.0	0.0	0.0
2024						0.0	0.0	0.0	0.0	0.0	0.0
2025						0.0	0.0	0.0	0.0	0.0	0.0
2026						0.0	0.0	0.0	0.0	0.0	0.0
2027						0.0	0.0	0.0	0.0	0.0	0.0
2028						0.0	0.0	0.0	0.0	0.0	0.0
2029						0.0	0.0	0.0	0.0	0.0	0.0
Total	-	-	-	-	-	-	-	-	-	-	41.2

Emissions from fossil fuel combustion (Indirect method)

Vehicle type																-
Fuel type *f*																-
Value	$SEC_{j\,f}$					NCV_f					NA	NA	NA	NA	NA	NA
	Average specific energy consumption of vehicle or equipment type *j* for fuel type *j*					0.0000	0.0000	0.0000	0.0000	0.0000						
	kg km^{-1} or hour^{-1}					$EF_{fuel\,f}$										
						0.0000	0.0000	0.0000	0.0000	0.0000						
Parameters	$NVE_{j\,f\,y}$					$TDU_{j\,f\,y}$					$E_{fuel\,j\,f\,y}$					$E_{fuel\,y}$ (indirect)
Description of data	Number of vehicle or equipment type *j* using fuel type *f* in year *y*					Total travel distance for vehicle type *j* or use hours for equipment type *j* using fuel type *f* in year *y*					CO_2 emissions from fossil fuel combustion in vehicle /or equipment type *j* using fuel type *f* in year *y*					CO_2 emissions from fossil fuel combustion in year *y* due to the project activities (indirect method)
Units	unit					km or hour unit^{-1}					tCO_2					tCO_2
Year 2018											0.0	0.0	0.0	0.0	0.0	0.0
2019											0.0	0.0	0.0	0.0	0.0	0.0
2020											0.0	0.0	0.0	0.0	0.0	0.0
2021											0.0	0.0	0.0	0.0	0.0	0.0
2022											0.0	0.0	0.0	0.0	0.0	0.0
2023											0.0	0.0	0.0	0.0	0.0	0.0
2024											0.0	0.0	0.0	0.0	0.0	0.0
2025											0.0	0.0	0.0	0.0	0.0	0.0
2026											0.0	0.0	0.0	0.0	0.0	0.0
2027											0.0	0.0	0.0	0.0	0.0	0.0
2028											0.0	0.0	0.0	0.0	0.0	0.0
2029											0.0	0.0	0.0	0.0	0.0	0.0
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0

Emission from fertilizer application

Parameters	$NC_{SN\,c}$		$NC_{ON\,c}$		$Frac_{Renew\,T}$			$R_{AG\,T}$			$R_{BG\,T}$			$N_{AG\,T}$			$N_{BG\,T}$		
Description of data	Nitrogen content of synthetic fertilizer applied in cropland type		Nitrogen content of organic fertilizer applied in cropland		Fraction of total area under N-fixing crop *T* that is renewed annually			Ratio of above-ground residues to harvested yield for N-fixing crop *T*			Ratio of below-ground residues to harvested yield for N-fixing crop *T*			N content of above-ground residues for N-fixing crop *T*			N content of below-ground residues for N-fixing crop *T*		
Units	tN (t fertilizer)$^{-1}$		tN (t fertilizer)$^{-1}$		dimensionless			t d.m. (t d.m.)$^{-1}$			t d.m. (t d.m.)$^{-1}$			t N (t d.m.)$^{-1}$			t N (t d.m.)$^{-1}$		
Cropland type *c* / N-fixing crop *T*	General (non-paddy)	Rice paddy	General (non-paddy)	Rice paddy	Beans & pulses	Beans & pulses		Beans & pulses	Beans & pulses		Beans & pulses	Beans & pulses		Beans & pulses	Beans & pulses		Beans & pulses	Beans & pulses	
Value					1.000			1.864			0.544			0.008			0.008		

