

Appendix Table 1 Brief description of sampling sites for paddy soils in Thailand.

Soil series	Latitude/ Longitude	Classification (Soil Survey Staff, 1999)	Parent material	Landform	Surrounding landform	Slope (%)	Depth to ground water (cm)	Elevation MSL (m)
Roi Et (Re)	102°40'16.14"E 16°26'39.72"N	Typic Paleaquult	Residuum derived from clastic sedimentary rock	Low terrace (erosional)	Slightly undulating	1	>200	170
Tha Tum (Tt)	103°34'39.60"E 15°22'41.69"N	Plinthic Endoaqualf	Mixed alluvium over residuum	Low terrace	Very gently undulating	1	>200	129
Phimai (Pm1)	102°25'37.83"E 15°14'44.84"N	Vertic Endoaqualf	Alluvium over residuum derived from weathered clastic sedimentary rocks	Floodplain	Flat	0	>200	148
Phimai (Pm2)	102°27'4.29"E 15°14'14.88"N	Aeric Vertic Natraqualf	Alluvium over residuum derived from weathered clastic sedimentary rocks	Floodplain	Flat to almost flat	<2	110	151
Kula Ronghai (Ki)	103°48'27.41"E 15°31'43.83"N	Typic Natraqualf	Wash over residuum derived from clastic sedimentary rock	Erosional plain	Flat	2	200	118
Udon (Ud)	102°40'41.13"E 16°4'14.33"N	Vertic Natraqualf	Alluvium over residuum derived from weathered clastic sedimentary rocks	Depression on erosional plain	Flat	3	200	152
Mae Sai (Ms)	98°59'43.27"E 18°43'18.13"N	Aeric Endoaqualf	Semi-recent alluvium	Low intermontane terrace	Gently undulating	2	-	299
Hang Dong (Hd)	98°55'55.10"E 18°38'35.89"N	Aeric Endoaqualf	Mixed local alluvium over residuum derived from weathered clastic metasedimentary rocks	Low erosional intermontane terrace	Gently undulating	3	>200	294
San Sai (Sai)	99°2'0.10"E 18°52'52.97"N	Typic Endoaqualf	Wash deposits on residuum derived from weathered granite	Upper part of low erosional intermontane terrace	Gently undulating	3	>70	320

Appendix Table 1 (Continued).

Soil series	Latitude/ Longitude	Classification (Soil Survey Staff, 1999)	Parent material	Landform	Surrounding landform	Slope (%)	Depth to ground water (cm)	Elevation MSL (m)
Chiang Rai (Cr)	99°45'4.47"E 17°0'37.96"N	Plinthic Paleaqualf	Old alluvium	Higher part of low alluvial terrace	Gently undulating	2	>200	61
Chum Saeng (Cs)	100°20'1.43"E 15°51'3.06"N	Plinthic Paleaqualf	Semi-recent alluvium	Low terrace	Gently undulating	0	>150	26
Chon Buri (Cb)	101°10'30.35"E 13°26'32.91"N	Typic Endoaqualf	Mixed alluvium derived mainly from granite	Higher part of low terrace	Gently undulating	0	190	9
Klaeng (Kl)	101°13'3.60"E 13°28'18.70"N	Typic Plinthaquult	Old alluvium	Low terrace- floodplain transition	Gently undulating	0	<150	7
Lop Buri (Lb)	100°49'21.57"E 14°39'17.51"N	Typic Haplustert	Local alluvium derived from limestone	Toeslope of limestone mountain	Flat	1	>200	24
Tha Rua (Tr)	100°43'13.10"E 14°33'11.61"N	Chromic Vertic Endoaqualf	Alluvium over old local alluvium	Low terrace	Flat	2	180	9
Khok Krathium (Kk)	100°36'1.41"E 14°34'59.92"N	Ustic Endoaquert	Recent alluvium	Flood plain	Flat	1	160	2
Bang Phae (Bph)	100°4'57.67"E 13°42'23.64"N	Typic Endoaquoll	Marine deposits mixed with riverine alluvium	Deltaic fringe	Flat	1	180	4

Appendix Table 2 Chemical and physical properties of Thai paddy soils.

Horizon	Sand	Silt	Clay	pH 1:1		OM	Total N	Avail P	Avail K	Extractable bases				Sum bases	EA	CEC	CEC	BS	BS	Bulk density
				H <sub>2</sub> O	KCl					Ca	Mg	K	Na							
(-----g kg <sup>-1</sup> -----)						(-----g kg <sup>-1</sup> -----)	(-----mg kg <sup>-1</sup> -----)	(-----cmol kg <sup>-1</sup> -----)												
Roi Et (Re): Typic Paleaquult, fine loamy, mixed, semiactive, isohyperthermic																				
Apg1	472	400	128	4.6	4.3	10.95	0.33	4.36	18.84	3.20	0.39	0.05	2.29	5.92	14.54	20.46	4.39	134.93	28.95	1.53
Apg2	421	427	152	5.2	4.8	5.00	0.19	4.11	8.81	3.37	0.39	0.02	1.64	5.41	13.33	18.74	4.12	131.40	28.88	1.63
Btg1	361	463	176	5.5	4.9	4.72	0.18	5.49	13.17	4.32	0.47	0.03	0.95	5.78	14.55	20.33	4.77	121.26	28.45	1.60
Btg2	326	494	180	5.8	4.6	4.46	0.15	7.65	18.25	3.62	0.38	0.05	0.93	4.97	13.89	18.86	3.58	138.72	26.36	1.79
Btg3	274	502	224	4.9	3.5	1.39	0.07	5.04	22.84	3.62	0.49	0.06	0.86	5.03	14.61	19.64	5.11	98.28	25.59	1.53
Btg4	249	363	388	4.4	3.1	1.26	0.08	3.22	41.03	4.62	1.00	0.11	1.91	7.64	20.59	28.23	13.11	58.28	27.07	1.83
Btg5	262	409	329	4.3	3.1	1.42	0.06	3.37	30.28	5.10	0.55	0.08	1.62	7.34	19.82	27.16	11.32	64.86	27.04	1.84
Btg6	293	399	308	4.3	3.3	1.32	0.05	3.20	27.99	6.04	0.43	0.07	2.08	8.62	17.32	25.94	12.97	66.49	33.23	1.83
Btg7	306	365	329	4.9	3.9	1.73	0.04	2.78	23.60	6.70	0.43	0.06	0.37	7.56	16.66	24.23	8.97	84.34	31.22	1.87
Tha Tum (Tt): Plinthic Endoaqualf, fine loamy, mixed, subactive, isohyperthermic																				
Apg	495	281	224	5.0	4.0	33.45	1.05	41.52	29.37	0.44	0.05	0.08	0.48	1.04	28.80	29.84	9.05	11.49	3.49	1.41
ABg	455	277	268	5.5	3.9	9.28	0.39	4.70	6.59	0.32	0.02	0.02	0.45	0.82	20.12	20.93	5.45	14.97	3.90	1.50
Btg1	470	254	276	5.3	3.9	5.31	0.14	3.52	7.11	0.54	0.03	0.02	1.30	1.89	16.45	18.34	4.67	40.52	10.32	1.58
Btg2	466	250	284	5.2	3.8	2.54	0.16	3.94	6.80	0.83	0.02	0.02	0.78	1.66	16.50	18.16	4.83	34.33	9.13	1.65
Btg3	493	223	284	5.2	3.7	1.57	0.11	3.02	10.68	2.76	0.05	0.03	1.08	3.92	17.16	21.09	6.34	61.90	18.60	1.80
Btg4	490	254	256	5.1	3.6	0.66	0.06	1.71	15.75	3.70	0.10	0.04	1.35	5.19	14.08	19.27	6.83	75.99	26.94	1.85
Btg5	500	220	280	5.4	3.7	0.64	0.04	1.51	22.68	6.24	0.25	0.06	1.66	8.21	15.36	23.57	9.33	87.92	34.82	1.87
Btg6	342	330	328	5.4	3.8	0.65	0.09	1.38	32.01	8.50	0.37	0.08	1.68	10.63	15.48	26.11	11.73	90.64	40.71	1.90
Btg7	204	476	320	5.8	3.9	0.63	0.03	1.95	39.05	9.82	0.42	0.10	1.71	12.05	16.73	28.78	12.52	96.25	41.87	1.92
Phimai (Pm1): Vertic Endoaqualf, very fine, kaolinitic, isohyperthermic																				
Apg1	142	271	588	5.4	4.5	20.90	0.78	4.25	101.40	16.37	0.16	0.28	4.29	21.10	15.26	36.36	17.25	122.34	58.02	1.78
Apg2	85	215	700	5.4	4.5	10.58	0.41	0.78	118.87	19.93	0.02	0.33	5.54	25.82	16.71	42.53	17.25	149.72	60.71	1.91
Btg1	116	255	629	5.4	4.4	6.14	0.32	0.40	94.76	23.94	0.02	0.26	5.86	30.07	13.43	43.50	31.23	96.28	69.12	1.88
Btg2	134	307	558	5.7	4.9	3.74	0.20	0.15	50.36	15.04	0.03	0.14	5.85	21.06	8.92	29.97	22.57	93.32	70.25	1.86
Btg3	100	317	583	6.1	5.3	2.52	0.18	0.14	47.91	16.80	0.18	0.13	6.68	23.79	8.31	32.10	22.06	107.82	74.10	1.84
Btg4	118	365	517	6.3	5.5	1.85	0.13	0.14	49.43	18.80	0.84	0.13	6.68	26.45	8.24	34.69	22.94	115.32	76.25	1.91
2Btg5	120	260	621	6.6	5.6	1.32	0.09	0.12	67.13	23.35	0.24	0.18	9.20	32.97	5.74	38.71	27.39	120.38	85.17	2.05
2Btg6	69	302	629	6.7	5.8	0.31	0.09	0.12	79.02	19.20	0.51	0.21	9.45	29.38	7.62	37.00	26.42	111.23	79.41	2.04

Appendix Table 2 (Continued).

