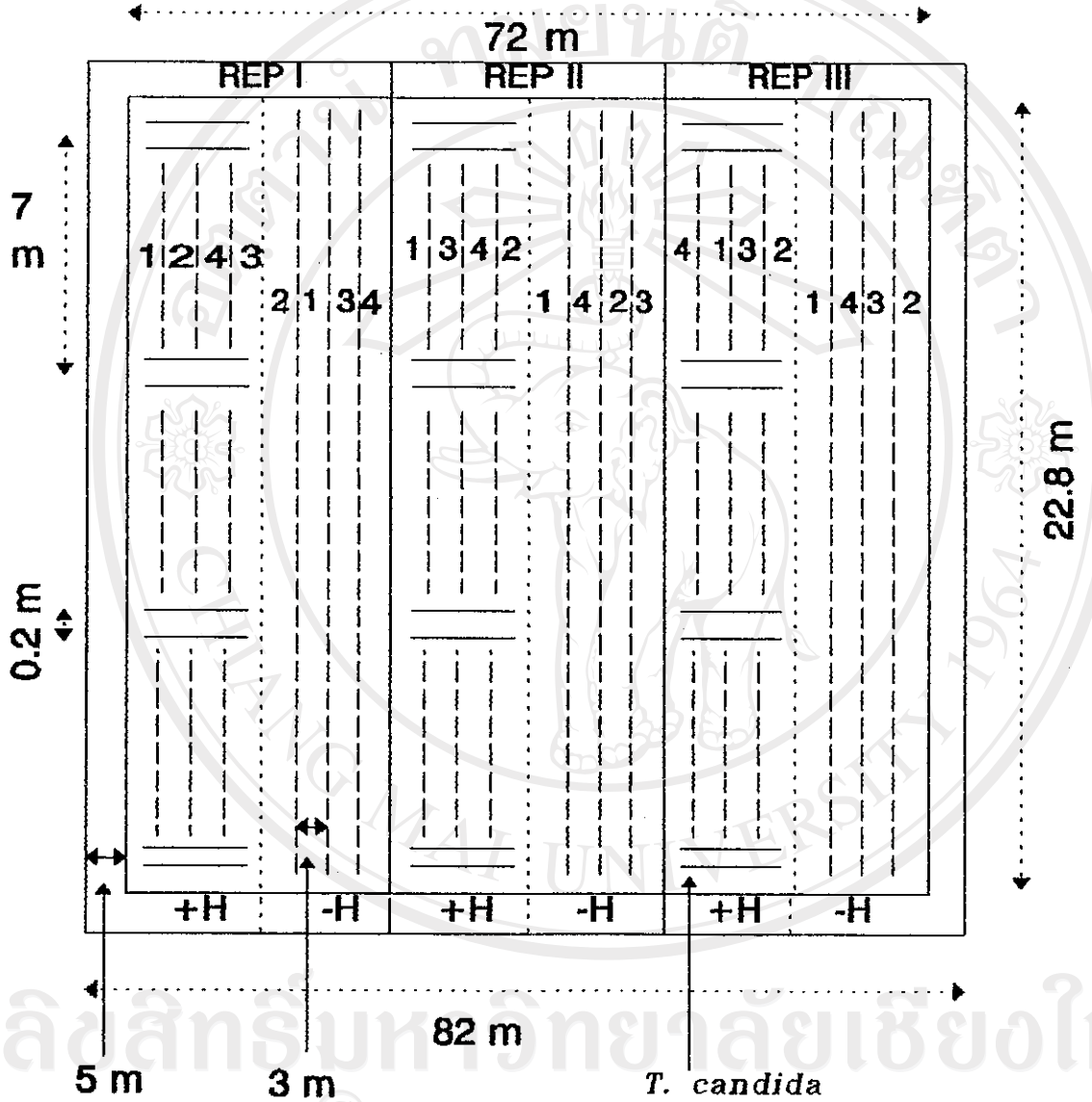
APPENDIX



Appendix figure 1: Layout of the experiment
(1: Peanut-corn sequential cropping
2: Peanut-upland rice reley cropping
3: Peanut-cassava intercropping
4: Peanut-corn reley cropping)

Appendix Table 1: Cropping calendar for different treatments.

TRT	Crops	Months
		Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec
+H1	*T. candida*	23 Mar ═══
	Peanut	23 Mar ═══ 22 Jul
	Corn	28 Jul ═══ 22 Oct
+H2	*T. candida*	23 Mar ═══
	Peanut	23 Mar ═══ 22 Jul
	Upland rice	4 Jul ═══ 14 Nov
+H3	*T. candida*	23 Mar ═══
	Peanut	23 Mar ═══ 22 Jul
	Cassava	23 Mar ═══ 5 Dec
+H4	*T. candida*	23 Mar ═══
	Peanut	23 Mar ═══ 22 Jul
	Corn	23 Jun ═══ 3 Oct
-H1	Peanut	23 Mar ═══ 22 Jul
	Corn	28 Jul ═══ 22 Oct
-H2	Peanut	23 Mar ═══ 22 Jul
	Upland	4 Jul ═══ 14 Nov
-H3	Peanut	23 Mar ═══ 22 Jul
	Cassava	23 Mar ═══ 5 Dec
-H4	Peanut	23 Mar ═══ 22 Jul
	Corn	23 Jun ═══ 3 Oct

Appendix Table 2: Fertilizers and times of application used in the experiment

TRT	Crops	Kind of fertilizers	Amount (kg/ha)	Nunber of times	Time of application 1st kg	1st DAS	2nd kg	2nd DAS	3rd kg	3rd DAS
		N	20	2	10	01	10	20	0	-
	Peanut	P	40	1	60	01	0	-	0	-
		K	20	2	10	01	10	50	0	-
+H1,-H1										
		N	40	2	15	01	15	20	10	50
	Corn	P	20	1	20	01	0	-	0	-
		K	20	2	10	20	10	50	0	-
		N	20	2	10	01	10	20	0	-
	Peanut	P	40	1	60	01	0	-	0	-
		K	20	2	10	01	10	50	0	-
+H2,-H2										
		N	40	3	10	01	20	20	10	70
	Upland rice	P	20	1	20	01	0	-	0	-
		K	20	3	10	20	10	70	0	-
		N	20	2	10	01	10	20	0	-
	Peanut	P	40	1	60	01	0	-	0	-
		K	20	2	10	01	10	50	0	-
+H3,-H3										
		N	40	3	20	40	10	90	10	140
	Cassava	P	20	1	20	01	0	-	0	-
		K	20	2	10	90	10	14	0	-
		N	20	2	10	01	10	20	0	-
	Peanut	P	40	1	60	01	0	-	0	-
		K	20	2	10	01	10	50	0	-
+H4,-H4										
		N	40	3	15	01	15	20	10	50
	Corn	P	20	1	20	01	0	-	0	-
		K	20	2	10	20	10	50	0	-

Appendix Table 3: Climatic data in Bac Thai province (1982-1992)

Items	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
T. mean (°C)	14.7	16.2	19.4	23.1	26.7	27.6	27.9	27.4	26.5	23.4	19.4	16.4	22.4[a]
Sunshine (hour)	64.5	45.5	49.0	80.5	172.5	164.0	191.0	176.0	179.5	164.0	131.0	108.0	1525.0
Rainfall (mm)	20.9	26.8	48.9	125.8	193.1	280.2	287.9	328.7	200.2	132.8	43.4	26.5	1715.2
Wet day (day)	10.7	11.3	16.9	17.4	15.8	16.6	17.9	19.5	14.2	12.8	8.2	8.6	169.9
Evaporation (mm)	57.0	52.9	53.1	58.8	83.4	74.1	74.2	63.0	66.7	71.0	65.0	61.3	780.8

