

# AGRONOMY ACTIVITIES IN SON LA



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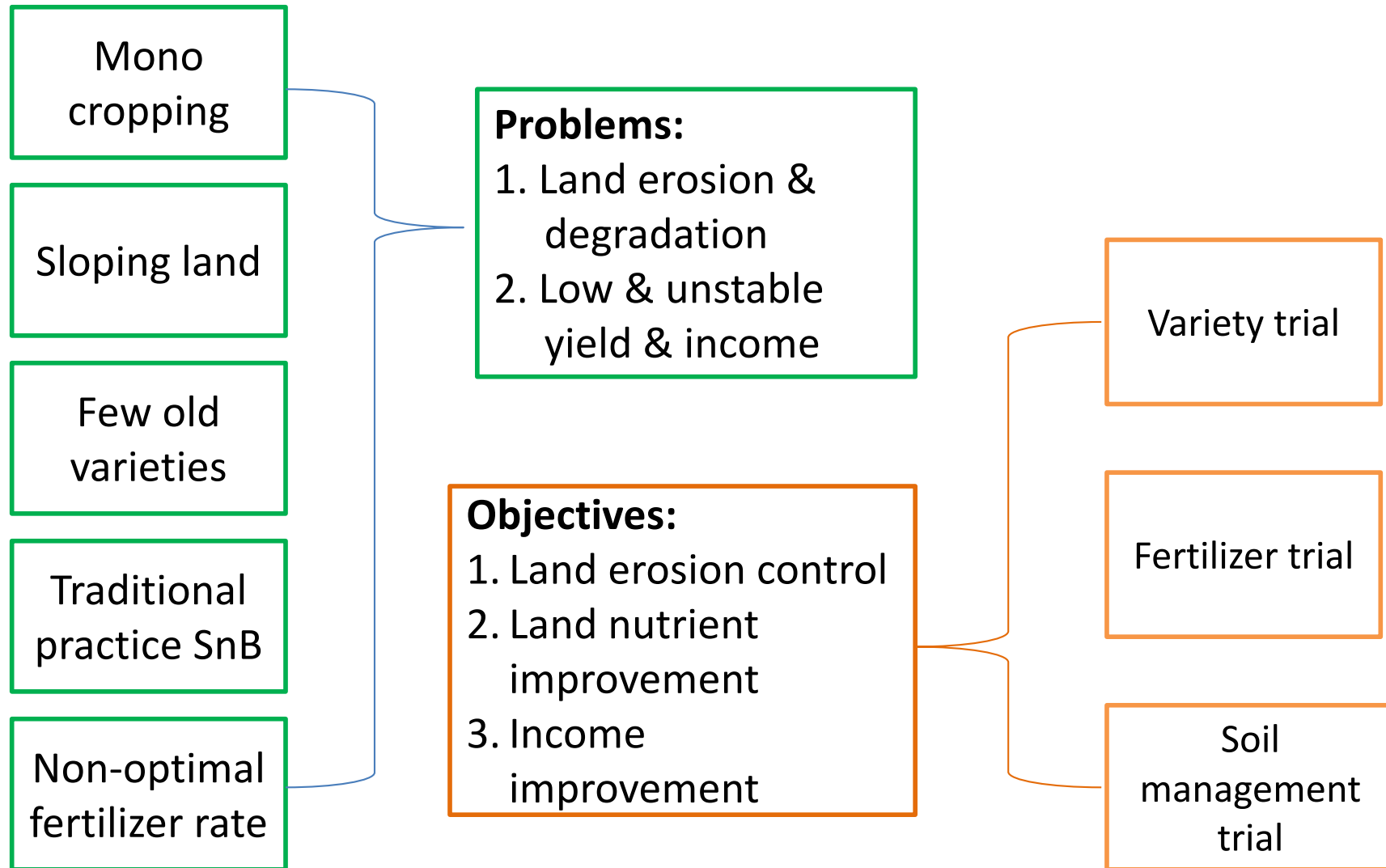
**Australian Government**  
**Australian Centre for  
International Agricultural Research**

# Outlines

- Introduction and objectives
- Activities implemented
  - Selection of sites
  - Designing of trials
  - Establishment of trials
- Trial results
  - Variety trial
  - Fertilizer trial
  - Land management trial
- Challenges and constraints
- Plan for 2018



# Introduction and objectives



# Summary of activities in 2017

Jan.-  
April

- Selection of the fields
- Sampling the soil samples
- Establishment of the trials

May-  
Nov.

