T-VER-P-TOOL-01-13

Calculation for methane emission reduction by adjusted water management practice in rice cultivation

Version 01

1. Introduction

This document is a tool for assessing the reduction of methane emissions from the project's rice cultivations. This can be used to calculate methane emissions from rice cultivation areas in both the bassline and project scenarios under the adjusted water management practice in rice cultivation activities.

2. Relevant definitions

Details appear in Annex 1

3. Characteristics of activities and use conditions

This tool is suitable for calculating the reduction of methane emissions from rice cultivation areas in baseline and project scenarios of the following areas:

1) This tool can be used in the area where one of the following actions is performed.
   (1) Rice farms with continuously flood condition in the form of intermittent flood condition and/or reduction of flood condition
   (2) Rice farms with alternate wetting and drying condition and aerobic rice cultivation
   (3) Rice farms with transplanting condition for direct seeding
2) Project activities must meet the following conditions:
   (1) The rice cultivation area of the project is irrigated flooded fields and do not cover rainfed, deep water, or upland rice fields that are determined from the survey of the geographical region proposed by the project developer, or by using national data, along with the details of the pre-season water regime and the insertion of organic material for the base case determination.
   (2) The rice cultivation area of the project uses controlled irrigation and drainage equipment or tools to control water in both the rainy and dry seasons.
   (3) Project activities shall not cause a reduction in rice yields beyond the requirements of the method and there is no need to modify the rice varieties planted
   (4) The project must provide training and technical support to the farmers implementing the project especially the area preparation, watering, drainage and fertilizer application and provide documentary evidence of implementation. Project developers must ensure that farmers have the criteria to assess the appropriate amount of nitrogen fertilizer application by using scientific tools such

as the use of leaf color charts or recommendations from government agencies or appropriate reference documents with supporting evidence.

(5) The project developer must demonstrate that the methane reduction activities in the rice cultivation area are not undertaken by the unit's requirements.

(6) If the assessment is carried out using the default value approach from the rice cultivation area that is measured by the representative area of the project The measurement method must be made using a closed chamber method and analyzed in a laboratory.

3) Project activities must specify details of rice cultivation patterns for baseline and project scenarios. Table 1 shows the cultivation patterns for reference.

Table 1 Details of rice cultivation patterns for base cases and project implementation cases

Parameter	Type[a]	Category/Value	Information Sources/Methods
Water management style (on-season)	Dynamic	Continuously flooded Single Drainage Multiple Drainage	Baseline: Farmer's information Project: Monitoring
Water management model (pre-season)	Dynamic	Flooded Short drainage, less than 180 days Long drained, more than 180 days	Baseline: Farmer's information Project: Monitoring
Organic Amendment	Dynamic	Straw on-season[b] Straw off-season[b] Green manure Farm yard manure Compost No organic amendment	Baseline: Farmer's information Project: Monitoring
Soil pH	Static	<4.5 4.5-5.5 >5.5	ISRIC-WISE soil property database or national data
Soil Organic carbon (SOC)	Static	<1% 1-3% >3%	ISRIC-WISE soil property database or national data
Climate	Static	Agroecological zones: AEZ	Data based on Rice Almanac (2002) or HarvestChoice. or according to the recognized area classification in the country

Remark:

[a] Dynamic conditions are those that are linked to the activity in the plot, thus causing changes over time and need to follow up Static conditions are parameters specific to the area in determining soil characteristics. and does not change over time therefore measure or report the value only once

[b] Straw on-season insertion is where the straw that has been left in the soil and that has been plowed into the soil and the rice is planted immediately. This is done within 30 days before rice cultivation. Straw off-season is the use of rice straw in the previous growing season. by doing this for more than 30 days before rice cultivation.

In this regard, the project developer must record the general details of the farmers in the participating rice cultivation areas. The project developer must also report on the details of various cultivation activities, including the day of rice cultivation, the day and the amount of fertilization and the use of organic materials, date and amount of pesticide applied each day, water management system, and rice production by referring to standard reporting formats.