Horizon	Sand	Silt	Clay	pH 1:1		OM	Total N	Avail P	Avail K	Extractable bases				Sum bases	EA	CEC By sum	CEC NH <sub>4</sub> OAc	BS CEC-7 %	BS CEC-8.2 %	Bulk density Mg m <sup>-3</sup>
				H <sub>2</sub> O	KCl					Ca	Mg	K	Na							
Phimai (Pm2): Aeric Vertic Natraqualf, fine, kaolinitic, isohyperthermic																				
Apg1	424	229	347	5.4	4.8	20.22	0.93	8.97	61.82	7.57	1.40	0.16	3.87	13.00	6.72	19.72	12.84	101.18	65.91	1.62
Apg2	403	234	363	5.7	4.9	9.75	0.52	1.35	41.84	6.86	1.28	0.11	2.42	10.67	6.48	17.15	12.70	84.03	62.23	1.88
Btg1	315	229	456	5.3	4.7	7.55	0.45	0.51	42.51	8.60	1.49	0.11	2.56	12.76	7.72	20.48	16.44	77.62	62.31	1.68
Btg2	224	225	551	5.3	4.6	6.69	0.37	0.68	39.71	9.74	1.65	0.10	2.56	14.06	8.18	22.24	19.17	73.33	63.21	1.79
Btg3	259	222	519	5.6	5.1	3.80	0.22	0.68	32.49	11.66	1.76	0.08	3.09	16.60	6.85	23.44	18.99	87.39	70.80	1.93
Btng1	250	285	465	6.3	5.5	2.34	0.16	0.68	29.18	13.33	1.91	0.07	3.75	19.07	4.93	24.00	19.01	100.32	79.45	1.91
2Btng2	346	289	365	6.6	5.9	1.78	0.13	0.33	24.73	11.22	1.67	0.06	2.94	15.89	3.09	18.98	16.46	96.49	83.69	1.87
2Btng3	395	292	313	6.7	6.1	0.71	0.09	0.16	25.63	9.25	1.45	0.07	2.58	13.35	1.84	15.19	13.50	98.89	87.89	1.84
2Btng4	522	208	270	6.8	6.2	0.35	0.06	0.16	24.05	7.47	1.33	0.06	2.38	11.24	1.21	12.45	11.77	95.51	90.30	1.81
2Btng5	556	208	236	6.9	6.2	0.17	0.05	0.16	22.87	6.19	1.20	0.06	2.61	10.05	0.91	10.96	14.09	71.34	91.69	1.75
Kula Ronghai (Ki): Typic Natraqualf, fine, kaolinitic, isohyperthermic																				
Apg1	708	216	76	4.7	3.6	6.02	0.26	12.46	9.87	0.30	0.04	0.03	0.09	0.45	8.38	8.83	1.70	26.73	5.14	1.59
Apg2	841	92	67	5.3	4.0	1.89	0.09	2.07	4.00	0.32	0.04	0.01	0.07	0.45	8.33	8.78	0.95	47.12	5.10	1.69
Btg	383	163	454	5.7	4.0	3.51	0.11	0.75	20.70	7.37	1.57	0.05	1.08	10.07	10.03	20.10	17.26	58.34	50.11	1.88
Btng1	287	247	466	5.3	3.7	1.59	0.16	0.59	21.80	8.42	1.71	0.06	1.16	11.34	7.02	18.36	32.71	34.67	61.78	1.87
Btng2	323	285	392	5.5	4.1	0.87	0.10	0.41	18.37	6.90	1.28	0.05	0.80	9.02	8.49	17.51	25.53	35.32	51.50	1.94
2Btng3	314	314	372	5.3	4.2	0.70	0.05	0.24	15.76	6.48	1.04	0.04	0.52	8.09	8.19	16.28	18.16	44.54	49.68	1.89
2Btng4	301	328	371	6.1	4.5	0.35	0.07	0.25	14.70	8.35	0.97	0.04	0.82	10.18	6.97	17.15	12.20	83.44	59.36	1.87
2Btng5	243	305	452	5.8	4.3	0.35	0.05	0.25	21.20	9.34	1.19	0.05	0.54	11.13	7.90	19.03	31.94	34.84	58.48	1.87
2Btng6	221	332	447	5.7	4.6	0.35	0.09	0.26	19.74	9.29	1.11	0.05	0.49	10.94	7.88	18.82	29.53	37.04	58.14	1.90
Udon (Ud): Vertic Natraqualf, fine, mixed, active, isohyperthermic																				
Ag	176	311	513	4.8	4.3	14.40	0.65	6.09	181.97	22.18	2.83	0.47	12.17	37.64	16.59	54.23	21.88	172.03	69.41	1.79
Btng1	174	317	509	4.8	3.9	8.45	0.33	1.15	63.53	25.10	2.22	0.16	11.14	38.62	16.85	55.47	19.09	202.27	69.63	1.83
Btng2	167	316	517	4.5	3.8	5.77	0.26	0.78	50.28	20.44	2.76	0.13	13.32	36.65	16.17	52.81	20.67	177.33	69.39	1.83
Btng3	105	248	647	4.6	4.2	3.28	0.20	0.80	63.30	29.58	4.19	0.16	18.29	52.23	16.96	69.19	27.46	190.21	75.49	1.94
Btng4	75	197	728	4.9	4.2	3.35	0.20	0.81	67.78	34.13	5.47	0.17	20.80	60.58	18.02	78.60	34.58	175.18	77.07	1.96
Btng5	58	93	849	5.1	4.7	2.63	0.18	0.83	97.01	35.42	6.73	0.25	23.48	65.88	18.35	84.24	38.36	171.73	78.21	1.96
Btng6	38	3	959	5.3	4.8	2.66	0.30	1.02	119.82	37.02	7.35	0.31	25.63	70.30	20.25	90.56	42.98	163.56	77.64	1.89
Btng7	66	19	915	5.1	4.9	2.07	0.41	1.37	133.03	37.20	6.41	0.34	21.56	65.52	19.52	85.04	41.85	156.56	77.04	1.89
Btng8	55	43	902	5.4	5.0	2.25	0.39	1.34	141.11	35.64	6.35	0.36	20.95	63.31	19.35	82.66	42.87	147.67	76.59	1.92

Appendix Table 2 (Continued).

Horizon	Sand	Silt	Clay	pH 1:1		OM	Total N	Avail P	Avail K	Extractable bases				Sum bases	EA	CEC By sum	CEC NH <sub>4</sub> OAc	BS CEC-7 %	BS CEC-8.2 %	Bulk density Mg m <sup>-3</sup>
				H <sub>2</sub> O	KCl					Ca	Mg	K	Na							
Mae Sai (Ms): Aeric Endoaqualf, fine, illitic, isohyperthermic																				
Apg1	61	523	416	6.1	5.4	29.33	1.01	5.45	93.71	15.79	3.96	0.25	0.61	20.61	18.56	39.17	21.44	96.10	52.61	1.52
Apg2	48	512	440	6.5	5.4	18.14	0.74	3.47	59.78	14.75	3.30	0.16	0.30	18.50	21.58	40.08	18.31	101.04	46.16	1.52
Btg1	34	578	388	6.5	5.2	10.93	0.37	5.10	53.03	11.76	2.48	0.14	0.44	14.82	19.69	34.52	15.38	96.35	42.95	1.63
Btg2	51	473	476	6.5	5.1	12.41	0.36	8.37	76.72	13.97	2.87	0.20	0.30	17.34	19.77	37.11	18.05	96.08	46.73	1.44
Btg3	119	417	464	6.4	4.9	16.54	0.56	11.61	76.52	15.95	3.43	0.20	0.58	20.16	22.98	43.14	26.24	76.84	46.73	1.48
Btg4	79	521	400	6.4	5.0	8.51	0.49	9.48	43.76	12.60	2.76	0.12	0.50	15.97	19.77	35.73	18.66	85.59	44.68	1.58
Btg5	56	488	456	6.5	5.4	9.74	0.57	11.53	43.52	14.68	3.03	0.12	0.29	18.12	19.80	37.92	19.62	92.36	47.78	1.54
Btg6	91	274	636	6.2	5.2	10.54	0.54	6.58	50.67	15.82	3.82	0.13	0.22	19.99	21.09	41.08	20.56	97.23	48.66	1.42
BCg	104	312	584	6.6	5.2	8.58	0.41	9.36	43.25	13.65	3.46	0.11	0.24	17.46	19.86	37.31	18.01	96.95	46.78	1.74
Hang Dong (Hd): Aeric Endoaqualf, fine, illitic, isohyperthermic																				
Apg1	177	403	420	6.8	5.8	16.08	0.67	4.47	83.63	12.55	2.00	0.22	0.44	15.22	16.02	31.24	15.72	96.78	48.71	1.67
Apg2	139	448	413	6.8	5.8	6.21	0.38	2.59	54.22	17.47	2.42	0.14	0.46	20.49	14.85	35.34	17.63	116.21	57.98	1.87
Btg1	252	300	448	7.1	5.8	4.96	0.35	3.16	43.45	14.21	2.02	0.11	0.65	17.00	14.80	31.80	15.22	111.66	53.45	1.86
Btg2	412	256	332	7.1	5.9	1.95	0.06	2.39	25.23	7.01	0.88	0.07	0.32	8.28	13.38	21.66	8.00	103.51	38.21	1.97
Btg3	395	205	400	7.1	5.8	1.25	0.03	2.18	28.01	5.83	0.69	0.07	0.33	6.92	13.36	20.28	7.08	97.87	34.14	1.85
2Btg4	356	196	448	7.0	5.8	0.32	0.13	1.93	33.79	5.88	0.72	0.09	0.55	7.23	13.44	20.67	8.69	83.14	34.98	1.83
2Btg5	335	153	512	6.9	5.8	0.67	0.13	1.57	39.41	7.92	0.99	0.10	0.83	9.84	16.06	25.90	12.59	78.17	38.00	1.91
2Btg6	231	125	644	7.0	5.8	0.65	0.10	1.57	45.72	9.57	1.24	0.12	0.52	11.44	16.06	27.50	13.45	85.03	41.60	1.82
2Btg7	254	158	588	7.1	5.8	0.33	0.08	1.55	44.46	10.27	1.15	0.12	0.65	12.19	16.01	28.20	14.03	86.86	43.22	1.82
2Btg8	307	149	544	7.0	5.8	0.56	0.07	1.92	40.47	9.12	0.94	0.11	0.42	10.59	14.11	24.70	12.12	87.34	42.86	1.82
San Sai (Sai): Typic Endoaqualf, coarse loamy, siliceous, subactive, isohyperthermic																				
Apg1	740	132	128	6.9	6.0	26.93	1.09	151.67	30.31	4.74	1.11	0.09	0.19	6.13	14.03	20.16	5.60	109.56	30.42	1.45
Apg2	755	113	132	6.9	5.5	5.35	0.20	64.97	24.33	2.28	0.33	0.06	0.21	2.88	12.04	14.92	3.12	92.20	19.29	1.87
Btg1	835	77	88	7.0	6.1	0.45	0.06	9.92	14.13	0.50	0.11	0.04	1.48	2.12	10.81	12.93	0.95	222.64	16.40	1.85
Btg2	806	94	100	6.5	5.8	0.37	0.06	14.16	18.91	0.48	0.13	0.05	0.31	0.97	10.21	11.18	1.36	70.84	8.64	1.88
Btg3	775	101	124	6.3	5.1	0.87	0.06	14.57	26.52	0.48	0.16	0.07	0.11	0.82	11.41	12.23	0.73	113.02	6.71	1.91
2Btg4	735	97	168	5.6	4.7	1.69	0.07	22.40	32.33	0.74	0.24	0.08	0.10	1.16	12.03	13.19	1.95	59.74	8.81	1.96
2Btg5	600	92	308	5.5	4.2	1.84	0.14	42.61	66.12	1.67	0.76	0.17	0.11	2.71	13.28	15.99	4.14	65.34	16.93	1.83
Chiang Rai (Cr): Plinthic Paleaqualf, fine, illitic, isohyperthermic																				
Apg1	316	336	348	5.5	4.0	16.50	0.76	3.39	79.60	5.29	2.14	0.21	0.64	8.28	18.92	27.20	13.40	61.81	30.45	1.71
Apg2	283	337	380	6.3	5.1	8.91	0.51	1.94	40.31	6.96	2.65	0.11	0.37	10.09	17.11	27.20	12.00	84.07	37.08	1.81
Btg1	371	321	308	6.1	4.8	1.81	0.27	2.18	20.50	4.27	1.58	0.05	0.25	6.15	13.92	20.07	6.02	102.13	30.64	1.77

Appendix Table 2 (Continued).