- Managing the trials
- Recording the parameters
- Analyzing the soil samples

Dec.-  
Jan.

- Organizing harvest field days
- Harvesting the trials
- Writing the report, proposing for 2018

## Trial sites

	Chiềng Chăn commune, Mai Son dist.	Nà Ót commune, Mai Son dist.	Bó Mư̄ời commune, Thuan Chau dist.	Púng Tra commune, Thuan Chau dist.
Area (km <sup>2</sup> )	60.03	106.50	62.21	25.64
Population	6,449	2,976	8,163	3,138
Ethnicity	Thái, H'Mông, Kinh	Thái, Khơ Mú, Sinh Mun, H'Mông	100% Thái	97,2% Thái 2,8% La Ha
No. of villages	19	17	18	14
Cassava area (ha)	244	541	100	750
Main crops	maize, cassava, sugarcane	cassava, coffee	maize, cassava	cassava, coffee

## Locations and designs of trials

	Trial	Location	Slope (degree)	Design
1	Variety	Quỳnh Lương village, Chiềng Chăn	5-10	CRB, 5 replicates
2	Variety	Púng Mé Village, Púng Tra	45-50	CRB, 5 replicates
3	Fertilizer	Quỳnh Lương village, Chiềng Chăn	5-10	Big PLots
4	Fertilizer	Há Xét village, Nà Ớt	55-60	Big Plots
5	Fertilizer	Long Sàn Village, Bó Mười	5-10	Big Plots
6	Fertilizer	Púng Mé Village, Púng Tra	5-10	Big Plots
7	Soil management	Sài Lương village, Chiềng Chăn	35-40	CRB, 4 replicates
8	Soil management	Há Xét village, Nà Ớt	55-60	CRB, 3 replicates
9	Soil management	Long Sàn Village, Bó Mười	40-45	CRB, 3 replicates
10	Soil management	Púng Mé Village, Púng Tra	45-50	CRB, 5 replicates

# Variety trial

(2 sites 1 in total, 1 site in each district)

V1: 13Sa05

V2: Sa21-12

V3: Rayong 9

V4: BK

V5: KM 94 (Control, a locally popular HYV)

V6: La Tre (Control 1, a local variety)

# Fertilizer trial:

(4 sites in total, 2 sites in each district)

**T0 (control):** no fertilizer

**T1:** 300 kg NPK (5:10:3), no top dressing

**T2:** 600 kg NPK (5:10:3), no top dressing

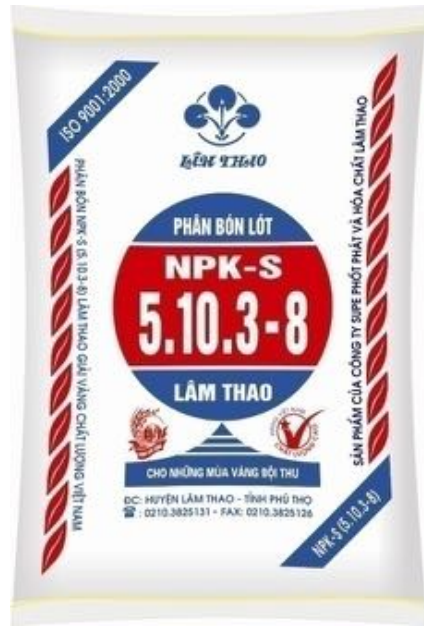
**T3:** Separate N, P and K (40N + 10P + 40K) (87 kg/ha Urea + 142 kg/ha Superphosphate + 80 kg/ha Kali clorua)