Parameters	$M_{SN\,c\,y}$		$M_{ON\,c\,y}$		$Crop_{c\,T\,y}$						$Area_{c\,T\,y}$						$F_{SN\,c\,y}$		$F_{ON\,c\,y}$		$F_{CR\,c\,y}$		$M_{limestone\,y}$	$M_{dolomite\,y}$	$M_{urea\,y}$	$E_{direct\text{-}N\,y}$	$E_{indirect\text{-}N\,y}$	$E_{liming\,y}$	$E_{urea\,y}$	$E_{fertilizer\,y}$
Description of data	Mass of synthetic fertilizer applied for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*		Mass of organic fertilizer made from materials sourced from outside of the project area and the activity area and applied for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*		Harvested annual dry matter yield for N-fixing crop *T* per unit area, introduced for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*						Total annual area harvested of N-fixing crop *T*, introduced for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*						Mass of nitrogen in synthetic fertilizer applied for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*		Mass of nitrogen in organic fertilizer made from materials sourced from outside the project area and the activity area and applied for implementation of the project activities in cropland type *c* in the project area and the activity area in year *y*		Mass of nitrogen in crop residues (above-ground and below-ground) in N-fixing crops, introduced for implementation of the project activities in cropland type c in the project area and the activity area and returned to soils, in year *y*		Mass of calcic limestone ($CaCO_3$) applied for implementation of the project activities in the project area and the activity area in year *y*	Mass of dolomite ($CaMg(CO_3)_2$) applied for implementation of the project activities in the project area and the activity area in year *y*	Mass of urea fertilizer applied for implementation of the project activities in the project area and the activity area in year *y*	Direct N_2O emissions as a result of nitrogen application within the project area and the activity area for implementation of the project activities in year *y*	Indirect N_2O emissions as a result of nitrogen application within the project area and the activity area for implementation of the project activities in year *y*	CO_2 emissions as a result of adding liming materials within the project area and the activity area for implementation of the project activities in year *y*	CO_2 emissions as a result of urea fertilization application within the project area and the activity area for implementation of the project activities in year *y*	GHG emissions from fertilizer application within the project area and the activity area for implementation of the project activities in year *y*
Units	t		t		t d.m. ha^{-1}						ha						tN		tN		tN		t	t	t	tCO_2-eq	tCO_2-eq	tCO_2	tCO_2	tCO_2-eq
Cropland type *c*	General (non-paddy)	Rice paddy	General (non-paddy)	Rice paddy	General (non-paddy)			Rice paddy			General (non-paddy)			Rice paddy			General (non-paddy)	Rice paddy	General (non-paddy)	Rice paddy	General (non-paddy)	Rice paddy	NA	NA	NA	NA	NA	NA	NA	NA
N-fixing crop *T*	NA	NA	NA	NA	Beans & pulses	Beans & pulses		Beans & pulses	Beans & pulses		Beans & pulses	Beans & pulses		Beans & pulses	Beans & pulses		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Year 2018					1.2			1.2			0.0			0.0			0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2019					1.2			1.2			0.0			0.0			0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2020					1.2			1.2			4.0			0.4			0.0	0.0	0.0	0.0	0.1	0.0				0.4	0.1	0.0	0.0	0.5
2021																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2022																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2023																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2024																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2025																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2026																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2027																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2028																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
2029																	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.1	0.0	0.0	0.5