Horizon	Sand	Silt	Clay	pH 1:1		OM	Total N	Avail P	Avail K	Extractable bases				Sum bases	EA	CEC	CEC	BS	BS	Bulk density
				H <sub>2</sub> O	KCl					Ca	Mg	K	Na							
				(-----g kg <sup>-1</sup> -----)		(-----g kg <sup>-1</sup> -----)		(----mg kg <sup>-1</sup> ----)		(-----cmol kg <sup>-1</sup> -----)						%		%		Mg m <sup>-3</sup>
Chiang Rai (Cr): Plinthic Paleaqualf, fine, illitic, isohyperthermic																				
Btcg1	347	289	364	5.5	4.3	1.30	0.31	1.91	24.59	3.52	1.37	0.06	0.28	5.23	16.43	21.67	8.27	63.28	24.16	1.81
Btg2	184	208	608	5.7	3.4	1.08	0.23	1.83	40.83	6.20	2.32	0.11	0.54	9.17	21.70	30.87	23.56	38.90	29.69	1.78
Btg3	167	237	596	5.4	3.3	2.43	0.16	1.93	42.60	5.44	2.10	0.11	0.92	8.58	24.12	32.70	13.49	63.59	26.24	1.75
Btg4	179	241	580	5.1	3.3	2.72	0.19	1.72	47.22	4.75	1.69	0.12	0.77	7.33	22.85	30.18	16.68	43.97	24.30	1.74
Btcg2	231	269	500	5.2	3.3	0.77	0.19	1.51	40.38	3.55	1.20	0.11	0.66	5.51	22.77	28.29	15.68	35.17	19.49	1.75
Btcg3	380	232	388	5.4	3.2	3.97	0.14	1.33	34.59	4.23	1.30	0.09	0.69	6.31	17.81	24.12	12.27	51.47	26.17	1.79
Chum Seang (Cs): Plinthic Paleaqualf, very fine, kaolinitic, isohyperthermic																				
Apg	149	355	496	5.6	4.5	19.32	0.85	3.55	43.78	9.10	1.79	0.12	1.59	12.60	17.28	29.88	17.26	73.00	42.16	1.85
Btg1	103	349	548	5.7	4.6	3.86	0.37	1.83	18.52	7.74	0.98	0.05	1.34	10.12	12.89	23.00	12.93	78.24	43.97	1.84
Btg2	78	338	584	5.6	4.5	2.94	0.35	1.63	21.06	12.04	0.91	0.06	2.73	15.73	15.48	31.21	16.54	95.13	50.41	1.87
Btg3	37	303	660	6.2	4.7	3.88	0.35	1.45	22.96	13.04	1.10	0.06	2.65	16.85	16.42	33.27	22.59	74.60	50.65	1.73
Btg4	34	142	824	6.0	4.6	1.71	0.23	1.59	25.97	11.84	1.36	0.07	3.87	17.15	15.64	32.79	21.41	80.10	52.30	1.75
Btg5	28	160	812	5.5	3.8	1.93	0.21	1.56	23.43	10.05	1.40	0.06	5.03	16.55	16.91	33.46	21.48	77.04	49.46	1.81
Btg6	35	225	740	5.5	3.9	1.86	0.28	1.61	23.17	9.81	1.46	0.06	4.97	16.30	17.54	33.84	23.55	69.19	48.16	1.81
Chon Buri (Cb): Typic Endoaqualf, fine loamy, mixed, semiactive, isohyperthermic																				
Apg1	681	182	138	5.6	4.6	10.58	0.50	5.07	55.65	1.60	5.85	0.14	0.28	7.88	4.83	12.70	3.57	220.68	62.01	1.82
Apg2	543	194	263	6.8	5.6	4.37	0.22	0.47	36.40	2.86	3.18	0.09	1.07	7.20	3.03	10.23	4.97	144.79	70.41	1.89
Btg1	578	156	267	6.7	5.4	0.65	0.12	0.39	29.74	2.20	3.22	0.08	2.31	7.80	4.24	12.04	7.66	101.87	64.76	1.91
Btg2	512	176	313	7.2	5.8	0.64	0.05	0.15	32.32	2.60	2.78	0.08	3.76	9.23	2.44	11.67	8.49	108.68	79.12	1.94
Btg3	493	187	321	7.7	6.2	0.28	0.05	0.15	32.63	2.92	2.51	0.09	4.50	10.01	3.05	13.07	9.79	102.26	76.64	1.88
Btg4	466	185	350	7.8	6.4	0.30	0.03	1.26	45.20	3.18	2.37	0.12	5.19	10.85	3.06	13.91	11.21	96.83	77.99	1.89
Btg5	475	183	342	8.0	6.5	0.61	0.05	1.03	52.36	2.86	2.24	0.14	5.17	10.41	2.45	12.86	10.45	99.65	80.95	1.90
Btg6	542	154	304	8.5	7.2	0.61	0.02	2.51	53.31	4.35	1.98	0.14	4.92	11.39	1.83	13.22	7.96	143.11	86.15	1.93
Kleang (Kl): Typic Plinthaquult, fine loamy, mixed, subactive, isohyperthermic																				
Apg	647	219	133	4.9	4.2	11.51	0.37	13.47	34.21	2.29	2.03	0.09	0.21	4.62	4.82	9.44	3.36	137.57	48.93	1.58
Apg2	517	262	221	6.0	5.3	3.71	0.19	1.05	13.74	3.63	1.16	0.04	0.44	5.26	4.23	9.49	4.34	121.27	55.44	1.87
Btg	460	261	279	4.6	3.7	3.62	0.21	1.45	16.77	1.62	1.14	0.04	0.22	3.02	5.45	8.47	4.88	62.03	35.71	1.70
Bvg1	456	207	338	4.6	3.7	2.97	0.20	1.85	26.24	0.69	2.10	0.07	0.23	3.09	9.69	12.79	5.57	55.49	24.18	1.71
Bvg2	466	214	321	4.7	3.7	1.79	0.11	2.06	33.06	0.71	1.76	0.09	0.35	2.90	7.87	10.77	4.80	60.49	26.93	1.73
Bvg3	468	236	296	5.1	3.8	0.60	0.10	1.15	32.93	1.00	0.03	0.09	0.52	1.64	7.87	9.51	4.71	34.76	17.21	1.74
Bvg4	457	268	275	5.1	3.7	0.65	0.07	1.06	25.60	0.70	0.09	0.07	0.85	1.71	6.66	8.37	4.61	37.14	20.45	1.84
Bvg5	400	288	313	5.1	3.5	0.31	0.05	0.47	27.20	0.60	0.09	0.07	0.48	1.24	10.33	11.58	7.31	17.01	10.74	1.81

Appendix Table 2 (Continued).

Horizon	Sand	Silt	Clay	pH 1:1		OM	Total N	Avail P	Avail K	Extractable bases				Sum bases	EA	CEC By sum	CEC NH <sub>4</sub> OAc	BS CEC-7 %	BS CEC-8.2 %	Bulk density Mg m <sup>-3</sup>
				H <sub>2</sub> O	KCl					Ca	Mg	K	Na							
(-----g kg <sup>-1</sup> -----)						(-----g kg <sup>-1</sup> -----)		(----mg kg <sup>-1</sup> ----)		(-----cmol kg <sup>-1</sup> -----)										
Lop Buri (Lb): Typic Haplustert, very fine, smectitic, isohyperthermic																				
Ap	70	326	604	8.0	6.6	24.00	0.98	8.44	350.00	62.84	2.18	0.90	0.87	66.80	4.00	70.80	29.60	94.00	94.35	1.22
Bw	52	268	680	8.5	6.5	10.30	0.45	2.38	150.00	57.98	1.34	0.38	1.11	60.80	6.00	66.81	35.40	91.00	91.00	1.25
Bss1	52	276	672	8.0	6.2	10.30	0.45	1.38	200.00	63.89	0.91	0.51	0.82	66.10	6.50	72.62	40.60	91.00	91.02	1.23
Bss2	73	287	640	7.8	6.8	6.70	0.25	0.50	150.00	63.16	0.73	0.38	0.64	64.90	4.50	69.41	36.20	94.00	93.50	1.24
Bss3	84	284	632	7.8	6.9	7.60	0.45	0.88	150.00	61.08	0.68	0.38	0.60	62.70	4.50	67.25	38.00	93.00	93.23	1.25
Bss4	88	316	596	7.8	6.6	4.10	0.28	0.50	150.00	66.17	0.61	0.38	0.62	67.80	4.00	71.78	25.40	94.00	94.46	1.33
BCK	178	354	468	8.2	6.8	3.40	0.31	0.38	150.00	46.51	0.45	0.38	0.62	48.00	2.50	50.46	25.60	95.00	95.12	1.53
Ck	240	480	280	8.3	6.9	1.40	0.11	0.25	50.00	33.38	0.35	0.13	0.63	34.50	1.50	35.99	13.00	96.00	95.86	1.78
Tha Rua (Tr): Chromic Vertic Endoaqualf, very fine, smectitic, isohyperthermic																				
Apg1	82	350	568	8.2	6.6	11.00	0.73	25.31	800.00	37.80	6.42	2.05	1.51	47.80	2.00	49.76	24.60	96.00	96.06	1.31
Apg2	101	279	620	7.9	7.1	6.20	0.62	36.88	450.00	31.22	4.65	1.15	2.51	39.50	2.00	41.52	23.20	95.00	95.13	1.32
Btg1	77	343	580	8.2	7.3	3.40	0.39	38.75	500.00	26.79	4.42	1.28	3.70	36.20	2.50	38.69	23.00	94.00	93.56	1.37
Btg2	68	340	592	8.8	7.0	4.20	0.28	30.00	550.00	32.26	4.87	1.41	4.47	43.00	1.50	44.51	23.40	97.00	96.61	1.30
2Btg3	69	323	608	8.5	7.0	5.20	0.39	17.19	450.00	28.78	5.69	1.15	7.04	42.60	2.00	44.65	28.80	96.00	95.41	1.37
2Btg4	77	291	632	8.1	6.6	18.50	0.36	11.25	400.00	25.00	4.67	1.02	7.53	38.20	2.00	40.22	27.60	95.00	94.98	1.42
2Btg5	43	361	596	8.1	7.1	2.40	0.34	6.88	450.00	21.77	4.24	1.15	5.98	33.10	2.00	35.13	26.40	94.00	94.22	1.34
2Btg6	41	351	608	8.4	7.0	2.40	0.34	5.31	550.00	24.63	4.25	1.41	7.08	37.40	2.00	39.36	26.80	95.00	95.02	1.35
Khok Krathium (Kk): Ustic Endoaquert, very fine, smectitic, isohyperthermic																				
Apg1	19	281	700	5.5	4.5	24.70	1.16	2.75	1150.00	23.81	4.44	2.94	1.58	32.80	18.00	50.77	33.60	65.00	64.61	0.93
Apg2	12	280	708	5.5	4.8	15.40	0.84	1.25	900.00	22.25	1.96	2.30	1.65	31.40	15.00	46.42	34.20	68.00	67.64	1.25
Bg1	21	331	648	6.3	4.4	10.30	0.64	0.88	650.00	23.11	1.97	1.66	2.04	32.10	13.00	45.07	32.80	71.00	71.22	1.22
Bg2	17	335	648	5.4	4.4	8.20	0.56	1.07	550.00	24.13	3.90	1.41	2.38	31.80	13.00	44.81	34.80	71.00	70.97	1.20
Bg3	13	251	736	6.4	5.2	5.50	0.45	0.88	550.00	23.55	4.58	1.41	2.52	32.00	9.00	41.02	38.00	78.00	78.01	1.20
Bssg1	14	210	776	7.6	6.0	3.80	0.42	1.50	350.00	15.81	4.22	0.90	1.91	22.80	5.00	27.64	39.20	82.00	82.49	1.18
Bssg2	14	214	772	8.2	6.3	2.80	0.36	1.88	550.00	31.55	4.15	1.41	3.19	40.30	5.00	45.30	38.00	89.00	88.96	1.24
Bssg3	12	388	600	7.3	6.1	3.40	0.28	1.88	550.00	33.84	4.70	1.41	3.60	43.50	4.00	47.54	36.40	92.00	91.50	1.31
Bg4	18	266	716	7.6	6.2	3.10	0.28	6.00	650.00	42.67	6.43	1.66	3.67	54.40	3.50	57.93	28.80	94.00	93.91	1.31
Bg5	16	188	796	7.8	6.1	1.40	0.39	0.75	550.00	36.44	5.05	1.41	3.52	46.40	4.00	50.42	32.00	92.00	92.03	1.27
Bang Phae (Bph): Typic Endoaquoll, fine, smectitic, isohyperthermic																				
Apg1	39	369	592	5.4	5.1	20.40	1.85	31.25	211.40	16.30	5.84	0.54	15.15	37.80	11.00	48.83	32.50	77.00	77.41	1.13
Apg2	50	306	644	7.1	6.7	11.40	0.67	10.00	141.90	23.82	6.95	0.36	16.92	48.00	5.00	53.04	31.00	91.00	90.50	1.34
ABg	174	270	556	7.1	6.8	10.90	0.36	5.75	141.40	55.09	6.87	0.36	16.96	79.30	1.00	80.28	23.00	99.00	98.78	1.36
Bg1	102	322	576	7.6	7.0	10.50	0.25	4.50	162.40	41.04	6.88	0.42	16.63	65.00	2.00	66.96	23.50	97.00	97.07	1.30
Bg2	97	387	516	7.8	6.8	10.30	0.22	7.19	133.90	11.46	4.54	0.34	15.80	32.10	1.00	33.14	17.00	97.00	96.86	1.14
Bg3	230	330	440	7.8	6.7	10.50	0.20	8.13	112.60	9.02	3.32	0.29	15.12	27.80	1.00	28.75	12.00	97.00	96.70	1.25
Bg4	255	369	376	8.0	7.2	10.40	0.14	34.38	105.70	12.20	3.44	0.27	15.08	31.00	1.00	31.99	12.50	97.00	96.91	1.25

Appendix Table 3 Total chemical composition of Thai paddy soils.