[a] annual mean

Appendix Table 4: Climatic data of Thai Nguyen city in 1992

Items	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
T. mean (°C)	15.6	18.8	20.3	24.8	27.1	29.2	29.7	30.7	29.6	24.4	22.4	19.7	24.4[a]
T. variation[b] (°C)	-0.6	-0.6	-0.6	-0.5	0.0	0.2	-0.6	1.2	1.1	-1.0	-0.7	2.1	36.2
T. max (°C)	23.0	26.5	27.9	31.0	31.6	35.3	36.2	37.2	36.3	33.0	31.0	30.0	11445.8
T. min (°C)	8.0	11.0	12.7	18.5	22.5	23.0	23.0	24.0	22.8	15.7	13.7	9.3	6166.8
Sunshine (hour)	64.8	24.3	81.0	153.0	163.0	108.0	147.0	242.0	153.0	164.0	133.0	141.0	1574.1
Rainfall (mm)	40.5	56.8	180.3	93.0	283.0	521.5	482.9	112.1	142.9	2.8	22.8	49.0	1987.6
R. variation[b] (mm)	18.5	29.0	88.3	-40.0	64.0	213.5	113.9	-246.9	-99.1	-160.2	-17.8	22.0	-14.8
Wet day (day)	10.0	14.0	21.0	15.0	15.0	17.0	18.0	11.0	16.0	4.0	4.0	5.0	150.0
Evaporation (mm)	58.8	108.0	165.0	68.4	69.9	70.5	72.7	100.0	79.5	131.0	100.0	77.5	1101.3
Humidity (%)	68.0	69.0	76.0	74.0	88.0	88.0	86.0	81.0	84.0	71.0	72.0	79.0	81.0[a]
A. rainfall[c] (mm)	22.0	27.8	92.0	133.0	219.0	308.0	369.0	359.0	242.0	163.0	40.6	72.0	2002.0

[a] annual mean

[b] Differentiation of temperature between 1992 and average of period 1982-1992

[c] Differentiation of rainfall between 1992 and average of period 1982-1992

Note: January: 3 times of cold wind in 1st; 7-9th; 13-20th,
February: 3 times of cold wind in 5th; 15th; 19th,
March: 1 times of cold wind in 14th
April: 1 times of cold wind in 11st

May: 1 times of cold wind in 1st

June: Very heavy rainfall ocurred with gusty winds caused by hitting of two winds, one was the cool breezes from China and the other was the high moisture from South Ocean.

July: Effected strongly by storms of No.3 in 13rd and No.4 in 21st. There was very heavy rain in Thai Nguyen city which caused 2 big floods in 14-15th and 24-26th.

August: Effected by 2 times of cold wind in 18th and 28th which caused temperature to decrease sharply of 5-7 °C in 24 hours.

September: Effected by a cold wind in 17th

October: Irregular drought weather ocurred from the effect of cold wind in 5th, 12th, 17th, and 23rd which concided with the spread of 2 storms of No.6 and No.7 in the central region of Viet Nam.

November: 3 times of cold wind in 8th, 15th and 19-23th.

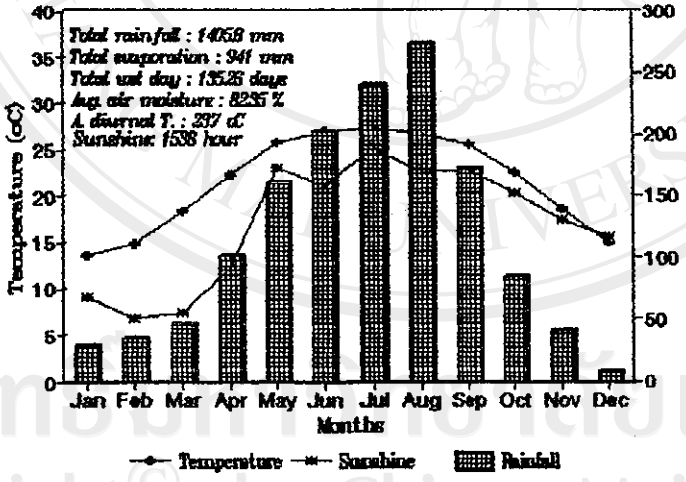
December: 2 times of cold wind in 14th and 23th.

Appendix Table 5: Climatic data of Lang Son province in 1992

Items	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
T. mean (°C)	13.6	15.0	18.5	22.4	26.0	27.1	27.4	26.8	25.5	22.7	18.8	15.1	21.6*
T.min absoluted(°C)	-1.7	0.9	4.8	8.7	13.0	17.0	20.0	18.4	14.0	7.0	2.3	-1.4	3075.6
T.max absoluted(°C)	31.0	34.0	33.1	37.0	38.0	38.1	38.0	37.2	36.0	35.0	33.1	30.0	12700.9
T. diurnal (°C)	13.5	17.0	20.0	24.0	29.0	30.2	30.5	30.0	29.0	25.3	21.1	17.1	23.7*
Sunshine (hour)	69.1	52.4	57.0	93.1	174.0	158.6	189.3	170.1	171.0	153.1	151.0	118.3	1536.7
Rainfall (mm)	29.4	36.0	47.2	102.0	161.0	203.1	241.0	274.0	274.0	86.0	43.0	9.4	1405.1
Wet day (day)	8.0	9.3	12.4	12.3	122.9	14.7	15.7	17.3	12.8	8.5	6.0	5.5	135.3
Evaporation (mm)	73.2	61.2	65.7	73.7	98.9	86.0	85.0	70.7	75.5	88.0	84.7	79.4	941.4
Humidity (%)	79.4	811.9	85.0	84.4	81.7	83.2	84.2	86.0	84.0	81.0	79.4	78.7	82.4*

* annual mean.

Climatic data in Appendix Table 5 are presented below.

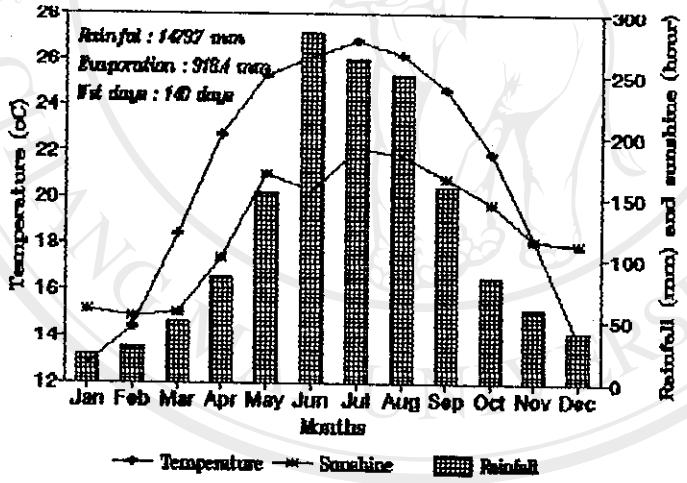


Appendix Table 6: Climatic data of Cao Bang province in (1982-1992)

Items	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
T.mean (°C)	12.8	14.4	18.4	22.7	15.3	26.1	27.0	26.2	24.8	22.0	18.2	14.0	20.2[a]
Sunshine (hour)	58.8	59.4	56.8	100.8	169.3	155.8	189.8	183.6	165.4	145.0	115.2	111.6	1506.0
Rainfall (mm)	22.5	28.1	49.0	87.0	154.0	285.0	262.3	250.7	158.0	83.9	59.6	41.6	1479.7
Evaporation (mm)	68.7	61.5	81.0	91.7	115.3	76.0	79.3	80.2	80.0	64.3	62.6	56.2	916.4
Humidity (%)	78.3	80.8	79.0	80.0	77.0	82.3	83.3	80.5	82.0	82.8	81.6	82.0	81.2[a]

[a] annual mean.

Climatic data in Appendix Table 6 are presented below.



Appendix Table 7: Biomass of peanut at different developmental stages (kg/ha)

TRT	60DAS	90DAS	Harvest
+H1	1014.61	1775.57	3924.33
+H2	1020.46	1679.08	3448.41
+H3	847.95	1621.63	2321.82
+H4	1053.35	1860.37	3562.01
-H1	1192.59	2393.51	3978.60
-H2	1178.70	2208.32	4076.83
-H3	898.15	1440.12	2196.15
-H4	1303.70	2096.29	4154.49
Mean	1063.69	1884.36	3457.83
Interaction	ns	ns	ns
CV (%)	16.39	22.41	24.42
LSD .05	118.96	389.32	461.48
LSD .01	166.77	545.81	646.97

Appendix Table 8: Cassava biomass at different developmental stages (kg/ha)

TRT	Parts of cassava	110 DAS	140 DAS	170 DAS	200 DAS	230 DAS	250 DAS
+H3	Stems	623.0	939.7	1500.0	2429.3	2336.5	2750.7
	Leaves	665.6	665.8	974.7	268.2	254.3	330.5
	Roots	583.3	1587.4	3438.1	4370.1	6707.7	6850.3
	Total	1871.9	3192.9	5912.8	7085.5	9298.5	9913.4
-H3	Stems	710.6	1125.9	1697.0	2706.2	2569.2	2949.2
	Leaves	750.7	791.2	1090.4	328.8	280.7	341.0
	Roots	572.3	1760.1	4033.2	4531.7	7272.8	7599.0
	Total	2033.6	3677.2	6826.2	7566.6	10122.6	10889.2
CV (%)	Stems	15.1	16.8	8.2	9.8	8.4	11.5
	Leaves	15.6	17.0	6.8	11.4	11.4	23.7
	Roots	11.8	12.0	12.3	5.4	9.0	10.0
	Total	11.2	14.1	9.2	5.5	7.8	10.1
LSD 05	Stems	ns	136.5	80.6	ns	ns	ns
	Leaves	ns	88.4	104.1	ns	ns	ns
	Roots	ns	ns	ns	ns	ns	ns
	Total	160.1	420.4	ns	ns	ns	ns
LSD 01	Stems	ns	ns	185.8	ns	ns	ns
	Leaves	ns	ns	ns	ns	ns	ns
	Roots	ns	ns	ns	ns	ns	ns
	Total	ns	ns	ns	ns	ns	ns