4. Calculation of methane emission reduction from rice cultivation area

Decreasing methane emissions from rice cultivation areas participating in the project implementation, there is an alternative assessment method by using the methane emission coefficient from rice cultivation as follows:

Option 1: The default value approach from the rice cultivation area that is measured by the representative area of the project

Step 1: Calculation of methane emissions from rice cultivation areas in the baseline scenarios can be calculated as the following equation

$$CH_4soil_{BSL,t} = \sum_{s} CH_4soil_{BSL,s}$$

$$CH_4soil_{BSL,s} = \sum_{g=1}^{G} EF_{BSL,s,g} \; x \; A_{s,g} \; x \; 10^{-3} \; x \; GWP_{CH4}$$

Where:

$CH_4soil_{BSL,t}$	Methane emissions from rice cultivation in the baseline in year t (tons of carbon dioxide equivalent)
$CH_4soil_{BSL,s}$	Methane emissions from rice cultivation in the baseline for the growing season s (tons of CO_2 equivalent)
$EF_{BSL,s,g}$	The methane emission factor from rice cultivation in the baseline of the g pattern for the growing season s (kg methane per Rai per growing

season) was measured in the representative area of the project by the enclosed chamber method. Closed chambers throughout the rice growing season had at least 3 replicates for each cultivation pattern (Table 1), and the methane emission factor was used as the mean of the repeats measured

$A_{s,g}$	The rice cultivation area of the project in g pattern for the growing season s (rai)
GWP_{CH4}	Global warming potential of methane
g	Cultivation patterns 1,2,3,... must cover all project field
s	Growing season

Step 2: Calculation of methane emissions from rice cultivation areas in project scenarios can be calculated as the following equation:

$$CH_4soil_{PROJ,t} = \sum_{s} CH_4soil_{PROJ,s}$$

$$CH_4soil_{PROJ,s} = \sum_{g=1}^{G} EF_{PROJ,s,g}\ x\ A_{s,g}\ x\ 10^{-3}\ x\ GWP_{CH4}$$

Where:

$CH_4soil_{PROJ,t}$	Methane emissions from rice cultivation in project implementation in year t (tons of carbon dioxide equivalent)
$CH_4soil_{PROJ,s}$	Methane emissions from rice cultivation in project implementation for s growing season (tons of carbon dioxide equivalent)
$EF_{PROJ,s,g}$	The methane emission factor from rice cultivation in project implementation of the g pattern for the growing season s (kg methane per rai per growing season) was measured in the representative area of the project by the chamber method. Closed chamber throughout the rice growing season with at least 3 repetitions for each cultivation pattern, and the methane emission factor used as the mean of the number of repeats measured.
$A_{s,g}$	The rice cultivation area of the project in g pattern for the growing season s (Rai)
GWP_{CH4}	Global warming potential of methane

g Cultivation patterns 1,2,3,... must cover all project field

s Growing season

Step 3: Calculate methane emission reduction from the rice cultivation area from the project scenarios can be calculated as the following equation

$$CH_4soil_{ER,t} = CH_4soil_{BSL,t} - CH_4soil_{PROJ,t}$$

Where:

$CH_4soil_{ER,t}$ Project methane emission reduction in year t (tons of carbon dioxide equivalent)

$CH_4soil_{BSL,t}$ Methane emissions from rice cultivation in the baseline in year t (tons of carbon dioxide equivalent)

$CH_4soil_{PROJ,t}$ Methane emissions from rice cultivation in project implementations in year t (tons of carbon dioxide equivalent)

Option 2: Recommended emission factor for rice cultivation

$$CH_4soil_{ER,t} = EF_{ER}\ x\ A_t\ x\ L_t\ x\ 10^{-3}\ x\ GWP_{CH4}$$

$$EF_{ER} = EF_{BSL} - EF_{PROJ}$$

In case of organic materials used

$$EF_{BSL} = EF_{BSL,c}\ x\ SF_{BSL,w}\ x\ SF_{BSL,p}\ x\ SF_{BSL,o}$$

$$EF_{PROJ} = EF_{BSL,c}\ x\ SF_{PROJ,w}\ x\ SF_{PROJ,p}\ x\ SF_{PROJ,o}$$

In the case of no organic materials used

$$EF_{BSL} = EF_{BSL,c}\ x\ SF_{BSL,w}\ x\ SF_{BSL,p}$$

$$EF_{PROJ} = EF_{BSL,c}\ x\ SF_{PROJ,w}\ x\ SF_{PROJ,p}$$

Where:

$CH_4soil_{ER,t}$ Methane emission reduction decreased in year t of the project (tons of carbon dioxide equivalent)

