

Farmer Participatory Research (FPR) on soil erosion control and fertilizer use for cassava in Vietnam

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Introduction

- In Vietnam, about 75% of total area are upland & most of these are sloping land.
- Of the 263,900ha of cassava, about 216,000ha are planted on sloping land. For that reason, in many areas the soil for planting cassava is severely eroded.
- Soil erosion and inadequate fertilization are the two main cause of soil degradation leading to a reduction in cassava productivity.

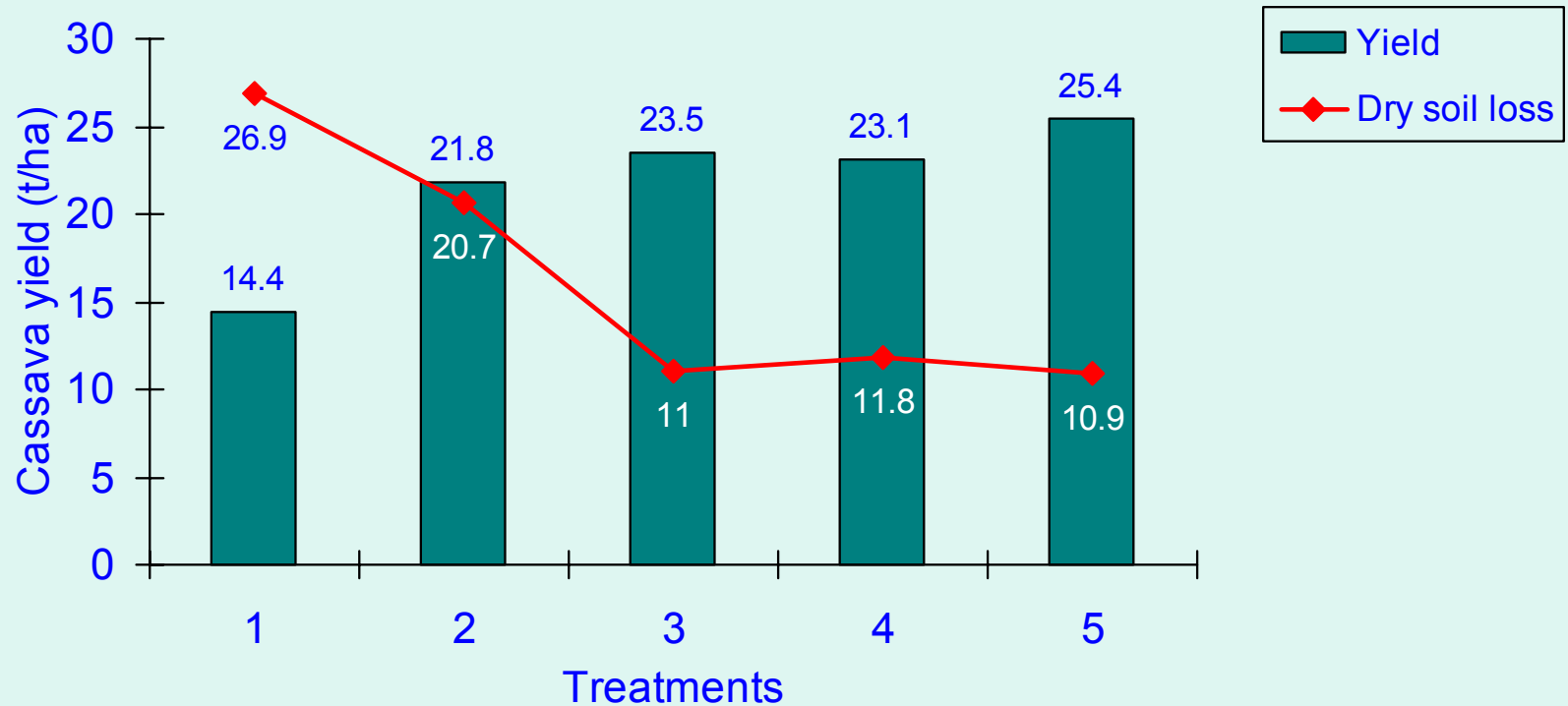
- Based on the identification of the above mentioned constraints, a series of FPR trials on soil erosion control for land management and balanced fertilization for cassava have been conducted by farmers in Vietnam.
- All of the trials was coordinated by 6 institutions: TUAFF, NISF, VASI, HUAFF, TDUAFF and IAS

Results

The Numbers of experiments and household 1999 - 2002

Institutions	Soil erosion control		Fertilizer		Research sites (Provinces)
	Trials	Household	Trials	Household	
1. TUAF	5	8	3	8	Thai Nguyen, Tuyen Quang, Yen Bai
2. NISF	6	12	3	7	Hoa Binh, Phu Tho
3. VASI	1	1	1	3	Ha Tay
4. HUAF	1	1	1	3	Thua Thien Hue
5. TDUAF	1	2	1	2	Ba Ria - Vung Tau
6. HARC	2	5	3	5	Dong Nai, Binh Phuoc
Total	16	29	12	28	10