Appendix Table 9: Various contribution in percent of crop components in the total biomass

TRT	Total biomass		*T. candida*		Peanut		Cassava		Corn		Upland rice	
	(t/ha)	(%)	(t/ha)	(%)	(t/ha)	(%)	(t/ha)	(%)	(t/ha)	(%)	(t/ha)	(%)
+H1	10242.0	100.0	3198.6	31.1	3924.3	38.3	0.0	0.0	3128.1	30.5	0.0	0.0
+H2	9261.1	100.0	3103.8	33.5	3448.4	37.2	0.0	0.0	0.0	0.0	2708.9	29.3
+H3	15284.9	100.0	3031.6	19.8	2321.8	15.2	9931.4	65.0	0.0	0.0	0.0	0.0
+H4	9386.6	100.0	3314.8	35.4	3562.0	38.0	0.0	0.0	2491.8	26.6	0.0	0.0
-H1	7356.4	100.0	0.0	0.0	3978.6	54.1	0.0	0.0	3377.8	45.9	0.0	0.0
-H2	7385.2	100.0	0.0	0.0	4076.8	55.2	0.0	0.0	0.0	0.0	3308.3	44.8
-H3	11245.9	100.0	0.0	0.0	2196.2	19.5	9049.7	80.5	0.0	0.0	0.0	0.0
-H4	6836.3	100.0	0.0	0.0	4154.5	60.8	0.0	0.0	2681.8	39.2	0.0	0.0
$\bar{X}$	9622.5	100.0	3159.9	30.0	3457.8	39.8	9490.6	72.7	2919.9	35.6	3008.6	37.0

Appendix Table 10: Covering percentage by crop canopy at various times

(%)

TRT	May	Jun	Jul	Aug	Sep	Oct	Mean
+H1	78.00	79.51	55.82	21.46	64.18	68.04	59.80
+H2	77.67	88.28	59.50	40.22	82.84	92.92	72.75
+H3	81.47	91.43	77.16	65.93	72.69	82.69	77.98
+H4	79.18	89.05	57.95	36.16	63.00	39.33	57.10
-H1	79.15	87.55	46.15	7.79	59.60	69.46	54.11
-H2	74.41	85.18	50.16	21.02	70.06	87.72	62.83
-H3	74.02	88.70	70.42	52.27	60.43	72.63	68.89
-H4	73.83	86.53	50.87	29.63	54.36	37.12	51.70
Mean	77.22	88.28	58.50	34.31	65.90	68.74	
Interaction	ns	ns	ns	*	ns	ns	
CV (%)	14.09	14.09	7.91	18.13	52.37	16.67	
LSD .05 (1)	ns	ns	ns	1.21	ns	ns	
LSD .05 (2)	ns	ns	3.02	2.93	6.30	6.03	
LSD .05 (3)	-	-	-	4.14	-	-	
LSD .05 (4)	-	-	-	3.71	-	-	

Due to the interaction between alley cropping factor and cropping system factor, caculation of LSD .05 value for crop canopy cover of August (Some, 1989) is shown in next page.

Calcuting t_{adjust} (t_{adj}): ta (df=2) = 2.92 Ea = 1.03
tb (df=12) = 1.78 Eb = 8.10

$$t_{adj} = \frac{(b-1)*E_b*t_b + E_a*t_a}{(b-1)E_b + E_a}$$

Calculating S_d :

$S_d(1)$ (MPLOT over SPLOT) = 0.4136 $\quad S_d(1) = \frac{2*E_a}{r*b}$

$S_d(2)$ (SPLOT over MPLOT) = 1.6433 $\quad S_d(2) = \frac{2*E_b}{r*a}$

$S_d(3)$ (SPLOT at the same MPLOT) = 2.3240 $\quad S_d(3) = \frac{2*E_b}{r}$

$S_d(4)$ (MPLOT at the same or different SPLOT) = 2.0338 $\quad S_d(4) = \frac{2*(b-1)*E_b + E_a}{r*b}$

Calculating LSD .05(1) = 1.2077 % $\quad LSD05(1) = t_b * S_d(1)$

LSD .05(2) = 2.9251 % $\quad LSD05(2) = t_b * S_d(2)$

LSD .05(3) = 4.1368 % $\quad LSD05(3) = t_b * S_d(3)$

LSD .05(4) = 3.7141 % $\quad LSD05(4) = t_{adj} * S_d(4)$

Where: r is replication
a is number of main-plot
b is number of sub-plot
E is mean square
Sd is standard deviation
LSD .05(1) is the least significant difference (LSD) between two main-plot treatment means averaged over all sup-plot treatments.
LSD .05(2) is LSD between two sub-plot treatment means averaged over all main-plot treatments.
LSD .05(3) is LSD between two sub-plot treatments at the same main-plot treatments.
LSD .05(4) is LSD between two main-plot treatments at the same or different sub-plot treatments.

Caculating LSD .05 for soil loss, and potasium in seed of corn are the same method canopy cover

Appendix Table 11: Nutrient concentration in different parts of crop plant

(%)

Parts of crop	Peanut	Corn	Upland rice	Cassava	*T. candida*
In the seeds:					
- N	3.109	1.049	-	0.613[a]	-
- P_2O_5	0.293	0.429	-	0.124[a]	-
- K_2O	0.479	0.328	-	0.128[a]	-
In the resedues:					
- N	1.697	0.954	1.400	0.164[b]	2.275[c]
- P_2O_5	0.121	0.156	0.220	0.095[b]	0.289[c]
- K_2O	0.238	0.328	0.296	0.386[b]	0.306[c]
In the leaves only:					
- N	-	-	-	2.735	-
- P_2O_5	-	-	-	0.230	-
- K_2O	-	-	-	0.260	-
CV(%):					
In the seeds					
- N	20.800	1.590	-	8.300	-
- P_2O_5	9.180	3.880	-	6.940	-
- K_2O	4.130	3.200	-	3.190	-
In the residues					
- N	7.270	3.090	9.390	9.560	-
- P_2O_5	13.300	5.680	4.070	11.800	-
- K_2O	7.730	1.800	3.940	15.840	-
In the leaves only					
- N	-	-	-	2.690	-
- P_2O_5	-	-	-	8.430	-
- K_2O	-	-	-	5.840	-

[a] These vales are in cassava

[b] These vales are in cassava stems only

[c] Average values of replications

- LSD .05: While no significant differences in certain nutrient concentration between treatments, only having significant differences in potasium concentration of corn seeds ware found. These were caused by effective interaction of both factors H and S. LSD05 were caculated as following: LSD .05(1) = 0.01363 (%), LSD .05(2) = 0.00965 (%), LSD .05(3) = 0.01364 (%), LSD .05(4) = 0.01421 (%)

Appendix Table 12a: Nutrient budget in different treatments

(kg/ha)