EF_{ER} Methane emission factor decreased from rice cultivation in project implementation (Kg Methane Gas per Rai per Day or Kg Methane Gas per Rai per Growing Season)

EF_{BSL}	The methane emission factor from rice cultivation in the baseline (Kg Methane Gas per Rai per Day or Kg Methane Gas per Rai per Growing Season)
EF_{PROJ}	Methane emission factor from rice cultivation in project implementation (Kg Methane Gas per Rai per Day or Kg Methane Gas per Rai per Growing Season)
$EF_{BSL,c}$	Methane emission factor rice cultivation as continuously flooded on the growing season without organic material in the baseline (kg of methane per Rai per Day or kg of methane per Rai per growing season) with 2 alternatives to use the values as follows: (1) the value obtained from the measurement in the representative area of the project by the closed chamber method throughout the rice growing season, there are at least 3 repetitions for each cultivation pattern and the methane emission coefficient used as the mean of the repeat counts, and (2) the IPCC guideline (Annex 2) recommended value
$SF_{BSL,w}$ or $SF_{PROJ,w}$	Adjustment for water management patterns during the growing season in rice cultivation areas in the baseline or project implementation (Annex 2)
$SF_{BSL,p}$ or $SF_{PROJ,p}$	Adjustment for pre-season continuously flooded patterns in rice cultivation areas in the baseline or project implementation (Annex 2)
$SF_{BSL,o}$ or $SF_{PROJ,o}$	Adjustment for organic material in rice cultivation area in baseline or project implementation by calculating from the following equation

$$SF_o = \left(1 + \sum_i ROA_i \ x \ CFOA_i\right)^{0.59}$$

Where:

ROA_i	Application rate of organic material type i (tons per rai by dry weight for straw and fresh weight for other materials)
$CFOA_i$	Conversion factor for organic material type i (compared with short-term straw applied) before cultivation (Annex 2)
A_t	Rice cultivation area of the project in year t (rai)
L_t	Project rice cultivation period in year t (Day) (use only methane emission factor ที่เป็นหน่วยวัน)

GWP_{CH4} Global warming potential of methane

5. Relevant Parameters

5.1 Parameter does not require monitoring

Parameter	$SF_{BSL,w}$ or $SF_{PROJ,w}$
Unit	-
Definition	Adjustment for water management patterns during the growing season in the rice cultivation area in the baseline or project implementation/scenario
Source of information	Recommended values according to the IPCC (Annex 2)
Remark	-

Parameter	$SF_{BSL,p}$ or $SF_{PROJ,p}$
Unit	-
Definition	Modifier for pre-season water management in rice cultivation area in baseline or project implementation/scenario
Source of information	Recommended values according to the IPCC (Annex 2)
Remark	-

Parameter	$CFOA$
Unit	-
Definition	Conversion factor for organic materials applied (compared to the short-term application of straw before cultivation)
Source of information	Recommended values according to the IPCC (Annex 2)
Remark	-

5.2 Parameter required monitoring

Option 1: The default value approach from the rice cultivation area that is measured by the representative area of the project

Parameter	$EF_{BSL,s,g}$

Unit	kg of methane per rai per growing season
Definition	Methane emission factor in baseline
Source of information	Methane gas samples were collected from the project's rice cultivation using IPCC-compliant method
Frequency of monitoring	Samples were collected by closed chamber method and reported the ƒGHG emission per growing season
Remark	-

Parameter	$EF_{PROJ,s,g}$
Unit	kg of methane per rai per growing season
Definition	Methane emission factor in case of project implementation/scenario
Source of information	Methane gas samples were collected from the project's rice cultivation using IPCC-compliant method
Frequency of monitoring	Samples were collected by closed chamber method and reported the GHG emissions per growing season
Remark	-

Parameter	$A_{s,g}$
Unit	Rai
Definition	Sum of project area in s growing season s in the pattren of g
Source of information	- Area exploration using GPS - Use satellite/aerial imagery
Frequency of monitoring	report in annual basis
Remark	-

Option 2: Recommended emission factor for rice cultivation

Parameter	$EF_{BSL,c}$
Unit	Kilograms of methane gas per rai per day or kilograms of methane gas per rai per growing season
Definition	Methane emission factor for continuously flooded fields without organic without organic material