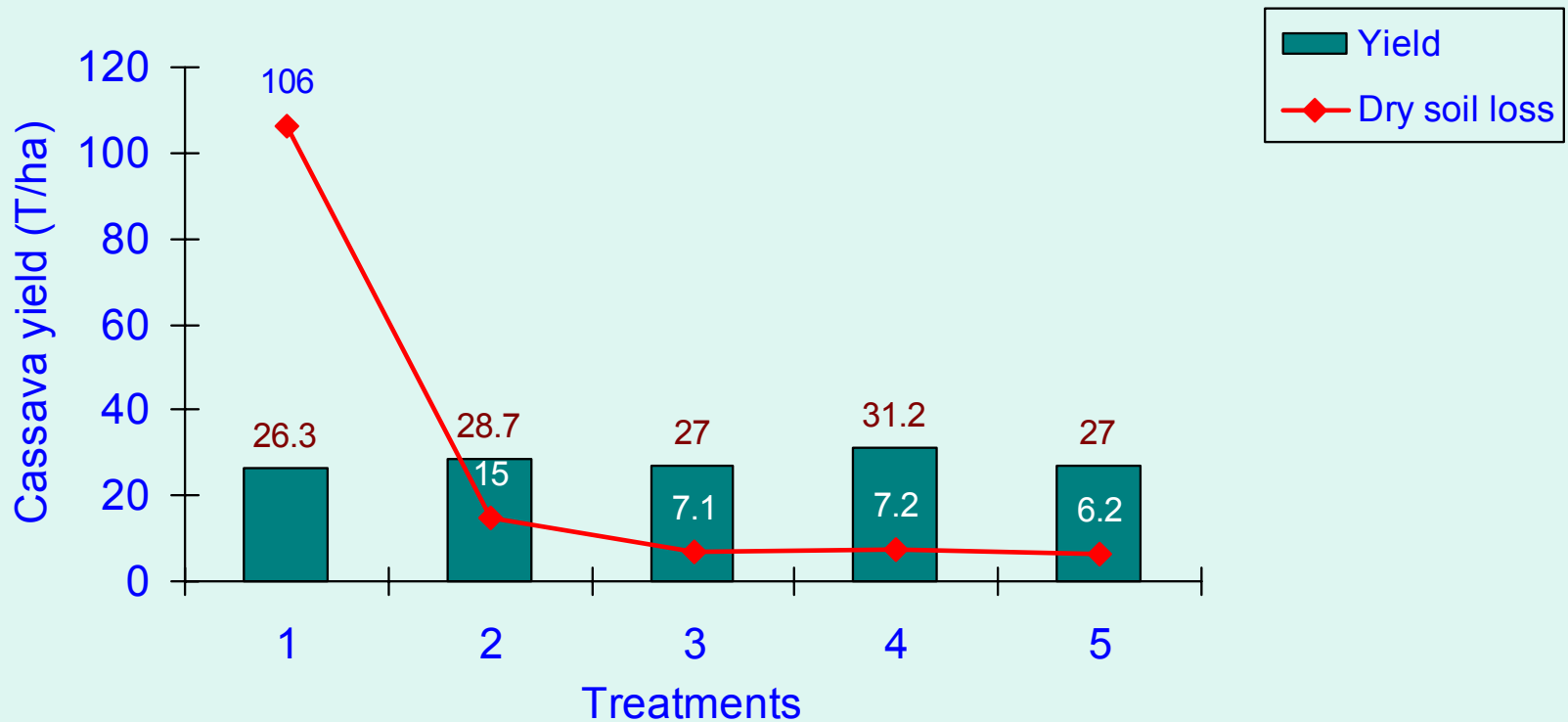
Average results of two FPR soil erosion control trials conducted by farmers in Minh Duc village - Thai Nguyen in 1999 - 2000



Treatments:

1. Farmer practice (Without hedgerow) → 12 tones FYM + 45N + 30P₂O₅/ha
 2. C + Teph.
 3. C + Peanut + Vetiver (hed.)
 4. C + Peanut + Teph. (hed.)
 5. C + Peanut + Teph. and Vetiver (hed.)
- } 10 tones FYM + 80N + 40P₂O₅ + 80K₂O/ha

Average results of three FPR soil erosion control trials conducted by farmers in hong tien village - Tuyen Quang in 1999 - 2000



1. Farmer practice (Without hedgerow)
 2. C + Teph. (hed.)
 3. C + Vetiver (hed.)
 4. C + Paspalum (hed.)
 5. C + Panicum (hed.)
- Fertilizer: 1,100 kg NPK (7:4:7)