Horizon	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Na <sub>2</sub> O	MgO	K <sub>2</sub> O	CaO	P <sub>2</sub> O <sub>5</sub>	MnO	S
(-----%-----)											
Roi Et (Re): Typic Paleaquult, fine loamy, mixed, semiactive, isohyperthermic											
Apg1	92.50	2.83	0.79	0.42	0.23	0.13	0.05	0.08	0.01	0.01	0.00
Apg2	93.34	2.83	0.92	0.45	0.15	0.12	0.05	0.08	0.01	0.04	0.00
Btg1	92.27	3.67	0.81	0.55	0.13	0.15	0.07	0.13	0.01	0.06	0.00
Btg2	94.26	3.85	0.81	0.47	0.11	0.13	0.06	0.10	0.02	0.03	0.00
Btg3	91.71	5.35	1.52	0.65	0.12	0.17	0.08	0.10	0.01	0.05	0.00
Btg4	81.38	12.73	2.36	0.68	0.18	0.30	0.14	0.17	0.01	0.04	0.00
Btg5	86.07	10.22	1.93	0.67	0.19	0.28	0.13	0.17	0.00	0.03	0.00
Btg6	87.88	8.18	1.80	0.60	0.22	0.25	0.12	0.20	0.00	0.03	0.00
Btg7	87.73	8.45	1.96	0.63	0.24	0.25	0.13	0.22	0.00	0.03	0.00
Tha Tum (Tt): Plinthic Endoaqualf, fine loamy, mixed, subactive, isohyperthermic											
Apg	80.52	11.98	1.26	0.92	0.12	0.12	0.06	0.03	0.06	0.01	0.02
ABg	84.35	10.92	1.36	0.95	0.12	0.10	0.05	0.01	0.01	0.00	0.00
Btg1	85.04	9.98	2.14	0.85	0.11	0.10	0.05	0.03	0.01	0.00	0.00
Btg2	84.67	11.36	1.59	0.77	0.13	0.15	0.08	0.06	0.01	0.02	0.00
Btg3	82.79	12.30	2.46	0.73	0.16	0.25	0.18	0.11	0.00	0.01	0.00
Btg4	83.88	9.90	1.50	0.72	0.19	0.27	0.22	0.14	0.00	0.00	0.00
Btg5	81.32	10.75	1.79	0.75	0.34	0.38	0.36	0.27	0.00	0.01	0.00
Btg6	82.56	10.20	2.77	0.87	0.35	0.41	0.51	0.32	0.00	0.09	0.00
Btg7	80.52	10.51	3.79	0.95	0.42	0.46	0.59	0.35	0.00	0.01	0.00
Phimai (Pm1): Vertic Endoaqualf, very fine, kaolinitic, isohyperthermic											
Apg1	67.60	17.25	4.53	1.08	0.35	0.73	0.70	0.70	0.06	0.04	0.03
Apg2	63.17	19.33	5.29	1.12	0.40	0.86	0.87	0.77	0.03	0.11	0.03
Btg1	64.12	19.31	4.90	1.07	0.46	0.93	0.76	0.71	0.02	0.09	0.02
Btg2	66.38	19.23	4.42	1.08	0.47	0.60	0.47	0.59	0.01	0.02	0.02
Btg3	66.47	19.61	5.20	1.12	0.51	0.55	0.41	0.59	0.01	0.01	0.02
Btg4	72.29	16.95	3.66	1.15	0.58	0.55	0.37	0.63	0.01	0.03	0.01
2Btg5	64.54	19.93	5.42	1.05	0.69	1.01	1.17	0.77	0.01	0.03	0.01
2Btg6	64.74	19.06	5.98	0.97	0.74	1.11	1.45	0.77	0.01	0.05	0.00
Phimai (Pm2): Aeric Vertic Natraqualf, fine, kaolinitic, isohyperthermic											
Apg1	76.20	13.30	3.00	0.70	0.40	0.40	0.40	0.40	0.06	0.03	0.04
Apg2	74.90	13.90	4.80	0.70	0.30	0.50	0.40	0.40	0.03	0.04	0.02
Btg1	71.20	16.30	4.20	0.90	0.30	0.50	0.50	0.40	0.02	0.04	0.01
Btg2	67.00	19.10	3.90	0.90	0.30	0.50	0.50	0.50	0.02	0.04	0.01
Btg3	67.30	20.00	3.50	0.90	0.80	0.50	0.50	0.60	0.01	0.03	0.00
Btng1	71.40	16.80	3.80	0.90	0.50	0.70	0.60	0.70	0.01	0.04	0.00
2Btng2	72.60	15.20	3.20	0.80	0.40	0.70	0.70	0.70	0.01	0.02	0.00
2Btng3	77.60	11.70	3.30	0.70	0.70	0.60	0.50	0.60	0.01	0.12	0.00
2Btng4	76.20	12.10	3.20	0.70	0.70	0.70	0.80	0.60	0.01	0.12	0.00
2Btng5	81.10	9.90	2.60	0.60	0.60	0.60	0.70	0.50	0.01	0.06	0.00
Kula Ronghai (Ki): Typic Natraqualf, fine, kaolinitic, isohyperthermic											
Apg1	94.20	1.00	0.30	0.20	0.10	0.00	0.00	0.00	0.01	0.00	0.00
Apg2	98.70	0.70	0.30	0.20	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Btg	72.50	17.80	3.00	0.80	0.20	0.30	0.30	0.20	0.00	0.04	0.01
Btng1	70.80	20.40	2.10	1.00	0.10	0.40	0.30	0.30	0.00	0.03	0.00
Btng2	76.90	15.80	2.00	1.00	0.10	0.30	0.20	0.20	0.00	0.02	0.00
2Btng3	79.70	13.60	2.50	1.00	0.10	0.20	0.20	0.20	0.00	0.02	0.00
2Btng4	79.30	13.20	3.00	1.00	0.10	0.20	0.20	0.20	0.00	0.01	0.00
2Btng5	75.60	15.40	3.70	1.10	0.10	0.20	0.20	0.20	0.00	0.01	0.00
2Btng6	72.80	16.60	6.30	1.10	0.10	0.20	0.20	0.30	0.00	0.01	0.00
Udon (Ud): Vertic Natraqualf, fine, mixed, active, isohyperthermic											
Ag	75.00	12.60	3.90	1.10	0.80	0.80	0.80	0.60	0.03	0.03	0.08
Btng1	76.40	12.50	3.60	1.10	0.70	0.70	0.70	0.50	0.02	0.02	0.05
Btng2	75.80	12.80	3.70	1.00	0.80	0.70	0.60	0.60	0.01	0.01	0.04
Btng3	69.60	15.70	4.00	1.10	1.30	1.00	0.80	1.10	0.01	0.03	0.05
Btng4	63.70	17.80	4.30	1.00	1.40	1.30	1.10	1.30	0.01	0.04	0.04
Btng5	60.20	20.40	4.50	1.00	1.20	1.40	1.50	1.20	0.01	0.04	0.03
Btng6	55.40	22.90	5.70	0.90	1.10	1.60	1.90	1.20	0.01	0.03	0.03
Btng7	57.10	22.00	6.90	0.90	0.90	1.50	1.70	1.00	0.02	0.04	0.02
Btng8	59.20	21.60	6.50	0.90	0.70	1.50	1.70	0.90	0.02	0.03	0.02

Appendix Table 3 (Continued).

