

Supplementary Material

Table S1. Site characterization of the Northern sites. For site locations refer to Figure 3; nd = not determined; Not yet publ. = not yet published.

Site	Commune	Province	Lat	Long	Publication
N1	Luong Phong	Bac Giang	21° 20' 32.28" N	106° 0' 50.76" E	[14]
N2	Binh Minh	Thai Binh	20°24'26.85"N	106°26'56.57"E	Not yet publ.
N3	Nguyen Xa	Thai Binh	20°24'23.00"N	106°16'57.76"E	Not yet publ.
N4	Tay Phong	Thai Binh	20°21'37.25"N	106°30'58.42"E	Not yet publ.
N5	Hai Phuc	Nam Dinh	20°13'58,56"N	106°15'32,58"E	Not yet publ.
N6	An Lam	Hai Duong	21°0'11.8512"E	106° 21' 6.4332" N	[16]
N7	Thinh Long	Nam Dinh	20° 3'8.05"N	106°13'27.92"E	[37]
N8	Vinh Quynh	Ha Noi	20°55'603"N	105°050'544"E	[39]
N9	Bac Phu	Ha Noi	21°16'21.08"N	105°53'34.46"E	Not yet publ.
N10	Rang Dong	Nam Dinh	19°59'37.03"N	106° 8'20.49"E	[37]

Table S2. Site characterization of the Central sites. For site locations refer to Figure 3; Not yet publ. = not yet published.

Site	Commune	Province	Lat	Long	Publication
C1	Nghi Thach	Nghe An	18°46'26.92"N	105°42'35.87"E	Not yet publ.
C2	Đai Minh	Quang Nam	15°51'13.60"N	108° 4'12.14"E	Not yet publ.
C3	Đai Minh	Quang Nam	15°51'9.38"N	108° 4'5.25"E	Not yet publ.
C4	Binh An	Quang Nam	15°38'44.05"N	108°25'23.27"E	Not yet publ.
C5	Phuoc Son	Binh Dinh	13°52'33.7"N+	109°12'19.1"E	[15]
C6	Tay Vinh	Binh Dinh	13° 55' 35.16" N	109° 0' 48.46" E	Not yet publ.
C7	An Thuy	Quang Binh	17° 14' 19.51" N	106° 42' 49.87" E	Not yet publ.
C8	Xuan Ninh	Quang Binh	106° 37' 47.262" E	106° 37' 47.26" E	Not yet publ.
C9	Nam Hung	Nghe An	18°44'37.17"N	105°26'41.16"E	Not yet publ.
C10	Nam Hung	Nghe An	18°44'43.60"N	105°26'37.18"E	Not yet publ.
C11	Nam Hung	Nghe An	18°45'19.91"N	105°26'0.32"E	Not yet publ.
C12	Nam Phuoc	Quang Nam	150 50' 56.3"N	1080 16' 37.1"E	[17]
C13	Dai Quang	Quang Nam	150 53' 20.9"N	108003' 23.2"E	[17]
C14	Huong An	Thua Thien Hue	16°28'16"N	107°31'26"E	[31]

Table S3. Site characterization of the Southern sites. For site locations refer to Figure 3; Not yet publ. = not yet published.

Site	Commune	Province	Lat	Long	Publication
S1	Tran De	Soc Trang	9°26'49.93"N	106° 9'49.03"E	Not yet publ.
S2	Nga Nam	Soc Trang	9°31'19.81"N	105°39'56.20"E	Not yet publ.
S3	Chau Thanh	An Giang	10°26'32.23"N	105°19'38.98"E	Not yet publ.
S4	Chau Thanh	An Giang	10°27'40.45"N	105°16'29.73"E	Not yet publ.
S5	Tri Ton	An Giang	10°25'N	105°0'E	[18]
S6	Hoa Binh	Bac Lieu	9°17'6"N	105°39'12"E	[18]
S7	Phuoc Long	Bac Lieu	9°25'18"N	105°27'32"E	[18]
S8	Thoi Lai	Can Tho	9°59'57"N	105°39'40"E	[18]
S9	Hoa An	Hau Giang	9°46'23"N	105°38'19"E	[18]
S10	Tan An	Long An	10° 32' 0" N	106° 25' 0" E	[18]
S11	Tan Thanh	Long An	10° 36' 0" N	106° 6' 0" E	[18]
S12	Tieu Can	Tra Vinh	9°48'41"N	106°11'46"E	[18]

Table S4. Agronomic data at the Northern sites. For site locations refer to Figure 3; Transpl = transplanting; E = early year season; L = late year season; nd = not determined; Incorpor. = incorporated.