Source of information	Option 1: Collect methane gas samples from the project's rice cultivation area using IPCC-compliant methods. Option 2. Using IPCC recommended values
Frequency of monitoring	Calculate the value before starting the project or yearly monitor
Remark	-

Parameter	A_t
Unit	Rai
Definition	The rice cultivation areas of the project in year t
Source of information	- Area exploration using GPS - Use satellite/aerial imagery
Frequency of monitoring	report in annual basis
Remark	-

Parameter	L_t
Unit	Day
Definition	The rice cultivation period of the project in year t
Source of information	Explore the area, such as a rice planting diary
Frequency of monitoring	Report in annual basis
Remark	Used in conjunction with the methane emission factor from the unit of rice in cultivation season

6. Reference Documents

1) Clean Development Mechanism (CDM) Small-scale methodology: AMS-III.AU. Methane emission reduction by adjusted water management practice in rice cultivation (Version 04.0), 2014.
2) 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 4 Agriculture, Forestry and Other Land Use
3) 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Annex

Annex 1 Relevant Definition

Term	Definition
Soil carbon	Decomposition of organic matter that accumulates in soil to form organic carbon
Transplanted rice	The rice is planted with seeds in the seedling plots for about 20-30 days, then the seedlings are planted in the continuously flooded rice fields
Direct seeded rice	Rice cultivation that is sown or germinated rice (Pre-germinated) directly in the cultivation plots in both continuously flooded or dry conditions
Project cultivation practice	It is an activity according to the requirements of the tool by focusing on water management in rice cultivation areas, site preparation, fertilization and pest management as an alternative to the action
Water regime	It is a rice cultivation pattern that considers both the ecosystem type, such as irrigation and rainwater, and according to the flooding pattern, such as continuously flooded throughout the season such as intermittent flooded
Upland rice	The main rice cultivation without flooded
Irrigated rice	The main rice cultivation is flooding and there is a system or management to control the water in the field
Rainfed and deep-water rice	The main rice cultivation is flooding and the water regime of the area depends solely on rainwater

Annex 2 Methane emission coefficient from rice cultivation , rice cultivation period and various modifiers

Reference to 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

2.1 Methane emission factor for continuously flooded fields without organic amendments ($EF_{bsl,c}$)

TABLE 5.11 (UPDATED)
DEFAULT CH_4 BASELINE EMISSION FACTOR ASSUMING NO FLOODING FOR LESS THAN 180 DAYS PRIOR TO RICE CULTIVATION, AND CONTINUOUSLY FLOODED DURING RICE CULTIVATION WITHOUT ORGANIC AMENDMENTS

World		Regional		
Emission factor (kg CH_4 ha^{-1} d^{-1})	Error range (kg CH_4 ha^{-1} d^{-1})	Region	Emission factor (kg CH_4 ha^{-1} d^{-1})	Error range (kg CH_4 ha^{-1} d^{-1})
1.19	0.80 – 1.76	Africa [1]	1.19	0.80 – 1.76
		East Asia	1.32	0.89 – 1.96
		Southeast Asia	1.22	0.83 – 1.81
		South Asia	0.85	0.58 – 1.26
		Europe	1.56	1.06 – 2.31
		North America	0.65	0.44 – 0.96
		South America	1.27	0.86 – 1.88

Note: Emission factors and error ranges were estimated based on 95% confidence interval, using statistical model with updated database; See Annex 5A.2 for more information.

[1] For Africa, the global estimate is used due to lack of data.

Remark: Applying value conversion unit to kg of methane per rai per day, where 1 hectare equals 6.25 rais

2.2 Modifiers for water management patterns during the growing season in rice cultivation ($SF_{bsl,w}$ or $SF_{proj,w}$)

TABLE 5.12 (UPDATED)
DEFAULT CH_4 EMISSION SCALING FACTORS FOR WATER REGIMES DURING THE CULTIVATION PERIOD RELATIVE TO CONTINUOUSLY FLOODED FIELDS

Water regime		Aggregated case		Disaggregated case	
		Scaling factor)SFw(	Error range	Scaling factor)SFw(	Error range
Upland [a]		0	-	0	–
Irrigated [b]	Continuously flooded	0.60	0.44 – 0.78	1.00	0.73 – 1.27
	Single drainage period			0.71	0.53 – 0.94
	Multiple drainage periods			0.55	0.41 – 0.72
Rainfed and deep water [c]	Regular rainfed	0.45	0.32 – 0.62	0.54	0.39 – 0.74
	Drought prone			0.16	0.11 – 0.24
	Deep water	0.06	0.03 – 0.12	0.06	0.03 – 0.12

Source: Scaling factors and error ranges (based on 95% confidential interval) were determined using statistical model and updated database; see Annex 5A.2 for more information.