Horizon	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Na <sub>2</sub> O	MgO	K <sub>2</sub> O	CaO	P <sub>2</sub> O <sub>5</sub>	MnO	S
(-----%-----)											
Mae Sai (Ms): Aeric Endoaqualf, fine, illitic, isohyperthermic											
Apg1	63.30	17.91	6.65	1.27	0.28	1.26	2.73	0.64	0.15	0.13	0.01
Apg2	63.71	18.01	6.79	1.27	0.26	1.28	2.71	0.57	0.14	0.12	0.01
Btg1	64.82	17.95	7.01	1.22	0.30	1.26	2.77	0.52	0.17	0.13	0.00
Btg2	61.51	19.05	8.06	1.32	0.24	1.34	2.83	0.57	0.20	0.17	0.00
Btg3	60.16	20.07	7.96	1.27	0.23	1.36	2.93	0.67	0.23	0.26	0.00
Btg4	63.22	18.88	6.89	1.20	0.27	1.29	2.85	0.52	0.17	0.15	0.00
Btg5	60.05	19.88	8.15	1.27	0.23	1.34	2.84	0.56	0.20	0.16	0.00
Btg6	55.30	22.43	9.62	1.15	0.19	1.41	2.90	0.60	0.20	0.18	0.00
BCg	60.52	21.63	6.09	1.00	0.23	1.18	2.88	0.55	0.13	0.10	0.01
Hang Dong (Hd): Aeric Endoaqualf, fine, illitic, isohyperthermic											
Apg1	66.06	17.72	4.63	0.87	0.30	0.88	2.92	0.66	0.07	0.18	0.00
Apg2	62.53	20.12	5.43	0.88	0.28	1.01	2.69	0.74	0.05	0.31	0.00
Btg1	69.38	17.12	4.00	0.75	0.26	0.80	2.67	0.64	0.04	0.21	0.00
Btg2	80.25	12.45	2.14	0.62	0.16	0.43	2.29	0.29	0.02	0.09	0.00
Btg3	77.47	15.47	2.49	0.65	0.15	0.40	2.20	0.24	0.02	0.02	0.00
2Btg4	71.09	17.72	6.51	0.68	0.15	0.41	2.06	0.27	0.03	0.06	0.00
2Btg5	61.87	22.45	7.08	0.75	0.18	0.41	1.81	0.35	0.03	0.45	0.00
2Btg6	60.27	24.79	4.19	0.78	0.16	0.41	1.73	0.39	0.02	0.17	0.00
2Btg7	63.75	22.79	3.56	0.80	0.16	0.41	1.93	0.36	0.02	0.08	0.00
2Btg8	67.35	20.86	3.23	0.83	0.16	0.45	2.12	0.35	0.02	0.10	0.00
San Sai (Sai): Typic Endoaqualf, coarse loamy, siliceous, subactive, isohyperthermic											
Apg1	96.03	3.44	0.57	0.40	0.05	0.20	0.23	0.24	0.16	0.01	0.02
Apg2	96.53	3.21	0.47	0.38	0.05	0.13	0.16	0.10	0.06	0.01	0.00
Btg1	100.08	1.25	0.26	0.32	0.04	0.07	0.10	0.01	0.01	0.00	0.00
Btg2	99.99	1.17	0.31	0.33	0.04	0.07	0.08	0.01	0.02	0.01	0.00
Btg3	99.39	1.93	0.34	0.38	0.04	0.07	0.11	0.01	0.03	0.00	0.00
2Btg4	93.21	4.46	1.70	0.57	0.05	0.12	0.19	0.03	0.12	0.03	0.00
2Btg5	83.93	11.83	1.64	0.92	0.07	0.20	0.45	0.08	0.12	0.02	0.00
Chiang Rai (Cr): Plinthic Paleaqualf, fine, illitic, isohyperthermic											
Apg1	72.82	14.70	4.16	0.95	0.55	0.73	1.67	0.35	0.05	0.06	0.01
Apg2	75.03	14.00	4.86	0.98	0.51	0.70	1.60	0.42	0.04	0.10	0.00
Btg1	83.71	10.05	2.54	0.97	0.27	0.33	1.07	0.18	0.02	0.06	0.00
Btcg1	76.18	13.83	8.25	1.05	0.23	0.32	1.14	0.17	0.03	0.26	0.00
Btg2	63.09	23.22	6.21	1.03	0.28	0.45	1.43	0.25	0.01	0.10	0.00
Btg3	63.65	23.77	5.50	1.00	0.31	0.45	1.43	0.24	0.01	0.10	0.00
Btg4	65.91	22.07	5.13	0.98	0.39	0.45	1.51	0.22	0.01	0.07	0.00
Btcg2	68.97	19.61	5.09	0.97	0.65	0.45	1.75	0.21	0.01	0.11	0.00
Btcg3	73.59	15.80	4.53	0.83	0.88	0.45	1.86	0.21	0.01	0.13	0.00
Chum Seang (Cs): Plinthic Paleaqualf, very fine, kaolinitic, isohyperthermic											
Apg	67.39	17.33	9.28	0.98	0.24	0.46	0.59	0.45	0.07	0.09	0.02
Btg1	73.79	15.97	6.36	1.10	0.20	0.33	0.37	0.32	0.03	0.06	0.01
Btg2	67.09	20.20	6.56	1.08	0.22	0.36	0.40	0.41	0.02	0.07	0.00
Btg3	59.07	25.00	5.88	1.02	0.30	0.41	0.52	0.50	0.02	0.04	0.00
Btg4	59.82	24.60	6.08	1.03	0.35	0.43	0.60	0.43	0.01	0.02	0.01
Btg5	60.20	24.26	6.02	0.98	0.39	0.45	0.70	0.38	0.01	0.01	0.02
Btg6	60.97	24.09	5.83	1.03	0.40	0.46	0.71	0.38	0.01	0.01	0.02
Chon Buri (Cb): Typic Endoaqualf, fine loamy, mixed, semiactive, isohyperthermic											
Apg1	90.62	4.89	0.64	0.38	0.12	0.15	0.71	0.07	0.03	0.01	0.01
Apg2	83.80	10.26	1.47	0.60	0.20	0.22	0.88	0.14	0.01	0.01	0.00
Btg1	84.35	10.37	1.69	0.47	1.28	0.23	0.64	0.10	0.01	0.00	0.00
Btg2	80.89	11.71	2.06	0.52	0.38	0.32	0.67	0.11	0.00	0.01	0.01
Btg3	83.09	10.85	2.06	0.47	0.39	0.33	0.55	0.11	0.00	0.04	0.01
Btg4	81.68	11.66	2.50	0.53	0.43	0.40	0.60	0.13	0.00	0.06	0.01
Btg5	80.12	12.32	2.56	0.57	0.80	0.43	0.64	0.13	0.00	0.04	0.01
Btg6	82.45	10.64	1.97	0.47	2.16	0.41	0.57	0.22	0.00	0.02	0.00
Btg7	80.59	12.19	2.43	0.53	0.36	0.18	0.51	0.39	0.00	0.02	0.01

Appendix Table 3 (Continued).

Horizon	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Na <sub>2</sub> O	MgO	K <sub>2</sub> O	CaO	P <sub>2</sub> O <sub>5</sub>	MnO	S
(-----%-----)											
Kleang (Kl): Typic Plinthaquult, fine loamy, mixed, subactive, isohyperthermic											
Apg	89.98	4.18	0.77	0.35	0.09	0.18	0.16	0.13	0.03	0.01	0.03
Apg2	89.19	6.84	1.06	0.45	0.11	0.13	0.12	0.14	0.01	0.02	0.01
Btg	82.71	11.88	1.72	0.63	0.11	0.15	0.22	0.07	0.02	0.00	0.02
Bvg1	79.24	13.59	2.69	0.63	0.11	0.15	0.23	0.04	0.02	0.00	0.02
Bvg2	79.35	14.13	2.89	0.65	0.11	0.15	0.20	0.04	0.02	0.01	0.02
Bvg3	80.31	12.58	3.30	0.60	0.11	0.13	0.18	0.03	0.02	0.02	0.01
Bvg4	80.89	11.66	2.60	0.63	0.12	0.13	0.17	0.03	0.01	0.01	0.01
Bvg5	79.86	12.21	2.49	0.58	0.13	0.18	0.18	0.01	0.00	0.01	0.00
Lop Buri (Lb): Typic Haplustert, very fine, smectitic, isohyperthermic											
Ap	59.47	17.14	6.41	1.17	0.04	0.78	0.07	4.48	0.07	0.26	0.02
Bw	62.04	18.63	6.76	1.25	0.04	0.71	0.05	2.46	0.04	0.15	0.01
Bss1	62.90	18.38	6.61	1.25	0.04	0.70	0.04	2.35	0.03	0.12	0.01
Bss2	60.12	17.53	6.23	1.27	0.04	0.66	0.02	5.43	0.02	0.12	0.01
Bss3	59.69	16.31	5.78	1.07	0.05	0.60	0.00	6.04	0.03	0.11	0.02
Bss4	55.84	15.89	5.49	1.05	0.05	0.58	0.00	9.04	0.03	0.10	0.02
BCK	37.44	11.98	3.85	0.78	0.01	0.53	0.00	23.37	0.02	0.04	0.03
Ck	17.97	6.73	2.06	0.38	0.00	0.48	0.00	38.62	0.01	0.03	0.03
Tha Rua (Tr): Chromic Vertic Endoaqualf, very fine, smectitic, isohyperthermic											
Apg1	63.75	15.81	6.43	0.98	0.31	1.14	0.83	3.36	0.06	0.23	0.02
Apg2	62.25	15.51	6.35	0.97	0.36	1.21	0.81	4.76	0.06	0.26	0.02
Btg1	63.11	15.93	6.51	0.97	0.47	1.24	0.84	3.92	0.06	0.25	0.02
Btg2	63.11	16.44	6.49	0.97	0.57	1.28	0.90	3.44	0.05	0.20	0.03
2Btg3	63.11	17.16	6.83	0.97	0.63	1.26	0.99	3.05	0.05	0.18	0.03
2Btg4	63.54	17.91	7.06	1.00	0.66	1.28	1.07	2.03	0.04	0.16	0.03
2Btg5	64.39	17.82	7.28	0.98	0.71	1.31	1.17	1.53	0.04	0.18	0.03
2Btg6	66.32	17.29	7.01	1.02	0.75	1.28	1.19	1.20	0.04	0.18	0.02
Khok Krathium (Kk): Ustic Endoaquert, very fine, smectitic, isohyperthermic											
Apg1	62.47	19.46	6.21	1.05	0.27	0.85	0.90	1.02	0.06	0.06	0.04
Apg2	62.90	19.46	6.58	1.02	0.28	0.85	0.88	1.05	0.05	0.08	0.03
Bg1	63.75	19.65	6.38	1.03	0.30	0.86	0.87	1.02	0.04	0.12	0.03
Bg2	62.90	20.22	6.18	1.03	0.31	0.90	0.88	1.08	0.04	0.16	0.02
Bg3	62.68	20.03	6.08	1.03	0.34	0.95	0.88	1.15	0.03	0.14	0.02
Bssg1	62.47	20.60	5.98	1.02	0.35	1.06	0.92	1.23	0.03	0.14	0.02
Bssg2	62.25	20.78	5.95	1.03	0.36	1.13	0.96	1.34	0.03	0.09	0.02
Bssg3	62.04	20.60	5.89	1.00	0.38	1.13	0.98	1.37	0.03	0.08	0.02
Bg4	63.97	19.08	5.76	0.98	0.39	1.14	1.00	1.44	0.03	0.04	0.11
Bg5	58.40	21.92	7.92	1.07	0.42	1.29	1.18	1.19	0.03	0.15	0.05
Bang Phae (Bph): Typic Endoaquoll, fine, smectitic, isohyperthermic											
Apg1	63.75	17.19	5.30	0.80	0.36	1.14	1.96	1.06	0.11	0.07	0.11
Apg2	62.90	18.29	6.03	0.83	0.44	1.33	2.01	1.61	0.04	0.08	0.42
ABg	57.12	16.29	5.22	0.75	0.44	1.29	1.87	4.91	0.03	0.05	2.12
Bg1	62.47	16.29	5.28	0.75	0.44	1.44	2.06	3.27	0.03	0.04	1.42
Bg2	70.38	14.79	5.56	0.73	0.49	1.44	2.11	0.50	0.03	0.08	0.04
Bg3	72.74	13.60	4.37	0.70	0.51	1.29	2.11	0.43	0.04	0.16	0.04
Bg4	73.38	13.13	4.36	0.68	0.51	1.28	2.12	0.50	0.06	0.08	0.04

Appendix Table 4 Trace elements of Thai paddy soils (in mg kg<sup>-1</sup> unit).

Horizon	Li	Be	P	Ti	V	Cr	Mn	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Ag	Cd	Pb	U
Roi Et (Re): Typic Paleaquult, fine loamy, mixed, semiactive, isohyperthermic																			
Ap <sub>g1</sub>	4	0	31	129	20	293	168	3	11	13	11	4	1.0	2.2	3.9	0.03	0.04	5.01	0.62
Ap <sub>g2</sub>	5	0	13	114	18	318	344	4	22	12	10	4	0.8	2.6	3.6	0.03	0.04	4.73	0.48
Bt <sub>g1</sub>	6	0	20	128	22	264	420	3	12	9	9	4	0.7	4.0	4.7	0.03	0.02	5.26	0.57
Bt <sub>g2</sub>	5	0	27	118	19	300	248	3	21	10	8	3	1.3	3.6	3.6	0.03	0.01	4.37	0.46
Bt <sub>g3</sub>	6	0	18	200	25	289	373	4	12	12	10	6	1.0	4.8	4.3	0.02	0.02	6.86	0.71
Bt <sub>g4</sub>	12	0	16	135	25	99	217	3	12	9	13	11	1.0	9.2	7.9	0.09	0.02	7.94	1.10
Bt <sub>g5</sub>	8	0	6	107	22	73	194	3	7	7	9	7	0.6	6.2	7.7	0.13	0.00	5.91	0.94
Bt <sub>g6</sub>	10	0	7	128	25	224	219	4	17	11	11	7	0.8	6.2	9.0	0.08	0.00	7.02	1.19
Bt <sub>g7</sub>	13	0	8	119	31	195	233	4	11	11	11	7	1.0	6.5	11.3	0.02	0.02	6.85	0.93
Tha Tum (Tt): Plinthic Endoaqualf, fine loamy, mixed, subactive, isohyperthermic																			
Ap <sub>g</sub>	17	1	56	227	55	110	48	6	18	15	12	10	0.3	2.6	2.2	0.05	0.04	8.75	0.97
AB <sub>g</sub>	19	1	18	369	53	240	34	7	23	12	8	11	1.0	3.0	2.1	0.06	0.01	8.06	1.01
Bt <sub>g1</sub>	17	1	17	280	43	187	34	6	24	11	9	10	0.6	3.2	2.5	0.07	0.01	6.15	1.08
Bt <sub>g2</sub>	21	0	14	273	31	206	68	7	21	14	10	10	0.2	5.0	4.3	0.03	0.01	5.31	0.94
Bt <sub>g3</sub>	29	0	13	288	42	175	50	7	23	12	12	10	1.1	11.1	8.3	0.07	0.00	7.21	1.11
Bt <sub>g4</sub>	17	0	8	323	26	185	44	5	14	13	12	8	0.4	11.4	11.0	0.04	0.02	4.58	0.77
Bt <sub>g5</sub>	7	0	9	230	34	182	128	10	16	10	13	7	0.3	13.1	17.0	0.04	0.00	7.75	0.75
Bt <sub>g6</sub>	6	1	7	236	35	73	662	43	10	10	18	8	0.8	14.8	22.4	0.05	0.01	23.04	0.80
Bt <sub>g7</sub>	6	1	8	317	45	84	120	7	12	11	19	8	1.4	17.9	25.0	0.10	0.01	7.61	0.99
Phimai (Pm1): Vertic Endoaqualf, very fine, kaolinitic, isohyperthermic																			
Ap <sub>g1</sub>	39	2	74	154	79	98	340	10	19	13	30	17	1.6	58.3	33.2	0.36	0.02	18.60	3.15
Ap <sub>g2</sub>	54	2	48	182	103	85	879	20	24	17	38	25	1.7	78.6	39.9	0.05	0.02	23.37	3.56
Bt <sub>g1</sub>	43	2	24	113	71	71	681	14	22	12	28	20	1.1	55.1	31.6	0.01	0.00	17.17	3.11
Bt <sub>g2</sub>	28	1	14	180	64	94	159	8	23	10	23	23	1.0	29.6	19.0	0.02	0.03	12.06	3.46
Bt <sub>g3</sub>	31	1	14	133	67	76	121	8	19	10	16	20	0.8	27.1	19.8	0.03	0.02	13.02	4.38
Bt <sub>g4</sub>	28	1	11	148	60	88	384	12	18	9	15	17	0.5	24.6	19.7	0.03	0.01	13.00	4.20
2Bt <sub>g5</sub>	25	2	14	145	80	69	210	16	23	18	31	17	1.8	42.1	23.7	0.02	0.03	22.60	2.33
2Bt <sub>g6</sub>	21	2	17	170	82	70	388	28	31	20	37	16	1.7	42.9	24.2	0.07	0.03	26.25	1.94