Items	+H1	+H2	+H3	+H4	-H1	-H2	-H3	-H4
I. Input								
1.1 Nutrients in the soil*								
- N	2125.00	2125.00	2125.00	2125.00	2125.00	2125.00	2125.00	2125.00
- P2O5	1975.00	1975.00	1975.00	1975.00	1975.00	1975.00	1975.00	1975.00
- K	3000.00	3000.00	3000.00	3000.00	3000.00	3000.00	3000.00	3000.00
1.2 Nutrients in the seeds								
- N	4.10	4.64	3.23	4.10	4.99	4.64	3.88	4.99
- P_2O_5	0.47	0.67	0.52	4.47	0.57	0.67	0.62	0.57
- K_2O	0.67	0.87	1.40	0.67	0.82	0.87	1.68	0.82
1.3 Nutrients in the fertilizers								
- N	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
- P_2O_5	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
- K_2O	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Total input								
- N	2189.10	2189.64	2188.23	2189.10	2198.99	2189.64	2188.88	2189.99
- P_2O_5	2035.47	2530.67	2035.52	5035.47	2035.57	2035.67	2035.62	2035.57
- K_2O	3040.67	3040.87	3041.40	3040.67	3040.82	3040.87	3041.88	3040.82
II. Output								
2.1 Nutrients in the soil after harvesting crops#								
- N	3000.00	3000.00	3000.00	3000.00	3000.00	3000.00	3000.00	3000.00
- P_2O_5	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00
- K_2O	2025.00	2025.00	2025.00	2025.00	2025.00	2025.00	2025.00	2025.00
2.2 Nutrients in residues								
- N	76.63	90.80	52.32	68.11	67.15	94.33	39.50	68.16
- P_2O_5	8.66	11.22	7.60	7.70	6.67	10.70	50.42	6.46
- K_2O	15.24	16.21	17.20	13.22	113.47	16.53	15.32	12.99
2.3 Nutrients in economic products								
- N	48.21	31.17	63.21	44.34	50.63	38.97	68.44	46.58
- P_2O_5	8.41	2.94	10.49	7.47	8.90	3.66	11.48	7.90
- K_2O	9.38	4.80	122.04	8.49	9.88	5.98	13.09	8.94
2.4 Nutrients loss through soil movement								
- N	118.94	118.94	86.57	118.94	118.94	118.94	86.57	118.94
- P_2O_5	89.93	89.93	65.46	89.93	89.93	89.93	65.46	89.93
- K_2O	116.62	116.62	84.88	116.62	116.62	116.62	84.88	116.62
Total output								
- N	3243.78	3240.91	3202.10	3231.38	3236.72	3252.06	3194.51	3233.69
- P_2O_5	2007.00	2004.09	1983.55	2005.16	2005.50	2004.29	1982.36	2004.28
- K_2O	2166.24	2162.64	2139.12	2163.33	2164.97	2164.12	2138.30	2163.55
III. Differences between total output and total input nutrients								
- N	1054.68	1051.27	1013.87	1342.28	1046.73	1062.42	1005.63	1043.70
- P_2O_5	-28.47	-31.58	-51.97	-30.31	-30.07	-31.38	-53.26	-31.29
- K_2O	-874.43	-878.23	-902.28	-877.34	-875.85	-876.75	-903.38	-877.27

* Nutrient amount in soil layer of 20 cm depht

Appendix Table 12b: Nutrient budget in different treatments (continued)

(kg/ha)

Items	+H1	+H2	+H3	+H4	-H1	-H2	-H3	-H4
IV. Nutrient moving directions								
4.1 Return into the soil[a]								
- N	3076.63	3090.80	3052.32	3068.11	3067.15	3094.33	3039.55	3068.16
- P_2O_5	1908.66	1911.22	1907.60	1907.76	1906.67	1910.70	1905.42	1906.46
- K_2O	2040.24	2041.21	2042.20	2038.22	2038.47	2041.53	2040.32	2037.99
4.2 Total nitrient loss[b]								
- N	167.15	150.12	149.78	163.28	169.57	157.73	155.01	165.52
- P_2O_5	97.34	92.87	75.95	97.40	98.83	93.59	76.94	97.83
- K_2O	126.00	121.42	96.92	125.11	126.50	122.60	97.98	125.56
4.2.1 Percentage of nutrient loss in economic products								
- N	28.84	20.77	42.20	27.15	29.86	24.59	44.15	28.14
- P_2O_5	8.55	33.16	13.82	7.67	9.00	3.91	14.92	8.07
- K_2O	7.44	3.96	12.42	6.79	7.81	4.87	13.36	7.12
4.2.2 Percentage of nutrient loss in soil loss								
- N	71.16	79.23	57.80	72.85	70.14	75.41	55.85	71.86
- P_2O_5	91.45	96.84	86.18	92.33	91.00	96.09	85.08	91.93
- K_2O	92.56	96.04	87.58	93.21	92.19	95.13	86.41	92.88

[a] is nutrients in the soil and residues (assuming all residues come to the soil)

[b] is nutrients in economic products and in soil loss.

Appendix Table 13a: Estimated cost, return, gross margin, return to material cost (RTMC), and return to labor cost (RTLC) of different treatments

(per ha)

Items	Unit	Price (d)	+H1 Amount	+H1 (d)	+H3 Amount	+H3 (d)	+H4 Amount	+H4 (d)
I. Cost								
1. Varieties								
- *T. candida*	kg	8000	5	40000	5	40000	5	40000
- Peanut	kg	6000	123	738000	90	540000	123	738000
- Cassava	stalk	15	0	0	8772	131580	0	0
- Corn	kg	3500	26	91000	0	0	26	91000
2. Fertilizers								
- Urea	kg	2500	130.5	326250	130.5	326250	130.5	326250
- Phosphorus	kg	750	300	225000	300	225000	300	225000
- Potasium	kg	3000	80	240000	80	240000	80	240000
- Lime	kg	50	5000	25000	500	25000	500	25000
3. Insecticides	kg	40000	1.5	60000	0	0	2	80000
4. Labor								
- *T. candida*	man/d	8000	20	160000	20	16000	20	160000
- Peanut	man/d	8000	256	2048000	193	1544000	256	2048000
- Cassava	man/d	8000	0	0	124	992000	0	0
- Corn	man/d	8000	163	1304000	0	0	145	1160000
Total cost				**5257250**		**4223830**		**5133250**
II. Return								
- Peanut	kg	4700	1142	5367400	693	3257100	1142	5367400
- Cassava	kg	230	0	0	17598	4047540	0	0
- Corn	kg	1500	1210.6	1816005	0	0	1029.5	1544385
Total return				**7183405**		**7304640**		**6911785**
III. Gross margin				**1926155**		**3080810**		**1778535**
IV. Return to material cost (RTMC)				**2.10**		**3.02**		**2.01**
V. Return to labor cost (RTLC)				**12388**		**17142**		**12225**

Note: 1 US$ = 10,500 VN dong (d) (December, 1992)

Appendix Table 13b: Estimated cost, return, gross margin, return to material cost (RTMC), and return to labor cost (RTLC) of different treatments (continued)

(per ha)

Items	Unit	Price (d)	-H1 Amount	-H1 (d)	-H3 Amount	-H3 (d)	-H4 Amount	-H4 (d)
I. Cost								
1. Varieties								
- *T. candida*	kg	8000	0	0	0	0	0	0
- Peanut	kg	6000	150	900000	108	648000	150	900000
- Cassava	stalk	15	0	0	10555	158325	0	0
- Corn	kg	3500	31	108500	0	0	31	108500
2. Fertilizers								
- Urea	kg	2500	130.5	326250	130.5	326250	130.5	236250
- Phophorus	kg	750	300	225000	300	225000	300	225000
- Potasium	kg	3000	80	240000	80	240000	80	240000
- Lime	kg	50	500	25000	500	25000	500	25000
3. Insecticides	kg	40000	1.5	60000	0	0	2	80000
4. Labor								
- *T. candida*	man/d	8000	0	0	0	0	0	0
- Peanut	man/d	8000	312	2496000	225	1800000	312	2496000
- Cassava	man/d	8000	0	0	155	1240000	0	0
- Corn	man/d	8000	206	1648000	0	0	183	1464000
Tottal				**6028750**		**466575**		**5864750**
II. Return								
- Peanut	kg	4700	1142	5367400	693	3257100	1142	5367400
- Cassava	kg	230	0	0	17598	4047540	0	0
- Corn	kg	1500	1211	1816005	0	0	1029.5	1544385
Total				**7183405**		**7304640**		**6911785**
III. Gross margin				**1154655**		**2642065**		**1047035**
IV. Return to material cost (RTMC)				**1.61**		**2.63**		**1.61**
V. Return to labor cost (RTLC)				**10229**		**14953**		**10499**

Note: 1 US$ = 10,500 VN dong (d) (December, 1992)

Appendix Table 14: Combination of all aspects of productivity, feasibility, and economics in treatments

