

## APPENDIX

## Results of Soil Analyses in Asia 2001-2006

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The following tables present the analysis results of soil samples taken in various countries in Asia, mainly in soil fertility maintenance experiments and in FPR trials in farmers fields. To facilitate interpretation of the results, **Table 1** indicates the approximate classification of soil chemical characteristic according to the nutritional requirements of cassava.

**Table 1. Approximate classification of soil chemical characteristics according to the nutritional requirements of cassava.**

Soil parameter <sup>1)</sup>	Very low	Low	Medium	High	Very high
pH	<3.5	3.5-4.5	4.5-7	7-8	>8
Org. matter (%)	<1.0	1.0-2.0	2.0-4.0	4.0-8.0	>8.0
P (µg/g)	<2	2-5	5-20	20-50	>50
Ca (me/100 g)	<0.25	0.25-1.0	1.0-5.0	>5.0	
Mg (me/100 g)	<0.2	0.2-0.4	0.4-1.0	>1.0	
K (me/100 g)	<0.10	0.10-0.15	0.15-0.25	>0.25	
Al-saturation (%)			<75	75-85	>85
Na-saturation (%)			<2	2-10	>10
Salinity (mmhos/cm)			<2	2-10	>10
S (µg/g)	<20	20-40	40-70	>70	
B (µg/g)	<0.2	0.2-0.3	0.3-1.0	1-2	>2
Zn (µg/g)	<0.5	0.5-1.0	1.0-5.0	5-50	>50
Mn (µg/g)	<5	5-10	10-100	100-250	>250
Cu (µg/g)	<0.1	0.1-0.2	0.2-1.0	1-5	>5
Fe (µg/g)	<1	1-10	10-100	>100	

<sup>1)</sup>pH in H<sub>2</sub>O: OM by method of Walkley and Black;  
 Al saturation = 100 x Al / (Al + Ca + Mg + K) in me/100g;  
 P in Bray II; K, Ca, Mg and Na in 1N NH<sub>4</sub>-acetate; S in Ca-phosphate;  
 B in hot water; and Cu, Mn, Fe and Zn in 0.05 N HCl + 0.025 N H<sub>2</sub>SO<sub>4</sub>  
*Source: modified from Howeler, 1996.*

## REFERENCE

Howeler, 1996. Diagnosis of nutritional disorders and soil fertility maintenance of cassava. In: G.T. Kurup *et al.* (Eds.). Tropical Tuber Crops. Problems, Prospects and Future Strategies. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, India. pp. 181-193.

<sup>1)</sup>CIAT Cassava Office for Asia, Dept. of Agric., Chatuchak, 10900 Thailand.

**Table 2. Soil samples taken in Cambodia in 2004 to 2006.**

Sample no.	Sample location and description	Date	Coordinates		Elevation (masl)
			N	E	
Kandal	-1 Kandal Stung district; Rolons commune, Kandal village; new site CelAgrid	Mar 04			
	-2 Saang, Sampan Commune; red and green local cassava varieties	July 04			
Kampong Cham	-1 Tbong Kmom district, Vihea Loung commune; cassava field, brown clay	Mar 04			
	-2 Tbong Kmom, Lreang village; vigorous cassava KM 94, red clay	Mar 04			
	-3 Tbong Kmom, cassava variety trial at planting	Jul 04			
	-4 Tbong Kmom, Thor Pich commune, Chub Rubber Co. variety trial; poor cassava	Mar 05	11°56'16"	105°41'28"	38
	-5 Tbong Kmom, Vihae Loung commune, Sre Leu village; variety trial, dark red clay	May 05			
	-6 Ponia Krek, Ampox village; NPK trial grey sandy soil	May 05	11°53'47"	105°49'51"	31
Kampong Speu	-1 CJ. Cambodia starch factory plantation; plot B8 -grey sandy loam	Mar 04			
	-2 CJ. Cambodia starch factory plantation; plot B12 -grey sandy loam	Mar 04			
	-3 CJ. Cambodia starch factory plantation; plot B28 (low) -grey sandy loam	Mar 04			
	-4 CJ. Cambodia starch factory plantation; plot F3 (high) -grey sandy loam	Mar 04			
	-5 CJ. Cambodia starch factory plantation; plot J1 -grey sandy loam	Mar 04			
	-6 CJ. Cambodia starch factory plantation; plot J2 -grey sandy loam	Mar 04			
	-7 CJ. Cambodia starch factory plantation; plot D45-new fertilizer trial	July 04			
	-8 CJ. Cambodia starch factory plantation; plot C1, very poor cassava, K def	July 04			
	-9 Trapeang Saray village; Mr. Lim Sokhom, sandy yellow soil in FPR variety trial	Oct 05	11°12'50"	104°12'49"	89
	-10 Cham Car Leu village; Mrs. Sam Khon, yellow sandy clay loam in NPK trial	Oct 05	11°14'37"	104°10'57"	119
	-11 Cham Car Leu village; Mrs. Mom Darom, yellow sandy loam in FPR variety trial	Oct 05	11°14'31"	104°10'53"	126
Battambang	-1 Pailin CARDI station, variety trial	Mar 05			
	-2 Pailin city, Sala Krap, O Roel village; Mr. Chomroeun, dark red clay in cassava field	Oct 05			
	-3 Ratanak Mondoul district, Thmor Prous village; variety trial at planting, brown clay	May 05	12°52'17"	102°58'24"	62
	-4 Ratanak Mondoul district, Ondeuk Hep village; NPK trial at planting, black clay	May 05	12°51'09"	102°57'37"	
	-5 Ratanak Mondoul district, Thmor Prous village, check plots of NPK trial at harvest	Mar 06	12°52'14"	102°58'24"	50
	-6 Banon district, Peak Kdei village; Mr. Chray Son; soil in lower part of large cassava field	Oct 05	13°07'19"	102°54'54"	29
	-7 Banon district, Peak Kdei village; Mr. Chray Son; upper part cassava field	Oct 05			
	-8 Banon district, Peak Kdei village; Mr. Chray Son; 2d cassava field, sandy clay loam	Oct 05	13°07'51"	102°51'59"	30

**Table 3. Chemical and physical characteristics of cassava soils in Cambodia, 2001 to 2006.**

Sample no.	pH	←—Chemical characteristics—→														←—Physical characteristics—→					
		%		ppm		←—me/100 g—→				%		mmhos /cm		←—ppm—→				←—%—→			
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay	Texture <sup>1)</sup>	
Kandal	-1	5.1	1.41	4.0	1.70	1.93	0.85	0.16		37										si.c	
	-2	5.9	1.43	35.0	0	7.56	2.57	0.16	0.10	0	1.0	0.17	0.39	3.13	80.0	2.82	93.5	14.9	40.8	44.3	si.c.l.
Kampong Cham	-1	5.0	2.79	19.3	1.02	1.00	0.52	0.12		38			0.43	2.99	161.0	0.87	23.9	25.6	19.6	54.8	clay
	-2	4.8	4.43	6.8	0.61	2.54	1.46	0.11		13			0.73	2.72	131.8	0.73	17.9	12.8	25.0	62.2	clay
	-3	5.1	2.48	18.0	1.41	0.98	0.46	0.17		47		0.04	0.52	3.09	114.4	1.04	22.4	17.3	20.4	62.3	clay
	-4	5.03	3.39	6.51	0.51	1.55	0.79	0.15		17			1.14	4.49	484.5	1.69	12.4	18.1	26.4	55.5	clay
	-5	4.95	2.89	3.70	0.31	2.76	1.04	0.12		7			0.72	5.93	130.8	1.19	10.8	18.1	25.7	56.2	clay
	-6	4.36	1.44	12.06	1.04	0.34	0.24	0.05		62			0.28	0.45	15.9	0.14	17.8	68.4	16.5	15.1	s.l.
Kampong Speu	-1	5.2	1.14	7.9	0.08	1.09	0.31	0.09		5			0.41	0.63	11.6	0.37	57.9	69.5	15.8	14.7	s.l.
	-2	5.5	0.76	6.2	0.07	0.67	0.21	0.08		7			0.67	0.45	8.6	0.34	64.8	73.4	13.2	13.4	s.l.
	-3	5.3	1.03	10.0	0.10	1.30	0.35	0.08		5			0.38	0.44	23.3	0.47	70.0	49.5	35.8	14.7	loam
	-4	5.7	1.38	6.9	0	1.90	0.40	0.06	0.02	0	0.8		0.81	0.66	34.4	0.30	20.6	62.0	23.3	14.7	s.l.
	-5	5.8	1.72	4.5	0	1.12	0.60	0.10	0.02	0	1.1		0.53	0.43	14.6	0.24	30.1	67.8	18.8	13.4	s.l.
	-6	5.5	1.57	48.4	0.26	0.75	0.38	0.10		17			0.33	2.47	14.2	0.55	76.9	57.6	23.9	18.5	s.l.
	-7	5.8	0.66	2.5	0	0.58	0.15	0.04	0.02	0	2.5	0.02	0.39	0.29	5.2	0.41	50.3	70.2	16.3	13.5	s.l.
	-8	6.0	0.40	1.6	0	0.14	0.01	0.02	0.01	0	5.6	0	0.39	0.22	0.6	0.29	20.2	72.2	15.5	12.3	s.l.
	-9	6.61	1.21	11.19	0	1.30	0.43	0.06	0.01	0	0.6		0.53	0.67	35.2	0.20	35.9	63.1	17.1	19.8	s.l.
	-10	7.06	1.23	2.40	0	2.59	0.73	0.10	0.02	0	0.6		0.52	0.97	41.4	0.40	15.3	58.0	15.8	26.2	s.c.l.
	-11	5.86	1.68	2.79	0	1.57	0.45	0.08	0.01	0	0.5		0.67	1.07	41.3	0.22	27.4	60.5	14.6	24.9	s.c.l.
Battambang	-1	6.20	3.51	9.05	0	6.25	2.83	0.36	0.02	0	0.2		1.03	1.55	70.6	0.40	25.4	39.0	35.1	25.9	loam
	-2	7.09	5.28	30.94	0	18.72	6.93	0.75	0.03	0	0.1		1.12	2.35	75.9	0.19	1.4	24.2	36.1	39.7	c.l.
	-3	7.68	3.89	4.49	0	62.00	2.44	0.85	0.03	0	<0.1		1.02	0.16	0.1	0.00	0	9.4	25.3	65.3	clay
	-4	6.46	4.13	1.42	0	46.40	8.05	0.44	0.05	0	<0.1		0.28	0.51	9.4	0.17	0.7	9.0	19.8	71.2	clay
	-5	6.03	2.82	2.16	0	54.56	6.09	0.82	0.06	0	0.1		0.66	0.39	30.9	0.17	2.9	15.2	23.2	61.6	clay
	-6	7.25	3.76	4.08	0	42.16	8.33	0.23	0.12	0	0.2		0.53	0.55	12.2	0.19	1.1	12.3	25.5	62.2	clay
	-7	7.82	6.90	7.57	0	55.49	2.98	0.64	0.04	0	0.1		0.81	0.00	0.3	0.00	0	19.0	35.2	45.8	clay
	-8	5.51	2.07	15.98	0	4.34	3.07	0.12	0.06	0	0.8		0.30	0.99	45.6	1.03	19.6	30.0	35.1	34.9	c.l.

<sup>1)</sup> s.c.l. = sandy clay loam.  
 si.c = silty clay  
 s.l. = sandy loam  
 si.c.l. = silty clay loam

c.l. = clay loam

**Table 6. Soil samples taken in East Timor from 2000 to 2006.**

Sample no.		Sample location and description	Date	Coordinates		Elevation (masl)
				S	E	
Dili	-1	Near Hera campus; Mr. Antonio da Costa, local cassava germplasm collection, fertile soil	Aug 05			
Baucau	-1	Fatomaca; Don Bosco Technical School; field of dark brown limestone derived soil	Nov 00			
	-2	Fatomaca; Baucau experimental site; red clay soil	Jan 02			
	-3	Fatomaca; Don Bosco Technical School, new cassava trial	Jan 03			
	-4	Fatomaca; Technical School; cassava variety trial at harvest	Aug 05	08°33'43"	126° 23'37"	568
Aileu	-1	Near Maubisse; 80% slope, purple brown clay soil after burning	Nov 00			
	-2	South of Maubisse; at 1,300 masl, yellow clay with lime stones	Nov 00			
	-3	South of Maubisse; same site, lower field, brown-red clay soil	Nov 00			
	-4	Maubisse, Coffee Cooperative; Bobonaro clay	Oct 01			
	-5	Aileu experimental site; dark purple soil	Jan 02			
	-6	Aileu experimental site; in cassava trial	Mar 02			
	-7	Aileu experimental site; in cassava trial	Jun 03			
	-8	Aileu experimental site; in cassava trial variety trial	Oct 04			
	-9	South of Aileu town, Suco Malere; rocky clay loam of Mr. Francisco's FPR trial	Aug 05	08° 44'15"	125° 33'59"	925
	-10	Sloi Craic village; very hard yellow clay in Nunu father's FPR trial	Aug 05	08° 41'54"	125° 32'37"	1098
	-11	Sloi Craic village; hard yellow clay, very poor cassava in Johaes FPR trial	Aug 05	08° 42'03"	125° 31'56"	1117
Manufahi	-1	Betano MAFF station; grey clay with rocks	Oct 01	09° 09'53"	125° 43'12"	3
	-2	Betano MAFF station; in cassava trial, yellow cassava	Mar 02			
	-3	Betano MAFF station; east side cassava trial, many rocks, poor growth	Jun 03			
	-4	Betano MAFF station; west side cassava trial, good cassava growth	Jun 03			
	-5	Betano MAFF station; in new cassava variety trial	Aug 05			
	-6	Near Betano, Pemuda Tani village; grey loam, FPR variety trial	Aug 05	09° 10'00"	125° 41'00"	13
	-7	Near Betano; Lalika village; grey loam, 2d FPR variety trial	Aug 05			
Cova Lima	-1	Beco village, about 10 km east of Suai; black clay	Feb 06			
	-2	Beco village, about 15 km east of Suai; in future cassava planting area	Feb 06			
	-3	Zunalai subdistrict, 1,400 ha of future cassava planting area, grey clay	Feb 06			
	-4	Zunalai subdistrict, Webaba SPI transmigration area of future starch factory	Feb 06			
Bobonaro	-1	Maliana MAFF station; dark yellow clay in cassava variety trial	Aug 05	08° 55'54"	125° 10'21"	142
	-2	First FPR trial near Maliana town, Mrs. Lucrecia; red clay loam	Feb 06			
	-3	Second FPR trial near Maliana town, Mr. Domingos; stony dark clay loam	Feb 06			
	-4	Third FPR trial near Maliana town, Mr. Anzelmos; stony red clay; very tall cassava	Feb 06			
	-5	SOL rice experiment outside of Maliana town	Feb 06			
Liquica	-1	Lois Transmigration Office; field behind office, silty loam	Oct 01			
	-2	Lois Transmigration Office; rice fields; grey loam	Oct 01			
	-3	Lois experimental site; in sweet potato trial	Aug 04			

Table 7. Chemical and physical characteristics of cassava soils in East Timor, 2000-2006.

Sample no.	Chemical characteristics																Physical characteristics				
	pH	% OM	ppm P	me/100 g				% Al	% Na	dS/m E.C.	ppm				% Sand Silt Clay			Texture <sup>1)</sup>			
				Al	Ca	Mg	K	Na	Al	Na		B	Zn	Mn	Cu	Fe	Sand	Silt	Clay		
Dili	-1	7.07	2.01	128.3	0	4.02	1.65	1.00	0.18	0	2.63		1.07	3.75	34.3	0.40	10.4	46.6	27.2	26.2	s.c.l.
Baucau	-1	5.6	3.30	6.2	0	15.41	0.98	0.28	-	0	-	-	0.48	0.32	209.7	0.24	0.6	20.0	25.0	55.0	clay
	-2	5.7	3.69	7.9	0	11.78	0.87	0.19	0.06	0	0.5	0.35	0.90	0.45	208.0	0.22	0.8	15.6	18.3	65.1	clay
	-3	5.6	3.71	17.0	0	9.67	1.19	0.20	0.04	0	0.4	0.31	1.31	0.41	411.2	0.39	1.5	13.0	27.8	59.2	clay
	-4	5.60	4.04	11.28	0	8.76	0.99	0.11	0.04	0	0.4		0.44	0.44	145.3	0.40	0.9	8.1	32.3	59.6	clay
Aileu	-1	6.5	6.00	28.5	0	15.39	3.20	0.84	-	0	-	-	2.00	2.75	140.2	1.01	4.4	64.2	16.7	19.1	s.l.
	-2	6.6	3.10	2.4	0	16.17	5.40	0.51	-	0	-	-	0.56	1.78	95.0	1.31	8.8	21.0	36.4	42.6	clay
	-3	6.6	3.30	2.3	0	16.18	5.51	0.47	-	0	-	-	0.56	1.87	126.7	1.57	15.2	26.3	33.7	40.0	c.l.
	-4	7.2	3.10	8.6	0	26.80	6.11	0.54	-	0	-	-	0.60	0.89	142.8	0.07	15.1	19.8	29.9	50.3	clay
	-5	4.9	4.96	5.3	0.94	3.20	1.35	0.49	0.03	16	0.6	-	0.90	1.37	28.8	0.32	49.9	38.4	27.8	33.9	c.l.
	-6	5.0	5.63	2.6	1.77	2.51	1.09	0.47	-	30	-	0.44	0.89	1.28	22.1	0.32	47.6	24.0	31.8	44.2	clay
	-7	5.0	4.77	3.7	1.93	1.76	0.82	0.28	-	40	-	0.46	0.86	0.89	17.0	0.39	54.3	27.3	31.0	41.7	clay
	-8	4.7	2.46	3.4	3.04	1.21	0.59	0.39	-	58	-	-	0.51	1.15	27.9	0.57	56.2	8.9	32.0	59.1	clay
	-9	6.17	1.99	11.39	0	2.09	1.47	0.24	0.03	0	0.8	-	0.72	7.27	55.8	1.10	44.5	37.0	31.0	32.0	c.l.
	-10	4.91	4.17	3.29	2.39	0.92	0.45	0.27	-	59	-	-	0.57	0.81	12.8	0.68	186.1	13.3	26.3	60.4	clay
	-11	4.36	7.53	3.88	3.17	0.58	0.43	0.43	-	69	-	-	0.42	0.73	12.8	0.92	74.4	28.3	14.9	56.8	clay
Bobonaro	-1	6.02	1.98	4.35	0	7.57	1.13	0.28	0.03	0	0.33		0.28	1.37	131.2	0.54	9.7	29.8	37.8	32.4	clay
	-2	6.47	2.03	2.48	0	7.67	2.40	0.57	0.04	0	0.4		0.53	6.36	202.7	1.78	15.1	20.8	37.6	41.6	clay
	-3	5.75	3.33	1.02	0	7.76	1.23	0.17	0.03	0	0.6		0.21	2.62	183.0	1.21	19.3	26.2	42.5	31.3	c.l.
	-4	5.78	3.32	20.34	0	8.74	3.39	1.50	0.03	0	0.2		0.72	1.75	134.0	0.62	9.4	21.1	22.5	56.4	clay
	-5	7.35	3.60	85.09	0	22.13	6.25	0.59	0.23	0	0.8		1.65	3.53	182.3	0.99	3.8	20.3	35.8	43.9	clay

**Table 7. Chemical and physical characteristics of cassava soils in East Timor, 2000-2006. (continued)**

Sample no.	Chemical characteristics															Physical characteristics					
	pH	% OM	ppm P	me/100 g				% Al	% Na	dS/m E.C.	ppm				% Sand Silt Clay			Texture <sup>1)</sup>			
Manufahi	-1	7.0	3.04	111.1	0	30.46	1.57	3.49	-	0	-	1.03	0.03	1.0	0.06	0.3	30.5	24.6	44.9	clay	
	-2	7.5	3.04	93.9	0	31.67	1.42	3.92	0.41	0	1.1	1.37	1.54	0.00	0.3	0.06	0.0	20.3	28.8	50.9	clay
	-3	6.9	3.30	129.5	0	34.73	1.12	3.44	0.14	0	0.3	0.28	1.40	0.0	0.2	0.06	0.0	28.8	25.5	45.7	clay
	-4	7.0	3.00	129.8	0	34.93	1.17	3.88	0.13	0	0.3	0.31	1.31	0.0	0.1	0.04	0.0	25.4	24.0	50.6	clay
	-5	7.74	2.64	50.84	0	29.72	1.14	2.99	0.18	0	0.5		1.09	0.0	3.3	0.02	0.0	14.3	36.4	49.3	clay
	-6	7.87	2.76	15.95	0	20.24	1.33	0.63	0.08	0	0.4		0.74	0.0	11.6	0.05	0.0	24.3	38.0	37.7	c.l.
	-7	7.89	3.67	5.47	0	23.07	2.89	0.65	0.21	0	0.8		1.32	0.0	7.1	0.05	0.0	3.9	48.8	47.3	loam
Cova Lima	-1	7.67	4.57	4.93	0	22.48	3.01	0.79	0.44	0	1.6		1.55	0.01	8.0	0.05	0.1	9.4	42.5	48.1	si.c
	-2	7.73	4.08	0.44	0	29.36	3.19	1.36	0.06	0	0.2		1.63	0.01	2.1	0.05	0.1	2.0	35.8	62.2	clay
	-3	7.20	4.56	62.14	0	18.09	2.35	0.91	0.11	0	0.5		1.91	1.90	100.4	0.38	1.9	22.5	35.4	42.1	clay
	-4	7.60	1.97	6.17	0	24.04	3.99	0.62	1.08	0	3.6		0.96	0.01	9.8	0.06	0.1	0.8	50.8	48.4	si.c
Liquica	-1	7.1	3.40	138.3	0	6.98	1.88	0.42	0.40	0	4.1	-	0.88	2.45	72.2	0.44	35.0	43.4	33.7	22.9	loam
	-2	7.2	2.40	62.5	0	7.55	1.52	0.17	0.40	0	4.1	-	0.61	2.73	190.3	3.74	192.9	8.1	76.6	15.3	si.l.
	-3	6.3	2.30	188.5	0	11.47	2.52	0.53	1.16	0	7.4	0.79	1.03	2.99	88.8	1.43	11.6	9.8	52.4	37.7	si.c.l.