Appendix Table 4 (Continued).

Horizon	Li	Be	P	Ti	V	Cr	Mn	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Ag	Cd	Pb	U
Phimai (Pm2): Aeric Vertic Natraqualf, fine, kaolinitic, isohyperthermic																			
Apg1	20	2	122	79	70	84	175	8	15	10	15	11	2.5	25.1	16.5	0.00	0.00	11.59	1.94
Apg2	24	2	74	116	88	88	283	9	16	10	17	14	3.6	29.0	15.1	0.00	0.02	12.97	2.04
Btg1	30	3	62	112	79	95	312	10	20	11	20	16	2.4	35.2	17.8	0.00	0.02	14.28	2.26
Btg2	41	3	59	110	69	78	293	11	22	9	21	20	1.4	36.2	20.6	0.00	0.02	14.27	2.68
Btg3	42	3	39	114	62	78	205	9	22	8	20	19	1.7	31.8	26.5	0.00	0.03	11.96	2.25
Btng1	33	2	33	156	63	74	263	11	22	11	24	17	1.5	32.4	29.6	0.00	0.03	12.33	1.53
2Btng2	24	2	28	150	51	85	164	8	20	9	23	13	2.3	26.7	27.3	0.00	0.02	9.95	1.14
2Btng3	17	2	28	184	50	69	1058	13	17	9	27	14	2.7	22.4	26.2	0.00	0.04	11.91	0.99
2Btng4	15	1	36	178	45	96	970	12	19	9	27	11	1.8	23.0	23.6	0.00	0.04	11.29	1.00
2Btng5	13	1	38	219	40	72	510	12	15	9	30	15	1.7	21.5	23.0	0.00	0.04	9.83	0.73
Kula Ronghai (Ki): Typic Natraqualf, fine, kaolinitic, isohyperthermic																			
Apg1	4	0	48	89	15	147	59	2	7	3	3	2	0.4	2.4	1.6	0.02	0.03	2.58	0.34
Apg2	3	0	16	69	17	259	43	2	13	3	2	2	0.7	1.5	1.4	0.03	0.02	2.41	0.25
Btg	25	1	17	85	35	83	394	14	17	3	10	13	1.2	13.6	13.4	0.03	0.01	12.24	1.43
Btng1	27	2	14	122	32	81	121	8	18	3	11	14	0.3	17.1	18.1	0.01	0.03	9.30	1.12
Btng2	21	2	12	212	41	94	185	18	15	3	9	13	0.6	14.4	18.7	0.04	0.04	12.80	1.01
2Btng3	16	2	13	272	48	78	189	18	11	5	8	12	1.2	11.0	15.1	0.13	0.00	17.25	0.85
2Btng4	14	1	13	243	51	76	84	8	11	6	6	10	1.1	8.4	13.3	0.02	0.00	10.13	0.86
2Btng5	18	2	17	230	64	87	78	10	11	7	8	12	1.1	10.8	16.5	0.06	0.01	7.98	1.25
2Btng6	19	2	22	270	90	73	55	7	11	10	9	13	2.6	10.9	16.5	0.07	0.04	9.53	1.89
Udon (Ud): Vertic Natraqualf, fine, mixed, active, isohyperthermic																			
Ag	26	2	128	127	63	70	242	8	13	13	24	12	2.3	36.8	34.8	0.00	0.03	15.65	1.96
Btng1	31	2	56	134	69	70	115	7	13	13	19	13	1.6	40.0	29.8	0.00	0.02	14.31	1.98
Btng2	33	2	41	131	66	74	105	7	14	11	17	13	1.3	38.4	31.2	0.00	0.03	13.67	1.94
Btng3	34	2	36	102	67	62	171	9	14	12	24	18	1.2	41.7	49.0	0.00	0.03	17.13	2.21
Btng4	39	3	40	102	82	66	292	14	17	17	29	22	1.7	51.9	62.9	0.00	0.01	21.82	2.17
Btng5	37	3	46	99	85	59	252	13	20	21	36	24	1.9	64.8	70.8	0.00	0.02	21.74	2.10
Btng6	29	3	55	75	101	54	161	8	19	27	37	22	2.7	63.0	69.6	0.00	0.02	23.31	2.56
Btng7	28	3	82	87	107	49	289	12	20	26	38	23	3.6	61.7	68.8	0.00	0.05	27.39	3.11
Btng8	28	3	70	90	89	45	177	8	18	23	40	23	2.6	59.8	64.8	0.00	0.03	22.33	2.87

Appendix Table 4 (Continued).

Horizon	Li	Be	P	Ti	V	Cr	Mn	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Ag	Cd	Pb	U
Mae Sai (Ms): Aeric Endoaqualf, fine, illitic, isohyperthermic																			
Apg1	27	2	195	639	80	105	826	17	47	38	71	15	13.7	61.0	17.6	0.15	0.29	34.41	4.46
Apg2	25	2	169	657	70	96	739	17	44	36	73	15	14.2	60.3	16.8	0.16	0.19	34.92	4.26
Btg1	29	2	229	952	84	117	871	20	52	40	76	17	17.8	64.0	16.9	0.14	0.16	35.47	4.98
Btg2	29	2	277	782	91	100	1078	21	53	44	82	18	20.8	67.2	19.2	0.11	0.23	38.75	4.68
Btg3	33	2	359	760	89	96	1747	22	57	44	88	20	19.8	80.7	20.9	0.12	0.32	41.93	5.52
Btg4	28	2	218	721	68	103	981	19	48	36	70	16	16.6	62.6	15.3	0.11	0.22	35.16	4.74
Btg5	30	2	257	760	84	100	985	20	49	40	79	18	21.9	64.9	15.7	0.10	0.22	39.35	4.96
Btg6	38	3	294	714	97	95	1062	21	57	44	89	21	20.4	77.3	19.7	0.12	0.26	47.27	5.87
BCg	39	2	195	579	82	91	628	14	43	35	70	17	9.7	69.4	15.6	0.15	0.22	41.90	6.43
Hang Dong (Hd): Aeric Endoaqualf, fine, illitic, isohyperthermic																			
Apg1	50	3	96	609	53	72	1227	12	23	25	71	16	6.2	90.4	23.6	0.15	0.20	40.36	4.04
Apg2	64	4	79	756	58	62	2073	13	26	27	85	20	6.8	86.0	31.4	0.15	0.16	49.68	5.32
Btg1	57	3	62	575	46	71	1348	10	23	23	68	17	4.7	74.1	27.3	0.14	0.14	39.41	4.03
Btg2	36	2	33	267	34	95	772	5	16	13	31	10	2.8	47.0	14.1	0.07	0.07	19.65	2.61
Btg3	37	2	33	186	37	75	179	4	15	13	28	11	3.0	60.8	10.4	0.08	0.05	18.26	3.51
2Btg4	53	2	47	249	68	98	322	8	22	18	37	17	6.7	79.7	13.7	0.11	0.04	27.85	6.96
2Btg5	77	3	48	274	65	77	3303	24	30	25	55	27	8.7	96.9	19.4	0.09	0.07	84.65	14.33
2Btg6	76	4	29	171	40	67	1206	12	27	19	52	25	2.2	80.5	17.8	0.10	0.13	44.71	11.52
2Btg7	63	3	25	198	37	70	594	7	20	17	46	21	1.5	68.6	17.8	0.25	0.09	34.79	9.56
2Btg8	53	3	26	243	35	85	685	6	18	15	45	18	2.1	64.6	17.4	0.08	0.07	29.24	7.63
San Sai (Sai): Typic Endoaqualf, coarse loamy, siliceous, subactive, isohyperthermic																			
Apg1	4	0	128	84	15	302	107	2	21	12	12	3	1.0	12.1	10.0	0.07	0.05	6.26	0.80
Apg2	2	0	58	77	13	266	83	2	10	6	5	2	0.3	8.5	5.0	0.04	0.03	5.04	0.37
Btg1	1	0	18	75	11	280	37	1	17	4	2	1	0.7	5.1	1.6	0.09	0.00	2.98	0.31
Btg2	1	0	33	87	11	291	70	2	9	5	2	1	0.4	7.5	1.9	0.09	0.03	4.53	0.50
Btg3	1	0	39	112	19	390	50	2	23	6	3	2	0.9	11.5	2.4	0.14	0.03	5.10	0.44
2Btg4	2	0	114	104	36	227	225	5	9	7	5	4	1.8	17.1	4.1	0.15	0.02	13.01	0.97
2Btg5	3	0	132	75	38	179	135	3	14	10	7	7	2.5	30.7	7.5	0.07	0.01	19.96	1.27

Appendix Table 4 (Continued).