Average results of two FPR soil erosion control trials conducted by farmer in
Suoi Rao - Chau Duc - Ba Ria - Vung Tau in 2000 - 2001

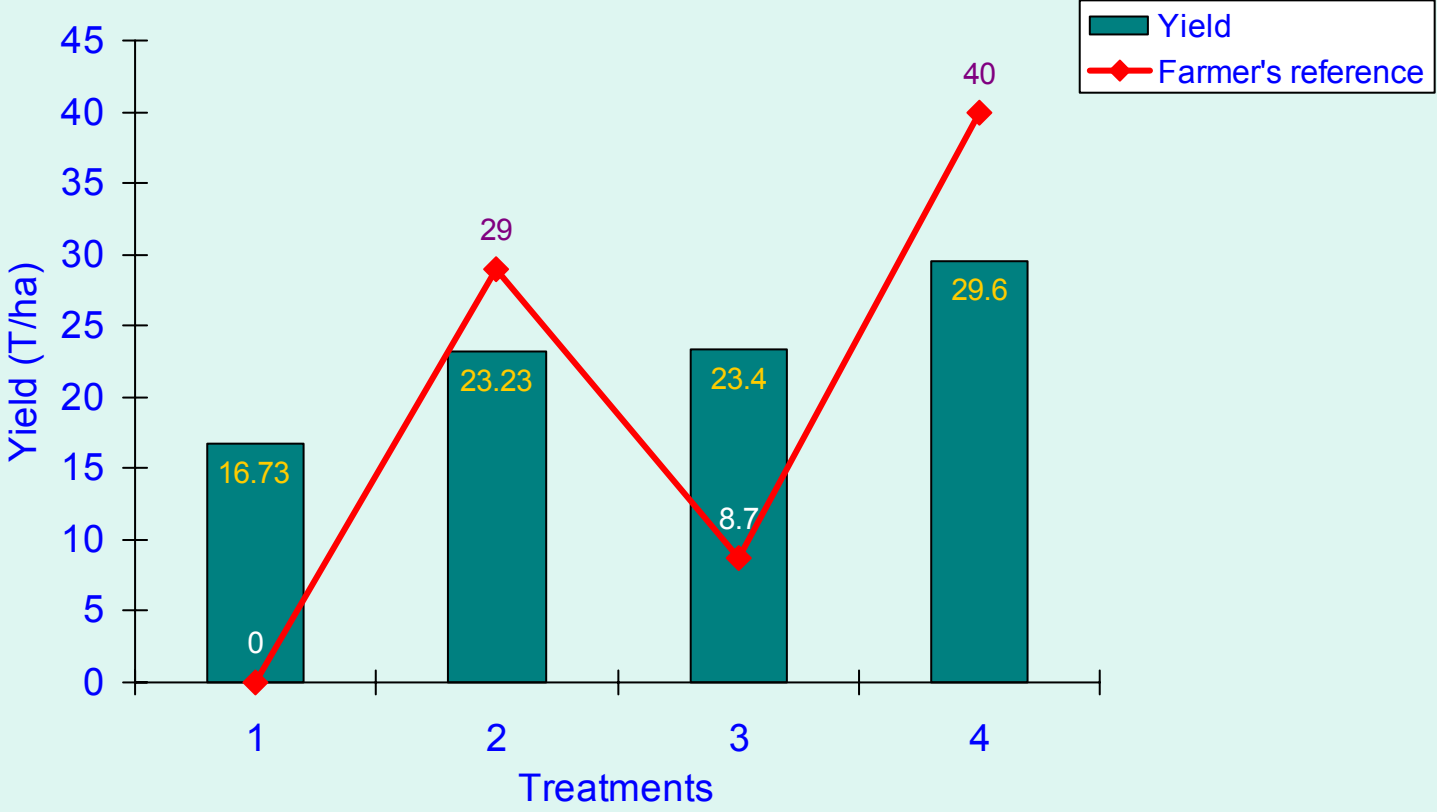
Treatment	Dry soil loss		Yield (T/ha)		Million VND/ha		Farmers' preference (%)
	Tones/ha	Compared to check plot (%)	Cassava	Intercrop	Gross income	Net income	
1. Check plot	31.76	100	48.85	-	14.66	7.81	-
2. C + Pineapple (hed.)	11.20	35.27	43.54	-	13.06	6.02	-
3. C + Paspalum (hed.)	15.49	48.77	40.54	-	12.16	5.12	70.8
4. C + Vetiver (hed.)	13.15	41.40	47.16	-	14.15	7.11	100.0
5. C + Maize (inter.)	11.82	37.22	33.24	4.47	14.52	6.18	16.6

- Fertilizer: 80N + 40P₂O₅ + 80 K₂O kg/ha

Average results of three FPR soil erosion control trials conducted by farmer in
Dong Tam - Dong Phu - Dong Nai in 2000 - 2001