Site	Crop rotation	Season ¹ and year	Seeding month	Harvesting month	Variety	Residue management	Seasonal CH ₄ emission rate (kg ha ⁻¹ season ⁻¹)
N1	2x rice/	E_'12	Feb	May	Khang dan 18	Removed	74
	Transpl.	L_'11	Jul	Sep	Khang dan 18	Removed	234
N2	2x rice/	E_'18	Jan	Jun	BC15	Removed	299
	Transpl.	L_'18	Jun	Oct	BC15	Removed	367
N3	2x rice/	E_'18	Jan	Jun	BT7	Compost	189
	Transpl..	L_'18	Jun	Oct	BT7	Compost	336
N4	2x rice/	E_'18	Feb	Jun	DS1	Compost	230
	Transpl.	L_'18	Jun	Oct	DS1	Compost	364
N5	2x rice/	E_'18	Feb	Jun	TX111	Removed	416
	Transpl.	L_'18	Jun	Oct	TX111	Burnt	576
N6	2x rice/	E_'18	Feb	June	Tam X.	Incorpor.	274
	Transpl.	L_'18	July	Oct	Bac Thom 7	Incorpor.	749
N7	2x rice/	E_'18	Feb	Jun	TX111	Removed	291
	Transpl.	L_'18	Jun	Oct	TX111*	Removed	358
N8	2x rice/	E_'18	Feb	Jun	Khang dan 18	Removed	311
	Transpl.	L_'18	Jun	Oct	Khang dan 18	Removed	595
N9	2x rice/	E_'18	Feb	Jun	BC15	Removed	74
	Transpl.	L_'18	Jun	Oct	BC15	Removed	203
N10	2x rice/	E_'18	Feb	Jun	TX111	Incorpor.	297
	Transpl.	L_'18	Jun	Oct	TX111	Burnt	521

Table S5. Agronomic data of the Central sites. For site locations refer to Figure 3; Transpl. = transplanting; Dir. Seed. = direct seeding; E = early year season; M = mid-year season; nd = not determined; Incorpor. = incorporated.

Site	Crop rotation	Season ² and year	Seeding month	Harvesting month	Variety	Residue management	Seasonal CH ₄ emission rate (kg ha ⁻¹ season ⁻¹)
C1	1x rice/ Transpl.	M_'18	Aug	Nov	Thiên Ưu	Removed	125
C2	2x rice/	E_'18	Dec	Apr	HT1	Removed	157
	Dir. Seed.	M_'18	Jun	Sep	HT1	Removed	171
C3	2x rice/	E_'18	Dec	Apr	HT1	n.d.	214
	Dir. Seed.	M_'18	Jun	Sep	HT1	Removed	191
C4	2x rice/	E_'18	Dec	Apr	HT1	n.d.	200
	Dir. Seed.	M_'18	Jun	Sep	HT1	n.d.	171
C5	1x rice/	E_'14	Dec	Apr	VNTA2	n.d.	323
	Dir. Seed.						