<sup>1)</sup> s.c.l. = sandy clay loam    c.l. = clay loam    si.l. = silt loam    s.l. = sandy loam    si.c.l. = silty clay loam    si.c. = silty clay

**Table 8. Soil samples taken in India from 2001 to 2002.**

Sample no.	Sample location and description	Date
Kerala	-1 Trivandrum district, Mandapam village; brown soil with lowland cassava	Jul 01
	-2 Trivandrum district, Chenkal village; gravilly soil, upland cassava, rather poor	Jul 01
	-3 Trivandrum district, Chenkal village; lowland cassava, very vigorous	Jul 01
	-4 Pathanamthitta district, Thatta village near Adur, lowland cassava	Jul 01
	-5 Trivandrum district, Chenkal village; upland area with cassava, red clay loam with laterite	Jul 02
Tamil Nadu	-1 Salem district, Daranaickanpatti village; grey sandy loam, irrigated cassava	Jul 01
	-2 Salem district, Valaisaiyur village; red Alfisol, upland cassava H226	Jul 01
	-3 Salem district, Masakkalipatty village; MKD-1 in irrigated black Vertisol	Jul 02
	-4 Salem district, Veddukkadu village; irrigated H-165, grey sandy clay	Jul 02
	-5 Kolli Hills; field being harvested, dark-red Alfisol, many stones	Jul 02
	-6 Kolli Hills; cassava field without stones, elephant grass hedgerows, red Alfisol	Jul 02
	-7 Salem district, Poovalitlui village; C1 of cassava true seed, Zn def. symptoms	Jul 02
	-8 Salem district, near Varalakshmi sago factory; triploid trial, dark grey sandy loam	Jul 02
A. Pradesh	-1 Near Samalkot, Kattamuru village; poor cassava stand, sandy loam	Jul 02
	-2 Rampachodavarum, Tativada village; recent cassava planting, reddish sandy loam	Jul 02
	-3 Burugapudi, Gangababi village; C+cucumber, very sandy soil, K+P deficient	Jul 02



**Table 9. Chemical and physical characteristics of cassava soils in India, 2001-2002.**

Sample no.	←Chemical characteristics→															←Physical characteristics→				
	pH	%		ppm	←me/100 g→					%	%	←ppm→				←%→			Texture <sup>1)</sup>	
		OM	P	Al	Ca	Mg	K	Na	Al	Na	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay		
Kerala	-1	5.2	2.48	27.5	1.25	1.03	0.38	0.13		45		1.24	1.67	29.8	3.82	48.2	40.4	15.7	43.9	clay
	-2	5.3	1.18	19.2	0.16	1.48	0.59	0.08		7		1.21	0.58	50.3	0.62	6.6	72.6	13.0	14.4	s.l.
	-3	4.7	1.88	51.7	0.62	1.16	0.27	0.38		25		1.43	1.44	60.2	2.18	40.4	56.2	10.5	33.3	s.c.l.
	-4	5.7	1.07	188.5	0	2.94	0.07	0.08		0		0.62	0.48	1.0	0.61	58.6	76.4	10.5	13.1	s.l.
	-5	6.0	1.67	63.5	0	2.04	0.92	0.15	0.04	0	1.3	0.79	2.00	73.2	0.75	10.1	54.8	6.4	38.8	s.c.
Tamil Nadu	-1	6.7	2.60	329.2	0	18.24	5.84	0.22		0		1.04	14.4	37.8	0.32	1.6	53.9	17.2	28.9	s.c.l.
	-2	6.8	1.37	51.7	0	6.74	3.10	0.25		0		0.75	3.5	47.0	1.84	87.6	64.6	13.2	22.2	s.c.l.
	-3	6.8	1.04	619.6	0	7.81	5.56	1.24	0.30	0	2.0	1.18	3.67	54.4	1.46	27.5	64.7	6.4	28.9	s.c.l.
	-4	7.3	1.42	143.7	0	13.10	7.03	0.32	0.36	0	1.7	1.35	0.03	7.1	0.05	0.0	63.4	8.9	27.7	s.c.l.
	-5	5.9	2.40	11.9	0	2.57	0.77	0.45	0.02	0	0.5	0.98	3.09	136.5	2.18	11.8	62.4	11.4	26.2	s.c.l.
	-6	5.4	3.08	11.0	0.28	3.73	1.34	0.29		5		1.30	0.56	185.1	1.68	11.4	37.9	14.0	48.1	clay
	-7	7.0	1.03	187.4	0	5.19	3.03	0.39	0.29	0	3.2	1.44	2.79	38.6	0.44	6.7	70.1	10.1	19.8	s.l.
	-8	6.8	1.72	212.2	0	13.53	7.63	0.53	1.06	0	4.6	0.95	0.04	18.7	0.05	0.1	59.5	12.8	27.7	s.c.l.
Andhra Pradesh	-1	6.7	0.53	30.2	0	0.92	0.37	0.16	0.04	0	2.7	0.74	3.20	32.4	0.76	9.8	79.7	4.4	15.9	s.l.
	-2	6.7	0.87	59.9	0	1.69	0.56	0.40	0.03	0	1.1	0.88	2.06	52.5	0.41	21.3	70.2	12.6	17.2	s.l.
	-3	6.9	0.82	39.4	0	14.04	0.49	0.12	0.05	0	0.3	0.97	2.38	36.2	0.42	10.5	77.9	5.0	17.1	s.l.

<sup>1)</sup>s.c.l. = sandy clay loam

s.l. = sandy loam

s.c. = sandy clay

**Table 10. Soil samples taken in Indonesia from 2001 to 2006.**

Sample no.	Sample location and description	Date	Coordinates		Elevation (masl)
			S	E	
West Java	-1 Sukabumi, Cikambar, Cimangu village; brown clay soil in cassava field	Aug 05	06°58'15"	106° 45'47"	335
	-2 Sukabumi, Cimanggu village; FPR fertilizer trial Mr. Juju, Plot A, red clay	Feb 06			
	-3 Sukabumi, Cimanggu village; FPR variety trial Mr. Jaja, red-brown clay	Feb 06			
	-4 Sukabumi, Cimanggu village; FPR variety trial Mr. Nyanyang	Feb 06	06°58'29"	106°45'43"	341
	-5 Sukabumi, Cimanggu village; FPR fertilizer trial Mrs. Ijah, Plot C	Feb 06			
Central Java	-1 Pati, Ngemplak Kidul; red clay in Markonah field	Aug 05	06°36'47"	111°02'48"	42
	-2 Pati, Tegalarum village; yellow-red clay in 8-month old Markonah field	Aug 05	06°36'46"	110°59'30"	207
	-3 Pati, Tayu subdistrict, Sonean village; black-brown clay in 8-month old Kasetsart field	Aug 05	06°36'36"	111°02'11"	38
	-4 Pati, Tlogowungu subdistrict, Tamansari village; variety x fert., trial, red clay	Feb 06	06°43'33"	110°59'47"	78
	-5 Pati, Cluwak subdistrict, Gerit village; variety x fertilizer trial, red clay	Feb 06	06°31'23"	110°58'29"	109
	-6 Pati, Tayu subdistrict, Senangrejo village; Mr. Arif field of Markonah	Feb 06	06°33'24"	111°01'45"	105
	-7 Pati, Tayu subdistrict, Sonean village; Mr. Rudi Siswanto field of Markonah, very vigorous growth	Feb 06	06°36'31"	111°02'08"	52
Yogyakarta	-1 Playen; micronutrient applic. trial, IV-1, severe Zn def	Mar 02			
	-2 Playen; micronutrient applic. trial, IV-5, very good growth	Mar 02			
	-3 Playen; micronutrient applic. trial, I-9, very poor growth	Mar 02			
	-4 Playen; micronutrient applic. trial, III-5, very good growth, in eroded sediments	Mar 02			
	-5 Playen; micronutrient applic. trial, III-9, poor growth	Mar 02			
	-6 Playen; micronutrient applic. trial, I-10, very good growth	Mar 02			
	-7 Playen; variety trial in black soil; rather good cassava	Apr 04			
	-8 Gunung Kidul, Tanjungsari, Hargosari; cassava multiplication Mr. Wardiyo, red clay	Mar 05	08°03'22"	110°36'39"	329
	-9 Guanug Kidul, Tanjungsari, Hargosari village; 2d fert. trial, dark brown clay	Feb 06	08°03'45"	110°37'22"	273
East Java	-1 Probolinggo; Muneng station, Rep III of cassava collection	Jan 03			
	-2 Malang; Jatikerto station, in fertilizer trial, C+M, T <sub>1</sub> ; black clay	Feb 05			
	-3 Malang, Kromengan, Ngadirejo village; variety trial Mr. Sopri, dark clay loam	Feb 06	08°08'08"	112°30'54"	325
	-4 Malang, Kromengan, Ngadirejo village; variety trial Mr. Juni	Feb 06			
	-5 Malang, Pagak, Sempol village; variety trial Mr. Misidjan, C+P, dark clay	Feb 06	08°17'10"	112°29'25"	408
	-6 Malang, Pagak, Sempol village; variety trial Mr. Misidjan, K def. in contour ridge	Feb 06			
	-7 Malang, Pagak, Sempol village; 2d variety trial, good maize, weak cassava	Feb 06			

**Table 10. Soil samples taken in Indonesia from 2001 to 2006. (continued)**

Sample no.	Sample location and description	Date	Coordinates		Elevation (masl)
			S	E	
Lampung	-1 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>1</sub>	Oct 01			
	-2 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>2</sub>	Oct 01			
	-3 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>3</sub>	Oct 01			
	-4 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>4</sub>	Oct 01			
	-5 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>5</sub>	Oct 01			
	-6 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>6</sub>	Oct 01			
	-7 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>7</sub>	Oct 01			
	-8 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>8</sub>	Oct 01			
	-9 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>9</sub>	Oct 01			
	-10 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>10</sub>	Oct 01			
	-11 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>11</sub>	Oct 01			
	-12 Tamanbogo; long-term NPK trial (11th year); monoculture -T <sub>12</sub>	Oct 01			
	-13 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>1</sub>	Oct 01			
	-14 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>2</sub>	Oct 01			
	-15 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>3</sub>	Oct 01			
	-16 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>4</sub>	Oct 01			
	-17 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>5</sub>	Oct 01			
	-18 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>6</sub>	Oct 01			
	-19 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>7</sub>	Oct 01			
	-20 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>8</sub>	Oct 01			
	-21 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>9</sub>	Oct 01			
	-22 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>10</sub>	Oct 01			
	-23 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>11</sub>	Oct 01			
	-24 Tamanbogo; long-term NPK trial (11th year); intercropped -T <sub>12</sub>	Oct 01			
	-25 Tamanbogo; long-term NPK trial (14th year)- T <sub>1</sub>	Nov 04			
	-26 Tamanbogo; long-term NPK trial (14th year)- T <sub>2</sub>	Nov 04			
	-27 Tamanbogo; long-term NPK trial (14th year)- T <sub>3</sub>	Nov 04			
	-28 Tamanbogo; long-term NPK trial (14th year)- T <sub>4</sub>	Nov 04			
	-29 Tamanbogo; long-term NPK trial (14th year)- T <sub>5</sub>	Nov 04			
	-30 Tamanbogo; long-term NPK trial (14th year)- T <sub>6</sub>	Nov 04			
	-31 Tamanbogo; long-term NPK trial (14th year)- T <sub>7</sub>	Nov 04			
	-32 Tamanbogo; long-term NPK trial (14th year)- T <sub>8</sub>	Nov 04			
	-33 Tamanbogo; long-term NPK trial (14th year)- T <sub>9</sub>	Nov 04			

**Table 10. Soil samples taken in Indonesia from 2001 to 2006. (continued)**

Sample no.	Sample location and description	Date	Coordinates		Elevation (masl)
			S	E	
Lampung	-34 Tamanbogo; long-term NPK trial (14th year)- T <sub>10</sub>	Nov 04			
	-35 Tamanbogo; long-term NPK trial (14th year)- T <sub>11</sub>	Nov 04			
	-36 Tamanbogo; long-term NPK trial (14th year)- T <sub>12</sub>	Nov 04			
	-37 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>1</sub>	Oct 05			
	-38 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>2</sub>	Oct 05			
	-39 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>3</sub>	Oct 05			
	-40 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>4</sub>	Oct 05			
	-41 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>5</sub>	Oct 05			
	-42 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>6</sub>	Oct 05			
	-43 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>7</sub>	Oct 05			
	-44 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>8</sub>	Oct 05			
	-45 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>9</sub>	Oct 05			
	-46 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>10</sub>	Oct 05			
	-47 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>11</sub>	Oct 05			
	-48 East Lampung, Tamanbogo; NPK trial (15th year); monoculture-T <sub>12</sub>	Oct 05			
	-49 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>1</sub>	Oct 05			
	-50 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>2</sub>	Oct 05			
	-51 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>3</sub>	Oct 05			
	-52 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>4</sub>	Oct 05			
	-53 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>5</sub>	Oct 05			
	-54 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>6</sub>	Oct 05			
	-55 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>7</sub>	Oct 05			
	-56 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>8</sub>	Oct 05			
	-57 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>9</sub>	Oct 05			
	-58 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>10</sub>	Oct 05			
	-59 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>11</sub>	Oct 05			
	-60 East Lampung, Tamanbogo; NPK trial (15 <sup>th</sup> year); intercropped-T <sub>12</sub>	Oct 05			
	-61 East Lampung, Tamanbogo; NPK trial; (15th year) III-T <sub>5</sub> (with lime)	Feb 06			
	-62 East Lampung, Tamanbogo; NPK trial; (15th year) II-T <sub>5</sub> (without lime)	Feb 06			
	-63 Tamabogo; Mr. Mulyono's rice field, to be followed by cassava	Feb 05	05° 01'04"	105° 30'14"	35
	-64 East Lampung, Sukadana, Sukadana Uir village; FPR fertilizer trial Mr. Marno	Feb 06	05° 02'08"	105° 31'08"	39
	-65 East Lampung, Sukadana, Sukadana Uir village; FPR fertilizer trial Mr. Jiono	Feb 06	05° 01'17"	105° 30'50"	50

**Table 11. Chemical and physical characteristics of cassava soils in Indonesia, 2001-2006.**

Sample no.	Chemical characteristics															Physical characteristics					
	pH	% OM	ppm P	me/100 g					% Al	% Na	dS/m E.C.	ppm					% Sand Silt Clay			Texture <sup>1)</sup>	
				Al	Ca	Mg	K	Na	Al	Na		B	Zn	Mn	Cu	Fe	Sand	Silt	Clay		
W. Java	-1	4.85	5.09	46.62	1.04	4.29	0.74	0.33	-	16		0.53	3.83	225.6	1.91	5.4	35.4	19.8	44.8	clay	
	-2	4.84	4.46	18.03	0.83	3.49	0.83	0.68		14		0.55	3.98	193.1	1.92	8.1	24.1	22.1	53.8	clay	
	-3	4.47	3.94	28.07	1.14	1.92	0.57	0.27		29		0.48	3.00	201.7	2.15	8.9	24.0	22.2	53.8	clay	
	-4	4.45	4.72	4.99	2.91	1.34	0.67	0.20		57		0.61	2.54	204.2	2.01	7.7	23.8	23.6	52.6	clay	
	-5	4.88	3.82	12.33	1.52	3.99	1.24	0.29		22		0.54	4.01	190.7	1.73	5.9	27.6	23.5	48.9	clay	
C. Java	-1	5.57	3.77	72.07	0	5.48	2.23	1.30	0.21	0	2.3	0.60	7.24	209.4	2.24	11.7	12.6	26.2	61.2	clay	
	-2	4.91	1.59	20.64	1.46	2.42	0.60	0.25	-	31		0.28	1.75	87.6	1.95	19.0	21.2	28.4	50.4	clay	
	-3	4.78	3.27	6.41	1.51	6.78	1.20	0.79	-	15		0.40	4.23	182.9	7.90	97.2	18.3	31.1	50.6	clay	
	-4	4.90	1.51	5.87	1.14	5.05	1.35	0.23		15		0.42	1.82	161.3	2.76	24.4	9.4	19.5	71.0	clay	
	-5	4.77	2.32	2.62	3.48	1.56	0.59	0.12		61		0.36	4.16	198.2	3.89	20.7	4.4	19.5	76.1	clay	
	-6	5.13	2.71	33.23	0.31	4.66	1.55	0.43		4		0.52	16.43	180.8	3.33	16.6	8.5	26.0	65.5	clay	
	-7	4.67	5.35	6.15	1.87	5.62	1.14	0.34		21		0.48	3.92	154.7	9.33	167.8	13.0	30.1	56.9	clay	
Yogyakarta	-1	7.0	0.75	3.6	0	58.31	2.72	0.19	0.06	0	0.1	0.35	0.30	0.00	0.2	0.02	0.0	25.9	23.4	50.7	clay
	-2	7.2	0.83	4.7	0	62.35	2.90	0.15	0.08	0	0.1	0.35	0.40	0.00	0.7	0.01	0.0	21.1	16.7	62.2	clay
	-3	7.4	1.32	7.0	0	60.40	1.70	0.15	0.07	0	0.1	0.35	0.41	0.00	0.2	0.01	0.0	25.2	27.3	47.5	clay
	-4	7.5	1.42	17.5	0	69.02	1.75	0.21	0.06	0	0.1	0.38	0.47	0.00	0.3	0.01	0.0	19.4	19.2	61.4	clay
	-5	7.5	1.13	5.1	0	60.13	1.93	0.17	0.06	0	0.1	0.35	0.37	0.00	0.2	0.01	0.0	25.7	10.8	63.5	clay
	-6	7.6	1.34	3.1	0	63.04	2.35	0.28	0.06	0	0.1	0.35	0.39	0.00	0.4	0.01	0.0	19.7	10.9	69.4	clay
	-7	7.3	2.00	4.1	0	62.75	2.79	0.31	0.13	0	0.2		0.38	0.13	7.2	0.10	0.2	3.6	14.6	81.8	clay
	-8	5.68	2.17	2.68	0	10.87	1.12	0.27	0.11	0			0.42	1.55	98.2	2.87	7.2	6.0	18.0	75.9	clay
	-9	5.92	2.03	21.99	0	14.78	0.85	0.38	0.07	0	0.4		0.46	3.77	132.8	2.38	2.4	6.8	28.0	65.2	clay
E. Java	-1	6.3	1.96	87.2	0	10.94	5.05	0.71	0.17	0	1.0		1.40	3.47	155.5	2.21	6.6	21.6	46.9	31.5	c.l.
	-2	6.49	1.51	11.61	0	8.51	3.55	1.56	0.10	0	0.7		0.22	3.04	83.9	4.79	21.5	28.5	33.9	37.6	c.l.
	-3	6.17	1.89	19.53	0	8.39	3.02	1.42	0.09	0	0.7		0.46	4.37	76.4	5.10	26.9	28.9	32.9	38.2	c.l.
	-4	5.29	1.07	3.31	0.62	4.24	1.75	0.46	0	9	0		0.35	2.51	51.6	4.49	96.0	33.5	31.3	35.2	c.l.
	-5	5.52	2.29	0.77	0	8.46	1.51	0.20	0.18	0	1.7		0.29	3.35	84.9	3.21	18.7	19.2	33.2	47.6	clay
	-6	5.60	1.74	0.94	0	10.85	1.05	0.07	0.15	0	1.2		0.38	2.51	94.9	3.17	19.6	21.7	27.9	50.4	clay