Displaced emission

Parameters	$A_{d\,i\,y}$												$\Delta CS_{d\,y}$										
Description of data	Area of forest class *i* in the displacement belt in year *y*												Projected carbon stock change in the displacement belt in year *y*										
Units	ha												tC										
Forest class *i*	Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation	non forest	Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation
Inception of the project 2018	6,241	5,161	0	4,396	184	0	0	0	621	0	0	0	-	-	-	-	-	-	-	-	-	-	-
Year 2018	6,115	5,032	0	4,274	182	0	0	0	572	0	0	428	11,466	17,414	0	5,910	0	0	0	0	2,080	0	0
2019	5,963	4,877	0	4,126	179	0	0	0	517	0	0	941	13,901	21,008	0	7,108	0	0	0	0	2,372	0	0
2020	5,814	4,726	0	3,984	177	0	0	0	466	0	0	1,436	13,555	20,359	0	6,863	0	0	0	0	2,141	0	0
2021	5,669	4,580	0	3,846	174	0	0	0	421	0	0	1,912	0	0	0	0	0	0	0	0	0	0	0
2022	5,528	4,438	0	3,714	172	0	0	0	380	0	0	2,370	0	0	0	0	0	0	0	0	0	0	0
2023	5,391	4,301	0	3,585	170	0	0	0	343	0	0	2,813	0	0	0	0	0	0	0	0	0	0	0
2024	5,256	4,168	0	3,462	167	0	0	0	310	0	0	3,239	0	0	0	0	0	0	0	0	0	0	0
2025	5,125	4,040	0	3,342	165	0	0	0	280	0	0	3,651	0	0	0	0	0	0	0	0	0	0	0
2026	4,998	3,915	0	3,227	163	0	0	0	252	0	0	4,048	0	0	0	0	0	0	0	0	0	0	0
2027	4,873	3,794	0	3,116	160	0	0	0	228	0	0	4,432	0	0	0	0	0	0	0	0	0	0	0
2028	4,752	3,677	0	3,008	158	0	0	0	206	0	0	4,802	0	0	0	0	0	0	0	0	0	0	0
2029	4,634	3,563	0	2,904	156	0	0	0	186	0	0	5,160	0	0	0	0	0	0	0	0	0	0	0
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Parameters	$CA_{d\,pj\,i\,y}$												$\Delta CS_{d\,pj\,i\,y}$											
Description of data	Area converted from forest class *i* to non-forest in the displacement belt in year *y*												Actual carbon stock change in the displacement belt in year *y*											
Units	ha												tC											
Forest class *i*	Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation	non forest	Evergreen forest	Semi-evergreen forest	Pine forest	Deciduous forest	Bamboo	Mangrove	Rear Mangrove	Flooded forest	Forest regrowth	Tree plantation	Pine plantation	non forest
Inception of the project 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Year 2018	561	0	0	325	53	0	0	0	0	0	0	0	51,247	0	0	15,648	0	0	0	0	0	0	0	0
2019	694	0	0	402	66	0	0	0	0	0	0	0	63,408	0	0	19,361	0	0	0	0	0	0	0	0
2020	696	0	0	403	66	0	0	0	0	0	0	0	63,581	0	0	19,414	0	0	0	0	0	0	0	0
2021													0	0	0	0	0	0	0	0	0	0	0	0
2022													0	0	0	0	0	0	0	0	0	0	0	0
2023													0	0	0	0	0	0	0	0	0	0	0	0
2024													0	0	0	0	0	0	0	0	0	0	0	0
2025													0	0	0	0	0	0	0	0	0	0	0	0
2026													0	0	0	0	0	0	0	0	0	0	0	0
2027													0	0	0	0	0	0	0	0	0	0	0	0
2028													0	0	0	0	0	0	0	0	0	0	0	0
2029													0	0	0	0	0	0	0	0	0	0	0	0
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Parameters	DR_y	DP_y	DE_y	d_y	d_{0y}	$\Delta CSd\,pj\,y$
Description of data	Reference emissions from the displacement belt in year *y*	Project emissions from the displacement belt in year *y*	Displaced emissions to the displacement belt in year *y*	number of operating days in year *y*	number of days in year *y*	
Units	tCO_2	tCO_2	tCO_2	*days*	*days*	tC
Forest class *i*	-	-	-	-	-	total
Inception of the project 2018	-	-	-	-	-	
Year 2018	135,191.8	245,281.8	110,090.0	295.0	365.0	66,895
2019	162,762.3	303,484.3	140,722.0	365.0	365.0	82,768
2020	157,368.4	304,315.7	146,947.4	366.0	366.0	82,995
2021	0.0	0.0	0.0	0.0	0.0	
2022	0.0	0.0	0.0	0.0	0.0	
2023	0.0	0.0	0.0	0.0	0.0	
2024	0.0	0.0	0.0	0.0	0.0	
2025	0.0	0.0	0.0	0.0	0.0	
2026	0.0	0.0	0.0	0.0	0.0	
2027	0.0	0.0	0.0	0.0	0.0	
2028	0.0	0.0	0.0	0.0	0.0	
2029	0.0	0.0	0.0	0.0	0.0	
Total	455,322.5	853,081.8	397,759.3	-	-	232,659

Total of Project net emissions

Parameters	PE_y
Description of data	Project net emission in year *y*
Units	tCO_2
Year 2018	322,579.2
2019	403,632.8
2020	410,581.0
2021	0.0
2022	0.0
2023	0.0
2024	0.0
2025	0.0
2026	0.0
2027	0.0
2028	0.0
2029	0.0
Total	1,136,793.0

Estimated E x0.8

tCO2	tCO2
347,522.3	278,018
404,985.6	323,989
373,456.8	298,765
1,125,964.7	900,772

Monitoring Spreadsheet: JCM_KH_AM004_ver01.1
Reference Number: KH005

Monitoring Report Sheet (Calculation Process Sheet) [For Verification]