¹ Local names: E = vụ Xuân; L = vụ Mùa

² Local names: E = vụ Đông Xuân; M= vụ Hè Thu

C6	1x rice/ Dir. Seed.	E_ '14	Dec	Apr	CT16	n.d.	468
C7	1x rice/ Dir. Seed.	E_ '14	Jan	May	P6	n.d.	136
C8	2x rice/ Dir. Seed.	E_ '14	Jan	May	P6	n.d.	454
C9	2x rice/ Transpl.	E_ '18	Jan	May	Thiên Ưu	n.d.	148
		M_ '18	May	Sep	Thiên Ưu	n.d.	130
C10	2x rice/ Transpl.	E_ '18	Jan	May	Thiên Ưu	Removed	273
		M_ '18	May	Sep	Thiên Ưu	Removed	184
C11	2x rice/ Transpl.	E_ '18	Jan	May	Thiên Ưu	Removed	302
		M_ '18	May	Sep	Thiên Ưu	Removed	213
		M_ '11	May	Sep	HT1	Removed	696
C12	2x rice/ Dir. Seed.	E_ '12	Dec	Apr	HT1	Removed	461
		M_ '12	May	Sep	HT1	Removed	103
		M_ '11	May	Sep	HT1	Removed	224
C13	2x rice/ Dir. Seed.	E_ '12	Dec	Apr	HT1	Removed	304
		M_ '12	May	Sep	HT1	Removed	83
		E_ '14	Jan	May	HT1	Removed	511
		M_ '14	May	Sep	HT1	Removed	1029
C14	2x rice/ Dir. Seed.	E_ '15	Jan	May	HT1	Removed	485
		M_ '15	May	Aug	HT1	Removed	343
		E_ '16	Jan	May	HT1	Removed	502
		M_ '16	Jun	Sep	HT1	Removed	560

Table S6. Agronomic data of the Southern sites. For site locations refer to Figure 3; Transpl. = transplanting; Dir. Seed. = direct seeding; E = early year season; M = mid-year season; L = late year season; nd = not determined; Incorpor. = incorporated.

Site	Crop rotation	Season ³ and year	Seeding month	Harvesting month	Variety	Residue manage- ment	Seasonal CH ₄ emission rate (kg ha ⁻¹ season ⁻¹)
S1	2x rice/	E_'18	Nov	Feb	OM4900	Removed	191
	Dir. Seed.	M_'18	Jul	Oct	OM4900	Removed	170
S2	2x rice/	E_'18	Jan	Apr	RVT	Removed	158
	Dir. Seed.	M_'18	May	Aug	RVT	Removed	311
S3	3x rice/	E_'18	Dec	Apr	Đài Thom 8	Removed	126
	Dir. Seed.	M_'18	May	Aug	Đài Thom 8	Removed	208
S4	2x rice/	E_'18	Dec	Apr	OM5451	n.d	161
	Dir. Seed.	M_'18	May	Aug	OM5451	n.d	126
S5	3x rice/	E_'13	Nov	Mar	OM7347	Burnt	341
	Dir. Seed.	M_'13	May	Aug	OM2517	Burnt	159
		L_'12	Aug	Nov	OM7346	Incorpor.	914
S6	3x rice/	E_'13	Jan	Apr	OM6977	Incorpor.	90
	Dir. Seed.	L_'12	Sep	Dec	OM6976	Incorpor.	350
S7	3x rice/	L_'12	Oct	Jan	OM4900	Incorpor.	31
	Dir. Seed.	L_'13	Oct	Jan	OM4900	Incorpor.	130
S8	2x rice	M_'12	May	Aug	OM7347	Incorpor.	422
	Dir. Seed.	E_'13	Nov	Feb	OM7347	Burnt	213
		M_'13	May	Aug	OM7347	Burnt	408
S9	3x rice/	M_'12	May	Aug	OM9921	Burnt	376
	Dir. Seed.	E_'13	Dec	Mar	OM9921	Incorpor.	265
S10	3x rice/	E_'16	Jan	May	OM6976	Burnt	167
	Dir. Seed.	E_'17	Nov	Feb	OM6976	Burnt	75
S11	3x rice/ Dir. Seed.	E_'14	Feb	May	MTL 560	Burnt	241
S12	2x rice/ Dir. Seed.	E_'12	Dec	Mar	IR50404	Removed	82

³ Local season names: E = vụ Đông Xuân, M = vụ Hè Thu; L = vụ Thu Đông

Table S7. Statistical comparison of CH₄ emission factor of all sites in three rice seasons among edapho-hydrological zones of the South region. (A = alluvial zone, F = deep flood zone, S = saline zone).

	Standard error	p*
Compare S to A	0.94	0.14
Compare S to F	0.91	0.24
Compare A to F	0.88	0.71

* The statistical significance value (p) at the confidence of 95% determined by one-way ANOVA. ($p \leq 0.05$: average emission factor of the two zones are statistically different)