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-7 5.52 2.05 1.45 0 9.39 1.47 0.55 0.12 0 1.0 0.32 2.57 121.8 3.01 14.4 14.5 29.5 56.0 clay

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c.l. = clay loam



**Table 11. Chemical and physical characteristics of cassava soils in Indonesia, 2001-2006. (continued)**

Sample no.	← Chemical characteristics →											← Physical characteristics →								
	pH	%	ppm	← me/100 g →				%	%	dS/m	← ppm →				← % →			Texture <sup>1)</sup>		
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand		Silt	Clay
Lampung -31	4.70	2.28	6.64	2.39	0.27	0.10	0.07	84												
-32	4.68	2.45	19.14	2.60	0.45	0.09	0.04	82												
-33	4.67	2.39	10.16	2.39	0.27	0.10	0.05	85												
-34	4.56	2.45	20.02	2.60	0.41	0.11	0.05	82												
-35	4.77	2.42	6.06	2.34	0.38	0.10	0.07	81												
-36	4.82	2.45	16.03	2.50	0.45	0.10	0.07	80			0.67	0.33	6.7	0.30	24.1	39.8	16.7	43.5	clay	
-37	4.17	1.98	14.96	3.22	0.40	0.15	0.05	84												
-38	4.21	2.08	7.71	2.39	0.79	0.18	0.13	68												
-39	4.12	2.00	7.58	2.96	0.41	0.10	0.05	84												
-40	3.98	2.04	5.52	3.02	0.28	0.09	0.07	87												
-41	4.06	1.91	3.03	3.07	0.20	0.05	0.04	91												
-42	3.86	1.95	12.88	2.76	0.19	0.09	0.09	88												
-43	3.89	1.98	12.79	3.07	0.28	0.08	0.08	87												
-44	4.04	2.08	20.74	2.60	0.52	0.13	0.06	79												
-45	3.86	2.32	13.70	2.86	0.20	0.07	0.04	90												
-46	3.91	2.24	6.43	2.81	0.26	0.07	0.05	88												
-47	4.04	2.14	3.53	2.50	0.45	0.12	0.09	79												
-48	4.00	2.20	8.30	2.86	0.35	0.08	0.07	85			0.28	0.30	12.7	0.57	29.1	34.0	15.7	50.3	clay	
-49	4.17	2.11	1.25	2.86	0.49	0.22	0.05	79												
-50	4.35	2.32	10.99	2.70	0.80	0.14	0.07	73												
-51	4.02	1.93	7.08	2.81	0.51	0.13	0.06	80												
-52	3.95	1.58	7.38	2.91	0.35	0.09	0.07	85												
-53	4.10	1.66	4.48	2.70	0.41	0.11	0.04	83												
-54	4.00	1.56	1.89	2.60	0.26	0.09	0.07	86												
-55	4.01	1.89	2.15	2.70	0.37	0.12	0.05	83												
-56	4.26	2.12	6.05	2.44	0.64	0.14	0.04	75												
-57	4.07	2.18	2.52	2.91	0.40	0.11	0.04	84												
-58	4.28	2.14	3.89	2.91	0.34	0.06	0.03	87												
-59	4.14	2.34	5.62	2.81	0.58	0.14	0.08	78												
-60	4.09	2.30	3.91	3.33	0.40	0.08	0.05	86			0.28	0.37	11.2	0.61	30.4	32.6	14.5	52.9	clay	

c.l. = clay loam

**Table 11. Chemical and physical characteristics of cassava soils in Indonesia, 2001-2006. (continued)**

Sample no.	← Chemical characteristics →											← Physical characteristics →							
	pH	% OM	ppm P	← me/100 g →			% K	% Na	% Al	% Na	dS/m E.C.	← ppm →				← % →			Texture <sup>1)</sup>
				Al	Ca	Mg					B	Zn	Mn	Cu	Fe	Sand	Silt	Clay	
Lampung	-61	4.46	2.35	2.50	0.69	0.04	0.05		76		0.39	0.67	35.2	0.37	31.5	36.2	18.4	45.5	clay
	-62	4.34	1.88	2.29	0.17	0.06	0.07		88		0.38	0.31	4.1	0.30	34.0	47.2	15.0	37.8	s.c.
	-63	4.29	2.03	2.97	0.08	0.02	0.03		96		0.21	0.29	6.0	0.41	29.1	38.9	17.3	43.8	clay
	-64	4.43	2.60	2.76	0.59	0.16	0.04		78		0.38	0.48	16.2	0.32	40.2	41.4	14.6	44.0	clay
	-65	4.27	2.38	3.07	0.30	0.13	0.05		86		0.36	0.42	10.4	0.24	46.6	41.5	18.3	40.2	clay
	-66	4.59	2.26	10.27	1.66	1.15	0.27	0.07	53		0.36	0.42	10.4	0.24	46.6	41.5	18.3	40.2	clay

c.l. = clay loam

Table 12. Soil samples taken in Laos from 2001 to 2006.

Sample no.	Sample location and description	Date	Coordinates		Elevation (masl)
			N	E	
Vientiane	-1 Namsuang Livestock Research Center; cassava variety trial	May 01			
	-2 Napok Agriculture Research Center, cassava variety trial, white sandy loam	May 04	18°08'44"	102°44'05"	168
Luang Prabang	-1 Houay Khot, NAFRI station; cassava variety trial	May 01			
	-2 Ngeum district, Kew Ta Loun village; cassava in slash-and-burn	May 01			
	-3 Killtalunnyi village; variety trial at 1,300 m; P deficiency symptoms	Aug 03			
	-4 Long-Or village; variety trial, dark red clay, rather good cassava growth	Aug 03			
	-5 Luang Prabang, Pik Noi village; variety trial, red clay on 30% slope; good cassava growth	Aug 03			
	-6 Luang Prabang, Pik Noi village; Mrs. Pornthip; red brown clay; Mg deficiency symptoms	Sept 04	20°05'65"	102°15'20"	320
	-7 Luang Prabang, Pik Noi village; Mr. Kam Pham FPR variety trial	Sept 05			
	-8 Luang Prabang, Kout Ngen village; Mr. Xieng Keo FPR variety trial	Sept 05			
	-9 Pak Ou, Haat Yai village; Mr. Bun Chan FPR variety trial	Sept 05	20°04'87"	102°15'05"	333
	-10 Pak Ou, Somsannouk village; Mr. Sinthorn FPR variety trial	Sept 05			
	-11 Xieng Nguen district, Houay Yen village; clay soil in slash-burn	Nov 03			
	-12 Xieng Nguen district Pak Wed village; variety trial on steep slope	May 05	19°46'49"	102°10'39"	331
	-13 Xieng Nguen district, Sylarlaek village; Mr. Kham Lee FPR variety trial	Sept 05			
Oudomxay	-1 Xay, cassava multiplication field of PAFO	May 05	20°41'57"	101°59'29"	640
	-2 Houn district, Phou Lath village; field in siam weed to be used for cassava trial	May 04	20°17'07"	101°20'32"	627
	-3 Houn district, Kone Theoy village; clay loam, very poor cassava	Sept 04	20°16'26"	101°24'04"	1,042
	-4 Pak Baeng district, Kone Lang village; black clay, very good cassava	Sept 04	20°04'19"	101°10'33"	770
	-5 Pak Baeng district, Kone Lang village; Mr. Soun, steep slope above fish pond	May 05	20°04'14"	101°10'30"	781
	-6 Pak Baeng district, Kone Lang village; Mr. Chit FPR variety trial	Sept 05	20°04'15"	101°10'30"	816
	-7 Pak Baeng district, Kone Lang village; Mr. Thongwue; dark clay with small rocks	Sept 05			
	-8 Pak Baeng district, road to Kone Lang village; soil clods eaten by pregnant women	May 05			
	-9 Pak Baeng district, Mok Loi village; rather good cassava on steep slope	Sept 04	20°05'07"	101°11'13"	788
Xieng Khouang	-1 Paek district; dark sticky clay in farmer's field with new cassava varieties	May 04			
	-2 Paek district, Cattle Bank Station; field near road (grass trial)	May 04	19°20'35"	103°09'10"	1,102
	-3 Paek district, Cattle Bank Station; large fenced area for cassava trial	May 04			
	-4 Paek district, Cattle Bank Station; 4 N <sub>0</sub> P <sub>0</sub> K <sub>0</sub> plots; 0.5 t/ha lime applied in NPK trial	Sept 05			
	-5 Phou Khout district, Phuong Man village; 3-month cassava in back yard	May 04	19°38'54"	103°08'11"	1,116
	-6 Phu Khout district, Phuong Man village; plowed field for cassava trial	May 04			

Table 12. Soil samples taken in Laos from 2001 to 2006. (continued)

Sample no.	Sample location and description	Date	Coordinates		Elevation (masl)		
			N	E			
Xieng Khouang	-7	Phu Khout district, Naa Xaithong, Song Hak village; cassava variety trial, Fo	Sept 04	19°37'32"	103°05'50"	1,057	
	-8	Phou Khout district, Man village; cassava variety trial, Fo	Sept 04	19°30'32"	103°08'08"	1,119	
	-9	Phou Khout district, Pung village; cassava variety trial, Fo; sandy clay loam	Jun 04	19°40'08"	103°08'43"	1,127	
	-10	Phou Khout district, Vieng village; cassava variety trial, Fo	Apr 06	19°38'31"	103°09'39"	1,126	
	-11	Phou Khout district, Koeng village; cassava variety trial, Fo	Apr 06				
	-12	Phou Khout district, Sombone village; cassava variety trial, Fo	Apr 06	19°38'35"	103°06'48"	1,111	
	-13	Phou Khout district, Song Hak village; cassava variety trial, Fo	Apr 06				
	-14	Phou Khout, Pong Man village; Mrs. Sommee; dark yellow clay loam in FPR variety trial	Sept 05				
	-15	Phou Khout, Pong Man village; Mrs. Outh Tha; sandy clay loam in FPR variety trial	Sept 05	19°40'24"	103°09'19"	1,114	
	-16	Phou Khout, Pong Man village; Mrs. Vanhsee; coarse sandy loam, 0.5 t/ha lime applied in FPR trial	Sept 05	19°40'31"	103°09'29"	1,118	
	-17	Phaxay district, Xoya village; cassava variety trial, Fo; poor cassava	Sept 04				
	-18	Phaxay district, Xoya village; Mrs. Phomma; 0.5 t/ha lime applied in FPR variety trial	Sept 05	19°17'56"	103°05'55"	1,118	
	-19	Phaxay district, Xoya village; Mrs Khamphan; 0.5 t/ha lime applied in FPR variety trial	Sept 05	19°17'54"	103°05'45"	1,130	
	-20	Phaxay district, Xieng Nuea village; Mr. Son, cassava variety trial; Fo, dark soil, quite good cassava	Jun 04	19°17'44"	103°04'35"	1,134	
	-21	Phaxay district, Xieng Nuea village; Mrs. Singtong, dark yellow clay loam in FPR variety trial	Sept 05	19°17'44"	103°04'57"	1,121	
	-22	Phaxay district, Xieng Nuea village; Mr. Son, in new cassava field, vigorous growth	Sept 05				
	Bolikhambxay	-1	Pakxa district, Si-sa-aat village; yellow clay loam in young cassava plantation in school	Jan 06			
		-2	Pakxa district, Pakhadin village; KU-50 at 4 MAP, very hard white clay	Jan 06			
	Khamnuan	-1	Siang Song village; very hard yellow clay loam in slash-burn cassava field	Jan 06			
		-2	Mahaxay district; outside DAFO office; very hard clay loam	Jan 06			
		-3	Mahaxay district; near DAFO office in food crop garden area at bottom of cliff.	Jan 06			
	Savannakhet	-1	Kisone district, Dong Kan Luang village; sandy loam near cassava garden	Jan 06			

**Table 13. Chemical and physical characteristics of cassava soils in Laos, 2001-2006.**

Sample no.	pH	Chemical characteristics														Physical characteristics					
		%		ppm		me/100 g					%		dS/m	ppm				%			Texture <sup>1)</sup>
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay		
Vientiane	-1	5.2	1.45	13.3	0.52	0.78	0.32	0.36		26			0.51	0.68	16.3	0.29	67.2	66.2	20.6	13.2	s.l.
	-2	5.4	1.77	15.8	0.11	2.36	0.42	0.34		3			0.30	0.64	19.9	0.84	112.5	31.1	48.6	20.3	loam
Luang Prabang	-1	5.4	3.50	12.4	0.10	6.94	2.78	0.89		1			0.76	3.16	110.1	0.79	16.2	19.7	29.9	50.4	clay
	-2	5.4	6.50	7.0	0.73	3.33	3.38	1.05		9			1.20	3.84	160.0	0.53	25.6	19.2	30.0	50.7	clay
	-3	4.8	6.08	2.7	3.35	0.90	0.91	0.15		63			0.44	1.12	88.7	0.99	79.0	10.4	24.4	65.2	clay
	-4	6.0	3.12	7.1	0	6.88	1.97	0.35		0			0.76	4.03	144.4	1.18	10.6	24.2	26.6	49.2	clay
	-5	6.0	3.99	13.6	0	6.69	4.20	0.61		0			0.95	2.54	77.3	0.97	8.9	25.9	28.2	45.9	clay
	-6	4.5	1.68	5.6	5.52	0.35	0.14	0.23		88			0.29	1.20	2.8	0.83	142.6	22.0	25.5	52.5	clay
	-7	6.13	3.61	4.54	0	7.11	2.61	0.19	0.02		0.2		0.53	2.55	76.8	0.98	21.3	18.7	35.9	45.3	clay
	-8	6.27	2.96	1.21	0	11.18	1.78	0.18	0.04		0.4		0.32	1.61	51.0	0.72	6.3	23.6	27.7	48.7	clay
	-9	6.28	3.14	4.11	0	5.33	3.86	0.23	0.03		0.3		0.27	1.41	43.1	0.42	9.4	34.0	30.2	35.8	c.l.
	-10	6.17	3.92	16.94	0	6.97	3.60	0.47	0.03		0.3		0.62	1.41	52.0	0.36	8.3	17.5	31.4	51.1	clay
	-11	4.5	4.90	4.3	5.50	0.60	0.32	0.23		83			0.32	1.38	14.2	1.53	90.0	3.8	20.9	75.3	clay
	-12	5.2	4.85	10.9	0.73	3.03	3.24	0.29		10			0.53	1.88	64.9	0.73	14.4	15.4	30.9	53.7	clay
	-13	5.92	4.57	1.59	0	5.74	4.05	0.38	0.04		0.4		0.40	3.30	91.6	0.69	8.2	17.4	30.2	52.4	clay
Oudomxay	-1	6.3	2.58	1.9	0	9.46	1.74	0.19	0.11	0	1.0		0.41	1.72	91.0	1.56	66.2	8.1	66.4	25.5	Si.l.
	-2	6.5	3.12	18.2	0	5.52	2.39	0.63		0			0.64	2.69	103.9	0.45	16.2	28.1	36.2	35.7	c.l.
	-3	4.8	3.17	1.5	4.63	0.65	0.37	0.24		79			0.30	1.09	41.1	0.46	25.4	11.7	27.2	61.1	clay
	-4	4.7	2.62	15.1	0.10	9.62	2.72	0.45		1			0.82	4.06	44.6	0.72	20.7	21.5	37.1	41.3	clay
	-5	4.6	5.08	2.1	3.69	1.02	0.77	0.44		62			0.55	2.04	45.7	1.40	66.4	10.1	32.3	57.7	clay
	-6	4.43	6.60	1.83	6.50	0.44	0.24	0.27	-	87			0.42	1.06	21.9	0.92	60.6	16.8	17.0	66.2	clay
	-7	5.77	4.95	10.07	0	3.96	3.17	0.95	0.03		0.4		0.62	3.58	84.6	0.47	9.3	24.6	23.3	52.0	clay
	-8	4.9	0.17	0.8	3.38	0	0	0.04		99			0.27	0.38	0.4	0.25	7.2	25.1	47.0	27.9	c.l.
	-9	4.8	2.51	1.3	4.68	1.39	1.06	0.33		63			0.34	2.07	66.6	1.74	42.2	9.3	28.4	62.3	clay

<sup>1)</sup> s.l. = sandy loam    c.l. = clay loam    s.c. = sandy clay    si.l. = silt loam

**Table 13. Chemical and physical characteristics of cassava soils in Laos, 2001-2006. (continued)**

Sample no.	pH	Chemical characteristics										Physical characteristics												
		%		ppm	me/100 g					%	%	dS/m	ppm				%			Texture <sup>1)</sup>				
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay					
Xieng Khouang	-1	5.1	5.67	10.7	0.47	6.72	2.20	0.47			5					0.31	2.44	8.9	0.46	13.4	25.6	31.7	42.7	clay
	-2	5.2	6.92	1.4	2.65	0.44	0.12	0.22			77					0.30	0.63	3.1	0.48	41.4	37.9	25.0	37.1	c.l.
	-3	4.3	4.79	0.9	3.22	0.21	0.06	0.17			88					0.30	0.47	2.0	0.55	46.0	27.7	31.3	41.0	clay
	-4	4.87	4.76	0.90	2.55	0.46	0.29	0.08			75					0.24	0.67	1.2	0.45	39.0	34.6	22.4	43.0	clay
	-5	5.6	5.36	3.6	0	0.88	0.30	0.64			0													
	-6	5.1	2.56	1.4	2.92	0.60	0.18	0.15			76					0.26	0.81	14.3	0.90	27.0	29.1	23.1	47.8	clay
	-7	4.5	2.22	1.4	2.13	0.57	0.18	0.17			70					0.30	0.63	13.7	0.52	59.2	43.7	26.7	29.6	c.l.
	-8	4.5	2.62	1.5	3.18	0.51	0.19	0.18			78					0.28	0.67	13.0	0.83	26.5	22.5	27.0	50.5	clay
	-9	5.2	5.29	1.4	1.61	0.26	0.08	0.20			75					0.59	0.63	10.3	0.80	22.7	64.2	12.0	23.8	s.c.l.
	-10	4.74	8.41	0.89	3.12	0.49	0.17	0.15			79					0.40	0.66	11.9	0.51	12.9	53.7	16.7	29.6	s.c.l.
	-11	4.78	2.73	1.66	1.46	0.32	0.20	0.05			72					0.25	0.33	4.9	0.27	41.6	55.0	21.3	23.7	s.c.l.
	-12	4.48	5.32	6.55	3.07	0.39	0.11	0.11			83					0.27	0.60	4.7	0.61	28.5	39.4	21.4	39.2	c.l.
	-13	4.72	4.87	1.33	3.48	0.33	0.12	0.17			85					0.36	0.43	12.0	0.55	29.9	35.5	26.6	37.9	c.l.
	-14	4.94	5.88	18.11	2.44	1.04	0.49	0.16			59					0.35	0.92	12.3	0.71	22.2	36.7	15.9	47.4	clay
	-15	4.82	5.29	1.93	2.39	0.54	0.28	0.10			72					0.29	2.60	8.2	0.82	28.4	51.0	10.7	38.2	s.c.
	-16	5.32	5.02	5.54	0.94	3.22	1.56	0.64			15					0.44	1.63	27.3	1.16	42.9	40.9	14.5	44.6	clay
	-17	4.7	3.67	0.2	3.14	0.49	0.14	0.19			86					0.45	1.55	4.6	1.06	79.0	27.6	30.9	41.5	clay
	-18	4.92	3.81	0.95	2.55	0.67	0.43	0.12	-		68					0.21	0.64	4.8	0.49	41.1	22.5	24.5	53.0	clay
	-19	4.72	7.17	0.50	2.65	0.61	0.38	0.18	-		69					0.38	1.68	4.0	0.78	54.1	32.1	14.4	53.5	clay
	-20	5.6	5.54	1.2	0	5.37	1.22	0.26			0					0.71	0.72	18.4	0.51	45.9	48.6	13.3	38.1	s.c.
	-21	4.88	5.89	3.67	2.03	1.19	0.57	0.51	-		47					0.40	2.83	20.6	1.59	154.2	38.1	13.3	48.6	clay
	-22	4.93	3.89	3.65	2.39	0.85	0.30	0.16			65					0.22	0.73	9.4	0.46	32.9	33.2	18.4	48.4	clay
Bolikhamxay	-1	4.61	2.45	4.23	1.30	0.57	0.16	0.16			59					0.25	2.44	19.9	0.74	52.0	38.7	23.6	37.7	c.l.
	-2	4.67	1.84	2.35	2.03	0.33	0.11	0.08			80					0.20	0.33	4.1	0.21	122.0	36.4	36.1	27.5	c.l.
Khamnuan	-1	4.88	1.66	1.85	1.30	0.89	0.35	0.11			49					0.26	0.43	30.2	0.22	138.8	50.7	25.1	24.2	s.c.l.
	-2	4.27	1.13	0.16	7.90	0.17	0.06	0.09			96					0.20	0.32	4.2	0.18	38.0	9.6	25.7	64.7	clay
	-3	5.33	3.43	6.72	0.52	4.87	1.14	0.42			7					0.41	0.87	97.0	0.27	38.1	32.1	28.0	39.9	c.l.
Savannakhet	-1	5.70	1.77	18.70	0	1.92	0.59	0.18	0.01	0	0.4					0.46	0.74	19.8	0.16	16.0	60.9	15.0	24.1	s.c.l.