Horizon	Li	Be	P	Ti	V	Cr	Mn	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Ag	Cd	Pb	U
Chiang Rai (Cr): Plinthic Paleaqualf, fine, illitic, isohyperthermic																			
Apg1	14	1	86	221	61	113	547	11	14	21	40	8	5.1	23.2	16.6	0.05	0.12	16.82	1.61
Apg2	17	1	60	211	65	134	696	12	16	23	36	10	4.9	27.3	22.5	0.03	0.04	17.37	1.48
Btg1	12	0	30	161	45	110	500	7	12	14	18	7	1.4	24.3	12.4	0.01	0.03	10.88	0.98
Btcg1	19	1	49	147	136	132	1958	30	15	23	29	14	12.2	40.8	16.0	0.05	0.03	25.88	2.33
Btg2	28	1	31	76	79	68	977	24	17	23	35	19	5.2	42.3	22.1	0.02	0.04	28.40	2.25
Btg3	27	1	22	72	58	69	803	20	17	21	33	17	3.2	38.8	20.6	0.13	0.01	26.30	2.15
Btg4	26	1	18	110	58	69	520	12	15	19	31	16	2.7	38.7	21.3	0.04	0.01	20.11	2.03
Btcg2	17	1	19	159	60	84	823	24	13	19	31	14	4.6	32.2	20.5	0.03	0.00	15.85	1.91
Btcg3	10	1	20	280	58	98	869	32	11	19	31	10	4.7	24.6	18.7	0.01	0.00	17.82	1.67
Chum Seang (Cs): Plinthic Paleaqualf, very fine, kaolinitic, isohyperthermic																			
Apg	25	1	87	137	144	128	513	16	23	30	45	15	5.8	23.7	22.9	0.04	0.07	14.56	1.10
Btg1	25	1	42	108	116	173	367	11	20	26	34	15	2.7	15.5	17.9	0.03	0.03	10.39	0.84
Btg2	32	1	34	91	98	102	264	12	23	26	35	17	1.6	18.1	22.4	0.04	0.01	9.40	0.90
Btg3	44	1	29	81	86	71	301	16	26	29	37	22	1.2	25.8	31.7	0.05	0.00	10.11	0.96
Btg4	37	1	24	71	79	83	133	12	23	25	30	19	1.3	22.3	31.3	0.04	0.00	10.51	1.02
Btg5	42	1	21	80	80	65	60	11	25	26	35	21	1.3	29.1	30.9	0.19	0.02	11.50	1.04
Btg6	41	1	22	63	79	66	72	10	24	30	36	21	1.3	27.3	31.1	0.00	0.01	11.50	1.10
Chon Buri (Cb): Typic Endoaqualf, fine loamy, mixed, semiactive, isohyperthermic																			
Apg1	6	0	24	195	13	469	88	3	27	10	8	4	0.7	16.7	5.3	0.07	0.02	8.33	2.31
Apg2	13	1	17	265	22	293	102	2	12	8	8	6	0.9	25.4	8.2	0.08	0.02	10.93	3.42
Btg1	14	1	11	232	25	303	43	3	20	8	8	7	0.8	23.5	7.0	0.06	0.03	10.78	3.70
Btg2	18	1	13	175	31	210	59	4	11	11	9	8	1.4	22.2	14.9	0.07	0.01	20.98	4.36
Btg3	20	2	8	183	24	119	366	11	15	9	9	8	1.1	20.6	15.2	0.05	0.04	29.39	3.82
Btg4	17	1	12	176	27	104	530	7	12	10	10	8	0.5	21.8	15.9	0.11	0.03	19.28	2.73
Btg5	12	1	7	154	25	93	404	6	11	7	8	7	0.8	19.1	20.6	0.04	0.05	20.24	2.17
Btg6	11	1	9	170	22	119	148	5	10	10	9	6	0.9	18.1	15.8	0.04	0.03	17.74	1.79
Btg7	15	1	8	194	34	205	184	8	18	11	12	10	2.0	21.5	34.2	0.05	0.03	43.83	2.23

Appendix Table 4 (Continued).

Horizon	Li	Be	P	Ti	V	Cr	Mn	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Ag	Cd	Pb	U
Kleang (Kl): Typic Plinthaquult, fine loamy, mixed, subactive, isohyperthermic																			
Apg	5	0	23	99	12	516	71	4	29	10	9	3	1.4	5.4	4.4	0.03	0.03	7.20	1.01
Apg2	12	0	15	118	22	307	164	3	12	9	9	6	0.8	7.3	9.4	0.01	0.02	6.29	1.16
Btg	16	0	19	109	26	251	41	4	17	16	15	8	0.8	10.3	5.6	0.07	0.04	7.42	1.28
Bvg1	20	0	25	118	33	219	43	4	12	15	15	10	2.0	12.0	4.4	0.04	0.02	8.14	1.94
Bvg2	21	1	22	117	30	222	41	4	18	13	12	9	1.9	10.7	4.0	0.07	0.01	8.03	1.95
Bvg3	23	1	33	174	49	270	230	6	15	19	15	12	2.3	12.6	4.6	0.13	0.03	14.91	2.52
Bvg4	11	0	18	150	32	234	75	3	16	12	10	8	0.4	8.8	3.4	0.09	0.01	12.64	1.27
Bvg5	10	0	8	181	30	174	62	4	10	16	14	8	0.0	10.2	3.1	0.06	0.00	11.51	0.84
Lop Buri (Lb): Typic Haplustert, very fine, smectitic, isohyperthermic																			
Ap	20	2	213	67	59	94	1774	16	31	29	47	16	14.3	2.7	41.6	0.11	0.17	22.18	1.00
Bw	22	2	99	52	54	101	982	10	27	27	47	17	10.4	3.3	33.1	0.08	0.08	20.09	0.88
Bss1	21	2	67	40	51	95	684	9	25	25	42	15	9.3	2.8	31.7	0.10	0.06	18.73	0.84
Bss2	24	3	60	59	58	99	916	10	28	24	39	16	9.5	2.8	46.5	0.06	0.06	19.27	0.68
Bss3	23	2	56	64	54	97	648	8	27	23	37	15	9.4	2.5	51.0	0.04	0.05	16.97	0.64
Bss4	23	2	59	66	53	97	741	8	27	22	38	15	9.2	2.7	69.1	0.07	0.05	16.18	0.70
BCk	19	1	39	75	36	75	265	4	23	16	27	11	6.4	2.6	128.4	0.06	0.03	10.94	1.17
Ck	12	1	28	78	30	48	355	4	23	9	15	7	5.9	1.6	236.2	0.02	0.05	6.31	2.08
Tha Rua (Tr): Chromic Vertic Endoaqualf, very fine, smectitic, isohyperthermic																			
Apg1	20	1	159	198	75	49	1457	17	27	28	49	15	3.4	28.3	110.8	0.12	0.12	12.71	0.70
Apg2	19	2	144	208	74	48	1739	17	27	30	53	18	2.9	26.4	129.8	0.09	0.12	12.62	0.82
Btg1	20	2	149	224	77	50	1674	18	29	32	55	18	2.9	24.5	125.9	0.03	0.11	12.71	0.96
Btg2	22	2	141	238	80	50	1343	17	28	31	53	17	3.0	25.0	130.0	0.07	0.16	12.47	1.29
2Btg3	22	2	128	270	80	49	1234	17	26	30	53	16	2.6	24.8	109.3	0.02	0.12	12.47	1.61
2Btg4	24	2	116	308	83	52	1090	18	29	32	57	18	3.8	27.8	103.3	0.03	0.09	12.80	1.58
2Btg5	23	2	110	352	84	54	1128	20	30	30	55	16	4.2	24.5	87.8	0.04	0.06	14.31	1.22
2Btg6	22	2	105	333	82	59	1123	19	29	29	51	14	2.9	21.0	85.2	0.04	0.09	13.09	1.02

Appendix Table 4 (Continued).

Horizon	Li	Be	P	Ti	V	Cr	Mn	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Ag	Cd	Pb	U
Khok Krathium (Kk): Ustic Endoaquert, very fine, smectitic, isohyperthermic																			
Apg1	25	2	164	127	84	50	360	14	22	29	62	16	2.4	40.7	43.0	0.06	0.10	15.19	1.16
Apg2	25	2	128	105	87	55	576	16	22	30	62	17	2.9	41.4	48.9	0.10	0.09	14.09	1.05
Bg1	26	2	119	103	85	56	818	16	21	32	63	17	2.4	41.3	47.2	0.11	0.06	13.03	1.02
Bg2	27	2	92	97	87	54	1077	22	23	33	64	17	2.6	38.0	57.3	0.04	0.12	13.68	0.93
Bg3	28	2	77	99	84	54	1139	22	27	33	64	16	2.6	36.3	66.3	0.06	0.12	14.00	0.82
Bssg1	31	2	64	111	89	54	978	21	28	34	71	20	2.3	38.0	78.3	0.09	0.12	13.78	0.56
Bssg2	30	2	65	112	90	50	678	18	27	34	70	19	2.6	36.4	84.5	0.04	0.04	14.18	0.56
Bssg3	30	2	64	95	89	46	502	16	26	34	65	16	1.8	34.2	83.9	0.04	0.05	13.53	0.70
Bg4	27	2	93	125	89	51	307	13	26	33	59	13	2.7	31.6	74.1	0.05	0.01	13.63	0.87
Bg5	36	2	83	183	113	57	1082	26	36	34	62	21	2.1	30.8	84.1	0.02	0.08	15.49	1.64
Bang Phae (Bph): Typic Endoaquoll, fine, smectitic, isohyperthermic																			
Apg1	43	5	326	108	50	82	496	15	24	21	53	15	9.6	76.0	26.8	0.09	0.10	41.43	7.09
Apg2	66	6	156	137	67	84	656	19	31	24	59	19	15.8	93.9	41.7	0.09	0.10	50.08	4.21
ABg	43	3	91	148	52	76	432	13	26	18	38	14	15.4	73.3	55.8	0.12	0.27	37.68	1.59
Bg1	44	4	88	128	42	69	319	15	25	16	46	12	5.3	62.5	37.0	0.03	0.08	39.37	1.06
Bg2	37	3	81	149	35	97	540	15	26	14	42	10	6.8	50.8	17.6	0.04	0.09	29.19	1.06
Bg3	42	3	111	200	33	99	1335	17	28	14	44	10	6.4	57.1	22.2	0.02	0.14	28.84	1.31
Bg4	33	3	149	168	25	92	627	16	23	11	37	8	8.9	42.5	17.6	0.04	0.08	21.41	1.29

**Appendix Table 5** Total Fe ( $Fe_t$ ) and extractable Fe by dithionite citrate bicarbonate ( $Fe_d$ ), oxalic acid ( $Fe_o$ ) and Na-pyrophosphate ( $Fe_p$ ) of whole soil samples of Thai paddy soils.