Items	Unit	+H1	+H2	+H3	+H4	-H1	-H2	-H3	-H4	AVG
Biomass	kg/ha	10242.0	9261.1	15284.9	9368.6	7356.4	7385.2	11245.9	6836.3	9622.5
	%	106.4	96.2	158.8	97.4	76.5	76.8	116.9	71.0	100.0
Leg. residue	kg/ha	4587.5	4300.7	3425.6	4433.8	2772.0	1493.1	2829.2	33014.6	3357.1
	%	136.7	128.1	102.0	132.1	82.6	44.5	84.3	89.8	100.0
Canopy cover	%	57.7	67.7	76.8	61.5	49.5	56.6	68.0	55.4	61.7
	%	93.7	109.8	124.6	99.8	80.3	91.8	110.2	89.8	100.0
Soil loss	t/ha	120.7	100.0	75.9	112.7	122.0	133.1	92.9	107.8	108.1
	%	111.6	92.5	70.2	104.2	112.8	123.11	85.9	99.7	100.0
Willingness	%	69.8	41.7	69.8	44.8	59.4	31.3	59.4	34.4	51.3
	%	136.0	81.2	136.0	87.3	115.7	60.9	115.7	67.0	100.0
Food yield	kg/ha	1171.0		6850.3	996.9	1250.4		7599.4	1062.3	2366.1
Equi.yield	kg/ha	1171.0		2540.5	996.9	1250.4		2853.6	1062.3	1645.8
	%	71.2		154.4	60.6	76.0		173.4	64.6	100.0
RTLC	d	12388.0		17142.0	12225.0	10229.0		14953.0	10499.0	12906.0
	%	96.0		132.8	94.7	79.3		115.9	81.3	100.0
Gross margin	1000d.	1926.2		3080.8	1778.5	1154.7		136.3	1047.0	1938.2
	%	99.4		159.0	91.8	59.6		136.3	54.0	100.0

Appendix Table 15: ANOVA of peanut biomass

Sources of Variation	df	70DAS		100DAS		122DAS	
		MS	P	MS	P	MS	P
REP(A)	2	27180	0.4261	188900	0.5025	61930	0.9390
Hedgerow(B)	1	152100	0.1093	514900	0.2358	495500	00.5457
A*B	2	19810		192800		905270	
C. system(C)	3	104800	**0.0007**	354800	**0.0427**	3868000	**0.0000**
B*C	3	10270	0.3693	95790	0.1629	217200	0.2381
A*B*C	12	8940		188900		134600	

Appendix Table 16: ANOVA of peanut characteristics

Sources of Variation	df	Plant height		Pod number		100 pod weight		Pod yield		Green manure yield	
		MS	P	MS	P	MS	P	MS	P	MS	P
REP(A)	2	49.30	0.5565	1.74	0.2655	145.09	0.1915	77120	0.7506	38720	0.8627
Hedgerow(B)	1	78.61	0.5007	0.50	0.4679	2.44	0.8150	50420	0.6870	1256000	0.5470
A*B	2	119.33		0.63		34.37		232100		2432000	
C. system(C)	3	42.37	0.0733	0.19	0.8179	55.03	0.1156	305600	**0.0000**	15240000	**0.0000**
B*C	3	6.17	0.7314	1.20	0.1680	36.89	0.2343	15950	0.3876	945300	0.2647
A*B*C	12	14.17		0.60		22.63		14520		630400	

Appendix Table 17: ANOVA of corn characteristics

Sources of Variation	df	Plant height		Cob/plant		Grain W./cob		100 grain W.		Grain yield	
		MS	P	MS	P	MS	P	MS	P	MS	P
REP(A)	2	81.53	0.823	0.019	0.500	71.85	0.571	24.20	0.084	3890	0.473
Hedgerow(B)	1	132.22	0.615	0.168	0.085	99.13	0.416	0.23	0.777	15750	0.104
A*B	2	387.68		0.019		95.78		2.23		1930	
C. system(C)	1	2645.30	**0.005**	0.000	1.000	15.30	0.329	6.74	0.302	98380	**0.002**
B*C	1	46.68	0.488	0.004	0.422	10.66	0.406	14.06	0.162	145	0.803
A*B*C	4	80.01		0.005		12.40		4.80		2056	

Appendix Table 18: ANOVA of corn biomass

Sources of Variation	df	30DAS		60DAS		Harvest	
		MS	P	MS	P	MS	P
REP(A)	2	2.77	0.2265	70390	0.0595	453400	0.1021
Hedgerow(B)	1	34.60	**0.0225**	15190	0.2060	145000	0.2355
A*B	2	0.81		4452		51550	
C. system(C)	1	20.80	0.2051	1498000	**0.0000**	1331000	**0.0213**
B*C	1	1.88	0.6732	6	0.9721	2673	0.8772
A*B*C	4	9.09		4335		98680	

Appendix Table 19: ANOVA of upland rice biomass over time

Sources of Variation	df	Day after grown									
		20DAS		50DAS		80DAS		110DAS		140DAS	
		MS	P	MS	P	MS	P	MS	P	MS	P
REP(A)	2	2.28	0.0505	489.01	0.4313	42.48	0.7600	3044.50	0.3939	34390.00	0.5588
TRT(B)	1	58.67	**0.0021**	6653.80	0.0515	125020.00	**0.0011**	301120.00	**0.0065**	539000.00	0.0722
A*B	2	0.12		741.57		134.53		1978.90		43540.00	

Appendix Table 20: ANOVA of dry weight of parts of cassava

110 days after growing

Sources of Variation	df	Leaves		Stems		Roots		Tatal biomass	
		MS	P	MS	P	MS	P	MS	P
REP(A)	2	24328	**0.0363**	18629	**0.0464**	8967	0.2230	97492	**0.0209**
TRT(B)	1	10851	0.0750	11531	0.0704	182	0.8151	39223	**0.0491**
A*B	2	916		906		2574		2078	
A*B	2								

140 days after growing

Sources of Variation	df	Leaves		Stems		Roots		Tatal biomass	
		MS	P	MS	P	MS	P	MS	P
REP(A)	2	25914	**0.0238**	47878	**0.0306**	64376	0.1801	398780	**0.0347**
TRT(B)	1	23594	**0.0258**	52023	**0.0278**	44720	0.2173	351840	**0.0384**
A*B	2	633		1510		14137		14321	

170 days after growing

Sources of Variation	df	Leaves MS	Leaves P	Stems MS	Stems P	Roots MS	Roots P	Tatal biomass MS	Tatal biomass P
REP(A)	2	648	0.5753	13529	**0.0374**	15890	0.9395	16426	0.9312
TRT(B)	1	21856	**0.0379**	58212	**0.0089**	532170	0.2798	1251300	0.1411
A*B	2	878		526		246920		222410	

200 days after growing

Sources of Variation	df	Leaves MS	Leaves P	Stems MS	Stems P	Roots MS	Roots P	Tatal biomass MS	Tatal biomass P
REP(A)	2	769	0.5532	70112	0.2863	12619	0.8438	128750	0.5959
TRT(B)	1	2729	0.2326	115020	0.1805	43733	0.7100	33220	0.7164
A*B	2	952		28129		68146		189890	

230 days after grown

Sources of Variation	df	Leaves MS	Leaves P	Stems MS	Stems P	Roots MS	Roots P	Tatal biomass MS	Tatal biomass P
REP(A)	2	1512	0.4408	38193	0.4150	573870	0.2420	712430	0.2215
TRT(B)	1	1042	0.4484	81209	0.2256	478990	0.2473	1018800	0.1542
A*B	2	1192		27098		183240		202710	

250 days after grown

Sources of Variation	df	Leaves MS	Leaves P	Stems MS	Stems P	Roots MS	Roots P	Tatal biomass MS	Tatal biomass P
REP(A)	2	15021	**0.0467**	223670	0.0722	797640	0.0782	1965500	**0.0430**
TRT(B)	1	164	0.6831	59104	0.2067	841020	0.0719	1375900	0.0580
A*B	2	735		17412		67653		88300	

Appendix Table 21: ANOVA on cassava characteristics

Sources of Variation	df	Plant height		Root number		Weight/root		Fresh root yield	
		MS	P	MS	P	MS	P	MS	P
REP(A)	2	35.82	0.6124	0.03	0.8838	2604.60	0.5338	5365900.00	0.0867
TRT(B)	1	2.37	0.8558	0.32	0.7568	454.66	0.7339	6143800.00	0.0738
A*B	2	55.74		0.27		2982.20		509280.00	

Appendix Table 22: ANOVA on canopy cover over the time

Sources of Variation	df	May		June		July		August		September		October	
		MS	P	MS	P	MS	P	MS	P	MS	P	MS	P
REP(A)	2	707.19	0.3550	261.57	0.4161	60.35	0.2887	22.50	**0.0436**	260.42	0.3342	81.44	0.5342
Hedgerow(B)	1	83.31	0.6891	39.95	0.6889	393.36	0.0568	1056.20	**0.0010**	548.74	0.1770	96.69	0.2791
A*B	2	398.18		186.43		24.39		1.03		130.75		44.67	
C. system(C)	3	8.01	0.8482	11.79	0.4482	620.44	**0.0000**	2034.90	**0.0000**	359.96	**0.0003**	2953.40	**0.0000**
B*C	3	20.24	0.5846	0.35	0.9934	4.55	0.5572	40.45	**0.0179**	21.61	0.4810	35.33	0.2549
A*B*C	12	30.05		12.44		6.28		8.10		24.87		22.94	