Treatment	Dry soil loss		Cassava yield (T/ha)	Million VND/ha		Farmers' preference (%)
	Tones/ha	Compared to check plot (%)		Gross income	Net income	
1. Check plot	37.8	100	21.4	6.42	2.95	10
2. C + Vetiver (hed.)	24.7	65.34	21.6	6.48	3.01	20
3. C + Leucaena (hed.)	33.6	88.89	22.0	6.60	3.13	20
4. C + Gliricidia (hed.)	34.8	92.06	23.4	7.02	3.55	25
5. C + Paspalum (hed.)	28.2	74.60	24.2	7.26	3.79	25

Combined results of 4 fpr fertilizer trials conducted by farmers in Am Thang and Hong Tien - Son Duong - Tuyen Quang in 2000 - 2001



- 1. Farmer practice (Check plot)
- 2. 40N + 40K₂O
- 3. 40N + 20P₂O₅ + 40K₂O
- 4. 80N + 40P₂O₅ + 80K₂O

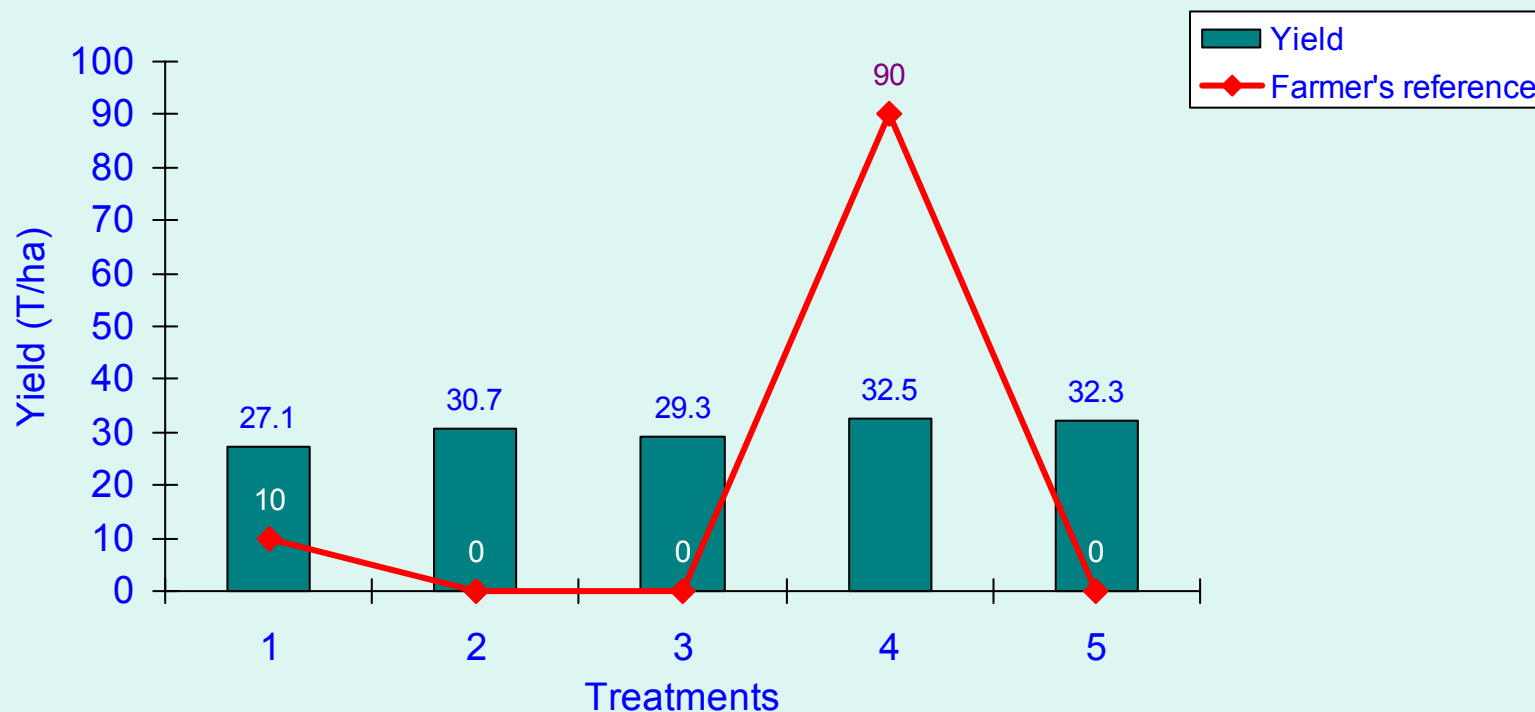
Average results of 5 FPR fertilizer trials conducted by farmers
in Kieu Tung - Thanh Ba - Phu Tho in 2000 - 2001