<sup>1)</sup> s.c.l. = sandy clay loam

c.l. = clay loam



**Table 14. Soil samples taken in Thailand from 2001 to 2006.**

Sample no.	Sample location and description	Date
Roy-et	-1 Phoo Chai, Kham Pha Ung, Phu Khaw Thong; variety trial Mr. Phrom	Sept 03
	-2 Roy-et FCR station; micronutrient trial 2002 Rep I	May 02
	-3 Roy-et FCR station; micronutrient trial 2002 Rep II	May 02
	-4 Roy-et FCR station; micronutrient trial 2002 Rep III	May 02
	-5 Roy-et FCR station; micronutrient trial 2002 Rep IV	May 02
Maha-Sarakham	-1 Maha Sarakham FCR station; micronutrient trial 2002 Rep I	May 02
	-2 Maha Sarakham FCR station; micronutrient trial 2002 Rep II	May 02
	-3 Maha Sarakham FCR station; micronutrient trial 2002 Rep III	May 02
	-4 Maha Sarakham FCR station; micronutrient trial 2002 Rep IV	May 02
Kalasin	-1 Sahatsakhan, Huay Suea Ten; cassava with vetiver hedgerows	Aug 01
	-2 Sahatsakhan district, Huay Suea Ten village; field with recently planted <i>Canavalia</i>	Jul 02
	-3 Sahatsakhan, district, Huay Suea Ten village; adjacent cassava after <i>Canavalia</i>	Jul 02
	-4 Mueang district, Kalasin FCR station; micronutrient trial Rep I	May 02
	-5 Mueang district, Kalasin FCR station; micronutrient trial Rep II	May 02
	-6 Mueang district, Kalasin FCR station; micronutrient trial Rep III	May 02
	-7 Mueang district, Kalasin FCR station; micronutrient trial Rep IV	May 02
	-8 Sahatsakhan, Noon Sawaat; Mr. Prasit, cassava field after green manure	Dec 02
	-9 Sahatsakhan, Noon Sawaat; Mr. Prasit, cassava field without green manure	Dec 02
	-10 Sahatsakhan, Huay Suea Ten; Mr Niphon, in small gully, cassava P deficient	Dec 02
	-11 Namon; Noon Thiang; Mr. Thongsak variety trial; very hard soil	Dec 02
	-12 Namon; Noon Thiang; Mr. Prachum, outside green manure trial; white sandy soil	Dec 02
	-13 Namon; Noon Thiang; behind cassava field school; white/red sandy soil, very poor	Dec 02
	-14 Huay Pueng, Nikhom, Huay Faa; FPR fertilizer trial Mrs. Sukchai; F <sub>0</sub>	Sept 03
	-15 Mueng district, Kalasin FCR station; bentonite trial Rep I, 0-10 cm	Jun 04
	-16 Mueng district, Kalasin FCR station; bentonite trial Rep I, 10-20 cm	Jun 04
	-17 Mueng district, Kalasin FCR station; bentonite trial Rep I, 20-30 cm	Jun 04
	-18 Mueng district, Kalasin FCR station; bentonite trial Rep II, 0-10 cm	Jun 04
	-19 Mueng district, Kalasin FCR station; bentonite trial Rep II, 10-20 cm	Jun 04
	-20 Mueng district, Kalasin FCR station; bentonite trial Rep II, 20-30 cm	Jun 04
	-21 Mueng district, Kalasin FCR station; bentonite trial Rep III, 0-10 cm	Jun 04
	-22 Mueng district, Kalasin FCR station; bentonite trial Rep III, 10-20 cm	Jun 04
	-23 Mueng district, Kalasin FCR station; bentonite trial Rep III, 20-30 cm	Jun 04
Khon Kaen	-1 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>1</sub>	May 02
	-2 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>2</sub>	May 02
	-3 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>3</sub>	May 02
	-4 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>4</sub>	May 02
	-5 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>5</sub>	May 02
	-6 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>6</sub>	May 02
	-7 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>7</sub>	May 02
	-8 Khon Kaen FCRC; long-term NPK trial, 27 th year- T <sub>8</sub>	May 02

<sup>1)</sup>M<sub>1</sub> = continuous cassava monoculture

M<sub>2</sub> = rotation cassava /peanut-pigeon pea

M<sub>3</sub> = continuous cassava intercropped with peanut

-1 = no fertilizers or amendments

-2 = chemical fertilizers

-4 = chemical fertilizers+amendments of compost, lime and rock phosphate in years 1, 5 and 9

**Table 14. Soil samples taken in Thailand from 2001 to 2006 (continued).**

Sample no.	Sample location and description	Date
Khon Kaen	-9 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>1</sub> -1 <sup>1)</sup>	Dec 02
	-10 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>1</sub> -2	Dec 02
	-11 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>1</sub> -4	Dec 02
	-12 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>2</sub> -1	Dec 02
	-13 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>2</sub> -2	Dec 02
	-14 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>2</sub> -4	Dec 02
	-15 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>3</sub> -1	Dec 02
	-16 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>3</sub> -2	Dec 02
	-17 Khon Kaen FCRC; long-term soil management trial, 0-20 cm, M <sub>3</sub> -4	Dec 02
	-18 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>1</sub> -1	Dec 02
	-19 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>1</sub> -2	Dec 02
	-20 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>1</sub> -4	Dec 02
	-21 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>2</sub> -1	Dec 02
	-22 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>2</sub> -2	Dec 02
	-23 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>2</sub> -4	Dec 02
	-24 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>3</sub> -1	Dec 02
	-25 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>3</sub> -2	Dec 02
	-26 Khon Kaen FCRC; long-term soil management trial, 25-40 cm, M <sub>3</sub> -4	Dec 02
	-27 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>1</sub>	Dec 02
	-28 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>2</sub>	Dec 02
	-29 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>3</sub>	Dec 02
	-30 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>4</sub>	Dec 02
	-31 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>5</sub>	Dec 02
	-32 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>6</sub>	Dec 02
	-33 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>7</sub>	Dec 02
	-34 Khon Kaen FCRC; long-term NPK trial, 0-20 cm, mix Rep II and III, T <sub>8</sub>	Dec 02
	-35 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>1</sub>	Dec 02
	-36 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>2</sub>	Dec 02
	-37 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>3</sub>	Dec 02
	-38 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>4</sub>	Dec 02
	-39 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>5</sub>	Dec 02
	-40 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>6</sub>	Dec 02
	-41 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>7</sub>	Dec 02
	-42 Khon Kaen FCRC; long-term NPK trial, 25-40 cm, mix Rep II and III, T <sub>8</sub>	Dec 02
	-43 Khon Kaen FCRC; variety trial for leaf production-T2002-1 Rep I	May 02
	-44 Khon Kaen FCRC; variety trial for leaf production-T2002-1 Rep II	May 02
	-45 Khon Kaen FCRC; variety trial for leaf production-T2002-1 Rep III	May 02
	-46 Khon Kaen FCRC; variety trial for leaf production-T2002-1 Rep IV	May 02
	-47 Khon Kaen FCRC; planting density trial for leaf prod. T-2002-4 Rep I	May 02
	-48 Khon Kaen FCRC; planting density trial for leaf prod. T-2002-4 Rep II	May 02
	-49 Khon Kaen FCRC; planting density trial for leaf prod. T-2002-4 Rep III	May 02
	-50 Khon Kaen FCRC; planting density trial for leaf prod. T-2002-4 Rep IV	May 02
	-51 Khon Kaen FCRC; cutting height/frequency trial for leaf prod. T-2002-5 Rep I	May 02
	-52 Khon Kaen FCRC; cutting height/frequency trial for leaf prod. T-2002-5 Rep II	May 02
	-53 Khon Kaen FCRC; cutting height/frequency trial for leaf prod. T-2002-5 Rep III	May 02
	-54 Khon Kaen FCRC; cutting height/frequency trial for leaf prod. T-2002-5 Rep IV	May 02

**Table 14. Soil samples taken in Thailand from 2001 to 2006 (continued).**

Sample no.	Sample location and description	Date
Khon Kaen	-55 Khon Kaen FCRC; NPK trial for leaf production T-2002-6 Rep I	May 02
	-56 Khon Kaen FCRC; NPK trial for leaf production T-2002-6 Rep II	May 02
	-57 Khon Kaen FCRC; NPK trial for leaf production T-2002-6 Rep III	May 02
	-58 Khon Kaen FCRC; NPK trial for leaf production T-2002-6 Rep IV	May 02
	-59 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>1</sub>	Jun 03
	-60 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>2</sub>	Jun 03
	-61 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>3</sub>	Jun 03
	-62 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>4</sub>	Jun 03
	-63 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>5</sub>	Jun 03
	-64 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>6</sub>	Jun 03
	-65 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>7</sub>	Jun 03
	-66 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>8</sub>	Jun 03
	-67 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>9</sub>	Jun 03
	-68 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>10</sub>	Jun 03
-69 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>11</sub>	Jun 03	
-70 Khon Kaen FCRC; NPK leaf trial, before 2d year T <sub>12</sub>	Jun 03	
N. Ratchasima	-1 Huay Bong, TTDI Center; long-term erosion trial I-1; before 6 th planting	Mar 01
	-2 Huay Bong, TTDI Center; long-term erosion trial I-2; before 6 th planting	Mar 01
	-3 Huay Bong, TTDI Center; long-term erosion trial I-3; before 6 th planting	Mar 01
	-4 Huay Bong, TTDI Center; long-term erosion trial I-4; before 6 th planting	Mar 01
	-5 Huay Bong, TTDI Center; long-term erosion trial I-5; before 6 th planting	Mar 01
	-6 Huay Bong, TTDI Center; long-term erosion trial I-6; before 6 th planting	Mar 01
	-7 Huay Bong, TTDI Center; long-term erosion trial II-1; before 6 th planting	Mar 01
	-8 Huay Bong, TTDI Center; long-term erosion trial II-2; before 6 th planting	Mar 01
	-9 Huay Bong, TTDI Center; long-term erosion trial II-3; before 6 th planting	Mar 01
	-10 Huay Bong, TTDI Center; long-term erosion trial II-4; before 6 th planting	Mar 01
	-11 Huay Bong, TTDI Center; long-term erosion trial II-5; before 6 th planting	Mar 01
	-12 Huay Bong, TTDI Center; long-term erosion trial II-6; before 6 th planting	Mar 01
	-13 Huay Bong, TTDI Center; land preparation trial I-1	Aug 01
	-14 Huay Bong, TTDI Center; land preparation trial II-1	Aug 01
	-15 Huay Bong, TTDI Center; land preparation trial III-1	Aug 01
	-16 Huay Bong, TTDI Center; land preparation trial IV-1	Aug 01
	-17 Huay Bong, TTDI Center; micronutrient trial I	Aug 01
	-18 Huay Bong, TTDI Center; micronutrient trial II	Aug 01
	-19 Huay Bong, TTDI Center; micronutrient trial III	Aug 01
	-20 Huay Bong, TTDI Center; micronutrient trial IV	Aug 01
	-21 Huay Bong, TTDI Center; cassava leaf production trial	Aug 01
	-22 Huay Bong, TTDI Center; long-term erosion trial – I-1; before 7 th planting	Feb 02
	-23 Huay Bong, TTDI Center; long-term erosion trial – I-2; before 7 th planting	Feb 02
	-24 Huay Bong, TTDI Center; long-term erosion trial – I-3; before 7 th planting	Feb 02
	-25 Huay Bong, TTDI Center; long-term erosion trial – I-4; before 7 th planting	Feb 02
	-26 Huay Bong, TTDI Center; long-term erosion trial – I-5; before 7 th planting	Feb 02
	-27 Huay Bong, TTDI Center; long-term erosion trial – I-6; before 7 th planting	Feb 02
	-28 Huay Bong, TTDI Center; long-term erosion trial – II-1; before 7 th planting	Feb 02
	-29 Huay Bong, TTDI Center; long-term erosion trial – II-2; before 7 th planting	Feb 02
	-30 Huay Bong, TTDI Center; long-term erosion trial – II-3; before 7 th planting	Feb 02

**Table 14. Soil samples taken in Thailand from 2001 to 2006 (continued).**

Sample no.	Sample location and description	Date
N. Ratchasima	-31 Huay Bong, TTDI Center; long-term erosion trial – II-4; before 7 th planting	Feb 02
	-32 Huay Bong, TTDI Center; long-term erosion trial – II-5; before 7 th planting	Feb 02
	-33 Huay Bong, TTDI Center; long-term erosion trial – II-6; before 7 th planting	Feb 02
	-34 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>1</sub>	May 02
	-35 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>2</sub>	May 02
	-36 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>3</sub>	May 02
	-37 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>4</sub>	May 02
	-38 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>5</sub>	May 02
	-39 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>6</sub>	May 02
	-40 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>7</sub>	May 02
	-41 Banmai Samrong; long-term NPK trial, 28 th year-T <sub>8</sub>	May 02
	-42 Huay Bong, TTDI; plot next to land preparation trial, yellow cassava	Oct 02
	-43 Huay Bong, TTDI; soil with white crust in II-T2 of soil preparation trial	Oct 02
	-44 Huay Bong, TTDI; long term erosion trial – I-1; before 8 th planting	May 03
	-45 Huay Bong, TTDI; long term erosion trial – I-2; before 8 th planting	May 03
	-46 Huay Bong, TTDI; long term erosion trial – I-3; before 8 th planting	May 03
	-47 Huay Bong, TTDI; long term erosion trial – I-4; before 8 th planting	May 03
	-48 Huay Bong, TTDI; long term erosion trial – I-5; before 8 th planting	May 03
	-49 Huay Bong, TTDI; long term erosion trial – I-6; before 8 th planting	May 03
	-50 Huay Bong, TTDI; long term erosion trial – II-1; before 8 th planting	May 03
	-51 Huay Bong, TTDI; long term erosion trial – II-2; before 8 th planting	May 03
	-52 Huay Bong, TTDI; long term erosion trial – II-3; before 8 th planting	May 03
	-53 Huay Bong, TTDI; long term erosion trial – II-4; before 8 th planting	May 03
	-54 Huay Bong, TTDI; long term erosion trial – II-5; before 8 th planting	May 03
	-55 Huay Bong, TTDI; long term erosion trial – II-6; before 8 th planting	May 03
	-56 Huay Bong, TTDI, lot 44 with yellow cassava plants	Aug 03
	-57 Huay Bong, TTDI, lot 44 with green plants nearby	Aug 03
	-58 Huay Bong, TTDI, new plot for EFFEM Food leaf trials	Apr 04
	-59 Tepharak, Bueng Prue; Mr. Suthin FPR erosion trial	Sept 03
	-60 Sii Khiew, Paanglako; Mr. Lamyai Srirakul, sandy soil, serious gullies	Sept 03
	-61 Daan Khun Thot, Khut Dook; Mr. Suem Kaapkhunhot, next to gully	Sept 03
	-62 Banmai Samrong; Zn application trial Rep I	May 04
	-63 Banmai Samrong; Zn application trial Rep II	May 04
	-64 Banmai Samrong; Zn application trial Rep III	May 04
	-65 Banmai Samrong; Zn application trial Rep IV	May 04
	-66 Huay Bong, TTDI; long-term erosion trial- I –1; at end 10/th planting	Feb 06
	-67 Huay Bong, TTDI; long-term erosion trial- I –2; at end 10/th planting	Feb 06
	-68 Huay Bong, TTDI; long-term erosion trial- I –3; at end 10/th planting	Feb 06
	-69 Huay Bong, TTDI; long-term erosion trial- I –4; at end 10/th planting	Feb 06
	-70 Huay Bong, TTDI; long-term erosion trial- I –5; at end 10/th planting	Feb 06
	-71 Huay Bong, TTDI; long-term erosion trial- I –6; at end 10/th planting	Feb 06
	-72 Huay Bong, TTDI; long-term erosion trial- II –1; at end 10/th planting	Feb 06
	-73 Huay Bong, TTDI; long-term erosion trial- II –2; at end 10/th planting	Feb 06
	-74 Huay Bong, TTDI; long-term erosion trial- II –3; at end 10/th planting	Feb 06
	-75 Huay Bong, TTDI; long-term erosion trial- II –4; at end 10/th planting	Feb 06
	-76 Huay Bong, TTDI; long-term erosion trial- II –5; at end 10/th planting	Feb 06
	-77 Huay Bong, TTDI; long-term erosion trial- II –6; at end 10/th planting	Feb 06