- *Basal fertilizing: All of P,  $\frac{1}{2}$  of K,  $\frac{1}{2}$  N*

- *Topdressing:  $\frac{1}{2}$  N,  $\frac{1}{2}$  K (2 months after planting)*

**T4:** FDP (fertilizer deep placement) 40N + 10P + 40K





# Soil management trial:

(4 sites in total, 2 sites in each district)

To (control): Cassava only

T1: Cassava + cowpea

T2: Cassava + mung bean

T3: Cassava + peanut

T4: Cassava + grass trip (Ghinea, *Panicum maximum*)

T5: Cassava+ contour barriers by residues of cassava plants of the last crop



Desining fertilizer trial in Bó Mười commune

Fertilizer and land management trials blocks in Na Ot

**Fertilizer  
trial**

**Soil  
management  
trial**





**Soil management trial in Púng Tra**

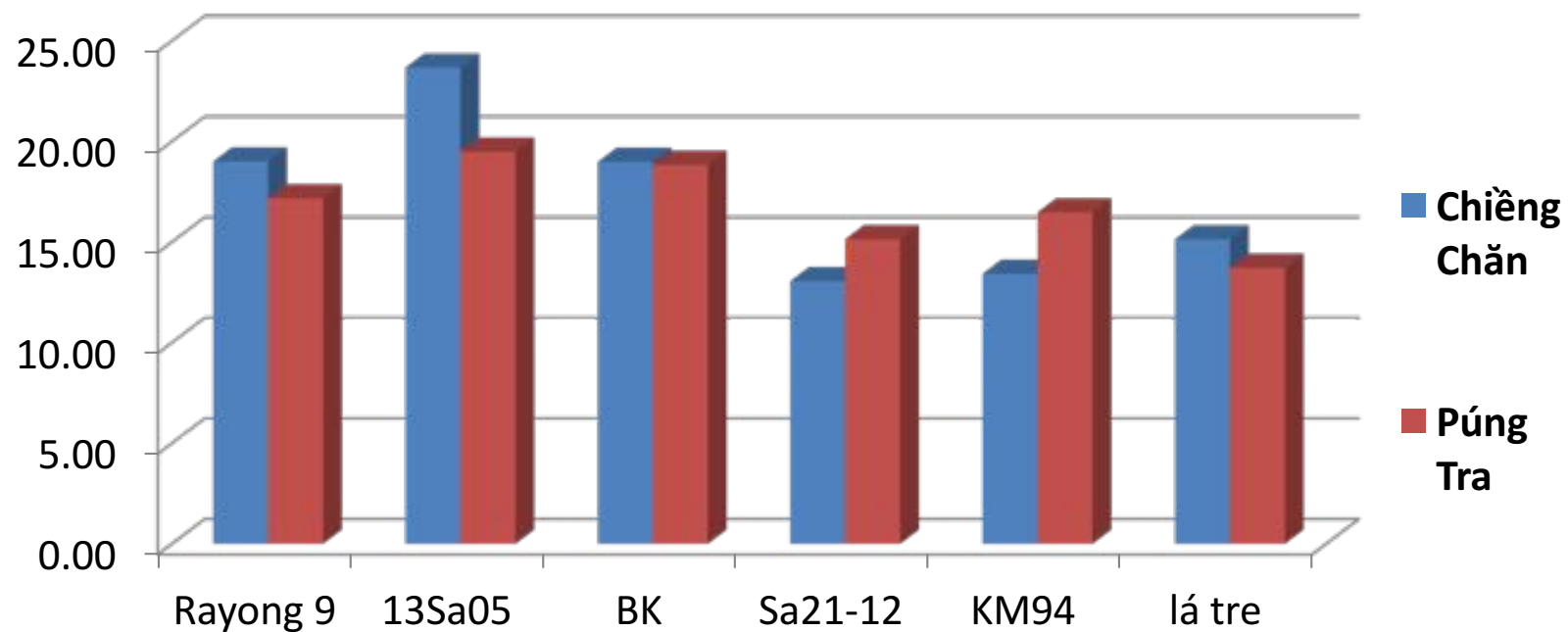
# Participants in the trials

1. Northern Mountainous Agriculture and Forestry Science Institute (**NOMAFSI**): responsible for all the trials.
2. Root Crop Research and Development Centre (**RCRDC**): participated in the variety trial, responsible for providing stakes
3. Farmers, the land owners: participated in all the activities (trials establishment, management and harvest).
4. DARD of Son La, and DARD of both Thuan Chau and Mai Son districts: local focal point
5. People committees of Chieng Chan, Na Ot, Pung Tra and Bo Muoi: commune focal point
6. Son La Cassava Factory (FOCOCEV): advices on the trial planning, starch content measurement
7. CIAT and UQ researchers: Advice on the trials treatments and design, and in other related technical issues