1. Calculations for emission reductions to be credited	Pool / Sources	Value	Units	Parameter
Project emission reductions to be credited during the period *p*		900,771.8	tCO_2e	ER_p
Project emission reductions to be credited in year *y*				
2018		278,017.9	tCO_2e	ER_y
2019		323,988.5	tCO_2e	ER_y
2020		298,765.4	tCO_2e	ER_y
2021		0.0	tCO_2e	ER_y
2022		0.0	tCO_2e	ER_y
2023		0.0	tCO_2e	ER_y
2024		0.0	tCO_2e	ER_y
2025		0.0	tCO_2e	ER_y
2026		0.0	tCO_2e	ER_y
2027		0.0	tCO_2e	ER_y
2028		0.0	tCO_2e	ER_y
2029		0.0	tCO_2e	ER_y
2. Calculations for project reference level				
Project reference level during period *p*		2,262,757.7	tCO_2e	RL_p
Project reference level in year *y*				
2018	Carbon stock	670,101.5	tCO_2e	RL_y
2019	Carbon stock	808,618.4	tCO_2e	RL_y
2020	Carbon stock	784,037.8	tCO_2e	RL_y
2021	Carbon stock	0.0	tCO_2e	RL_y
2022	Carbon stock	0.0	tCO_2e	RL_y
2023	Carbon stock	0.0	tCO_2e	RL_y
2024	Carbon stock	0.0	tCO_2e	RL_y
2025	Carbon stock	0.0	tCO_2e	RL_y
2026	Carbon stock	0.0	tCO_2e	RL_y
2027	Carbon stock	0.0	tCO_2e	RL_y
2028	Carbon stock	0.0	tCO_2e	RL_y
2029	Carbon stock	0.0	tCO_2e	RL_y

3. Calculations of the project emissions				
Project net emissions during period *p*		1,136,793.0	tCO_2e	Pep
Emissions from carbon stock change in the project area in year *y*				
2018	Carbon stock	212,478.2	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2019	Carbon stock	262,896.7	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2020	Carbon stock	263,617.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2021	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2022	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2023	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2024	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2025	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2026	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2027	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2028	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
2029	Carbon stock	0.0	tCO_2e	$\Delta CS_{pi\,y}$*44/12
CO_2 emissions from fossil fuel combustion in year *y*				
2018	Combustion of fossil fuels	11.0	tCO_2e	Efuel y
2019	Combustion of fossil fuels	14.1	tCO_2e	Efuel y
2020	Combustion of fossil fuels	16.1	tCO_2e	Efuel y
2021	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2022	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2023	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2024	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2025	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2026	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2027	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2028	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
2029	Combustion of fossil fuels	0.0	tCO_2e	Efuel y
GHG emissions from fertilizer application in year *y*				
2018	Fertilizer application	0.0	tCO_2e	Efertilizer y
2019	Fertilizer application	0.0	tCO_2e	Efertilizer y
2020	Fertilizer application	0.5	tCO_2e	Efertilizer y
2021	Fertilizer application	0.0	tCO_2e	Efertilizer y
2022	Fertilizer application	0.0	tCO_2e	Efertilizer y
2023	Fertilizer application	0.0	tCO_2e	Efertilizer y
2024	Fertilizer application	0.0	tCO_2e	Efertilizer y
2025	Fertilizer application	0.0	tCO_2e	Efertilizer y
2026	Fertilizer application	0.0	tCO_2e	Efertilizer y
2027	Fertilizer application	0.0	tCO_2e	Efertilizer y
2028	Fertilizer application	0.0	tCO_2e	Efertilizer y
2029	Fertilizer application	0.0	tCO_2e	Efertilizer y
Displacement of net emissions in year *y*				
2018	Carbon stock	110,090.0	tCO_2e	DE_y
2019	Carbon stock	140,722.0	tCO_2e	DE_y
2020	Carbon stock	146,947.4	tCO_2e	DE_y
2021	Carbon stock	0.0	tCO_2e	DE_y
2022	Carbon stock	0.0	tCO_2e	DE_y
2023	Carbon stock	0.0	tCO_2e	DE_y
2024	Carbon stock	0.0	tCO_2e	DE_y
2025	Carbon stock	0.0	tCO_2e	DE_y
2026	Carbon stock	0.0	tCO_2e	DE_y
2027	Carbon stock	0.0	tCO_2e	DE_y
2028	Carbon stock	0.0	tCO_2e	DE_y
2029	Carbon stock	0.0	tCO_2e	DE_y
4. Calculation of discount factor				
Discount factor		20	%	DF