Notes:

[a] Fields are never flooded for a significant period of time.

[b] Fields are flooded for a significant period of time and the water regime is fully controlled.

- Continuously flooded: Fields have standing water throughout the rice growing season and may only dry out for harvest)end-season drainage(.
- Single drainage period: Fields have a single drainage event and period during the cropping season at any growth stage, in addition to the end of season drainage.
- Multiple drainage periods: Fields have more than one drainage event and period of time without flooded conditions during the cropping season, in addition to an end of season drainage, including alternate wetting and drying (AWD).

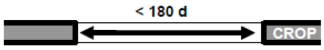
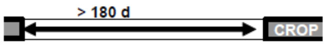
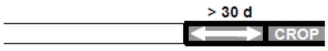
[c] Fields are flooded for a significant period of time with water regimes that depend solely on precipitation.

- Regular rainfed: The water level may rise up to 50 cm during the cropping season.
- Drought prone: Drought periods occur during every cropping season.
- Deep-water rice: Water level rises to more than 50 cm above the soil for a significant period of time during the cropping season.

Other rice ecosystem categories, like swamps and inland, saline or tidal wetlands may be discriminated within each sub-category.

2.3 Modifiers for water management prior to the rice cultivation ($SF_{bsl,p}$ or $SF_{proj,p}$)

TABLE 5.13 (UPDATED)
DEFAULT CH_4 EMISSION SCALING FACTORS FOR WATER REGIMES BEFORE THE CULTIVATION PERIOD

Water regime prior to rice cultivation (schematic presentation showing flooded periods as shaded)		Aggregated case		Disaggregated case	
		Scaling factor (SF_p)	Error range	Scaling factor (SF_p)	Error range
Non flooded pre-season <180 d		1.22	1.08 – 1.37	1.00	0.88 – 1.12
Non flooded pre-season >180 d				0.89	0.80 – 0.99
Flooded pre-season (>30 d)[a,b]				2.41	2.13 – 2.73
Non-flooded pre-season >365 d [c]				0.59	0.41 – 0.84

Source: Scaling factors and error ranges (based on 95% confidential interval) were determined using statistical model and updated database; see Annex 5A.2 for more information.

[a] Short pre-season flooding periods of less than 30 d are not considered in selection of SFp

[b] For calculation of pre-season emission see below (section on completeness)

[c] Refers to "upland crop - paddy rotation" or fallow without flooding in previous year.

2.4 Conversion Factor for Organic Amendment (CFOA)

TABLE 5.14 (UPDATED)
DEFAULT CONVERSION FACTORS FOR DIFFERENT TYPES OF ORGANIC AMENDMENTS

Organic amendment	Conversion factor (CFOA)	Error range
Straw incorporated shortly (<30 days) before cultivation[a]	1.00	0.85 – 1.17
Straw incorporated long (>30 days) before cultivation[a]	0.19	0.11 – 0.28
Compost	0.17	0.09 – 0.29
Farm yard manure	0.21	0.15 – 0.28
Green manure	0.45	0.36 – 0.57

Source: Conversion factors and error ranges (based on 95% confidential interval) were determined using statistical model and updated database; see Annex 5A.2 for more information.

[a] Straw application means that straws are incorporated into the soil. It does not include cases where straws are just placed on soil surface, and straws that were burnt on the field.

Annex 3 Guidelines for measuring methane emissions from rice cultivation areas

Operational requirements

- Measurement of methane emissions from rice cultivations must be controlled or consulted by professionals who have experience collecting gas samples in the field or trained.
- Project developers must prepare laboratory sampling plan and analysis. To obtain methane emission coefficient from rice cultivation area before the growing season, there are important contents such as the determination of the rice cultivation representative area of the project, including climate, soil type, water management, rice and other crops as well as fertilization and organic materials used for rice cultivation schedule and gas sampling including sample analysis
- Details of the installation of gas sample storage chamber are shown below.