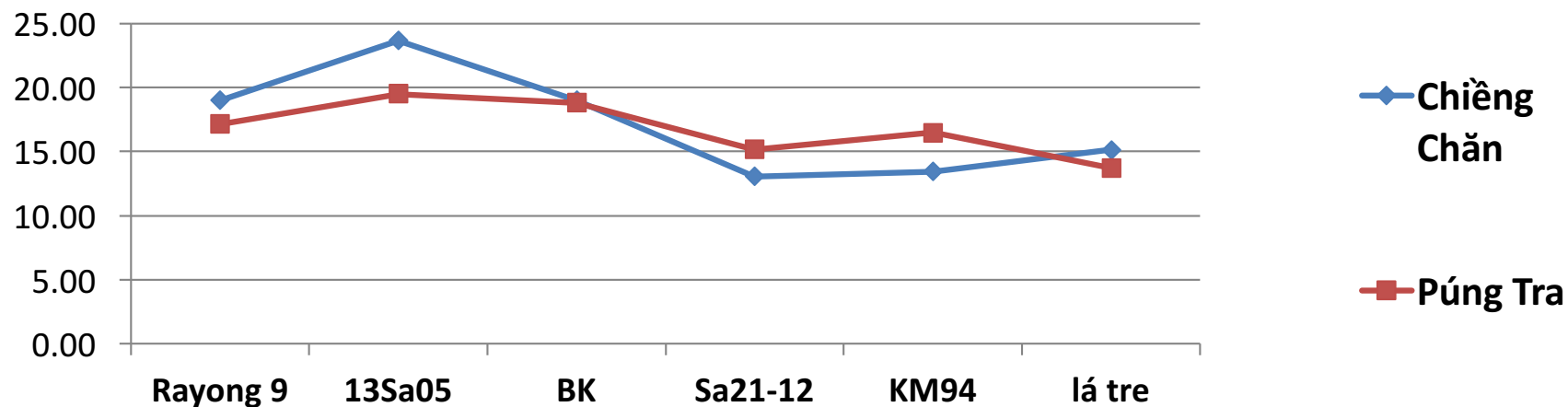
**RESULT OF  
VARIETY TRIAL**



## Number of roots per plant

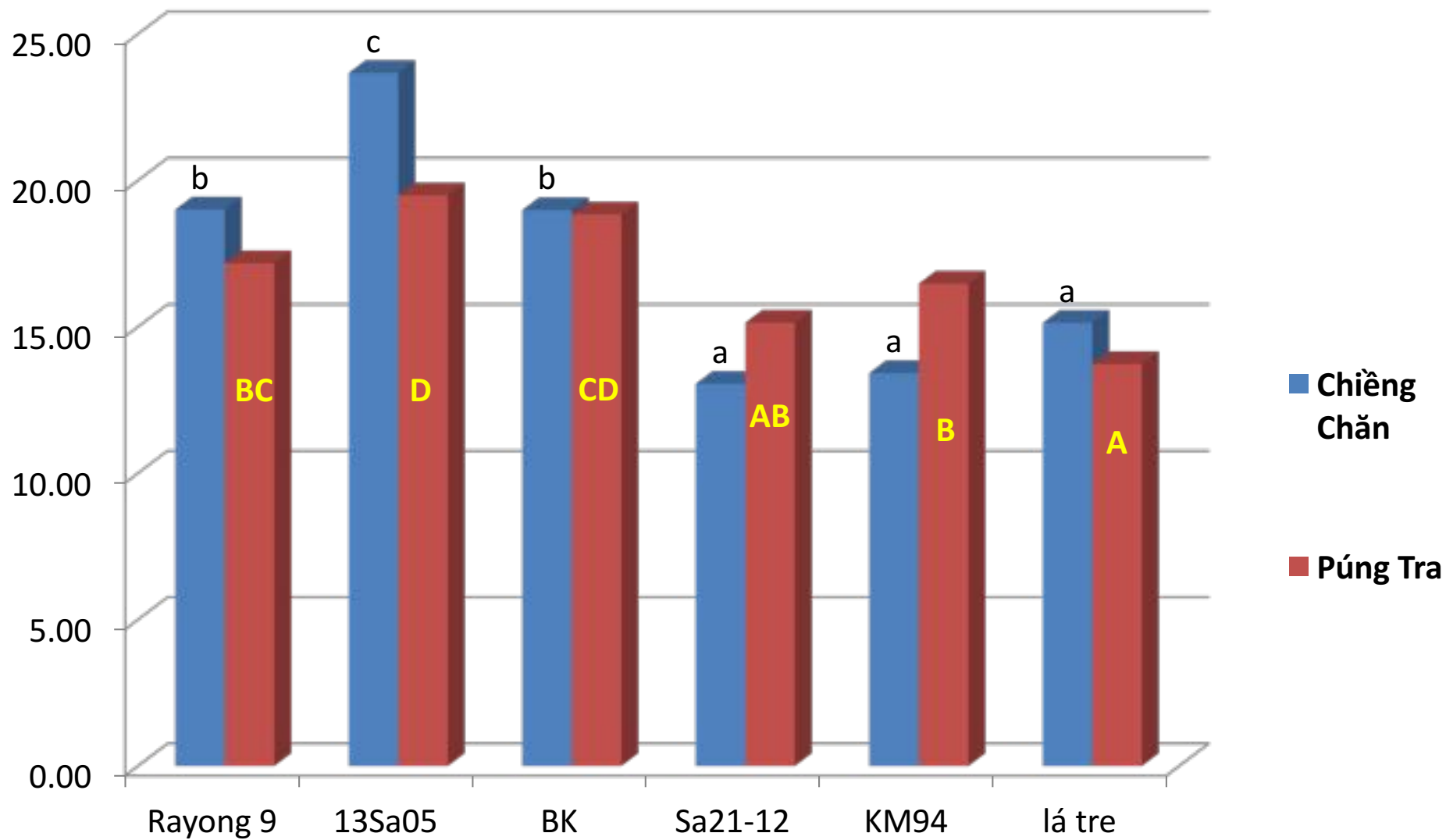