Treatment	Cassava yield (T/ha)				Compared to check plot (%)
	1999	2000	2001	Average	
1. 10 t/ha FYM (check plot)	13.5	18.5	18.5	16.83	100
2. 10 t/ha FYM + 60N + 60P ₂ O ₅ + 120K ₂ O	19.1	25.8	21.4	22.10	131.31
3. 10 t/ha FYM + 60N + 60P ₂ O ₅ + 80K ₂ O	18.7	28.5	20.7	22.63	134.48
4. 10 t/ha FYM + 60N + 40P ₂ O ₅ + 120K ₂ O	19.1	27.3	23.1	23.20	137.85

Average results of 5 FPR fertilizer trials conducted by farmers
in Thong Nhat and Bao Thanh - Phu Ninh - Phu Tho in 2001

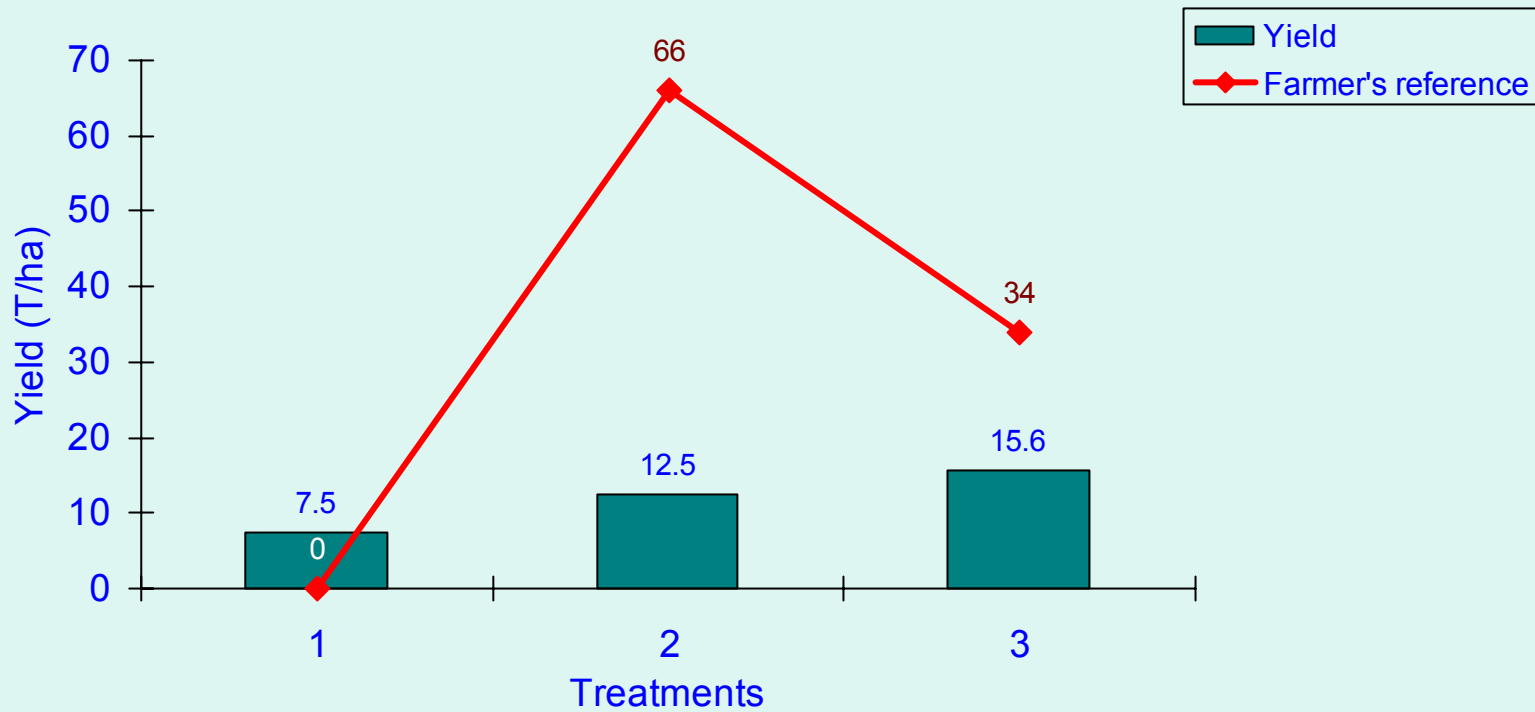
Treatment	Cassava yield (T/ha)			Compared to check plot (%)
	Thong Nhat	Bao Thanh	Average	
1. 10 t FYM + 500kg NPK (5 :10 :3)	19.3	19.4	19.35	100
2. 10 t FYM + 40N + 20P ₂ O ₅ + 40K ₂ O	21.0	21.8	21.40	110.59
3. 10 t FYM + 80N + 40P ₂ O ₅ + 80K ₂ O	22.3	23.7	23.00	118.86
4. 10 t FYM + 80N + 40P ₂ O ₅ + 120K ₂ O	22.7	21.3	22.00	113.40
5. 10 t FYM + 80N + 60P ₂ O ₅ + 120K ₂ O	21.3	19.4	20.35	105.44