Topic	Details	
Materials used for making sample chambers	Option 1: Using an opaque material • Made of PVC plastic or from factory materials such as galvanized steel or galvanized steel. • Make white or a substance that helps reflect light. • Suitable for short-term sampling. Typically about 30 minutes.	Option 2: Using a Translucent Material • Made of acrylic material. • The advantage of a translucent chamber is that it has a lid that can be opened and closed. The chamber can be left in the plot longer.
Installation in soil	Option 1: A base that is fixed to the area. • The base is made of non-rusting material and can be left in the field throughout the growing season. • Must cover the chamber with rust. and does not allow air to enter and exit	Option 2: No Base • Gas storage chambers placed on the ground and open the lid of the chamber for ventilation

Topic	Details	
	• Drill holes in the base to allow water exchange in the interior and exterior of the base. • Must be installed at least 24 hours before the first gas sample collection.	
Auxiliary material	• Install an air temperature gauge or device inside the chamber. Gas sampling point Using rubber stoppers to open and close the sampling point	
Base shape	Round or rectangular shape that must cover an area of at least 4 rice stalks or at least 0.1 square meters in size	
Chamber height	Option 1: Fixed Height • not less than the height of the rice plant	Option 2: Adjustable Height • Height can be adjusted according to the rice plant. • There are chambers according to different heights

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Topic	Details
Number of duplicates per plot	At least 3 duplicates per plot
Number of gas samples per chamber per measurement	At least 3 samples per chamber at a time
Sampling collection period	30 minutes
Time of sampling collection	Morning
Sampling frequency	At least once a week throughout the rice growing season (Begin cultivation rice until before harvesting rice)
Gas storage tube	It is in a suitable condition for use, i.e. the sample is well collected and does not leak. However, the condition must be

Topic	Details
	checked before use. and use equipment that controls gas storage for ease of use
Sample retention	• Sample analysis within 24 hours. Samples can be stored in gas collection tubes • Sample analysis for more than 24 hours, gas samples must be collected in vacuum flasks and stored at slightly higher than normal pressure (slight overpressure)

- Details of gas sample analysis

Topic	Details
Measurement method	Gas Chromatograph and use a Flame ionization detector (FID) as a measuring device
Gas injection	Direct injection or use Multi-port valve and Sample loop
Column	Packed or Capillary columns
Calibration	Standard gas samples were analyzed before and after each day of sample analysis

• Method for calculating methane emission rate from rice cultivation area as shown in the following equation

$$m_{CH4,t} = C_{CH4,t}\ x\ V_{chamber}\ x\ M_{CH4}\ x\ \frac{1\ atm}{R\ x\ T_t\ x\ 1000}$$

$$s = \frac{\Delta m_{CH4}}{\Delta t}$$

$$RE_{ch} = s\ x\ \frac{60\ min}{A_{chamber}}$$

$$RE_{plot} = \frac{\sum RE_{ch}}{N_{ch}}$$

Where:

$m_{CH4,t}$ Mass of methane in the chamber at time t (mg)

t	Point of time of sample (e.g. 0, 15, 30 minutes)
$C_{CH4,t}$	Methane concentration in chamber at time t from the sample analysis (parts per million)
$V_{chamber}$	Chamber volume (liters)
M_{CH4}	Molecular mass of methane (16 g/mol)
$1\ atm$	Atmospheric pressure (set a constant value of 1 atmosphere or have a measuring device installed inside the chamber)
R	Gas constant (defined as 0.08206 L/Kelvin/mol)
T_t	Temperature at time t (Kelvin)
s	The slope of the linear showing relationship between gas concentration and time (value from calculation)
RE_{ch}	Emission rate of chamber (milligrams per square meter height)
ch	Chamber 1, 2, 3, ... on a the plot
$A_{chamber}$	Cross-sectional area of the chamber (square meter)
RE_{plot}	Average emission rate from a plot (milligrams per square meter height)
N_{ch}	Number of chambers in the plot

- Once the average methane emission rate per rice cultivation area is obtained, calculate the amount of methane emissions throughout the rice growing season. For calculating the amount of emissions in each sampling period, we use the total amount of emissions throughout the growing season and report in unit of milligrams per square meter or unit of kilograms per rai.

Document information

Version	Amendment	Entry into force	Description
01	--	1 March 2023	-