**Table 14. Soil samples taken in Thailand from 2001 to 2006 (continued).**

Sample no.	Sample location and description	Date
Chayaphum	-1 Thepsatit, Khook Anu, below FPR green manure trial, reddish sandy soil	Aug 01
	-2 Thepsatit, Nayaang Klak, Khook Anu; FPR variety trial, red sandy loam	Aug 01
	-3 Thepsatit, Nayaang Klak, Khook Anu; R5 variety trial Mr. Chanthong	Apr 02
	-4 Thepsatit, Nayaang Klak, Khook Anu; erosion trial Mr. Lun	Apr 02
	-5 Thepsatit, Huay Yaay Yiew; Mrs. Mani Ruengrak FPR erosion trial, clay loam	Sept 03
Kamphengpet	-1 Khanuwaralakburi; sandy grey soil with severe gulleys	Aug 01
Kanchanaburi	-1 Lawkhwan, Baan Nongkae; FPR weed control trial, sandy loam	Aug 01
	-2 Lawkhwan, Baan Nongkae; FPR erosion trial, red clay soil	Aug 01
	-3 Lawkhwan, Baan Nongkae; FPR variety trial, grey sandy soil	Aug 01
	-4 Lawkhwan, Thung Krabam; FPR variety trial Mrs. Sompong, high yield	Sept 03
	-5 Lawkhwan, Thung Krabam; FPR fertilizer trial Mr. Lek, F <sub>0</sub> ; poor growth	Sept 03
	-6 Lawkhwan, Thung Krabam; FPR green manure trial, Mr. Bunyuen, no GM	Sept 03
	-7 Lawkhwan, Thung Krabam; FPR green manure trial, Mr. Bunyuen, Canavalia	Sept 03
	-8 Lawkhwan, Thung Krabam; FPR green manure trial, Mr. Bunyuen, cowpea	Sept 03
	-9 Lawkhwan, Thung Krabam; FPR green manure trial, Mr. Bunyuen, mungbean	Sept 03
	-10 Lawkhwan, Thung Krabam; yellow cassava on termite hill, white sandy loam	Sept 03
	-11 Lawkhwan, Thung Krabam; nearby green cassava; white sandy loam	Sept 03
	-12 Say Yook; FPR variety trial Mrs. Lalita, excessive top growth, clay soil	Sept 03
	-13 Say Yook; near FPR erosion trial Mr. Chu; K deficiency in Rayong 5, red clay	Sept 03
Ratchaburi	-1 Baan Poong, Poong Yo village; FPR erosion trial Mr. Chamrung, poor cassava	Aug 03
	-2 Baan Poong, Poong Yo village; FPR fertilizer+manure trial, good growth	Aug 03
Chachoengsao	-1 Khaw Hin Sorn; land preparation trial Rep I	Jul 01
	-2 Khaw Hin Sorn; land preparation trial Rep II	Jul 01
	-3 Khaw Hin Sorn; land preparation trial Rep III	Jul 01
	-4 Khaw Hin Sorn; new land preparation trial	May 02
	-5 Sanaam Chai Khet, Thaachiwitmai; Mr. Chamlong, harvested cassava field	Nov 01
	-6 Sanaam Chai Khet, Thaachiwitmai; Mr. Somchai, cassava field above vetiver	Nov 01
	-7 Thaa Takiab, Nong Yai village; rocky soil on 20% slope with vetiver	Aug 01
Prachinburi	-1 Nadi, Kaeng Dinso; soil sedimenta above vetiver in gully	Sept 03
	-2 Nadi, Kaeng Dinso; soil in cassava field near gully	Sept 03
Sra Kaew	-1 Wang Nam Yen, Wang Sombuun; C+Canavalia, K deficiency symptoms	Sept 03
Rayong	-1 Rayong FCRC; cassava variety trial for leaf production	May 01
	-2 Rayong; land preparation trial-Rep I	Jun 01
	-3 Rayong; land preparation trial-Rep II	Jun 01
	-4 Rayong; land preparation trial-Rep III	Jun 01
	-5 Rayong; land preparation trial-Rep IV	June 01
	-6 Rayong FCRC; long-term NPK trial – T <sub>1</sub>	May 02
	-7 Rayong FCRC; long-term NPK trial – T <sub>2</sub>	May 02
	-8 Rayong FCRC; long-term NPK trial – T <sub>3</sub>	May 02
	-9 Rayong FCRC; long-term NPK trial – T <sub>4</sub>	May 02
	-10 Rayong FCRC; long-term NPK trial – T <sub>5</sub>	May 02
	-11 Rayong FCRC; long-term NPK trial – T <sub>6</sub>	May 02
	-12 Rayong FCRC; long-term NPK trial – T <sub>7</sub>	May 02

**Table 14. Soil samples taken in Thailand from 2001 to 2006 (continued).**

Sample no.	Sample location and description	Date
-13	Rayong FCRC; long-term NPK trial – T <sub>8</sub>	May 02
-14	Rayong, FCRC; variety trial for leaf production Rep I	May 02
-15	Rayong, FCRC; variety trial for leaf production Rep II	May 02
-16	Rayong, FCRC; variety trial for leaf production Rep III	May 02
-17	Rayong, FCRC; variety trial for leaf production Rep IV	May 02
-18	Rayong, FCRC; cutting height/frequency trial for leaf production Rep I	May 02
-19	Rayong, FCRC; cutting height/frequency trial for leaf production Rep II	May 02
-20	Rayong, FCRC; cutting height/frequency trial for leaf production Rep III	May 02
-21	Rayong, FCRC; cutting height/frequency trial for leaf production Rep IV	May 02
-22	Rayong, FCRC; NPK trial for leaf production Rep I	May 02
-23	Rayong, FCRC; NPK trial for leaf production Rep II	May 02
-24	Rayong, FCRC; NPK trial for leaf production Rep III	May 02
-25	Rayong, FCRC; NPK trial for leaf production Rep IV	May 02
-26	Rayong, FCRC; planting density trial for leaf production Rep I	May 02
-27	Rayong, FCRC; planting density trial for leaf production Rep II	May 02
-28	Rayong, FCRC; planting density trial for leaf production Rep III	May 02
-29	Rayong, FCRC; planting density trial for leaf production Rep IV	May 02
-30	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>1</sub>	Dec 02
-31	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>2</sub>	Dec 02
-32	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>3</sub>	Dec 02
-33	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>4</sub>	Dec 02
-34	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>5</sub>	Dec 02
-35	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>6</sub>	Dec 02
-36	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>7</sub>	Dec 02
-37	Rayong FCRC; long-term NPK trial, mix Rep II and III, 0-20 cm, T <sub>8</sub>	Dec 02
-38	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>1</sub>	Dec 02
-39	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>2</sub>	Dec 02
-40	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>3</sub>	Dec 02
-41	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>4</sub>	Dec 02
-42	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>5</sub>	Dec 02
-43	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>6</sub>	Dec 02
-44	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>7</sub>	Dec 02
-45	Rayong FCRC; long-term NPK trial, mix Rep II and III, 25-40 cm, T <sub>8</sub>	Dec 02
-46	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>1</sub>	May 03
-47	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>2</sub>	May 03
-48	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>3</sub>	May 03
-49	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>4</sub>	May 03
-50	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>5</sub>	May 03
-51	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>6</sub>	May 03
-52	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>7</sub>	May 03
-53	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>8</sub>	May 03
-54	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>9</sub>	May 03
-55	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>10</sub>	May 03
-56	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>11</sub>	May 03
-57	Rayong FCRC, NPK leaf trial-before 2d year – T <sub>12</sub>	May 03

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006.**

Sample no.	pH	←Chemical characteristics→										←Physical characteristics→									
		%		ppm		←me/100 g→				%		mmhos /cm E.C.	←ppm→				←%→				
		OM	P	Al	Ca	Mg	K	Na	Al	Na	B		Zn	Mn	Cu	Fe	Sand	Silt	Clay	Texture <sup>1)</sup>	
Roy-et	-1	5.6	1.01	10.5	0	0.87	0.21	0.04	0.03	0	2.6	0.32	0.50	32.8	0.37	10.0	67.0	13.8	19.2	s.l.	
	-2	6.1	0.38	82.0	0	0.91	0.18	0.11	0.03	0	2.4	0.58	1.87	33.2	0.49	55.8	68.9	16.3	14.8	s.l.	
	-3	6.2	0.41	73.4	0	0.69	0.19	0.09	0.02	0	2.0	0.71	0.63	16.4	0.60	70.0	67.7	17.5	14.8	s.l.	
	-4	6.5	0.37	60.4	0	1.04	0.26	0.11	0.02	0	1.4	0.72	1.20	34.5	0.45	34.3	69.0	16.2	14.8	s.l.	
	-5	6.6	0.31	83.1	0	0.83	0.22	0.10	0.02	0	1.7	0.52	1.01	21.8	0.61	78.1	67.7	17.5	14.8	s.l.	
M. Sarakham	-1	6.5	0.37	34.7	0	1.04	0.13	0.11	0.03	0	2.2	0.04	0.43	1.48	51.8	0.37	6.2	73.9	12.5	13.6	s.l.
	-2	6.4	0.34	45.2	0	1.44	0.17	0.13	0.03	0	1.7	0.07	0.75	1.88	49.2	0.45	7.1	74.0	12.5	13.5	s.l.
	-3	6.5	0.26	35.1	0	1.29	0.13	0.11	0.02	0	1.3	0.03	0.46	1.38	51.8	0.37	7.2	74.0	12.5	13.5	s.l.
	-4	6.5	0.23	33.9	0	0.86	0.11	0.10	0.02	0	1.8	0.03	0.35	1.45	54.5	0.45	8.7	73.9	12.5	13.6	s.l.
Kalasin	-1	6.2	0.66	7.3	0	0.57	0.21	0.11	0.30	0		0.28	0.80	0.60	31.8	0.21	9.2	64.7	22.6	12.7	s.l.
	-2	5.3	0.46	6.7	0.21	0.39	0.17	0.08		25			0.26	0.12	5.5	0.16	49.3	64.1	18.1	17.9	s.l.
	-3	5.2	0.73	10.4	0.36	0.50	0.17	0.09		32			0.40	0.30	12.7	0.16	35.6	58.9	22.7	18.4	s.l.
	-4	5.3	0.38	80.1	0.10	0.58	0.06	0.07	0.03	12	3.2	0.31	0.36	6.22	21.8	0.26	55.8	68.8	12.7	18.5	s.l.
	-5	5.3	0.41	86.9	0.16	0.51	0.04	0.07	0.02	20	2.2	0.32	0.36	9.57	21.0	0.28	57.3	69.0	12.6	18.4	s.l.
	-6	5.4	0.41	66.3	0.10	0.57	0.07	0.08	0.03	12	3.3	0.28	0.43	3.90	22.1	0.25	69.1	66.4	13.9	19.7	s.l.
	-7	5.4	0.37	109.9	0.16	0.59	0.08	0.09	0.03	17	3.1	0.31	0.45	8.52	26.4	0.34	71.1	69.0	12.6	18.4	s.l.
	-8	6.1	0.39	19.1	0	0.36	0.18	0.06	-	0	-	-	0.43	0.46	29.3	0.14	12.5	69.0	15.4	15.6	s.l.
	-9	6.2	0.62	43.5	0	0.67	0.17	0.05	-	0	-	-	0.42	2.54	28.8	0.42	30.1	71.4	14.2	14.4	s.l.
	-10	4.8	0.20	6.6	1.56	0.55	0.98	0.13	-	48	-	-	0.19	0.06	10.9	0.20	6.7	59.9	6.3	33.0	s.c.l.
	-11	5.2	1.08	15.7	0.16	1.74	0.39	0.10	-	7	-	-	0.39	0.45	41.5	0.22	9.6	62.6	22.6	14.8	s.l.
	-12	5.4	0.34	10.1	0.10	0.47	0.15	0.07	-	13	-	-	0.30	0.26	29.2	0.19	24.6	62.6	22.6	14.8	s.l.
	-13	5.7	0.04	6.9	0	0.18	0.03	0.02	-	0	-	-	0.42	0.15	6.4	0.11	26.3	81.5	5.0	13.5	s.l.
	-14	6.6	0.48	6.0	0	0.62	0.17	0.03	0.03	0	3.5	0.34	0.43	22.5	0.40	8.4	73.4	11.3	15.3	s.l.	
	-15	5.2	0.64	102.1	0.31	0.27	0.04	0.20		38			0.30	2.61	9.1	0.34	96.2	66.5	18.3	15.2	s.l.
	-16	5.1	0.50	103.4	0.36	0.24	0.04	0.19		43			0.39	3.30	8.6	0.31	90.5	66.5	18.3	15.2	s.l.
	-17	5.4	0.76	150.0	0.07	0.86	0.09	0.17		6			0.38	2.57	13.6	0.60	140.4	67.8	19.5	12.7	s.l.
	-18	5.3	0.65	150.0	0.16	0.81	0.09	0.21		13			0.47	2.93	13.5	0.46	119.2	67.7	18.3	14.0	s.l.

s.l. =sandy loam; s.c.l. = sandy clay loam

Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006 (continued).

Sample no.	pH	Chemical characteristics										Physical characteristics									
		%		ppm		me/100 g				%		mmhos /cm		ppm					%		Texture <sup>1)</sup>
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay		
Kalasin	-19	5.4	0.32	99.2	0.26	0.30	0.04	0.16		34		0.36	2.51	22.3	0.32	76.5	65.3	19.5	15.2	s.l.	
	-20	5.1	0.32	89.5	0.31	0.35	0.04	0.15		36		0.31	1.66	5.7	0.35	62.6	65.3	19.5	15.2	s.l.	
	-21	5.2	0.81	157.7	0.10	1.08	0.11	0.22		7		0.48	4.45	17.9	0.50	108.6	69.2	18.2	12.6	s.l.	
	-22	5.6	0.79	167.0	0	1.43	0.16	0.13	0.19	0	9.9	0.52	4.17	21.9	0.49	94.9	69.2	17.0	13.8	s.l.	
	-23	5.5	0.32	110.5	0.16	0.63	0.13	0.19		14		0.40	2.80	16.8	0.39	88.3	69.2	17.0	13.8	s.l.	
Khon Kaen	-1	5.9	0.91	5.6	0	0.69	0.18	0.04		0											
	-2	4.2	0.97	9.6	0.94	0.22	0.06	0.04		75											
	-3	4.1	0.86	59.2	1.04	0.17	0.05	0.03		81											
	-4	4.3	0.64	2.5	1.14	0.11	0.03	0.07		84											
	-5	4.8	0.91	53.8	0.73	0.25	0.04	0.06		68	0.27	0.81	0.39	3.8	0.20	6.3	70.3	9.5	20.2	s.c.l.	
	-6	6.7	1.42	261.7	0	4.48	0.47	0.13		0											
	-7	5.0	1.18	55.2	0.42	0.69	0.19	0.07		31											
	-8	5.7	0.78	5.3	0	0.74	0.33	0.04		0											
	-9	5.8	0.30	2.1	0	0.71	0.19	0.03	0.01	0	-	0.40	0.39	17.8	0.35	5.0	72.6	13.8	13.6	s.l.	
	-10	5.3	0.30	31.8	0.16	0.31	0.12	0.07	-	24	-	0.41	0.29	27.2	0.28	11.0	71.5	15.0	13.5	s.l.	
	-11	5.6	0.32	54.4	0	0.84	0.07	0.04	0.02	0	-	-	-	-	-	-	-	-	-	-	
	-12	5.2	0.40	3.4	0.21	0.17	0.12	0.03	-	40	-	-	-	-	-	-	-	-	-	-	
	-13	5.1	0.47	45.7	0.42	0.32	0.19	0.08	-	42	-	-	-	-	-	-	-	-	-	-	
	-14	5.2	0.66	91.5	0.13	1.04	0.18	0.08	-	9	-	0.53	6.92	43.9	1.73	12.8	67.7	18.8	13.5	s.l.	
	-15	5.6	0.41	4.1	0	0.69	0.23	0.04	0.01	0	-	-	-	-	-	-	-	-	-	-	
	-16	5.1	0.55	47.0	0.21	0.44	0.20	0.11	-	22	-	-	-	-	-	-	-	-	-	-	
	-17	5.1	0.50	79.2	0.16	0.92	0.15	0.06	-	12	-	-	-	-	-	-	-	-	-	-	
	-18	5.7	0.08	3.0	0	0.65	0.22	0.03	0.01	0	-	0.50	0.14	11.6	0.29	4.5	67.7	17.5	14.8	s.l.	
	-19	5.0	0.17	32.5	0.44	0.48	0.18	0.08	-	37	-	-	-	-	-	-	-	-	-	-	
	-20	5.9	0.28	15.9	0	1.97	0.31	0.07	0.01	0	-	-	-	-	-	-	-	-	-	-	
	-21	5.3	0.15	3.2	0.36	0.16	0.11	0.04	-	54	-	-	-	-	-	-	-	-	-	-	
	-22	4.9	0.24	28.1	0.54	0.26	0.13	0.06	-	55	-	-	-	-	-	-	-	-	-	-	
	-23	5.3	0.43	67.4	0.10	1.12	0.22	0.06	-	7	-	0.50	5.68	26.7	1.65	10.2	67.7	16.3	16.1	s.l.	
	-24	5.8	0.33	2.5	0	0.94	0.41	0.04	0.01	0	-	-	-	-	-	-	-	-	-	-	

s.l. =sandy loam; s.c.l. = sandy clay loam



**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	←—Chemical characteristics—→															←—Physical characteristics—→					
	pH	%		←—me/100 g—→					%			←—ppm—→					←—%—→				
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay	Texture <sup>1)</sup>	
Khon Kaen	-25	5.4	0.10	22.7	0.10	0.44	0.18	0.08	-	13	-	-	-	-	-	-	-	-	-	-	
	-26	5.4	0.11	34.5	0.10	0.84	0.14	0.05	-	9	-	-	-	-	-	-	-	-	-	-	
	-27	5.1	0.31	5.1	0.63	0.62	0.16	0.03	-	44	-	-	0.59	0.42	18.9	0.27	5.5	62.6	17.6	19.8	s.l.
	-28	4.0	0.35	5.3	1.56	0.06	0.06	0.03	-	91	-	-	-	-	-	-	-	-	-	-	
	-29	4.2	0.33	53.6	0.83	0.10	0.07	0.03	-	81	-	-	-	-	-	-	-	-	-	-	
	-30	4.2	0.48	3.9	1.04	0.13	0.09	0.08	-	78	-	-	-	-	-	-	-	-	-	-	
	-31	4.4	0.47	37.7	0.62	0.19	0.09	0.06	-	65	-	-	0.39	0.43	6.1	0.33	4.9	-	-	-	-
	-32	6.3	0.94	212.0	0	3.43	0.21	0.05	0.02	0	<0.1	-	0.65	30.88	29.4	6.00	21.9	-	-	-	-
	-33	5.2	0.56	53.0	0.44	0.34	0.13	0.05	-	46	-	-	0.45	0.57	10.7	0.34	5.7	-	-	-	-
	-34	5.6	0.31	11.3	0	0.84	0.24	0.03	0.01	0	<0.1	-	-	-	-	-	-	-	-	-	
	-35	5.1	0.42	3.8	0.94	0.67	0.15	0.03	-	53	-	-	0.59	0.13	4.8	0.30	2.9	58.7	15.5	25.7	s.c.l.
	-36	3.9	0.34	3.3	1.87	0.05	0.06	0.03	-	93	-	-	-	-	-	-	-	-	-	-	-
	-37	4.2	0.40	27.7	1.66	0.11	0.08	0.03	-	88	-	-	-	-	-	-	-	-	-	-	-
	-38	3.9	0.46	2.1	1.98	0.10	0.07	0.05	-	90	-	-	-	-	-	-	-	-	-	-	-
	-39	4.1	0.36	19.5	1.14	0.14	0.07	0.04	-	82	-	-	0.39	0.18	2.1	0.27	4.9	-	-	-	-
	-40	5.8	0.51	51.7	0	2.37	0.20	0.06	0.01	0	<0.1	-	1.10	11.98	13.6	3.33	9.0	-	-	-	-
	-41	4.6	0.51	36.3	0.94	0.42	0.17	0.05	-	59	-	-	0.65	0.46	8.6	0.44	4.3	-	-	-	-
	-42	5.4	0.33	5.1	0.07	1.53	0.41	0.03	-	3	-	-	-	-	-	-	-	-	-	-	-
	-43	5.8	0.38	27.0	0	0.89	0.15	0.07	0.03	0	2.6	-	0.51	0.78	31.0	0.36	9.9	65.1	15.1	19.8	s.l.
	-44	5.9	0.35	18.3	0	0.96	0.13	0.05	0.02	0	1.7	-	0.48	0.50	22.4	0.41	13.8	68.9	17.5	13.6	s.l.
	-45	6.1	0.40	21.4	0	1.04	0.13	0.06	0.03	0	2.4	-	0.70	0.48	20.1	0.41	6.8	68.9	16.3	14.8	s.l.
	-46	6.0	0.38	19.0	0	1.13	0.12	0.04	0.03	0	2.2	-	0.79	0.74	26.0	0.65	12.5	68.9	16.3	14.8	s.l.
	-47	5.9	0.47	22.6	0	0.89	0.17	0.06	0.01	0	0.8	-	0.48	0.55	32.5	0.49	9.3	66.8	17.6	15.6	s.l.
	-48	5.9	0.36	28.6	0	0.95	0.20	0.07	0.02	0	0.8	-	0.50	0.62	23.7	0.60	6.8	66.9	18.8	14.3	s.l.
	-49	5.9	0.46	26.4	0	1.03	0.18	0.06	0.03	0	2.3	-	0.52	0.74	27.6	0.59	12.6	66.8	17.6	15.6	s.l.
	-50	6.0	0.45	26.8	0	1.01	0.16	0.06	0.01	0	0.8	-	0.42	0.68	28.9	0.52	10.5	68.1	16.3	15.6	s.l.