Appendix Table 23: ANOVA on soil loss

Sources of variation	df	MS	P
REP(A)	2	309.69	0.8594
Hedgerow(B)	1	812.90	0.5797
A*B	2	1894.30	
C. system(C)	3	1620.70	**0.0001**
B*C	3	434.27	**0.0219**
A*B*C	12	92.85	

Appendix Table 24: ANOVA on some soil properties after experiment

Sources of Variation	df	pH		OM (%)		N (%)		P_2O_5 (ppm)		K_2O (ppm)	
		MS	P	MS	P	MS	P	MS	P	MS	P
REP(A)	2	0.5000	0.3980	1.8250	0.2110	0.0014	0.6940	54263	0.0842	47329	0.1591
Hedgerow(B)	1	0.0504	0.3740	0.0315	0.8230	0.0000	0.9370	15000	0.2250	18704	0.2852
A*B	2	0.3304		0.4877		0.0032		4967		8954	
C. system(C)	3	0.0193	0.3340	0.0794	0.1050	0.0000	0.8760	4583	0.3943	13371	0.6022
B*C	3	0.0081	0.6690	0.0551	0.2060	0.0002	0.3930	12367	0.0778	15204	0.5533
A*B*C	12	0.0154		0.0311		0.0002		4241		20808	

Appendix Table 25: ANOVA on chemical concentration in different parts of peanut

In the leaves and stems

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	0.0803	0.216	0.0007	0.1890	0.0003	0.4203
Hedgerow(B)	1	0.0181	0.197	0.0035	**0.0441**	0.0003	0.3543
A*B	2	0.0221		0.0001		0.0002	
C. system(C)	3	0.0028	0.422	0.0000	0.1261	0.0004	0.2715
B*C	3	0.0071	0.105	0.0000	0.4693	0.0003	0.3518
A*B*C	12	0.0028		0.0000		0.0003	

In the seeds

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	0.8964	0.4825	0.0008	0.6670	0.0006	0.4306
Hedgerow(B)	1	0.0009	0.9757	0.0076	0.1664	0.0025	0.1385
A*B	2	0.8357		0.0016		0.0004	
C. system(C)	3	0.2712	0.5186	0.0002	0.4955	0.0001	0.8827
B*C	3	0.4183	0.3414	0.0003	0.3763	0.0001	0.9093
A*B*C	12	0.3400		0.0002		0.0003	

Appendix Table 26: ANOVA of chemical concentration in the different parts of cassava

In the leaves

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	0.0130	0.030	0.0008	0.0455	0.0001	0.7405
Hedgerow(B)	1	0.0001	0.640	0.0000	0.3311	0.0004	0.3524
A*B	2	0.0004		0.0004		0.0003	

In the stems

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	0.0001	0.7673	0.0002	0.3157	0.0006	0.9274
Hedgerow(B)	1	0.0000	0.9867	0.0000	0.8854	0.0003	0.8669
A*B	2	0.0005		0.0001		0.0078	

In the roots

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	0.0009	0.8399	0.0001	0.0826	0.0000	0.0966
Hedgerow(B)	1	0.0018	0.5976	0.0001	0.0995	0.0000	0.1710
A*B	2	0.0048		0.0000		0.0000	

Appendix Table 27: ANOVA on chemical concentration in upland rice straw

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	0.0150	0.1000	0.0000	1.000	0.0002	0.1412
Hedgerow(B)	1	0.0067	0.1835	0.0003	0.1835	0.0002	0.1835
A*B	2	0.0017		0.0001		0.0000	

Appendix Table 28: ANOVA on chemical concentration in the parts of corn

In the residues

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	1.063E-03	0.2989	1.057E-05	0.4932	1.455E-05	0.5686
Hedgerow(B)	1	1.165E-03	0.2501	3.276E-04	**0.0300**	1.693E-05	0.4466
A‡B	2	4.534E-04		1.028E-05		1.918E-05	
C. patterns(C)	1	3.882E-04	0.5992	1.122E-04	0.3172	1.595E-04	0.0887
B‡C	1	1.490E-04	0.7076	4.294E-05	0.5190	2.546E-07	0.9330
A‡B‡C	4	1.945E-03		8.609E-05		3.182E-05	

In the seeds

Sources of Variation	df	N		P_2O_5		K_2O	
		MS	P	MS	P	MS	P
REP(A)	2	7.786E-04	0.2937	6.273E-04	0.3751	8.858E-05	0.3981
Hedgerow(B)	1	6.096E-05	0.7067	2.133E-05	0.8340	6.533E-05	0.4017
A‡B	2	3.238E-04		3.766E-04		5.858E-05	
C. patterns(C)	1	3.096E-04	0.1913	3.000E-04	0.2505	9.633E-05	0.2786
B‡C	1	2.122E-06	0.9028	4.033E-05	0.6483	5.070E-04	**0.0453**
A‡B‡C	4	1.254E-04		1.664E-04		6.142E-05	

Appendix Table 29: ANOVA on total biomass, yield of cash product (pods of peanut), legumious residues and non-legumious residue and return.

Sources of Variation	df	Total biomass		Cash yield		Legume residue		Non-legume residue		Return	
		MS	P	MS	P	MS	P	MS	P	MS	P
REP(A)	2	2.662E+06	0.347	7.712E+04	0.751	1.032E+05	0.628	5.786E+05	0.111	2.204E+12	0.648
Hedgerow(B)	1	3.419E+07	**0.039**	5.042E+04	0.687	5.321E+07	**0.003**	4.517E+05	0.130	7.907E+11	0.702
A‡B	2	1.412E+06		2.321E+05		1.742E+05		7.253E+04		4.063E+12	
C. system(C)	3	5.040E+07	**0.000**	3.056E+05	**0.000**	2.365E+06	**0.000**	3.625E+06	**0.000**	6.296E+11	0.316
B‡C	3	2.566E+05	0.360	1.595E+04	0.388	8.336E+04	0.456	7.214E+04	0.295	2.399E+10	0.951
A‡B‡C	12	2.185E+05		1.452E+04		9.969E+04		5.205E+04		4.709E+11	

Appendix Table 30: Biomass, yield and yield component of peanut in different experimental units

REP	TRT	Plant height	Number of pod	100 pod weight	Pod yield	Green manure	Total biomass over time 60DAS	90DAS	Harvest
		(cm)	(pod)	(g)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)
I	+H1	43.50	4.27	100.00	1302.19	8419.31	1122.80	1758.76	4248.94
	+H2	45.17	4.83	104.10	1036.63	7893.10	1065.78	1600.87	3799.21
	+H3	52.00	4.58	107.27	660.92	4335.97	842.10	1696.49	2221.87
	+H4	42.25	4.00	106.14	941.91	7103.79	899.12	1710.51	3570.31
	-H1	43.00	4.33	107.84	1138.43	8498.27	1377.77	2152.77	4197.81
	-H2	40.83	5.67	99.24	1233.08	8053.91	1211.11	2180.55	4213.03
	-H3	48.42	4.58	107.00	613.21	3495.59	944.44	1833.33	1871.62
	-H4	47.75	3.92	106.52	859.82	7998.37	1477.77	2222.21	3739.24
II	+H1	43.83	5.42	102.50	962.96	5963.68	1052.62	1651.30	3109.88
	+H2	42.42	3.92	90.68	905.08	5963.68	986.84	2010.95	3111.64
	+H3	48.25	5.50	108.33	677.76	4560.48	824.56	1500.00	2365.14
	+H4	36.58	5.58	106.67	1071.18	6665.29	1164.47	1879.37	3404.03
	-H1	48.83	6.42	100.68	1549.91	8442.72	1111.11	3222.21	4504.86
	-H2	37.25	5.25	105.56	1549.91	8442.72	1213.88	2583.32	4673.71
	-H3	47.92	3.83	114.29	888.71	4739.79	927.78	1270.37	2547.64
	-H4	45.92	5.33	98.13	1529.02	8331.63	1291.66	2144.44	4528.41
III	+H1	47.55	4.27	110.87	1201.68	8682.41	868.41	1916.65	4414.17
	+H2	40.18	5.00	114.66	1066.45	6577.58	1008.76	1425.43	3434.38
	+H3	43.92	4.67	110.42	708.63	4770.97	877.19	1668.42	2378.47
	+H4	48.29	5.25	107.14	1256.06	7016.09	1096.48	1991.21	3711.69
	-H1	30.33	3.58	109.30	931.37	6220.95	1088.88	1805.55	3233.12
	-H2	32.75	4.75	105.56	959.80	6443.13	1111.11	1861.10	3343.76
	-H3	36.50	3.45	115.15	607.29	4221.37	822.22	1216.67	2169.19
	-H4	31.33	4.17	104.72	1030.90	8553.81	1141.66	1922.20	4195.81