Average results of 3 FPR fertilizer trials conducted by farmer in Thanh Hoa - Thach That - Ha Tay in 2000



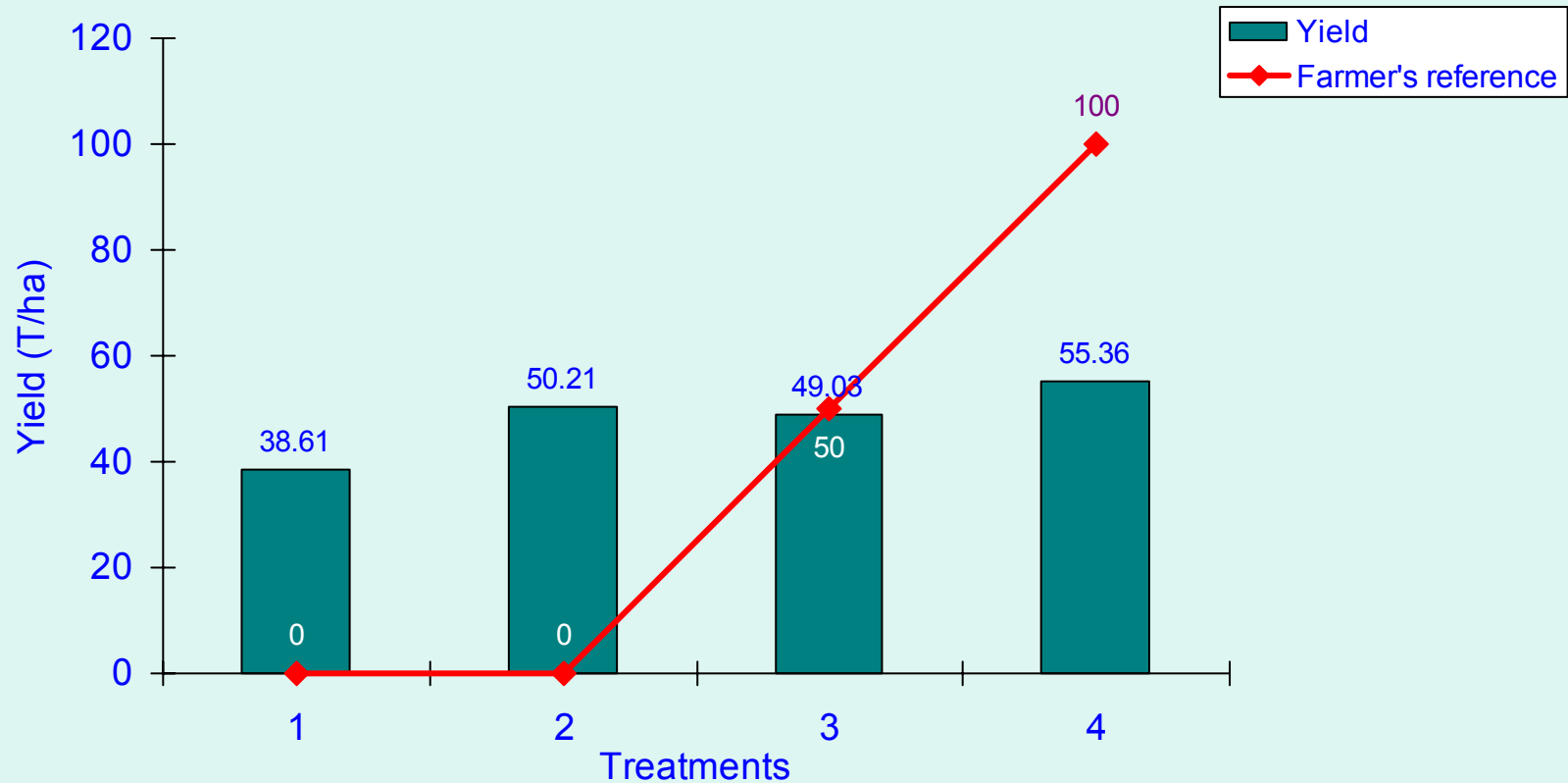
1. Farmer practice (Check)
2. $40\text{N} + 40\text{P}_2\text{O}_5$
3. $40\text{N} + 40\text{K}_2\text{O}$
4. $60\text{N} + 40\text{P}_2\text{O}_5 + 80\text{K}_2\text{O}$
5. $80\text{N} + 40\text{P}_2\text{O}_5 + 120\text{K}_2\text{O}$

Average results of 3 FPR fertilizer trials conducted by farmers in Thuong Long - A luoi - Thua Thien Hue in 2000