s.l. =sandy loam; s.c.l. = sandy clay loam

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	pH	←—Chemical characteristics—→										←—Physical characteristics—→									
		%	ppm	←—me/100 g—→				%	%	mmhos /cm	←—ppm—→			←—%—→		Texture <sup>1)</sup>					
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu		Fe	Sand	Silt	Clay	
Khon Kaen	-51	5.7	0.44	23.6	0	1.01	0.21	0.08	0.02	0	1.5	0.52	0.63	33.0	0.73	6.2	68.0	15.7	16.3	s.l.	
	-52	5.9	0.47	33.9	0	1.03	0.22	0.09	0.02	0	1.5	0.52	0.85	34.6	0.44	7.8	66.7	18.2	15.1	s.l.	
	-53	6.1	0.38	14.8	0	1.11	0.16	0.05	0.01	0	0.8	0.47	0.58	30.5	0.58	5.6	65.5	18.8	15.7	s.l.	
	-54	6.0	0.60	22.3	0	1.21	0.19	0.08	0.02	0	1.3	0.50	0.80	27.9	0.47	7.2	64.3	20.0	15.6	s.l.	
	-55	6.1	0.42	17.9	0	1.08	0.16	0.05	0.02	0	1.5	0.56	0.62	28.2	0.39	8.1	68.1	17.5	14.4	s.l.	
	-56	6.1	0.50	16.5	0	0.99	0.14	0.05	0.02	0	1.7	0.38	0.69	22.1	0.37	8.3	68.1	16.3	15.6	s.l.	
	-57	6.1	0.49	17.5	0	1.33	0.17	0.05	0.01	0	0.7	0.51	0.64	21.9	0.40	9.0	68.0	16.3	15.7	s.l.	
	-58	5.9	0.44	17.0	0	0.97	0.14	0.05	0.01	0	0.9	0.39	0.56	28.8	0.37	10.0	68.1	17.5	14.4	s.l.	
	-59	5.5	0.59	18.0	0	0.85	0.14	0.07	0.01	-	0	0.50	0.80	15.2	0.41	8.9	71.0	14.4	14.6	s.l.	
	-60	5.4	0.73	41.7	0	0.77	0.11	0.10	0.01	-	0										
	-61	5.3	0.62	35.5	0.21	0.77	0.10	0.11	0	18	0										
	-62	5.2	0.67	36.9	0.26	0.77	0.10	0.12	0	21	0										
	-63	4.9	0.60	38.0	0.44	0.55	0.07	0.11	0	38	0										
	-64	5.4	0.66	19.1	0.27	0.70	0.08	0.13	0	23	0										
-65	5.1	0.68	28.3	0.27	0.63	0.08	0.12	0	25	0											
-66	5.0	0.61	64.3	0.30	0.70	0.09	0.11	0	25	0											
-67	5.0	0.71	40.2	0.69	0.71	0.10	0.05	0	44	0											
-68	5.0	0.66	54.3	0.31	0.68	0.09	0.08	0	27	0											
-69	5.0	0.63	39.2	0.23	0.75	0.10	0.17	0	18	0											
-70	4.9	0.60	76.5	0.28	0.67	0.07	0.16	0	24	0	-	0.48	1.03	19.0	0.40	15.0	72.3	10.6	17.1	s.l.	
N. Ratchasima	-1	7.0	1.02	4.6	0	4.52	0.97	0.23	0.03	4	<0.1	0.71	0.72	58.2	0.43	24.4	57.1	22.6	20.3	s.c.l.	
	-2	5.6	1.18	13.6	0	8.10	1.23	0.41	0.04	0	<0.1	0.77	1.75	70.8	0.47	25.8	55.9	22.4	21.7	s.c.l.	
	-3	5.9	1.13	9.9	0	6.16	1.11	0.27	0.05	0	<0.1	0.85	1.06	62.2	0.41	34.5	56.2	24.8	19.0	s.l.	
	-4	6.2	1.05	6.0	0	3.31	0.70	0.29	0.02	0	<0.1	0.71	0.53	48.1	0.27	16.7	58.6	23.6	17.8	s.l.	
	-5	6.2	0.99	7.7	0	5.41	0.80	0.27	0.09	0	<0.1	0.75	0.54	44.7	0.44	60.5	57.5	26.0	16.5	s.l.	

s.l. =sandy loam; s.c.l. = sandy clay loam; c.l. = clay loam

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	←—Chemical characteristics—→											←—Physical characteristics—→									
	pH	%	ppm	←—me/100 g—→					%	%	mmhos	←—ppm—→				←—%—→					
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay	Texture <sup>1)</sup>	
N. Ratchasima	-6	6.4	1.10	7.0	0	4.94	0.99	0.28	0.03	0	<0.1	0.76	0.69	55.6	0.34	18.7	58.7	23.5	17.8	s.l.	
	-7	6.7	1.25	12.0	0	11.81	0.81	0.40	0.02	0	<0.1	0.81	0.87	68.6	0.33	11.1	53.6	28.6	17.8	s.l.	
	-8	6.8	0.89	9.7	0	3.93	0.64	0.28	0.06	0	<0.1	0.77	1.04	29.4	0.25	31.0	56.2	28.6	15.2	s.l.	
	-9	6.7	1.10	25.6	0	7.11	0.82	0.35	0.02	0	<0.1	0.80	1.00	56.6	0.31	9.3	54.9	27.3	17.8	s.l.	
	-10	6.7	1.12	15.9	0	10.14	0.79	0.40	0.03	0	<0.1	0.84	1.33	57.5	0.35	18.1	53.4	28.7	17.9	s.l.	
	-11	6.9	1.12	11.2	0	5.24	0.73	0.39	0.02	0	<0.1	1.03	0.71	39.8	0.30	19.6	58.7	26.0	15.3	s.l.	
	-12	6.7	1.07	9.6	0	6.80	0.88	0.30	0.04	0	<0.1	1.15	0.71	52.8	0.31	12.6	58.6	26.1	15.3	s.l.	
	-13	6.2	1.86	152.0	0	11.55	1.00	0.65	-	0	-	1.09	13.06	55.7	0.15	7.1	56.3	25.8	17.9	s.l.	
	-14	6.2	1.14	8.7	0	5.25	0.62	0.36	-	0	-	1.14	0.72	0.63	42.8	0.15	3.6	51.4	30.7	17.8	s.l.
	-15	6.6	1.49	7.2	0	12.03	0.65	0.38	-	0	-	0.81	0.50	51.8	0.16	6.9	44.7	33.5	21.8	loam	
	-16	6.7	1.41	7.0	0	7.75	0.63	0.45	-	0	-	1.22	0.77	0.72	59.0	0.18	4.4	46.5	30.5	23.0	loam
	-17	6.8	1.98	24.0	0	22.88	0.92	0.72	-	0	-	0.81	0.06	14.0	0.04	0.2	32.0	33.3	34.7	c.l.	
	-18	6.8	1.76	31.6	0	18.34	0.80	0.64	-	0	-	1.13	1.15	46.4	0.14	1.7	41.3	33.1	25.6	loam	
	-19	6.9	2.08	24.7	0	22.50	0.95	0.83	-	0	-	0.96	0.06	14.2	0.03	0.2	30.5	38.5	31.0	c.l.	
	-20	6.9	2.01	20.7	0	17.93	0.98	0.72	-	0	-	0.82	0.73	47.8	0.04	0.9	37.0	29.5	33.5	c.l.	
	-21	6.9	1.69	28.1	0	15.60	0.81	0.54	-	0	-	0.77	0.93	57.1	0.11	1.3	50.7	26.3	23.0	s.c.l.	
	-22	6.6	1.16	5.8	0	4.80	0.85	0.23	0.04	0	0.7	0.66	0.73	34.0	0.38	17.8	58.7	17.6	23.7	s.c.l.	
	-23	6.8	1.34	11.6	0	8.40	1.10	0.38	0.05	0	0.5	0.83	0.86	2.35	44.3	0.38	13.2	56.1	16.4	27.5	s.c.l.
	-24	7.1	1.34	8.7	0	6.27	1.10	0.26	0.04	0	0.5	0.85	0.78	1.12	43.4	0.34	24.9	61.8	15.1	23.1	s.c.l.
	-25	6.9	1.18	6.0	0	2.61	0.59	0.24	0.04	0	1.1	0.63	1.54	0.52	27.4	0.21	14.8	63.8	13.8	22.4	s.c.l.
	-26	7.0	1.02	9.8	0	4.85	0.78	0.27	0.05	0	0.8	1.04	0.71	0.55	29.7	0.31	50.6	62.7	13.8	23.6	s.c.l.
	-27	7.1	1.26	7.3	0	6.14	1.10	0.28	0.07	0	0.9	0.84	0.83	1.02	37.1	0.35	26.7	62.6	12.6	24.9	s.c.l.
	-28	7.3	1.45	9.8	0	13.72	0.92	0.34	0.05	0	0.3	0.76	0.84	0.77	51.7	0.28	8.8	55.9	16.5	27.6	s.c.l.
	-29	7.1	0.94	11.6	0	2.34	0.52	0.21	0.05	0	1.6	0.75	0.72	0.72	19.9	0.24	28.8	68.7	9.0	22.3	s.c.l.
	-30	7.2	1.24	9.7	0	7.03	0.90	0.28	0.02	0	0.2	0.80	0.74	0.86	40.3	0.32	6.9	53.8	12.7	33.5	s.c.l.

s.l. =sandy loam; s.c.l. = sandy clay loam; c.l. = clay loam

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	←— Chemical characteristics —→											←— Physical characteristics —→									
	pH	%		me/100 g					ppm				%			Texture <sup>1)</sup>					
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu		Fe	Sand	Silt	Clay	
N. Ratchasima	-31	7.3	1.26	11.8	0	11.44	0.97	0.33	0.03	0	0.2	0.84	0.78	0.86	52.5	0.28	10.8	53.8	16.5	29.9	s.c.l.
	-32	7.3	1.07	7.0	0	4.32	0.73	0.30	0.04	0	0.7	0.78	0.41	0.74	38.7	0.37	19.4	58.6	16.6	24.8	s.c.l.
	-33	7.4	0.97	10.8	0	10.30	1.15	0.32	0.04	0	0.3	0.88	0.74	0.87	42.7	0.32	22.1	53.8	16.5	29.7	s.c.l.
	-34	6.2	0.78	27.6	0	4.65	0.68	0.21	0.03	0	0.5										
	-35	6.2	0.91	18.6	0	4.71	0.74	0.20	0.03	0	0.5										
	-36	6.3	1.21	84.7	0	5.88	0.61	0.20	0.03	0	0.4										
	-37	6.3	0.94	21.1	0	5.16	0.74	0.35	0.05	0	0.8										
	-38	6.3	1.07	74.4	0	4.51	0.66	0.29	0.04	0	0.7	1.17	0.50	1.02	44.3	0.30	11.2	51.9	22.8	25.3	s.c.l.
	-39	6.6	1.78	292.4	0	8.90	1.08	0.43	0.05	0	0.5										
	-40	6.8	0.99	83.7	0	7.37	0.77	0.42	0.06	0	0.7										
	-41	7.0	0.83	38.9	0	4.80	0.75	0.26	0.03	0	0.5										
	-42	6.8	2.19	17.9	0	15.59	0.73	0.47	0.02	0	0.1	0.58	1.10	0.47	44.8	0.08	0.4	44.4	21.1	34.5	c.l.
	-43	7.3	1.81	25.0	0	14.36	0.49	0.42	0.02	0	0.1	0.66	1.15	0.48	58.1	0.07	0.1	52.5	17.6	29.9	s.c.l.
	-44	6.6	1.05	6.0	0	5.10	0.86	0.23	0.02	0	0.3		0.44	0.83	25.6	0.44	16.2	59.0	22.5	18.5	s.l.
	-45	7.1	1.38	14.4	0	9.55	1.17	0.38	0.02	0	0.2		0.76	1.37	45.9	0.48	13.9	57.5	18.8	23.7	s.c.l.
	-46	7.2	1.16	15.7	0	8.19	1.28	0.31	0.05	0	0.5		0.58	1.91	34.5	0.53	22.2	56.4	22.5	21.1	s.c.l.
	-47	7.2	1.12	15.7	0	3.75	0.69	0.23	0.02	0	0.4		0.49	0.69	31.1	0.35	18.6	58.3	23.9	17.8	s.l.
	-48	7.2	1.13	14.4	0	5.61	0.88	0.35	0.03	0	0.4		0.51	0.58	32.5	0.48	46.0	59.6	22.6	17.8	s.l.
	-49	7.1	1.24	13.4	0	4.74	0.98	0.31	0.03	0	0.5		0.56	0.80	35.4	0.44	20.4	59.6	18.9	21.6	s.c.l.
	-50	7.4	1.41	10.5	0	13.46	0.84	0.37	0.02	0	0.1		0.60	0.92	48.9	0.38	9.3	50.3	20.3	29.4	s.c.l.
	-51	7.4	0.89	10.8	0	5.02	0.68	0.27	0.03	0	0.5		0.64	0.81	18.8	0.41	47.5	59.5	22.7	17.8	s.l.
	-52	7.3	1.33	25.7	0	8.40	0.93	0.32	0.02	0	0.2		0.74	1.17	32.1	0.45	12.3	54.1	23.4	22.4	s.c.l.
	-53	7.4	1.19	13.0	0	13.58	0.96	0.34	0.02	0	0.1		0.59	1.06	39.1	0.46	10.2	52.9	23.4	23.7	s.c.l.
	-54	7.5	1.26	9.1	0	7.25	0.90	0.39	0.03	0	0.4		0.77	1.09	33.2	0.44	29.2	57.0	23.3	19.7	s.l.
	-55	7.5	1.18	16.1	0	12.79	1.22	0.42	0.03	0	0.2		0.75	0.98	44.2	0.45	13.2	51.8	20.8	27.4	s.c.l.

s.l. =sandy loam; c.l. = clay loam; s.c.l. = sandy clay loam; si. c.l. = silty clay loam

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	pH	Chemical characteristics										Physical characteristics										
		%	ppm	me/100 g					%	%	mmhos /cm	ppm				%			Texture <sup>1)</sup>			
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay			
N. Ratchasima	-56	6.6	0.78	14.2	0	11.88	0.54	0.29	0.03	0	0.2	0.31	0.70	0.87	43.0	0.51	9.0	50.3	32.2	17.5	loam	
	-57	6.8	0.98	20.8	0	16.56	0.65	0.44	0.04	0	0.2	0.48	0.91	0.91	54.4	0.34	1.8	49.2	32.1	18.7	loam	
	-58	5.9	0.69	11.8	0	1.58	0.27	0.21	0.03	0	1.4		0.57	0.84	34.6	0.45	9.2	68.3	16.3	14.4	s.l.	
	-59	7.0	1.16	8.2	0	23.29	2.50	0.30	0.06	0	0.2		0.94	0.00	8.8	0.00	0.0	24.7	31.8	43.5	clay	
	-60	6.7	0.44	118.1	0	0.76	0.14	0.10	0.01	0	1.0		0.23	2.72	17.0	0.39	25.8	77.8	8.1	14.1	s.l.	
	-61	6.3	0.81	9.9	0	2.33	1.07	0.27	0.02	0	0.5		0.32	0.40	49.5	0.27	9.6	61.3	18.2	20.5	s.l.	
	-62	7.3	1.21	34.7	0	25.08	0.61	0.56	0.13	0	0.5		0.52	0	0.6	0.02	0	16.2	51.8	32.0	si.c.l.	
	-63	7.6	0.93	63.1	0	21.07	0.55	0.48	0.07	0	0.3		0.63	0.15	19.9	0.10	0.17	26.7	43.9	29.4	c.l.	
	-64	7.7	1.38	89.1	0	20.40	0.58	0.52	0.05	0	0.2		0.40	0.31	22.4	0.08	0.25	25.7	45.0	29.3	c.l.	
	-65	7.9	1.18	59.8	0	23.55	0.62	0.56	0.06	0	0.2		0.52	0.03	2.3	0.06	0.02	18.6	44.2	37.2	s.i.c.l.	
	-66	6.32	0.48	2.66	0	4.46	0.64	0.12	0.06	0	1.1		0.27	0.65	20.0	0.41	12.3	64.6	12.6	22.8	s.c.l.	
	-67	6.33	0.71	14.64	0	9.23	0.90	0.31	0.02	0	0.2											
	-68	6.50	0.60	18.35	0	5.48	0.81	0.18	0.02	0	0.3											
	-69	6.52	0.42	3.23	0	2.46	0.48	0.13	0.02	0	0.6											
	-70	6.86	0.34	5.60	0	2.47	0.49	0.19	0.02	0	0.6											
	-71	6.78	0.52	5.11	0	3.55	0.70	0.19	0.02	0	0.4											
	-72	6.79	0.62	9.01	0	9.60	0.60	0.21	0.01	0	0.1		0.34	0.85	30.4	0.32	6.1	54.3	19.0	26.7	s.c.l.	
-73	6.84	0.29	7.03	0	2.42	0.45	0.16	0.01	0	0.6												
-74	6.81	0.71	43.51	0	7.11	0.82	0.22	0.04	0	0.5												
-75	6.83	0.65	9.82	0	6.18	0.69	0.25	0.02	0	0.3												
-76	6.74	0.54	3.89	0	4.11	0.56	0.25	0.02	0	0.4												
-77	6.80	0.59	13.94	0	8.79	0.72	0.26	0.02	0	0.2												
Chaiyaphum	-1	5.8	0.89	130.8	0	1.12	0.41	0.29	0.30	0	14.1		0.81	3.29	8.5	0.16	67.0	52.1	34.0	14.0	loam	
	-2	6.1	1.13	5.3	0	4.50	1.05	0.32	0.29	0	4.7		0.74	0.69	76.0	0.27	5.4	51.9	30.3	17.8	loam	
	-3	6.0	1.32	4.6	0	3.71	1.25	0.26	0.04	0	0.8	0.41	0.48	0.63	76.0	0.24	5.1	48.7	22.6	28.7	s.c.l.	

s.l. =sandy loam; c.l. = clay loam; s.c.l. = sandy clay loam; si. c.l. = silty clay loam