Appendix Table 31: Biomass, yield and yield component of corn in different experimental units

REP	TRT	Plant height	Cob number	Grain W. /cob	100 grain weight	Grain yield	Residue yield	Biomass over time 30DAS	60DAS	Harvest
		(cm)	(cob)	(g)	(g)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)
I	+H1	180.67	1.33	50.96	277.00	1242.98	2365.18	20.20	1828.52	3608.16
	+H4	148.17	1.22	41.80	275.00	994.96	1570.65	25.00	1092.74	2565.61
	-H1	180.33	1.11	52.38	278.33	1280.04	2656.47	25.00	1991.40	3936.51
	-H4	166.80	1.22	48.02	272.67	1025.63	1839.03	24.93	1225.93	2864.66
II	+H1	183.50	1.22	53.99	270.00	1228.16	1673.11	21.45	1838.78	2901.27
	+H4	162.67	1.33	50.40	274.33	1071.36	1550.77	19.34	1053.93	2602.13
	-H1	193.92	1.00	44.13	274.33	1337.06	1861.85	23.64	1782.63	3198.91
	-H4	151.83	1.00	49.61	274.00	1203.07	1871.20	25.00	1184.39	3074.27
III	+H1	190.17	1.33	49.36	271.33	1041.71	1833.21	18.45	1565.76	2874.92
	+H4	166.25	1.22	49.68	271.00	924.25	1383.34	21.78	962.15	2307.59
	-H1	172.00	0.89	34.90	273.00	1134.08	1863.90	19.79	1668.27	2997.98
	-H4	127.42	0.89	32.66	268.00	958.25	1148.08	28.78	916.24	2106.33

Appendix Table 32: Biomass of cassava in different experimental units

(kg/ha)

REP	TRT	110 DAS				140 DAS				170 DAS			
		Leaf	Stem	Root	Total	Leaf	Stem	Root	Total	Leaf	Stem	Root	Total
I	+H3	767.96	709.36	608.19	2085.51	792.05	1099.95	1884.52	3776.52	941.53	1570.19	3888.92	6400.64
	-H3	902.38	846.16	543.58	2292.12	927.43	1322.19	1867.18	4116.80	1103.00	1769.72	3673.14	6545.86
II	+H3	621.41	587.43	665.21	1874.05	591.50	846.59	1461.12	2899.20	994.16	1502.94	3135.99	5633.09
	-H3	683.68	651.95	626.26	1961.89	746.45	1060.07	1763.39	3569.91	1117.07	1731.02	4130.52	6978.61
III	+H3	607.49	571.93	476.61	1656.04	613.81	872.40	1416.68	2902.89	988.31	1426.91	3289.50	5704.72
	-H3	665.95	633.65	547.10	1846.70	699.73	995.37	1649.75	3344.84	1066.06	1590.29	4297.64	6953.99

Appendix Table 33: Biomass of cassava in different experimental units (continued)

(kg/ha)

REP	TRT	200 DAS				230 DAS				250 DAS			
		Leaf	Stem	Root	Total	Leaf	Stem	Root	Total	Leaf	Stem	Root	Total
I	+H3	291.93	2499.06	4246.61	7037.60	265.27	2589.49	6930.06	9784.82	409.39	3015.68	7227.16	10652.23
	-H3	357.99	3038.10	5066.40	8462.49	329.32	2625.66	7018.55	9973.53	451.51	3429.24	8035.87	11916.63
II	+H3	251.46	2429.26	4197.40	6878.13	240.21	2323.12	6910.58	9473.91	332.45	2712.01	7003.79	10048.24
	-H3	321.08	2643.82	3799.80	6764.70	284.04	2495.20	8156.83	10936.07	300.25	2791.29	8086.82	11178.37
III	+H3	315.06	2359.46	4666.35	7340.88	257.49	2096.86	6282.48	8636.82	249.67	2924.32	6319.83	9093.82
	-H3	307.36	2436.59	4728.64	7472.59	228.69	2586.64	6643.00	9458.34	271.14	2626.98	6674.44	9572.56

Appendix Table 34: Biomass, yield and yield component of cassava in different experimental units

REP	TRT	Plant height	Root number	Root weight	Fresh root yield	Dry root yield	Total biomass
		(cm)	(No./plant)	(g)	(kg/ha)	(kg/ha)	(kg/ha)
I	+H3	154.33	4.11	500.16	17499.18	7227.16	10652.23
	-H3	155.89	4.78	416.80	20089.68	8035.87	11916.63
II	+H3	147.67	4.78	428.63	16958.32	7003.79	10048.24
	-H3	159.33	4.11	496.18	19580.69	8086.82	11178.37
III	+H3	151.89	4.44	416.24	15302.26	6319.83	9093.82
	-H3	142.44	4.00	379.82	16160.87	6674.44	9572.56

Appendix Table 35: Biomass of upland rice in different experimental units

(kg/ha)

REP	TRT	20DAS	50DAS	80DAS	110DAS	140DAS
I	+H2	31.72	282.16	1099.41	1971.77	2777.90
	-H2	38.52	335.18	1370.36	2429.25	3382.58
II	+H2	31.58	301.17	1080.40	1908.17	2642.38
	-H2	37.41	350.00	1372.22	2413.88	3534.25
III	+H2	29.97	290.93	1080.86	1932.00	2706.41
	-H2	36.11	388.89	1385.18	2312.95	3008.14

Appendix Table 36: Biomass of *T. candida* in different experimental units (kg/ha)

REP	TRT	Green matter[a]	Green matter[b]	Total green matter	Dry matter	Fire wood	Total biomass
I	+H1	4620.00	1168.13	5788.13	1794.84	1448.13	3242.97
	+H2	4672.50	1163.75	5836.25	1750.70	1382.50	3133.20
	+H3	4567.50	1102.50	5670.00	1710.45	1347.50	3057.95
	+H4	5355.00	1216.25	6571.25	2085.74	1487.50	3573.24
II	+H1	4471.25	1238.13	5709.38	1807.05	1470.00	3277.05
	+H2	5355.00	1229.38	6584.38	1946.35	1373.75	3320.10
	+H3	4865.00	1159.38	6024.38	1830.50	1290.63	3121.13
	+H4	4620.00	1155.00	5775.00	1790.25	1413.13	3203.38
III	+H1	5403.13	975.63	6378.75	1854.34	1194.38	3048.72
	+H2	5363.75	918.75	6282.50	1867.86	1155.00	3022.86
	+H3	5411.88	945.00	6356.88	1817.73	1098.13	2915.85
	+H4	6090.00	918.75	7008.75	2008.39	1159.38	3167.76

[a] Green matter of *T. candida* at the first cuting (22nd July, 1992);
[b] Green matter of *T. candida* at the second cuting (2nd October, 1992).

Appendix Table 37: Canopy cover precentage infor different experimental units at different times (%)

REP	TRT	May	Jun	Jul	Aug	Sep	Oct
I	+H1	76.22	86.79	53.80	20.95	57.84	62.20
	+H2	85.92	92.27	65.00	44.09	90.10	96.54
	+H3	86.58	93.12	78.80	67.95	75.96	88.17
	+H4	77.28	87.85	58.12	33.39	60.14	39.52
	-H1	93.27	96.83	49.42	8.65	64.13	71.54
	-H2	91.04	94.12	53.80	23.67	81.15	91.92
	-H3	88.26	95.57	75.19	50.50	67.55	80.87
	-H4	88.70	94.56	53.41	33.35	58.80	36.54
II	+H1	77.50	89.71	55.96	22.73	66.39	69.71
	+H2	78.31	89.95	59.95	42.14	85.82	95.19
	+H3	84.33	92.98	76.25	66.04	73.27	79.33
	+H4	76.38	88.20	57.21	36.57	64.09	39.23
	-H1	87.22	94.33	49.18	7.79	63.51	75.29
	-H2	74.63	89.45	53.70	22.14	74.52	92.60
	-H3	71.74	88.86	69.28	53.76	64.71	73.17
	-H4	77.93	89.56	52.45	30.73	58.99	37.50
III	+H1	80.28	92.01	57.69	20.71	68.32	72.40
	+H2	68.79	82.63	55.14	34.43	72.60	87.02
	+H3	73.49	88.20	75.19	63.80	68.85	80.58
	+H4	83.89	91.11	58.51	38.53	64.76	39.23
	-H1	56.96	71.48	39.86	6.92	51.15	61.54
	-H2	57.55	71.88	44.04	17.25	54.52	78.65
	-H3	62.08	81.67	66.78	52.54	49.04	63.85
	-H4	54.88	75.46	47.36	24.82	45.29	37.31