## Average weight of 1 root (kg)





# Yield of fresh roots (t/ha)



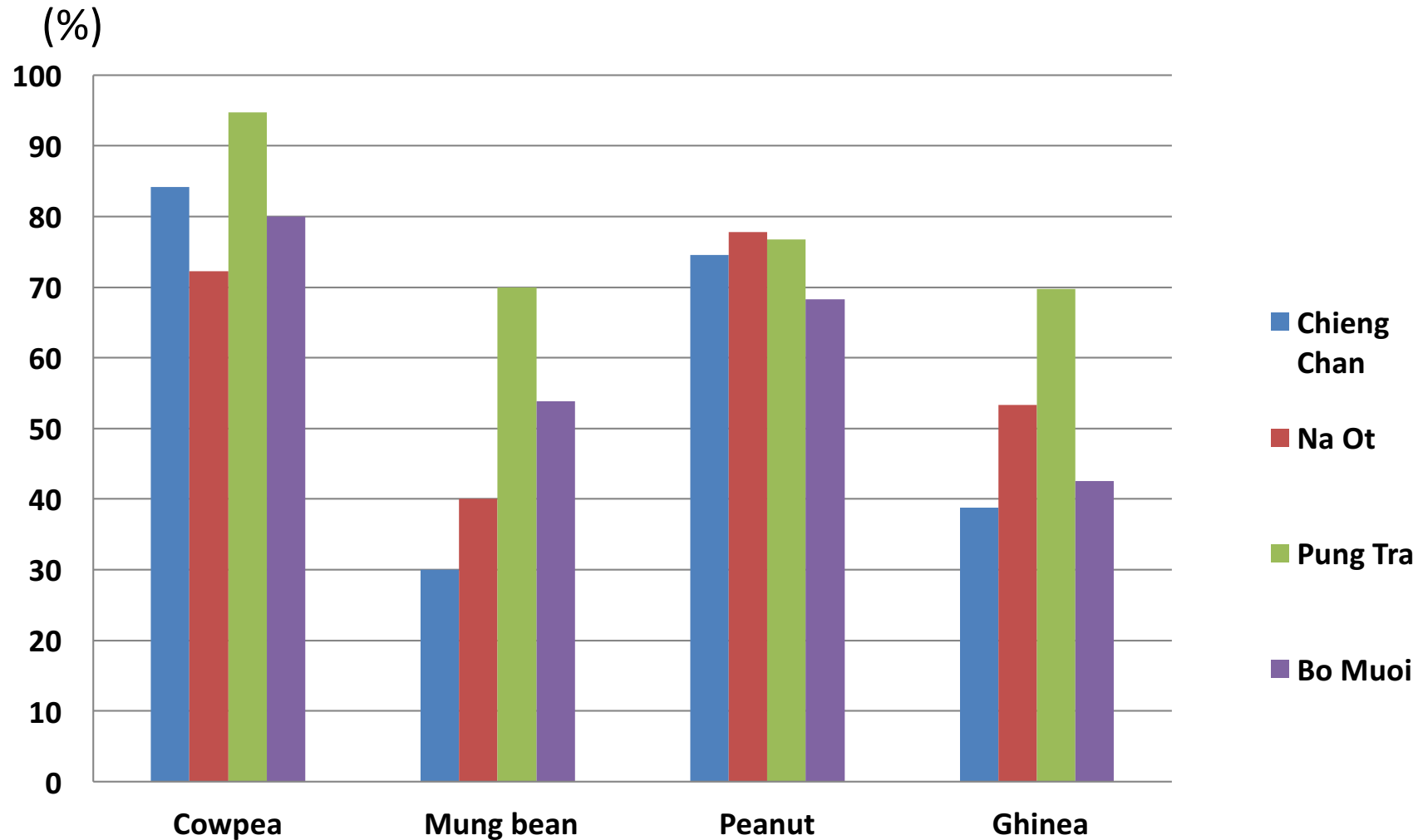
## Content of starch in fresh roots (%)

	<b>Chiềng chăn</b>	<b>Púng Tra</b>
Rayong 9	29.2	29.6
13Sa05	30.0	28.1
BK	29.0	28.5
Sa21-12	30.0	30.0
KM94 (control 1)	30.0	30.0
Lá tre (control 2)	30.0	27.7