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	Chemical characteristics											Physical characteristics										
	pH	% OM	ppm P	Al	me/100 g			% Na	% Al	% Na	mmhos/cm E.C.	ppm					% Sand Silt Clay			Texture <sup>1)</sup>		
Chaiyaphum	-4	6.2	1.16	3.7	0	4.81	1.28	0.18	0.04	0	0.6	0.51	0.68	0.56	42.0	0.12	5.5	56.1	20.2	23.7	s.c.l.	
	-5	7.0	0.81	14.5	0	2.72	1.21	0.14	0.03	0	0.7		0.58	3.10	92.3	0.64	13.5	45.5	34.0	20.5	loam	
Kamphengphet	-1	5.4	0.85	25.6	0.16	1.13	0.22	0.16										71.0	16.3	12.7	s.l.	
Kanchanaburi	-1	6.4	0.88	8.1	0	3.34	0.37	0.26	0.30	0	2.4		0.92	2.02	120.1	0.63	4.6	60.00	26.9	13.1	s.l.	
	-2	5.5	2.22	2.7	0	3.59	3.20	0.50	0.33	0	4.3	0.45	0.93	1.09	90.0	1.12	8.6	36.3	17.8	45.9	clay	
	-3	5.7	0.77	4.0	0	0.63	0.16	0.08	0.25	0	22.3	0.39	0.77	0.25	5.7	0.11	6.5	77.3	11.3	11.4	s.l.	
	-4	6.6	1.43	4.1	0	11.38	3.29	0.51	0.09	0	0.6		0.38	0.89	57.9	1.22	7.3	30.1	21.7	48.2	clay	
	-5	6.8	1.56	6.2	0	6.37	0.99	0.49	0.03	0	0.4		0.54	2.73	138.4	2.49	7.7	22.2	49.5	28.3	c.l.	
	-6	6.9	0.69	12.5	0	2.11	0.41	0.26	0.02	0	0.7		0.45	1.15	74.2	0.88	5.9	60.8	23.8	15.4	s.l.	
	-7	6.8	0.80	14.9	0	2.75	0.41	0.23	0.03	0	0.9		0.58	1.45	83.6	1.14	5.8	54.4	30.2	15.4	s.l.	
	-8	6.8	0.83	11.5	0	2.17	0.47	0.25	0.02	0	0.7		0.54	1.42	88.0	0.76	6.3	56.8	26.5	16.7	s.l.	
	-9	6.8	1.05	9.0	0	3.06	0.52	0.27	0.05	0	1.3		0.58	1.65	82.5	0.93	6.8	54.3	30.2	15.5	s.l.	
	-10	7.3	1.20	48.3	0	16.82	1.57	0.55	0.03	0	0.2		0.86	0.00	39.1	0.03	0.0	55.3	31.7	13.0	s.l.	
	-11	7.3	0.90	14.8	0	4.87	0.49	0.13	0.04	0	0.7		0.59	0.70	50.1	0.30	1.6	64.4	22.7	12.9	s.l.	
	-12	5.9	3.04	3.2	0	3.89	2.13	0.45	0.05	0	0.8		0.41	3.76	148.4	0.65	10.9	17.9	30.0	52.1	clay	
	-13	5.1	5.48	25.5	1.49	2.31	1.36	0.10	-	0			0.43	2.40	220.4	0.46	3.9	10.9	25.9	63.2	clay	
Ratchaburi	-1	5.6	0.57	2.5	0	0.71	0.26	0.12	0.03	0	2.6		0.29	0.57	13.0	0.37	7.7	73.3	13.1	13.6	s.l.	
	-2	6.0	1.46	13.2	0	5.84	0.79	0.36	0.03	0	0.4		0.84	1.51	67.9	0.31	3.2	53.0	30.9	16.2	s.l.	
Chachoengsao	-1	5.2	1.46	16.3	0.21	1.48	0.32	0.05					0.74	2.15	34.1	1.16	14.9	68.0	19.3	12.7	s.l.	
	-2	5.6	0.66	13.8	0	0.86	0.21	0.08	0.27	0	19.0	0.42										
	-3	5.6	1.15	42.1	0	1.17	0.30	0.11	0.31	0	16.4	0.59										
	-4	5.0	1.28	6.5	0.08	1.36	0.27	0.19	-	4	-	-	0.65	0.75	45.5	0.19	17.8	67.7	11.3	21.0	s.c.l.	
	-5	6.1	3.04	5.8	0	3.84	0.92	0.20	0.03	0	0.6		1.00	1.19	58.2	0.20	4.3	52.2	21.7	28.1	s.c.l.	
	-6	6.7	1.48	2.9	0	6.86	1.12	0.12	0.04	0	0.5		0.79	1.47	103.1	0.87	11.0	53.5	17.7	28.8	s.c.l.	
	-7	5.7	2.40	2.4	0	3.49	1.10	0.42	0.31	0	5.8		1.01	0.85	47.8	0.59	20.1	39.1	39.2	21.7	loam	

s.l. =sandy loam; c.l. = clay loam; s.c.l. = sandy clay loam; si. c.l. = silty clay loam

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	pH	←—Chemical characteristics—→										←—Physical characteristics—→									
		%	ppm	←—me/100 g—→				%	%	mmhos /cm E.C.	←—ppm—→				←—%—→			Texture <sup>1)</sup>			
		OM	P	Al	Ca	Mg	K	Na	Al	Na		B	Zn	Mn	Cu	Fe	Sand	Silt	Clay		
Prachinburi	-1	5.4	1.05	6.7	0.99	0.35	0.09	0.04	-	67		0.32	0.56	3.0	0.25	38.9	63.9	8.1	28.0	s.c.l.	
	-2	4.6	1.14	7.1	1.35	0.21	0.04	0.04	-	82		0.22	0.37	1.5	0.20	46.5	61.5	9.3	29.2	s.c.l.	
Sra Kaew	-1	6.6	3.08	1.6	0	36.4	10.5	0.27	0.09	0	1.8	0.52	0.12	15.6	0.07	0.0	11.9	24.7	63.4	clay	
Rayong	-1	4.7	1.10	50.4	0.78	0.80	0.19	0.09		42		0.96	1.78	10.7	0.47	20.2	57.2	7.8	35.2	s.c.	
	-2	5.3	0.59	15.4	0.16	0.25	0.08	0.10		27		0.18	0.79	37.0	0.13	6.7	71.5	12.5	16.0	s.l.	
	-3	5.2	0.62	19.9	0.10	0.35	0.08	0.10		16											
	-4	5.2	0.72	9.2	0.10	0.39	0.09	0.09		15											
	-5	6.4	0.72	10.7	0	2.01	0.29	0.10		0											
	-6	5.2	1.69	15.9	0.43	1.02	0.22	0.03													
	-7	4.4	0.91	15.5	1.04	0.63	0.13	0.03													
	-8	4.5	0.88	96.9	0.65	1.05	0.23	0.05													
	-9	4.4	0.99	20.9	0.94	0.73	0.12	0.07													
	-10	4.5	0.97	80.7	0.76	1.01	0.24	0.09		36		0.46	1.06	3.67	11.4	0.96	19.9	62.0	15.8	22.2	s.c.l.
	-11	6.8	1.69	347.3	0	4.71	0.52	0.24	0.03		0.5										
	-12	5.0	1.42	86.7	0.52	0.94	0.21	0.08													
	-13	5.0	1.16	20.2	0.52	0.84	0.27	0.05													
	-14	5.1	1.06	48.7	0.11	1.29	0.31	0.10				0.80	3.24	16.1	0.58	23.6	62.6	5.8	31.6	s.c.l.	
	-15	5.1	0.97	77.8	0.11	1.30	0.25	0.11													
	-16	5.0	0.84	54.1	0.27	1.27	0.26	0.10													
	-17	5.2	0.75	112.3	0.22	1.29	0.22	0.09													
	-18	5.2	1.14	82.4	0.33	1.32	0.32	0.12													
	-19	5.4	1.57	50.2	0.11	1.56	0.33	0.13													

s.l. =sandy loam; c.l. = clay loam; s.c.l. = sandy clay loam; si. c.l. = silty clay loam

**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	←—Chemical characteristics—→											←—Physical characteristics—→								
	pH	%	ppm	←—me/100 g—→					%	%	mmhos	←—ppm—→				←—%—→				
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay	Texture <sup>1)</sup>
Rayong	-20	5.1	1.13	102.3	0.11	1.30	0.27	0.09												
	-21	5.0	1.24	55.4	0.16	1.25	0.27	0.11												
	-22	5.2	1.14	71.9	0.11	1.28	0.29	0.13			0.89	7.22	21.4	1.56	61.0	65.2	5.8	29.0	s.c.l.	
	-23	5.3	1.36	71.9	0.08	1.11	0.23	0.17												
	-24	5.3	1.30	73.2	0.08	1.57	0.37	0.13												
	-25	5.2	1.37	87.4	0.11	1.26	0.25	0.11												
	-26	5.1	1.16	50.2	0.22	1.08	0.26	0.09			0.79	3.65	16.1	0.85	26.2	64.0	4.5	31.5	s.c.l.	
	-27	5.3	1.39	103.8	0.11	1.49	0.31	0.11												
	-28	5.3	1.29	56.0	0.13	1.20	0.24	0.12												
	-29	5.3	1.30	73.2	0.05	1.51	0.30	0.10												
	-30	5.2	0.76	8.3	0.13	1.26	0.28	0.03	-	-	-	0.61	3.41	13.8	1.36	21.9	58.8	26.8	14.4	s.l.
	-31	3.6	1.00	18.4	1.35	0.27	0.12	0.04	-	-	-	-	-	-	-	-	-	-	-	-
	-32	3.8	1.06	109.0	1.04	0.51	0.14	0.04	-	-	-	-	-	-	-	-	-	-	-	-
	-33	4.3	1.12	28.6	0.52	0.94	0.17	0.07	-	-	-	-	-	-	-	-	-	-	-	-
	-34	4.5	1.07	79.8	0.62	1.21	0.30	0.10	-	-	-	0.82	2.99	17.3	1.34	25.9	-	-	-	-
	-35	6.3	1.67	214.1	0	4.99	0.39	0.16	0.02	-	-	0.84	21.22	45.2	2.09	20.6	-	-	-	-
	-36	5.1	1.41	82.9	0.21	1.62	0.37	0.14	-	-	-	0.97	5.29	31.2	1.57	29.8	-	-	-	-
	-37	5.1	0.99	18.7	0.21	1.08	0.37	0.05	-	-	-	-	-	-	-	-	-	-	-	-
	-38	5.4	0.87	11.6	0.10	1.26	0.30	0.03	-	-	-	0.66	3.09	13.7	1.44	39.6	60.0	24.3	15.7	s.l.
	-39	3.5	0.90	12.3	1.46	0.21	0.08	0.03	-	-	-	-	-	-	-	-	-	-	-	-
	-40	3.8	0.94	39.0	1.35	0.35	0.10	0.03	-	-	-	-	-	-	-	-	-	-	-	-
	-41	4.3	0.84	11.7	0.66	0.91	0.16	0.07	-	-	-	-	-	-	-	-	-	-	-	-
	-42	4.1	0.74	28.4	1.04	0.79	0.25	0.06	-	-	-	0.86	0.72	5.6	0.66	24.7	-	-	-	-
	-43	5.7	0.77	77.8	0	3.89	0.34	0.18	0.02	-	-	1.39	8.56	26.9	1.44	27.9	-	-	-	-
	-44	4.7	0.82	36.1	0.44	1.51	0.37	0.08	-	-	-	0.93	1.79	16.1	0.84	29.6	-	-	-	-

s.c.l. = sandy clay loam; c.l. = clay loam; s.l. = sandy loam; s.c. = sandy clay



**Table 15. Chemical and physical characteristics of cassava soils in Thailand, 2001-2006. (continued)**

Sample no.	←—Chemical characteristics—→															←—Physical characteristics—→					
	pH	%	ppm	←—me/100 g—→					%	%	mmhos	←—ppm—→					←—%—→				
		OM	P	Al	Ca	Mg	K	Na	Al	Na	E.C.	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay	Texture <sup>1)</sup>	
Rayong	-45	5.0	0.74	6.7	0.36	0.96	0.32	0.03	-	-	-	-	-	-	-	-	-	-	-	-	
	-46	5.6	1.25	72.5	0	1.49	0.25	0.06	0.02	0	0	-	0.62	6.19	19.1	1.41	52.7	64.7	13.1	22.2	s.c.l.
	-47	5.8	1.18	127.5	0	1.56	0.22	0.13	0.02	0	0	-									
	-48	5.7	1.25	121.5	0	1.49	0.24	0.12	0.02	0	0	-									
	-49	5.6	1.06	125.8	0	1.13	0.15	0.10	0.01	0	0	-									
	-50	5.2	1.14	102.7	0.69	1.02	0.16	0.12	0	35	0	-									
	-51	5.6	1.19	81.5	0	1.45	0.19	0.10	0.02	0	0	-									
	-52	5.5	1.24	108.8	0	1.42	0.20	0.12	0.01	0	0	-									
	-53	5.3	1.21	166.3	0.26	1.21	0.18	0.13	0	15	0	-									
	-54	5.6	1.30	148.3	0	1.39	0.19	0.06	0.03	0	0	-									
	-55	5.6	1.21	94.3	0	1.41	0.20	0.08	0.02	0	0	-									
	-56	5.4	1.23	124.9	0	1.19	0.17	0.19	0.01	0	0	-									
	-57	5.1	1.18	122.4	0.31	1.04	0.14	0.14	0	19	0	-	0.64	5.69	22.6	1.51	66.6	64.7	8.1	27.1	s.c.l.

s.c.l. = sandy clay loam; c.l. = clay loam; s.l. = sandy loam; s.c. = sandy clay

**Table 16. Soil samples taken in Vietnam from 2001 to 2005.**

Sample no.	Sample location and description	Date
Thai Nguyen	-1 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>1</sub>	Mar 02
	-2 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>2</sub>	Mar 02
	-3 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>3</sub>	Mar 02
	-4 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>4</sub>	Mar 02
	-5 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>5</sub>	Mar 02
	-6 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>6</sub>	Mar 02
	-7 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>7</sub>	Mar 02
	-8 Thai Nguyen Univ; FYM trial, before 2d year, T <sub>8</sub>	Mar 02
	-9 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>1</sub>	Mar 02
	-10 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>2</sub>	Mar 02
	-11 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>3</sub>	Mar 02
	-12 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>4</sub>	Mar 02
	-13 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>5</sub>	Mar 02
	-14 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>6</sub>	Mar 02
	-15 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>7</sub>	Mar 02
	-16 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>8</sub>	Mar 02
	-17 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>9</sub>	Mar 02
	-18 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>10</sub>	Mar 02
	-19 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>11</sub>	Mar 02
	-20 Thai Nguyen Univ; long-term NPK trial, before 13 th year, T <sub>12</sub>	Mar 02
	-21 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>1</sub>	Mar 05
	-22 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>2</sub>	Mar 05
	-23 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>3</sub>	Mar 05
	-24 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>4</sub>	Mar 05
	-25 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>5</sub>	Mar 05
	-26 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>6</sub>	Mar 05
	-27 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>7</sub>	Mar 05
	-28 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>8</sub>	Mar 05
	-29 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>9</sub>	Mar 05
	-30 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>10</sub>	Mar 05
	-31 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>11</sub>	Mar 05
	-32 Thai Nguyen Univ.; long-term NPK trial, beore 16 th year, T <sub>12</sub>	Mar 05
Tuyen Quang	-1 Son Duong district, Hong Tien; FPR fertilizer trial, check plot	Apr 01
	-2 Son Duong district, Hong Tien; FPR variety trial Mr. Khuong Minh Tran	Apr 01
	-3 Son Duong district, Hong Tien; FPR fertilizer trial, check plot	Oct 01
	-4 Son Duong district, Thuong Am, Hong Tien; FPR erosion trial Mr. Trieu, dark clay loam	Jun 03
	-5 Son Duong district, Thuong Am, Hong Tien; FPR erosion trial Mr. Nhien, black-grey si.l.	Jun 03
Yen Bai	-1 Van Yen district, Dau A; field outside city, near river, yellow loam	Feb 02
	-2 Van Yen district, Dau A; on hillside outside city for cassava + cinnamon	Feb 02
	-3 Van Yen district, Mau Dang; near starch factory, cassava+vetiver hedgerows	Feb 02
	-4 Van Yen district, Caukhai village; red clay soil, cassava Mg deficient	Aug 02
	-5 Van Yen district, An Binh, Cau Mang; dark-brown clay loam on steep slope, C+peanut	Jun 03
	-6 Van Yen district, An Binh, Cau Mang; dark-red clay loam, cassava field	Oct 03
Phu Tho	-1 Phu Ninh district, Bao Thanh; FPR fert. trial Mr. Le Van Sinh, T <sub>5</sub>	Apr 01
	-2 Phu Ninh district, Bao Thanh; FPR fert. trial Mr. Hoang Minh Chien, check plot	Apr 01
	-3 Phu Ninh district, Bao Thanh; FPR erosion trial	Oct 01
	-4 Thanh Ba district, Kieu Tung village; Fo in NPK trial Mr. Luu Huy Cam	Aug 02
	-5 Thanh Ba district, Kieu Tung village; opposite hill FPR erosion trial, poor cassava	Aug 02

**Table 16. Soil samples taken in Vietnam from 2001 to 2005 (continued)**

Sample no.	Sample location and description	Date
Hoa Binh	-1 Suong Son district, Dong Rang; MSEC site, 65% slope with vetiver	Aug 01
	-2 Lac Son district; Suat Hoa commune; 10 ha demonstration plot, C+peanut	Jun 03
Thanh Hoa	-1 Nhu Xuan district, Yen Cat commune; FPR erosion trial on 30% slope, yellow clay soil	Jun 03
	-2 Nhu Xuan district, Bai Tranh commune; demonstration plot, KM 98-1, brown clay loam	Jun 03
	-3 Nhu Xuan district, Bai Tranh commune; hillside opposite 2d demon. plot, poor cassava	Jun 03
Hue	-1 A-Luoi district, Hong Ha, Kon Tom village; Mrs. Kan Xiong-yellow clay loam	Mar 01
	-2 A-Luoi district, Hong Ha, Kon Tom village; Mrs. Tran Minh Xuong (extensionist)	Mar 01
	-3 A-Luoi district, Huong Phong; 5 ha multiplication field, sandy loam, some P/K deficiency	Jun 03
	-4 A-Luoi district, Hong Ha, Mr Dang Van Plun field with hedgerows; yellow clay loam	Jun 03
	-5 A-Luoi district, Hong Ha, Paring village; large cassava field along river	Jun 05
	-6 Nam Dong district, Thuong Long; Mr. Taruong Lu erosion trial	Mar 01
	-7 Nam Dong district, Thuong Long; Mr. Taruong Lu erosion trial, Mg def	Jun 05
	-8 Nam Dong district, Thuong Long; Mr Ho Thi En erosion trial on 27% slope	Mar 01
	-9 Nam Dong district, Thuong Long; Mr Voi's field on steep slope, P def.	Feb 02
	-10 Huong Tra district, Huong Van com., Lai Bang village; variety trial, sandy loam	Feb 02
	-11 Huong Tra district, Huong Van com., Lai Bang village; KM 94 multiplication, C+P	Feb 02
	-12 Huong Tra district, Huong Van commune; white sandy soil, KM140-2 with red mite	Aug 02
	-13 Huong Tra district, Quang Than commune; pure white sand, cassava on high ridges	Aug 02
	-14 Huong Tra district; Huong Van commune; field behind commune office, yellow sandy loam	Jun 03
	-15 Huong Tra district; Tu Ha town; across road from cement factory, Mn deficiency symptoms	Jun 03
Baria-Vungtau	-1 Chau Duc district, Son Binh; FPR erosion trial, sandy soil with laterite	Aug 01
	-2 Chau Duc district, Suoi Rao; FPR erosion trial, sandy clay	Aug 01
	-3 Chau Duc district, Son Binh; FPR fert. trial check plot, dark brown clay	Feb 02
	-4 Chau Duc district, Son Binh commune; grey sandy loam, KM 98-5 multiplication	Aug 02
	-5 Chau Duc district, Suoi Rao; Mrs. Vo Thi Ly, C+peanut, red soil with plinthite	Jun 03
	-6 Chau Duc district, Suoi Rao; Mr. Pham Tien Huygh erosion trial; sediment in C+maize plot	Jun 03
	-7 Chau Duc district, Son Binh; check in fert. trial, sandy loam; Mg defic. or herbicide damage	Jun 03
Dong Nai	-1 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>1</sub>	May 01
	-2 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>2</sub>	May 01
	-3 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>3</sub>	May 01
	-4 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>4</sub>	May 01
	-5 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>5</sub>	May 01
	-6 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>6</sub>	May 01
	-7 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>7</sub>	May 01
	-8 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>8</sub>	May 01
	-9 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>9</sub>	May 01
	-10 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>10</sub>	May 01
	-11 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>11</sub>	May 01
	-12 Thong Nhat district, Hung Loc Center; NPK trial, 12th year, T <sub>12</sub>	May 01
	-13 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>1</sub>	May 01
	-14 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>2</sub>	May 01
	-15 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>3</sub>	May 01
	-16 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>4</sub>	May 01
	-17 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>5</sub>	May 01
	-18 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>6</sub>	May 01
	-19 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>7</sub>	May 01
	-20 Thong Nhat district, Hung Loc Center; soil improvement trial, 10th year, T <sub>8</sub>	May 01