[List of Default Values]

Emission factor for N_2O emission from N inputs for general (non-paddy)	0.01	$tN_2O\text{-}N\ (tN\text{-}input)^{-1}$	$EF_{direct\text{-}N}$ (general)
Emission factor for N_2O emission from N inputs for Rice paddy (flooded rice field)	0.003	$tN_2O\text{-}N\ (tN\text{-}input)^{-1}$	$EF_{direct\text{-}N}$ (paddy)
Fraction that volatilized as NH_3 and NOx for synthetic fertilizers	0.10	dimensionless	$Frac_{SN}$
Fraction that volatilized as NH_3 and NOx for organic	0.20	dimensionless	$Frac_{ON}$
Emission factor for N_2O emissions from atmospheric deposition of N on soils and water surfaces	0.010	$tN_2O\text{-}N\ (tNH_3\text{-}N$ and $NO_X\text{-}N$ volatilized)$^{-1}$	$EF_{indirect\text{-}N}$
Fraction of N that is lost through leaching and runoff	0.30	dimensionless	$Frac_{leach}$
Emission factor for N_2O emissions from N leaching and runoff	0.0075	$tN_2O\text{-}N$ (t leaching and runoff)$^{-1}$	$EF_{leach\text{-}N}$
Emission factor for limestone	0.12	tC (t limestone)$^{-}$	$EF_{limestone}$
Emission factor for dolomite	0.13	tC (t dolomite)$^{-1}$	$EF_{dolomite}$
Emission factor for urea	0.20	tC (t urea)$^{-1}$	EF_{urea}
Global Warming Potential for N_2O	298	$tCO_2\ tN_2O^{-1}$	GWP_{N2O}
Net calorific value of gas/diesel oil	0.043	GJ kg^{-1}	NCV_f
Net calorific value of motor gasoline	0.0443	GJ kg^{-1}	NCV_f
Net calorific value of crude oil	0.0423	GJ kg^{-1}	NCV_f
CO_2 emission factor of gas/diesel oil combusted	0.0741	$tCO_2\ GJ^{-1}$	$EF_{fuel\ f}$
CO_2 emission factor of motor gasoline combusted	0.0693	$tCO_2\ GJ^{-1}$	$EF_{fuel\ f}$
CO_2 emission factor of crude oil combusted	0.0733	$tCO_2\ GJ^{-1}$	$EF_{fuel\ f}$

Monitoring Report Sheet Attachment

1. Monitoring sites of the ground-based survey(s)

Description of data	Monitoring sites (Map and locations)
No ground-based survey for the monitoring of net project emissions was conducted.	

2. Reassessment of project reference level

We didn't reassess as it was less than five years since the establishment of the reference level.

3. Recording and archiving data

Description of data	Actual situation of recording and archiving
Area converted from forest class i to non-forest in the project area in year y	Ministry of Environment, Cambodia, provided data to CI, and CI keeps it in a Sharepoint folder.
Area converted from forest class i to non-forest in the displacement belt in year y	Ministry of Environment, Cambodia, provided data to CI, and CI keeps it in a Sharepoint folder.
(Direct method) Quantity of fuel type f consumed in year y	Staff, who purchased fuel, submitted receipts to their organization, and the receipts were kept both in paper and in PDF.
Harvested annual dry matter yield for N-fixing crop T per unit area, introduced for implementation of the project activities in cropland type c in the project area and the activity area in year y	Public data (FAOSTAT)
Total annual area harvested of N-fixing crop T, introduced for implementation of the project activities in cropland type c in the project area and the activity area in year y	Sansom Mlup Prey Cambodia recorded area and provided to CI. CI kept the data I a Sharepoint folder.
Ratio of above-ground residues to harvested yield for N-fixing crop T	Public data (IPCC and FAOSTAT)
Ratio of below-ground residues to harvested yield for N-fixing crop T	Public data (IPCC and FAOSTAT)
N content of above-ground residues for N-fixing crop T	Public data (IPCC)
N content of below-ground residues for N-fixing crop T	Public data (IPCC)
Fraction of total area under N-fixing crop T that is renewed annually	CI interviewed to Sansom Mlup Prey Cambodia and recorded in Project Management Cord (excel sheet) in a Sharepoint folder.

Annex