Soil	Horizon	Depth (cm)	$Fe_t$	$Fe_d$	$Fe_o$	$Fe_p$	$Fe_o/Fe_d$	$Fe_d/Fe_t$
(-----g kg <sup>-1</sup> -----)								
Re	App1	0-14	5.50	3.51	0.88	1.13	0.25	0.64
	App2	14-25/32	6.40	4.30	1.32	0.95	0.31	0.67
	Btg1	32-45	5.70	2.64	0.80	0.70	0.30	0.46
	Btg2	45-65	5.70	3.47	0.81	0.61	0.23	0.61
	Btg3	65-90	10.60	5.34	0.65	0.74	0.12	0.50
	Btg4	90-116	16.50	2.09	0.32	0.65	0.15	0.13
	Btg5	116-140	13.50	2.13	0.45	0.73	0.21	0.16
	Btg6	140-169	12.60	3.25	0.58	0.73	0.18	0.26
	Btg7	169-200+	13.70	3.13	0.35	1.00	0.11	0.23
Tt	App	0-12	8.80	2.79	1.43	1.36	0.51	0.32
	ABg	12-26	9.50	4.28	0.84	1.36	0.20	0.45
	Btg1	26-43	15.00	9.42	0.38	0.60	0.04	0.63
	Btg2	43-70	11.10	5.03	0.19	0.09	0.04	0.45
	Btg3	70-93	17.20	8.78	0.19	0.12	0.02	0.51
	Btg4	93-123	10.50	3.74	0.07	0.19	0.02	0.36
	Btg5	123-157	12.50	3.83	0.17	0.62	0.04	0.31
	Btg6	157-182	19.40	5.82	0.50	1.06	0.09	0.30
	Btg7	182-200+	26.50	10.38	0.33	0.99	0.03	0.39
Pm1	App1	0-12	31.70	8.31	3.99	1.73	0.48	0.26
	App2	12-32	37.00	9.67	3.09	1.28	0.32	0.26
	Btg1	32-43	34.30	8.99	1.55	1.24	0.17	0.26
	Btg2	43-76	30.90	10.21	0.39	0.44	0.04	0.33
	Btg3	76-105	36.40	15.17	0.32	0.26	0.02	0.42
	Btg4	105-140	25.60	7.90	0.29	0.21	0.04	0.31
	2Btg5	140-170	37.90	12.05	0.19	0.26	0.02	0.32
	2Btg6	170-210	41.80	15.94	0.31	0.32	0.02	0.38
Pm2	App1	0-10	20.70	8.45	3.38	1.86	0.40	0.41
	App2	10-22	33.90	11.67	1.71	1.22	0.15	0.34
	Btg1	22-38	29.70	10.67	1.01	1.84	0.09	0.36
	Btg2	38-60	27.60	6.70	0.75	1.07	0.11	0.24
	Btg3	60-83	24.20	5.20	0.26	0.16	0.05	0.21
	Btng1	83-102	26.90	8.06	0.17	0.11	0.02	0.30
	2Btng2	102-121	22.40	8.20	0.14	0.12	0.02	0.37
	2Btng3	121-140	23.10	9.72	0.30	0.21	0.03	0.42
	2Btng4	140-162	22.40	7.74	0.27	0.18	0.03	0.35
	2Btng5	162-190	18.50	7.07	0.20	0.38	0.03	0.38
Ki	App1	0-18	2.10	1.45	0.64	0.34	0.44	0.69
	App2	18-30	2.30	1.98	0.22	0.10	0.11	0.86
	Btg	30-48	20.80	12.42	0.44	0.10	0.04	0.60
	Btng1	48-73	14.80	3.43	0.13	0.06	0.04	0.23
	Btng2	73-91	14.30	5.15	0.18	0.07	0.04	0.36
	2Btng3	91-118	17.20	7.70	0.18	0.05	0.02	0.45
	2Btng4	118-150	21.30	11.15	0.11	0.08	0.01	0.52
	2Btng5	150-185	25.80	15.77	0.17	0.08	0.01	0.61
	2Btng6	185-210+	44.10	27.48	0.12	0.06	0.00	0.62
Ud	Ag	0-21	27.00	7.75	2.74	4.20	0.35	0.29
	Btng1	21-41	25.30	7.51	1.03	3.63	0.14	0.30
	Btng2	41-66	25.60	7.58	0.81	2.42	0.11	0.30
	Btng3	66-88	27.80	6.43	0.65	1.81	0.10	0.23
	Btng4	88-108	30.10	5.62	0.62	2.20	0.11	0.19
	Btng5	108-132	31.60	3.40	0.87	2.28	0.26	0.11
	Btng6	132-165	40.20	6.98	0.83	2.41	0.12	0.17
	Btng7	165-184	48.60	12.33	0.89	2.07	0.07	0.25
	Btng8	184-202+	45.80	10.89	0.59	2.49	0.05	0.24

Appendix Table 5 (Continued).

Soil	Horizon	Depth (cm)	Fe <sub>t</sub>	Fe <sub>d</sub>	Fe <sub>o</sub>	Fe <sub>p</sub>	Fe <sub>o</sub> /Fe <sub>d</sub>	Fe <sub>d</sub> /Fe <sub>t</sub>
			(-----g kg <sup>-1</sup> -----)					
Ms	Apg1	0-15	46.50	22.09	8.01	1.96	0.36	0.48
	Apg2	15-33	47.50	23.38	8.74	1.55	0.37	0.49
	Btg1	33-54	49.00	25.68	5.86	1.57	0.23	0.52
	Btg2	54-70	56.40	30.47	7.97	1.43	0.26	0.54
	Btg3	70-94	55.70	27.80	11.73	1.67	0.42	0.50
	Btg4	94-125	48.20	24.55	5.12	1.51	0.21	0.51
	Btg5	125-144	57.00	27.47	6.33	1.96	0.23	0.48
	Btg6	144-168	67.30	32.38	7.21	1.81	0.22	0.48
BCg	168-200+	42.60	17.85	4.38	1.64	0.25	0.42	
Hd	Apg1	0-15	32.40	10.11	4.28	1.38	0.42	0.31
	Apg2	15-29	38.00	10.10	1.67	0.62	0.17	0.27
	Btg1	29-50/53	28.00	6.16	1.53	0.76	0.25	0.22
	Btg2	53-68	15.00	4.33	0.52	0.53	0.12	0.29
	Btg3	68-88/90	17.40	5.68	0.22	0.12	0.04	0.33
	2Btg4	90-102/105	45.50	13.36	0.28	0.12	0.02	0.29
	2Btg5	105-124	49.50	21.41	0.60	0.09	0.03	0.43
	2Btg6	124-148	29.30	10.65	0.31	0.05	0.03	0.36
2Btg7	148-174	24.90	7.15	0.23	0.08	0.03	0.29	
2Btg8	174-200+	22.60	7.42	0.23	0.17	0.03	0.33	
Sai	Apg1	0-13/17	4.00	2.96	0.82	0.57	0.28	0.74
	Apg2	17-30/40	3.30	2.48	0.67	0.40	0.27	0.75
	Btg1	40-50	1.80	1.44	0.10	0.05	0.07	0.80
	Btg2	50-70	2.20	1.25	0.16	0.06	0.13	0.57
	Btg3	70-90	2.40	1.14	0.26	0.05	0.23	0.48
	2Btg4	90-115	11.90	4.74	1.29	0.21	0.27	0.40
2Btg5	115-135+	11.50	6.20	1.58	0.22	0.26	0.54	
Cr	Apg1	0-12	29.10	9.95	4.78	2.09	0.48	0.34
	Apg2	12-25/30	34.00	11.70	3.02	1.64	0.26	0.34
	Btg1	30-53	17.80	7.92	0.88	0.66	0.11	0.44
	Btcg1	53-80/90	57.70	30.72	1.23	0.24	0.04	0.53
	Btg2	90-106	43.40	18.44	0.88	0.10	0.05	0.42
	Btg3	106-123	38.50	13.00	0.91	0.17	0.07	0.34
	Btg4	123-144	35.90	13.23	0.86	0.27	0.07	0.37
	Btcg2	144-166	35.60	16.82	1.25	0.57	0.07	0.47
Btcg3	166-190+	31.70	13.42	1.28	0.82	0.10	0.42	
Cs	Apg	0-12	64.90	24.73	3.61	2.37	0.15	0.38
	Btg1	12-32	44.50	16.03	0.78	0.82	0.05	0.36
	Btg2	32-55	45.90	12.94	0.62	0.26	0.05	0.28
	Btg3	55-82	41.10	10.83	0.33	0.11	0.03	0.26
	Btg4	82-109	42.50	10.91	0.37	0.09	0.03	0.26
	Btg5	109-131	42.10	12.84	0.33	0.10	0.03	0.30
Btg6	131-152+	40.80	12.89	0.34	0.09	0.03	0.32	
Cb	Apg1	0-20	4.50	3.67	0.77	0.68	0.21	0.81
	Apg2	20-38	10.30	4.27	0.59	0.92	0.14	0.41
	Btg1	38-65	11.80	4.91	0.38	0.57	0.08	0.42
	Btg2	65-87	14.40	3.87	0.37	0.62	0.09	0.27
	Btg3	87-110	14.40	2.80	0.38	0.60	0.14	0.19
	Btg4	110-130	17.50	3.27	0.30	0.49	0.09	0.19
	Btg5	130-150	17.90	3.86	0.29	0.52	0.07	0.22
Btg6	150-175	13.80	2.64	0.18	0.47	0.07	0.19	
Btg7	175-192+	17.00	4.44	0.28	0.42	0.06	0.26	
Kl	Apg	0-13/15	5.40	4.28	1.15	0.88	0.27	0.79
	Apg2	15-30	7.40	3.00	0.51	0.67	0.17	0.41
	Btg	30-57	12.00	4.32	1.41	0.89	0.33	0.36
	Bvg1	57-72	18.80	10.43	0.87	0.34	0.08	0.56
	Bvg2	72-100	20.20	11.90	0.45	0.24	0.04	0.59
Bvg3	100-125	23.10	18.83	0.31	0.18	0.02	0.82	
Bvg4	125-155	18.20	10.06	0.23	0.17	0.02	0.55	
Bvg5	155-180+	17.40	6.89	0.45	0.72	0.07	0.40	

Appendix Table 5 (Continued).

Soil	Horizon	Depth (cm)	Fe <sub>t</sub>	Fe <sub>d</sub>	Fe <sub>o</sub>	Fe <sub>p</sub>	Fe <sub>o</sub> /Fe <sub>d</sub>	Fe <sub>d</sub> /Fe <sub>t</sub>
			(-----g kg <sup>-1</sup> -----)					
Lb	Ap	0-23	44.80	6.84	2.60	0.27	0.38	0.15
	Bw	23-42	47.30	6.40	1.06	0.22	0.16	0.14
	Bss1	42-70	46.20	6.10	0.71	0.19	0.12	0.13
	Bss2	70-90	43.60	5.65	0.69	0.15	0.12	0.13
	Bss3	90-110	40.40	5.11	0.66	0.21	0.13	0.13
	Bss4	110-130	38.40	5.03	0.57	0.16	0.11	0.13
	BCK	130-155	26.90	2.89	0.20	0.10	0.07	0.11
	Ck	155-182+	14.40	1.76	0.20	0.14	0.11	0.12
Tr	Ap <sub>g1</sub>	0-18	45.00	6.29	2.24	1.86	0.36	0.14
	Ap <sub>g2</sub>	18-35	44.40	4.66	1.88	1.71	0.40	0.10
	Bt <sub>g1</sub>	35-60	45.50	5.46	1.72	2.38	0.32	0.12
	Bt <sub>g2</sub>	60-88	45.40	6.36	1.42	1.31	0.22	0.14
	2Bt <sub>g3</sub>	88-110	47.80	10.45	1.21	1.62	0.12	0.22
	2Bt <sub>g4</sub>	110-140	49.40	11.70	1.15	1.23	0.10	0.24
	2Bt <sub>g5</sub>	140-170	50.90	14.62	1.16	1.19	0.08	0.29
	2Bt <sub>g6</sub>	170-180+	49.00	14.83	1.09	0.93	0.07	0.30
Kk	Ap <sub>g1</sub>	0-10	43.40	10.39	6.58	5.08	0.63	0.24
	Ap <sub>g2</sub>	10-27	46.00	12.60	2.92	4.80	0.23	0.27
	B <sub>g1</sub>	27-45	44.60	10.85	2.84	3.26	0.26	0.24
	B <sub>g2</sub>	45-63	43.20	8.32	2.85	3.98	0.34	0.19
	B <sub>g3</sub>	63-82	42.50	6.94	1.79	2.90	0.26	0.16
	Bss <sub>g1</sub>	82-100	41.80	3.45	1.49	3.68	0.43	0.08
	Bss <sub>g2</sub>	100-120	41.60	2.66	1.24	2.54	0.47	0.06
	Bss <sub>g3</sub>	120-140	41.20	2.85	0.99	2.32	0.35	0.07
	B <sub>g4</sub>	140-170	40.30	2.54	0.80	2.22	0.32	0.06
	B <sub>g5</sub>	170-180+	55.40	16.00	0.86	1.17	0.05	0.29
Bph	Ap <sub>g1</sub>	0-6	37.10	9.62	4.16	5.04	0.43	0.26
	Ap <sub>g2</sub>	6-30	42.20	12.08	1.17	1.05	0.10	0.29
	AB <sub>g</sub>	30-55	36.50	10.55	0.67	1.35	0.06	0.29
	B <sub>g1</sub>	55-80	36.90	4.27	0.86	0.56	0.20	0.12
	B <sub>g2</sub>	80-115	38.90	5.51	0.89	1.02	0.16	0.14
	B <sub>g3</sub>	115-150	30.60	6.36	0.89	1.02	0.14	0.21
	B <sub>g4</sub>	150-180+	30.50	7.44	1.29	0.83	0.17	0.24