# RESULTS OF SOIL MANAGEMENT TRIAL



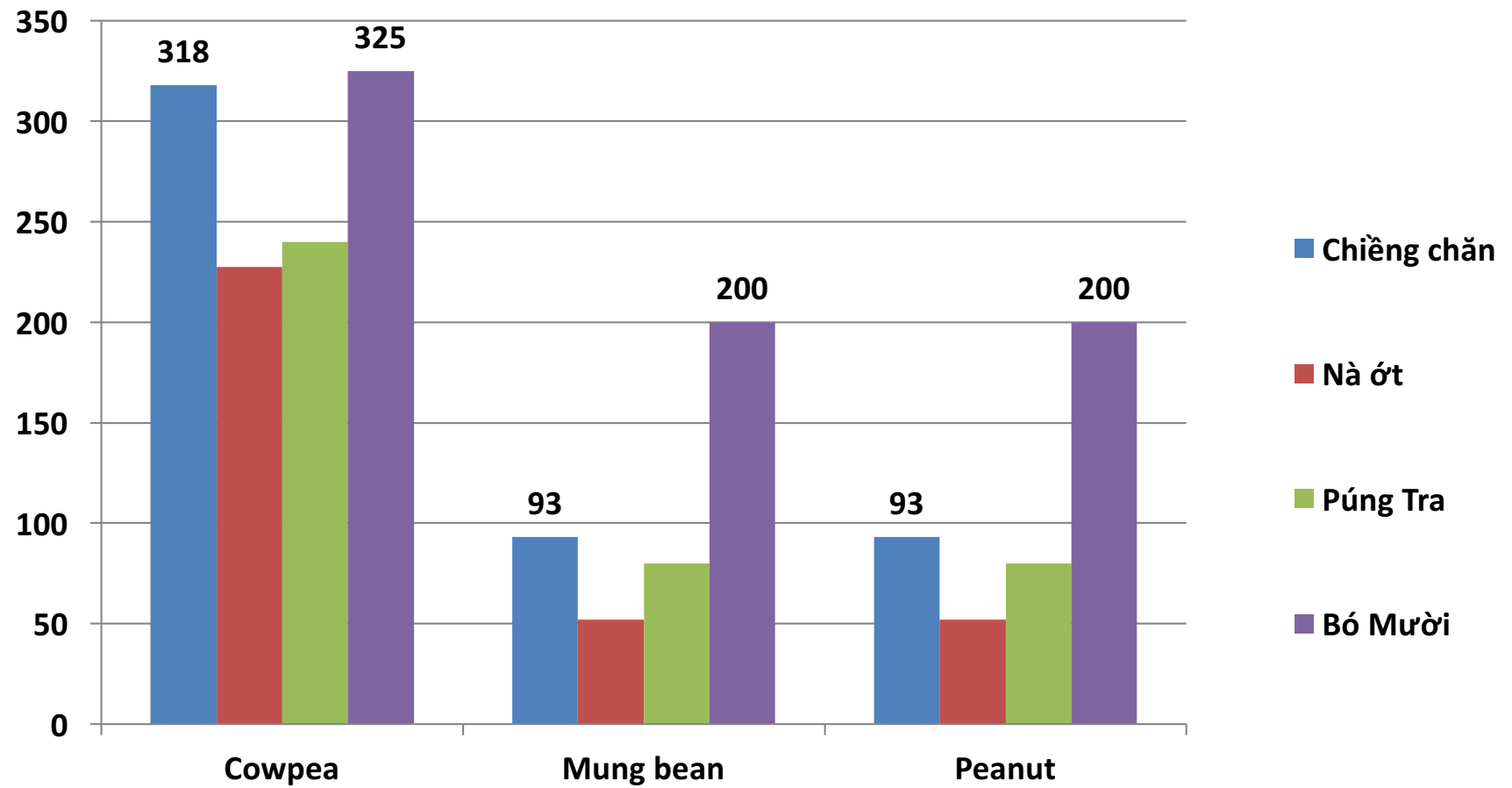
## Survival rates of intercrops (15 May, 2017, 38 days after trial establishment, after a long and severe drought spell)