**Table 16. Soil samples taken in Vietnam from 2001 to 2005. (continued)**

Sample no.	Sample location and description	Date
Dong Nai	-21 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>1</sub>	Mar 02
	-22 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>2</sub>	Mar 02
	-23 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>3</sub>	Mar 02
	-24 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>4</sub>	Mar 02
	-25 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>5</sub>	Mar 02
	-26 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>6</sub>	Mar 02
	-27 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>7</sub>	Mar 02
	-28 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>8</sub>	Mar 02
	-29 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>9</sub>	Mar 02
	-30 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>10</sub>	Mar 02
	-31 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>11</sub>	Mar 02
	-32 Thong Nhat district, Hung Loc Center; long-term NPK trial, 13th year, T <sub>12</sub>	Mar 02
	-33 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, C monoculture	Mar 02
	-34 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, C+pigeon pea	Mar 02
	-35 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, C+mucuna	Mar 02
	-36 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, C+peanut	Mar 02
	-37 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, C+cowpea	Mar 02
	-38 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, C+ <i>Canavalia</i>	Mar 02
	-39 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, <i>Leucaena</i>	Mar 02
	-40 Thong Nhat, Hung Loc Center; soil improvement trial, 11 <sup>th</sup> year, <i>Gliricidia</i>	Mar 02
	-41 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>1</sub>	Mar 03
	-42 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>2</sub>	Mar 03
	-43 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>3</sub>	Mar 03
	-44 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>4</sub>	Mar 03
	-45 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>5</sub>	Mar 03
	-46 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>6</sub>	Mar 03
	-47 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>7</sub>	Mar 03
	-48 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, no fertilizer T <sub>8</sub>	Mar 03
	-49 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>1</sub>	Mar 03
	-50 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>2</sub>	Mar 03
	-51 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>3</sub>	Mar 03
	-52 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>4</sub>	Mar 03
	-53 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>5</sub>	Mar 03
	-54 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>6</sub>	Mar 03
	-55 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>7</sub>	Mar 03
	-56 Thong Nhat, Hung Loc Center; soil improvement trial, 12 <sup>th</sup> year, with fertilizer T <sub>8</sub>	Mar 03
	-57 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>1</sub>	Mar 03
	-58 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>2</sub>	Mar 03
	-59 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>3</sub>	Mar 03
	-60 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>4</sub>	Mar 03
	-61 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>5</sub>	Mar 03
	-62 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>6</sub>	Mar 03
	-63 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>7</sub>	Mar 03
	-64 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>8</sub>	Mar 03
	-65 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>9</sub>	Mar 03
	-66 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>10</sub>	Mar 03
	-67 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>11</sub>	Mar 03
	-68 Thong Nhat district, Hung Loc Center; long-term NPK trial, 14 <sup>th</sup> year, T <sub>12</sub>	Mar 03

**Table 16. Soil samples taken in Vietnam from 2001 to 2005 (continued)**

Sample no.	Sample location and description	Date
Dong Nai		
-69	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>1</sub>	Mar 03
-70	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>2</sub>	Mar 03
-71	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>3</sub>	Mar 03
-72	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>4</sub>	Mar 03
-73	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>5</sub>	Mar 03
-74	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>6</sub>	Mar 03
-75	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>1</sub>	May 04
-76	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>2</sub>	May 04
-77	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>3</sub>	May 04
-78	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>4</sub>	May 04
-79	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>5</sub>	May 04
-80	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>6</sub>	May 04
-81	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>7</sub>	May 04
-82	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>8</sub>	May 04
-83	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>9</sub>	May 04
-84	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>10</sub>	May 04
-85	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>11</sub>	May 04
-86	Thong Nhat district, Hung Loc Center; long-term NPK trial, -15 <sup>th</sup> year, T <sub>12</sub>	May 04
-87	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>1</sub>	May 05
-88	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>2</sub>	May 05
-89	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>3</sub>	May 05
-90	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>4</sub>	May 05
-91	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>5</sub>	May 05
-92	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>6</sub>	May 05
-93	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>7</sub>	May 05
-94	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>8</sub>	May 05
-95	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>9</sub>	May 05
-96	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>10</sub>	May 05
-97	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>11</sub>	May 05
-98	Thong Nhat district, Hung Loc Center; long-term NPK trial, -16 <sup>th</sup> year, T <sub>12</sub>	May 05
-99	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>1</sub>	May 05
-100	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>2</sub>	May 05
-101	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>3</sub>	May 05
-102	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>4</sub>	May 05
-103	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>5</sub>	May 05
-104	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>6</sub>	May 05
-105	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>7</sub>	May 05
-106	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, with fertilizer T <sub>8</sub>	May 05
-107	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>1</sub>	May 05
-108	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>2</sub>	May 05
-109	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>3</sub>	May 05
-110	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>4</sub>	May 05
-111	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>5</sub>	May 05
-112	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>6</sub>	May 05
-113	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>7</sub>	May 05
-114	Thong Nhat district, Hung Loc Center; soil improvement trial, -14 <sup>th</sup> year, no fertilizer T <sub>8</sub>	May 05

**Table 16. Soil samples taken in Vietnam from 2001 to 2005 (continued)**

Sample no.	Sample location and description	Date
-115	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>1</sub>	May 05
-116	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>2</sub>	May 05
-117	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>3</sub>	May 05
-118	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>4</sub>	May 05
-119	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>5</sub>	May 05
-120	Thong Nhat district, Hung Loc Center; soil erosion trial T <sub>6</sub>	May 05
Binh Phuoc	-1 Dong Xoai district, Dong Tam; clay soil below erosion trial	Aug 01
	-2 Dong Xoai district, Dong Tam; erosion trial with <i>Paspalum</i> , Mr. Le Rong Thanh	Aug 01
	-3 Dong Xoai district, Dong Tam, FPR variety trial, yellow clay loam	Dec 01
	-4 Dong Xoai district, Minh Lap; variety trial Mr. Le Xuan Huyen, black brown clay	Aug 01
	-5 Dong Xoai district, Minh Lap village; dark-grey clay loam, C+young rubber	Aug 02
	-6 Dong Xoai district, Dong Tam village; stony reddish grey soil, C+vetiver hedgerows	Aug 02
	-7 Chan Thanh district, Minh Lap; near FPR plastic trial, yellow-brown soil with phinwhite	Jun 03



Table 17. Chemical and physical characteristics of cassava soils in Vietnam, 2001-2005.

Sample no.	←— Chemical characteristics —→													←— Physical characteristics —→					
	pH	%	ppm	←— me/100 g —→					%	←— ppm —→					←— % —→			Texture <sup>1)</sup>	
				OM	P	Al	Ca	Mg		K	Al	B	Zn	Mn	Cu	Fe	Sand		Silt
Thai Nguyen	-28	4.51	1.47	8.79	2.71	0.37	0.07	0.04	85										
	-29	4.87	1.27	17.62	1.66	0.67	0.22	0.04	64										
	-30	4.51	1.17	7.25	2.89	0.31	0.08	0.04	87										
	-31	4.66	1.18	23.92	2.39	0.58	0.13	0.02	77										
	-32	4.67	1.16	10.71	2.67	0.47	0.13	0.03	81	0.24	0.96	2.5	0.22	68.5	55.7	29.1	15.2	s.l.	
Tuyen Quang	-1	4.9	2.16	3.6	0.52	1.91	0.78	0.13	15	0.85	1.22	186.8	0.48	21.9	45.6	25.0	29.4	s.c.l.	
	-2	5.3	4.00	1.7	0.21	14.29	3.84	0.21	1	0.62	1.90	169.0	0.47	8.6	38.9	28.3	32.8	c.l.	
	-3	5.6	2.24	1.8	0	2.18	0.61	0.12	0	0.63	1.26	79.6	0.46	39.5	44.0	23.2	32.8	c.l.	
	-4	5.7	4.01	1.9	0	16.77	4.11	0.21	0	0.45	2.24	101.0	0.47	5.2	29.1	32.4	38.5	c.l.	
	-5	6.0	2.75	3.8	0	5.72	1.21	0.19	0	0.52	3.53	153.3	0.94	14.3	37.0	29.2	33.8	c.l.	
Yen Bai	-1	4.8	1.59	17.4	0.75	2.03	0.34	0.11	23	0.40	2.89	91.3	1.31	40.0	23.4	47.9	28.7	c.l.	
	-2	4.2	3.42	4.4	1.87	0.80	0.20	0.17	61	0.50	0.91	41.8	2.16	14.4	19.7	16.6	63.7	clay	
	-3	4.0	3.66	11.3	3.97	0.60	0.20	0.14	81	0.44	1.08	15.5	0.97	40.1	46.6	1.2	52.2	s.l.	
	-4	4.1	3.75	9.8	4.37	0.38	0.10	0.10	88	0.46	0.96	12.5	1.06	45.2	24.0	21.1	54.9	clay	
	-5	4.9	2.63	5.2	1.62	0.40	0.15	0.35	64	0.29	1.55	59.3	1.05	38.9	32.1	30.4	37.6	c.l.	
	-6	4.9	2.99	5.7	2.13	0.53	0.19	0.27	68	0.89	2.99	46.3	1.20	49.3	30.8	32.2	37.0	c.l.	
Phu Tho	-1	4.9	1.59	98.8	0.83	1.97	0.21	1.04	20	1.21	0.81	8.9	0.40	17.4	52.1	22.4	25.5	s.c.l.	
	-2	4.4	1.95	56.9	1.35	0.98	0.14	0.37	47	1.06	1.28	7.4	0.52	15.0	42.1	8.5	49.4	clay	
	-3	5.4	1.70	5.2	2.29	0.30	0.08	0.04	85	0.53	0.79	2.1	0.57	13.9	36.3	6.7	57.0	clay	
	-4	4.5	2.17	3.8	6.03	0.74	0.12	0.08	87	0.47	0.88	6.7	0.32	46.3	21.5	19.8	58.7	clay	
	-5	4.4	1.86	1.6	5.20	0.71	0.12	0.08	85	0.38	0.52	3.6	0.47	25.4	24.0	16.0	60.0	clay	
Hoa Binh	-1	5.1	4.45	0.8	1.14	1.74	1.55	0.13	25	0.96	2.55	190.0	11.39	49.2	21.4	42.4	36.2	c.l.	
	-2	5.9	2.48	3.9	0	6.12	1.15	0.11	0	0.31	1.88	209.6	2.30	16.2	20.0	31.9	48.1	clay	



**Table 17. Chemical and physical characteristics of cassava soils in Vietnam, 2001-2005 (continued)**

Sample no.	←———— Chemical characteristics —————→													←———— Physical characteristics —————→				
	pH	% OM	ppm P	←———— me/100 g —————→				%	←———— ppm —————→					←———— % —————→			Texture <sup>1)</sup>	
				Al	Ca	Mg	K		Al	B	Zn	Mn	Cu	Fe	Sand	Silt		Clay
Thanh Hoa	-1	4.2	3.99	5.5	7.02	0.60	0.19	0.13	88	0.49	1.52	19.2	1.52	107.2	7.3	19.1	73.6	clay
	-2	4.6	4.84	107.0	0.80	3.46	1.13	0.26	14	0.66	6.16	108.6	1.51	14.4	14.8	28.5	56.7	clay
	-3	5.0	5.34	104.0	0.32	4.12	2.39	0.21	5	0.79	3.92	157.7	0.93	8.3	16.9	24.8	58.3	clay
Hue	-1	4.7	2.30	2.8	1.09	0.46	0.28	0.19	54	0.57	1.28	48.2	1.17	53.0	39.5	32.7	27.8	c.l.
	-2	4.7	2.27	1.0	3.33	1.81	1.21	0.19	51	0.52	1.07	60.8	0.88	72.3	48.9	22.9	28.2	s.c.l.
	-3	4.8	2.21	7.1	1.63	0.25	0.11	0.07	79	0.24	0.77	3.3	0.83	203.2	42.5	28.9	28.6	c.l.
	-4	4.5	3.33	1.2	2.23	0.66	0.46	0.22	62	0.32	3.14	48.7	2.59	90.8	37.4	23.4	39.2	c.l.
	-5	4.7	2.12	1.7	1.92	0.28	0.27	0.07	76	0.19	1.49	17.5	1.69	64.9	20.3	49.4	30.3	c.l.
	-6	4.8	3.50	1.6	5.20	0.20	0.16	0.14	91	0.77	1.75	6.3	0.92	56.2	28.6	26.7	44.7	clay
	-7	4.1	2.97	1.6	4.65	0.05	0.05	0.14	95	0.44	1.07	2.5	0.90	49.4	25.6	28.4	46.0	clay
	-8	4.2	3.10	3.8	2.39	0.39	0.23	0.21	74	0.55	1.75	32.2	0.58	62.6	42.8	21.6	35.6	c.l.
	-9	4.3	3.83	1.4	4.16	0.31	0.23	0.11	86	0.44	1.87	19.5	0.23	85.3	37.7	23.0	39.3	c.l.
	-10	4.4	1.59	12.7	0.42	0.50	0.15	0.07	37	0.37	0.76	2.7	0.41	74.1	47.7	36.3	16.0	loam
	-11	5.1	1.48	9.7	0.21	0.79	0.12	0.06	18	0.50	0.59	2.5	0.30	81.7	54.0	27.5	18.5	s.l.
	-12	4.7	0.75	18.2	0.26	0.38	0.06	0.16	30	0.44	0.29	1.2	0.09	15.3	62.8	20.8	16.4	s.l.
	-13	4.5	0.80	5.6	0.31	0.14	0.02	0.02	63	0.60	0.51	0.2	0.03	12.3	85.4	2.0	12.6	l.s.
	-14	5.3	0.71	21.9	0.16	1.74	0.34	0.11	7	0.27	1.12	33.2	1.21	41.2	58.2	23.2	18.6	s.l.
	-15	6.3	0.48	89.8	0	5.03	0.10	0.11	0	0.69	1.55	10.1	0.79	80.8	65.8	19.4	14.8	s.l.
Baria Vungtau	-1	5.1	1.54	3.7	0.62	0.75	0.30	0.08	35	0.68	0.45	14.8	0.32	30.8	69.7	11.3	19.0	s.l.
	-2	5.0	2.97	7.8	0.73	2.26	0.88	0.19	18	0.81	1.19	46.1	0.69	42.2	42.7	19.1	38.2	c.l.
	-3	5.2	3.85	1.7	0.10	7.50	2.74	0.39	1	0.81	11.67	170.2	0.98	11.8	9.4	25.0	65.6	clay
	-4	4.7	0.82	16.6	0.62	0.41	0.09	0.06	52	0.37	0.49	16.6	0.08	29.2	71.5	9.5	19.0	s.l.
	-5	5.3	2.85	15.9	0.71	1.70	0.46	0.48	21	0.57	1.84	107.3	0.62	18.6	24.1	19.8	56.1	clay
	-6	5.3	5.03	11.1	0.45	2.65	0.72	0.33	11	0.78	2.12	294.1	2.36	571.9	8.2	41.2	50.6	si.c
	-7	5.0	0.90	13.9	0.42	0.32	0.08	0.08	47	0.23	0.55	13.8	0.47	13.6	77.1	5.6	17.3	s.l.







**Table 17. Chemical and physical characteristics of cassava soils Vietnam, 2001-2004. (continued)**

Sample no.	←———— Chemical characteristics —————→								←———— Physical characteristics —————→										
	pH	% OM	ppm P	←———— me/100 g —————→				% Al	←———— ppm —————→					←———— % —————→			Texture <sup>1)</sup>		
				Al	Ca	Mg	K		B	Zn	Mn	Cu	Fe	Sand	Silt	Clay			
Dong Nai	-82	4.4	2.47	58.8	2.03	1.03	0.18	0.21	59										
	-83	4.4	2.24	54.6	2.34	0.75	0.14	0.17	69										
	-84	4.5	2.17	31.8	2.39	0.59	0.12	0.21	72										
	-85	4.5	2.33	40.2	2.03	0.82	0.16	0.43	59										
	-86	4.5	2.30	21.3	2.50	0.53	0.12	0.29	73										
	-87	4.03	2.02	22.24	3.33	0.43	0.16	0.10	83										
	-88	4.10	1.98	47.98	2.96	0.69	0.14	0.13	76										
	-89	4.07	1.86	28.26	2.91	0.66	0.17	0.12	75										
	-90	4.01	1.71	33.17	3.07	0.64	0.12	0.11	78										
	-91	3.97	1.75	32.08	2.91	0.64	0.13	0.11	77										
	-92	3.95	1.67	16.99	3.07	0.39	0.12	0.14	83										
	-93	4.10	1.55	147.68	2.13	2.07	0.11	0.12	48										
	-94	3.93	1.44	66.40	2.76	0.92	0.14	0.13	70										
	-95	3.88	1.82	50.32	3.12	0.59	0.12	0.08	80										
	-96	3.98	1.55	30.23	3.12	0.55	0.09	0.09	81										
	-97	3.95	1.82	41.60	2.91	0.86	0.15	0.15	71										
	-98	4.06	1.66	90.91	2.44	1.51	0.17	0.16	57	0.41	1.71	83.3	0.83	14.9	1.6	18.4	80.0	clay	
	-99	4.12	1.46	16.38	2.50	0.84	0.19	0.14	68										
	-100	4.13	1.38	14.81	2.65	0.69	0.17	0.12	73										

<sup>1)</sup>s.c.l. = sandy clay loam  
c.l. = clay loam  
s.l. = sandy loam  
l.s. = loamy sand

**Table 17. Chemical and physical characteristics of cassava soils Vietnam, 2001-2005. (continued)**

Sample no.	←————— Chemical characteristics —————→								←————— Physical characteristics —————→										
	pH	% OM	ppm P	←————— me/100 g —————→			% Al	←————— ppm —————→					←————— % —————→			Texture <sup>1)</sup>			
				Al	Ca	Mg		K	B	Zn	Mn	Cu	Fe	Sand	Silt		Clay		
Dong Nai	-101	4.05	1.46	17.32	2.39	1.00	0.28	0.20	62										
	-102	3.93	1.26	14.97	2.76	0.71	0.17	0.13	73										
	-103	4.02	1.15	26.89	2.50	1.02	0.22	0.13	65										
	-104	4.18	0.83	14.99	2.55	0.81	0.21	0.13	69										
	-105	4.02	2.65	22.33	2.44	1.12	0.33	0.17	60										
	-106	4.11	2.22	14.83	2.39	0.89	0.27	0.16	64										
	-107	4.11	1.60	14.96	1.87	0.96	0.60	0.86	44	0.49	1.98	179.9	0.96	14.3	1.2	15.9	82.9	clay	
	-108	4.15	1.52	11.98	2.60	0.66	0.23	0.10	72										
	-109	4.04	1.71	11.46	2.76	0.63	0.21	0.08	75										
	-110	4.12	1.63	8.63	2.91	0.60	0.21	0.08	77										
	-111	4.17	1.64	10.13	2.76	0.70	0.23	0.11	73										
	-112	4.04	1.48	10.51	2.70	0.61	0.23	0.09	74										
	-113	3.94	2.22	15.33	2.55	1.14	0.41	0.16	60										
	-114	4.14	1.76	10.39	2.44	0.96	0.39	0.17	62	0.47	2.26	129.4	1.02	13.2	1.7	15.5	82.8	clay	
	-115	4.25	2.64	16.70	1.82	2.39	0.69	0.13	36										
	-116	4.23	2.58	15.82	2.13	1.90	0.51	0.12	46										
	-117	4.22	2.81	20.83	1.77	2.13	0.67	0.16	37										
	-118	4.24	2.72	24.95	1.40	2.83	0.77	0.18	27										
	-119	4.33	2.76	153.47	0.99	3.66	0.76	0.19	17										
	-120	4.29	2.85	29.62	1.30	3.04	0.81	0.20	24	0.47	3.10	140.9	1.13	15.6	4.1	18.1	77.8	clay	
Binh Phuoc	-1	4.9	3.40	2.4	1.87	0.98	0.59	0.29	50	0.77	0.95	11.7	0.62	142.0	15.7	30.6	53.7	clay	
	-2	4.6	2.65	2.2	3.02	0.32	0.13	0.18	83	0.78	0.41	3.9	0.67	115.2	23.6	24.1	52.3	clay	
	-3	4.8	3.34	1.4	1.82	0.73	0.34	0.15	60	0.48	0.55	7.7	0.86	202.8	25.9	26.5	47.6	clay	
	-4	5.1	4.65	3.8	0.73	8.00	5.49	0.24	5	0.71	7.72	152.3	1.05	11.0	15.6	32.9	51.5	clay	
	-5	4.3	2.94	13.9	3.43	0.27	0.08	0.07	89	0.59	0.23	4.7	0.13	53.6	31.8	9.6	58.6	clay	
	-6	4.7	4.70	4.2	2.07	1.33	1.09	0.36	43	0.63	1.56	46.5	0.62	45.6	18.7	28.8	52.5	clay	
	-7	5.0	3.58	30.8	0.69	2.80	1.04	0.65	13	0.45	17.16	76.1	5.09	11.5	-	-	-	-	

<sup>1)</sup> s.c.l. = sandy clay loam; c.l. = clay loam; s.l. = sandy loam; l.s. = loamy sand

A CIAT Publication  
CIAT Cassava Office for Asia

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Editing:	Reinhardt H. Howeler
Word Processing:	Pimjutha Kerdnoom
Graphical Arts:	Apicharn Khemthong
Printing:	Love and Lip Press Co. Ltd., Bangkok