

REPORT

USING VETIVER TO CONTROL SOIL EROSION AND ITS EFFECTS ON GROWTH OF COCOA ON SLOPING LAND

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TITLE:

USING VETIVER TO CONTROL SOIL EROSION AND ITS EFFECTS ON GROWTH OF COCOA ON SLOPING LAND

OBJECTIVES:

To find out:

- Capacity of vetiver hedge row in controlling soil erosion on slope of cocoa farm.**
- Competition between vetiver and cocoa or effect of vetiver on growth of cocoa trees.**

LOCATION:

Bau Ca district, Dong Nai province

**Soil type: red basaltic soil with the structure:
sand: 14%; loam: 10%; clay: 76%**

TREATMENTS:

A: no vetiver (control)

B: planting vetiver in straight line

C: planting vetiver around cocoa tree in arc

D: planting vetiver around cocoa tree in circle

Vetiver is planted at 1 m far from the base of cocoa trees

Soil samples are collected at 30 cm from the base of cocoa trunk



**cocoa without vetiver
(control)**

Vetiver planted in strait line near cocoa tree







Vetiver planted in semi circle around cocoa tree







Vetiver planted in circle around cocoa tree



Table 3.1 Plant height (cm) affected by vetiver planted nearby

T	Days after planting vetiver									
	15	30	45	60	75	90	105	120	135	150
A	82.50ns	89.46ns	91.53ns	96.66ns	100.60ns	104.40n	107.33ns	115.46ns	120.06ns	122.46ns
B	181.80ns	88.40ns	92.20ns	95.20ns	100.73ns	104.80ns	107.33ns	112.53ns	118.60ns	123.06ns
C	88.93ns	94.40ns	96.73ns	100.13ns	106.33ns	111.33ns	114.13ns	122.13ns	126.26ns	131.13ns
D	85.96ns	91.40ns	93.80ns	97.80ns	105.13ns	109.73ns	111.66ns	118.86ns	121.86ns	127.33ns

CV = 5.14%

Note: T: treatment; ns: non significant

Table 3.2: Branches/cocoa tree affected by planting vetiver nearby

T	Days after planting vetiver									
	15	30	45	60	75	90	105	120	135	150
A	8,8ns	8,8ns	13,2ns	13,8ns	14,2ns	14,4ns	14,4ns	14,5ns	14,5ns	15,0ns
B	13,1ns	13,1ns	13,6ns	14,3ns	14,5ns	14,5ns	14,7ns	14,8ns	14,9ns	15,2ns
C	11,6ns	11,6ns	14,6ns	14,6ns	14,8ns	14,8ns	15,4ns	15,6ns	15,6ns	15,8ns
D	12,6ns	12,6ns	14,4ns	14,7ns	15,2ns	15,4ns	15,7ns	15,8ns	15,8ns	16,2ns

CV = 14.73%

Note: T: treatment; ns: non significant.

Table 3.3: Trunk parameter (mm) of cocoa affected by planting vetiver nearby

T	Days after planting vetiver									
	15	30	45	60	75	90	105	120	135	150
A	40,40ns	42,16ns	46,06ns	49,07ns	52,54ns	54,62ns	57,19ns	60,52ns	63,64ns	65,53ns
B	42,70ns	44,26ns	46,39ns	50,60ns	53,70ns	55,55ns	57,04ns	59,71ns	63,17ns	66,51ns
C	45,60ns	49,03ns	53,19ns	56,63ns	60,32ns	62,52ns	64,38ns	67,95ns	70,96ns	74,00ns
D	43,23ns	47,03ns	49,97ns	53,32ns	55,83ns	56,38ns	59,14ns	62,47ns	66,02ns	68,75ns

CV = 9,91%

Note: T: treatment; ns: non significant

Table 3.5: Nitrogen content of soil affected by planting vetiver nearby

T	Rep	N (%)			Average
		1	2	3	
A		0,161	0,149	0,140	0,150ns
B		0,145	0,151	0,148	0,148ns
C		0,158	0,169	0,167	0,164ns
D		0,151	0,116	0,152	0,139ns

CV = 8,70%

Table 3.6: Phosphorus (P₂O₅) content of soil affected by planting vetiver nearby

T	Rep	P (%)			Average
		1	2	3	
A		0,215	0,253	0,214	0,227ns
B		0,238	0,203	0,238	0,226ns
C		0,201	0,186	0,209	0,198ns
D		0,234	0,233	0,176	0,214ns

CV = 11,81%

Table 3.7: Potassium (K₂O) content of soil affected by planting vetiver nearby

T	Rep	K(%)			Average
		1	2	3	
A		0,024	0,026	0,024	0,024ns
B		0,024	0,025	0,034	0,027ns
C		0,021	0,026	0,016	0,021ns
D		0,033	0,022	0,029	0,028ns

CV = 21,21%

CONCLUSION:

There is no significant difference in N, P and K content in soil at 30 cm from the base of cocoa trees at different treatments. Therefore, vetiver does not affect the nutrients supplied to cocoa trees.

Table 3.8: Organic matter content of soil affected by planting vetiver nearby

T	Rep	Organic matter(%)			Average
		1	2	3	
	A	2,31	2,67	2,23	2,40ns
	B	2,35	2,37	2,52	2,41ns
	C	2,49	2,54	2,47	2,50ns
	D	2,34	2,24	2,54	2,37ns

CV = 6,76%

Table 3.9: Water holding capacity affected by vetiver planted nearby

T	Rep	Water holding capacity (%)			Average
		1	2	3	
	A	62,0	65,0	64,0	63,66ns
	B	61,0	64,0	67,0	64,00ns
	C	61,0	66,0	65,0	64,00ns
	D	65,0	65,0	67,0	65,66ns

CV = 2,21%

Table 3.10: Effect of vetiver on controlling soil erosion

T	Rep	Soil accumulated after the vetiver hedge row (mm)			Average
		1	2	3	
A		1,50	3,00	2,50	2,333a
B		1,16	2,00	1,83	1,663b
C		1,00	1,28	1,00	1,093 b
D		0,91	2,00	1,66	1,523 b

CV = 16,78%; LSD = 0,72

OVERALL CONCLUSION

When vetiver planted in cocoa farm to control soil erosion we have the following results at 6 months after planting:

1. Growth of cocoa: not affected
2. Nutrition: no competition between vetiver and cocoa
3. Water holding capacity: no significant difference
4. Soil erosion: significance difference between those treatments with vetiver and without vetiver