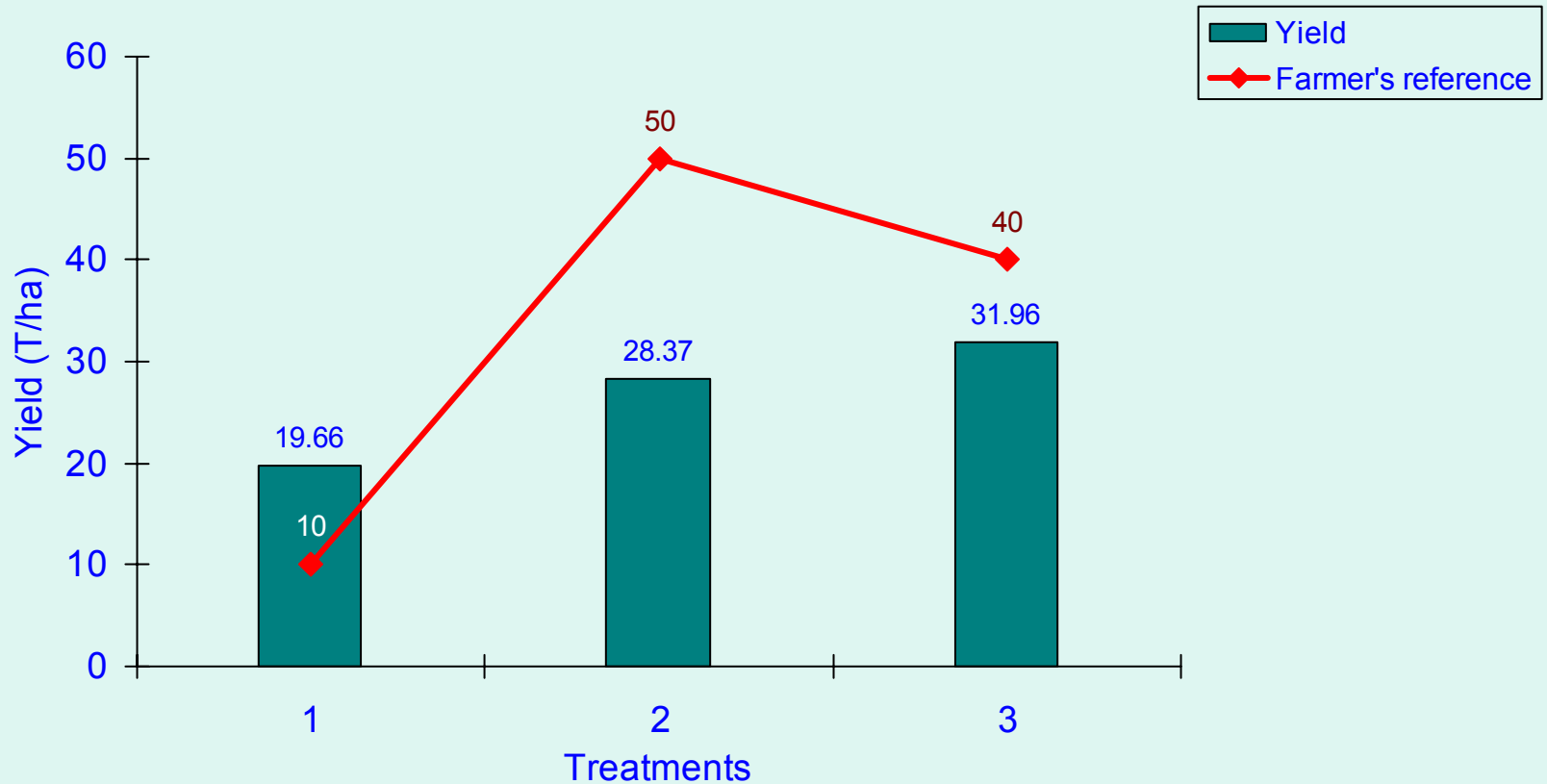
1. Without fertilizer (Check)
2. 30N + 30P₂O₅ + 90K₂O
3. 60N + 60P₂O₅ + 120K₂O

Average results of 3 FPR fertilizer trials conducted by farmers in Suoi Rao - Chau Duc - Ba Ria Vung Tau in 2000 - 2001