Appendix Table 38: Cumulative soil loss in different experimental units at various times

REP	TRT	Jun (cm)	July (cm)	Aug (cm)	Sep (cm)	Amount (t/ha/year)
I	+H1	0.24	0.90	0.71	0.81	101.81
	+H2	0.12	-0.16	0.46	0.60	75.00
	+H3	0.30	0.47	0.32	0.44	55.02
	+H4	0.34	0.44	0.78	0.84	105.30
	-H1	0.19	0.62	1.09	1.01	125.71
	-H2	0.51	0.87	1.11	1.07	133.58
	-H3	0.09	0.48	0.86	0.91	113.19
	-H4	0.75	0.81	1.41	1.05	131.17
II	+H1	-0.02	0.48	0.77	1.02	127.29
	+H2	-0.20	0.36	0.74	0.90	112.50
	+H3	0.29	0.13	0.63	0.67	84.03
	+H4	-0.11	0.48	0.66	0.89	111.13
	-H1	0.22	0.56	0.97	1.03	128.47
	-H2	-0.08	0.58	1.03	1.14	142.21
	-H3	0.08	0.52	0.70	0.79	99.31
	-H4	0.16	0.78	1.03	0.94	117.57
III	+H1	0.59	0.51	1.10	1.06	132.90
	+H2	0.62	0.93	1.02	0.90	112.50
	+H3	0.52	0.21	0.71	0.71	88.89
	+H4	0.39	0.70	1.10	0.97	121.61
	-H1	0.14	0.82	0.66	0.89	111.81
	-H2	-0.72	0.00	0.73	0.99	123.61
	-H3	0.39	0.22	0.42	0.53	66.30
	-H4	-0.21	-0.18	-0.19	0.60	74.72

Appendix Table 39: Origin data of soil nutrients before experiment were carried out

REP	pH	OM (%)	N (%)	P_2O_5 (%)	K_2O (%)
I	4.500	1.900	0.086	0.081	0.120
II	4.500	1.910	0.084	0.079	0.140
III	4.500	1.870	0.084	0.077	0.100

Appendix Table 40: Soil nutrients after harvesting crops in different experimental units

REP	TRT	pH	OM (%)	N (%)	P_2O_5 (%)	K_2O (%)
I	+H1	4.700	2.400	0.105	0.073	0.085
	+H2	4.700	1.900	0.091	0.060	0.070
	+H3	4.700	2.060	0.112	0.063	0.075
	+H4	4.700	2.220	0.098	0.064	0.060
	-H1	5.200	1.980	0.119	0.063	0.080
	-H2	5.200	1.930	0.119	0.063	0.075
	-H3	5.300	2.060	0.098	0.063	0.060
	-H4	5.300	2.290	0.105	0.081	0.075
II	+H1	4.600	2.060	0.098	0.073	0.070
	+H2	4.800	2.450	0.091	0.083	0.132
	+H3	5.200	2.090	0.105	0.073	0.085
	+H4	4.700	2.140	0.112	0.073	0.090
	-H1	4.600	2.370	0.147	0.073	0.095
	-H2	4.600	2.450	0.168	0.088	0.080
	-H3	4.600	2.780	0.119	0.093	0.080
	-H4	4.600	2.840	0.126	0.091	0.070
III	+H1	4.600	3.430	0.164	0.090	0.090
	+H2	4.400	3.120	0.133	0.073	0.075
	+H3	4.500	3.220	0.154	0.069	0.085
	+H4	4.500	3.510	0.161	0.085	0.085
	-H1	4.300	2.840	0.105	0.078	0.090
	-H2	4.500	2.370	0.091	0.076	0.075
	-H3	4.500	2.910	0.133	0.085	0.070
	-H4	4.500	2.910	0.119	0.085	0.085

Appendix Table 41: Nutrients in different parts of peanut

REP	TRT	In the residue			In the seeds		
		N (%)	P_2O_5 (%)	K_2O (%)	N (%)	P_2O_5 (%)	K_2O (%)
I	+H1	1.820	0.120	0.223	3.010	0.290	0.500
	+H2	1.850	0.134	0.231	3.016	0.285	0.493
	+H3	1.713	0.131	0.237	3.182	0.281	0.513
	+H4	1.810	0.138	0.258	3.089	0.296	0.509
	-H1	1.505	0.110	0.212	3.080	0.290	0.472
	-H2	1.601	0.109	0.215	3.110	0.276	0.485
	-H3	1.628	0.119	0.238	3.024	0.291	0.467
	-H4	1.510	0.124	0.241	3.065	0.278	0.469
II	+H1	1.890	0.130	0.218	3.800	0.300	0.472
	+H2	1.793	0.129	0.218	3.820	0.305	0.501
	+H3	1.756	0.119	0.283	3.620	0.351	0.456
	+H4	1.912	0.131	0.221	3.850	0.345	0.482
	-H1	1.785	0.090	0.255	3.045	0.290	0.472
	-H2	1.712	0.095	0.231	3.290	0.297	0.483
	-H3	1.810	0.091	0.235	3.106	0.267	0.493
	-H4	1.785	0.099	0.237	3.150	0.281	0.449
III	+H1	1.645	0.140	0.245	3.150	0.310	0.480
	+H2	1.578	0.149	0.255	3.290	0.318	0.468
	+H3	1.630	0.140	0.275	3.210	0.330	0.516
	+H4	1.670	0.135	0.238	3.150	0.316	0.480
	-H1	1.575	0.110	0.219	3.080	0.260	0.468
	-H2	1.490	0.121	0.256	3.180	0.241	0.439
	-H3	1.620	0.118	0.228	3.125	0.279	0.459
	-H4	1.651	0.119	0.241	3.125	0.249	0.468

Appendix Table 42: Nutrients in upland rice and *T. candida*

REP	In the leaf and branch of *T. candida*			In the residue of upland rice			
	N (%)	P_2O_5 (%)	K_2O (%)	TRT	N (%)	P_2O_5 (%)	K_2O (%)
I	2.275	0.294	0.306	+H2	1.400	0.210	0.310
				-H2	1.500	0.230	0.295
II	2.281	0.275	0.321	+H2	1.300	0.220	0.284
				-H2	1.300	0.220	0.284
III	2.269	0.299	0.303	+H2	1.400	0.210	0.310
				-H2	1.500	0.230	0.295

Appendix Table 43: Nutrients in different parts of cassava

REP	TRT	In the leaf			In the stem			In the root		
		N (%)	P_2O_5 (%)	K_2O (%)	N (%)	P_2O_5 (%)	K_2O (%)	N (%)	P_2O_5 (%)	K_2O (%)
I	+H3	2.730	0.250	0.255	0.560	0.120	0.130	0.143	0.101	0.356
	-H3	2.716	0.253	0.249	0.624	0.126	0.130	0.171	0.086	0.357
II	+H3	2.660	0.210	0.265	0.630	0.130	0.126	0.160	0.102	0.461
	-H3	2.660	0.210	0.265	0.592	0.135	0.122	0.164	0.112	0.316
III	+H3	2.800	0.220	0.286	0.700	0.110	0.134	0.190	0.082	0.309
	-H3	2.841	0.237	0.242	0.569	0.124	0.129	0.157	0.091	0.412

Appendix Table 44: Nutrients in different parts of corn

REP	TRT	In the residue			In the seeds		
		N (%)	P_2O_5 (%)	K_2O (%)	N (%)	P_2O_5 (%)	K_2O (%)
I	+H1	0.910	0.150	0.332	1.052	0.437	0.336
	+H4	0.952	0.153	0.324	1.052	0.469	0.309
	-H1	0.980	0.170	0.323	1.081	0.419	0.319
	-H4	0.970	0.159	0.319	1.053	0.446	0.325
II	+H1	0.973	0.150	0.319	1.071	0.426	0.331
	+H4	0.895	0.156	0.321	1.060	0.418	0.329
	-H1	0.927	0.150	0.323	1.039	0.416	0.329
	-H4	0.461	0.170	0.320	1.051	0.417	1.331
III	+H1	0.980	1.150	0.332	1.046	0.417	0.351
	+H4	0.958	0.148	0.315	1.029	0.412	0.324
	-H1	0.991	0.150	0.329	1.038	0.426	0.317
	-H4	0.957	0.171	0.315	1.021	0.439	0.331

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