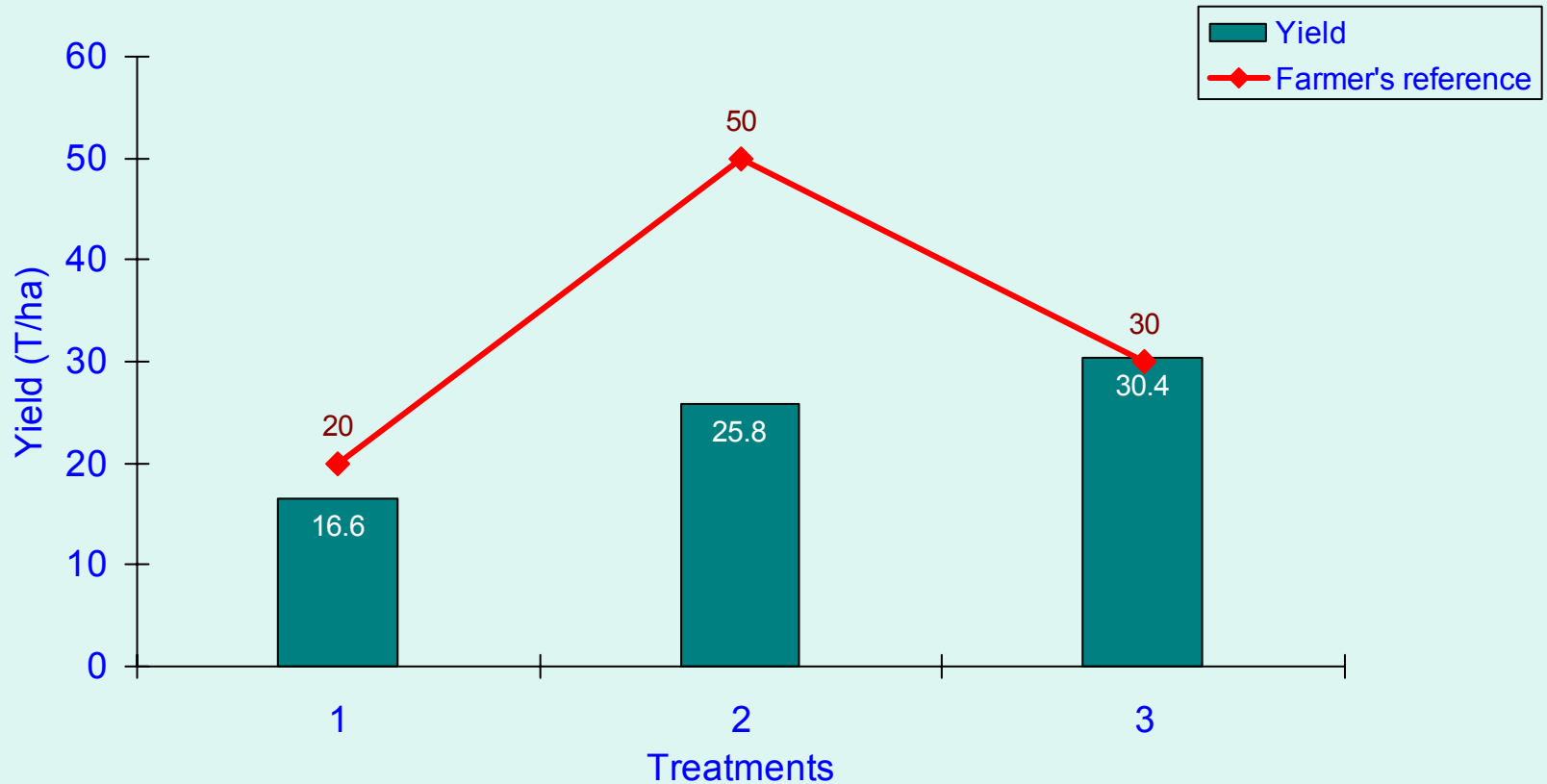
1. Without fertilizer (Check)
2. 80N + 40P₂O₅ + 80K₂O
3. 40N + 40P₂O₅ + 80K₂O
4. 40N + 40P₂O₅ + 40K₂O + 5 t FYM

Average results of 3 FPR fertilizer trials conducted by farmers in An Vien - Thong Nhat - Dong Nai in 2000 - 2001



1. Without fertilizer (Check)
2. 80N + 40P₂O₅ + 80K₂O
3. 40N + 40P₂O₅ + 80K₂O + 5 t FYM

Average results of 3 FPR fertilizer trials conducted by farmers in Dong Tam - Dong Phuc - Binh Phuoc in 2000 - 2001



1. Without fertilizer (Check)
2. 80N + 40P₂O₅ + 80K₂O
3. 40N + 40P₂O₅ + 80K₂O + 5 t FYM

Conclusion

- Using of green hedgerow on contour line reduced the amount of eroded soil from 2.5 to 48.8% compared to the check plot.
- The combined use of chemical and organic manure, intercropping, and the planting of contour hedgerows have been very effective in controlling soil erosion, retaining water and nutrients in the soil and improving the yield of cassava.



- Applying 60 - 80 N + 40 - 50 P_2O_5 + 80 - 120 K_2O /ha increase the cassava yield 20 to 70% compared to without fertilizer.
- After the field-days at harvest time, farmers selected and adopted the planting of hedgerows of paspalum, vetiver and tephrosia as well as the combined 10 tones FYM + 60 - 80 N + 40 - 50 P_2O_5 + 80 - 120 K_2O /ha for cassava production.