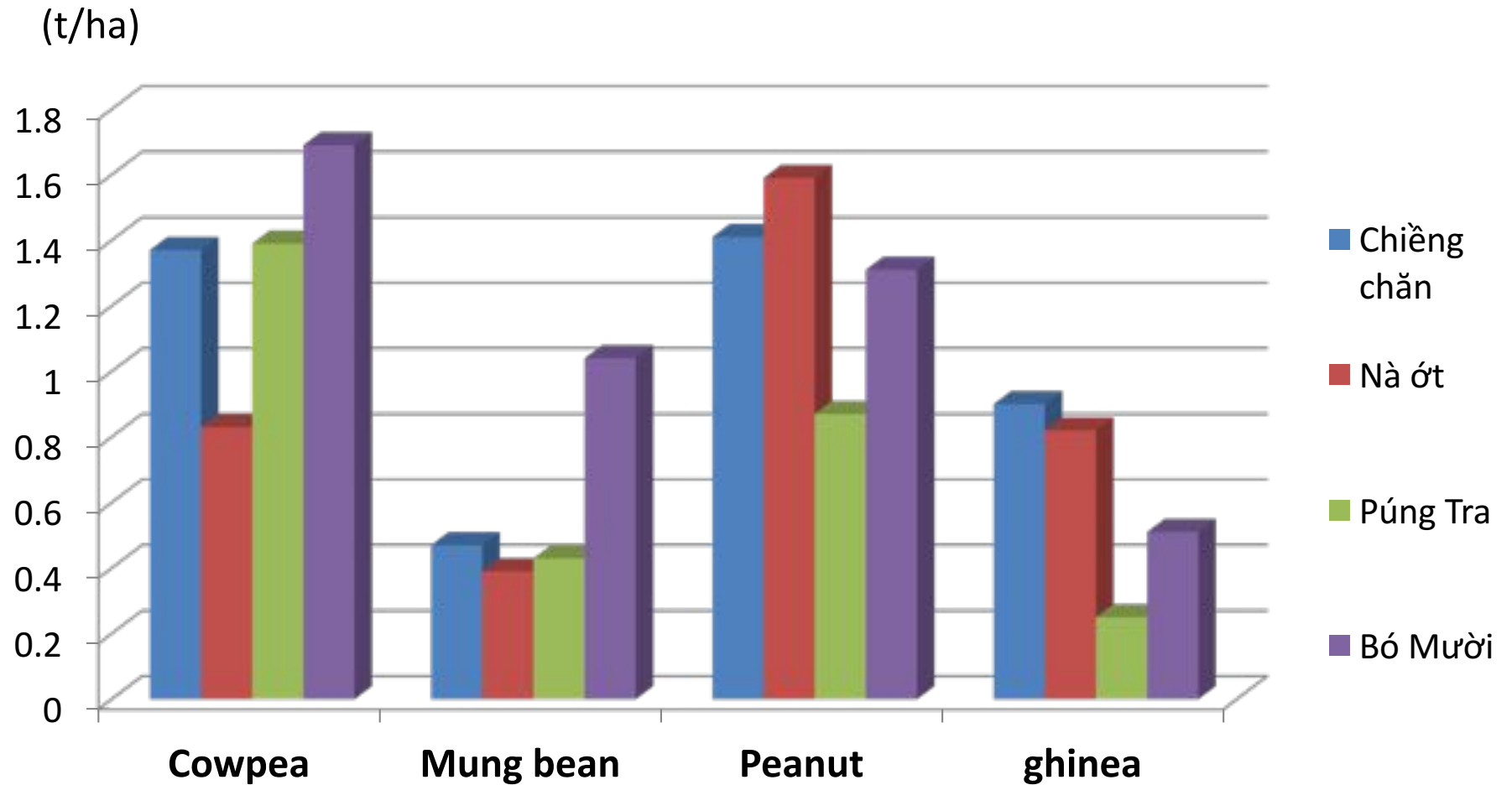
(Cassava was not significantly impacted)

## Yield of intercropped legumes

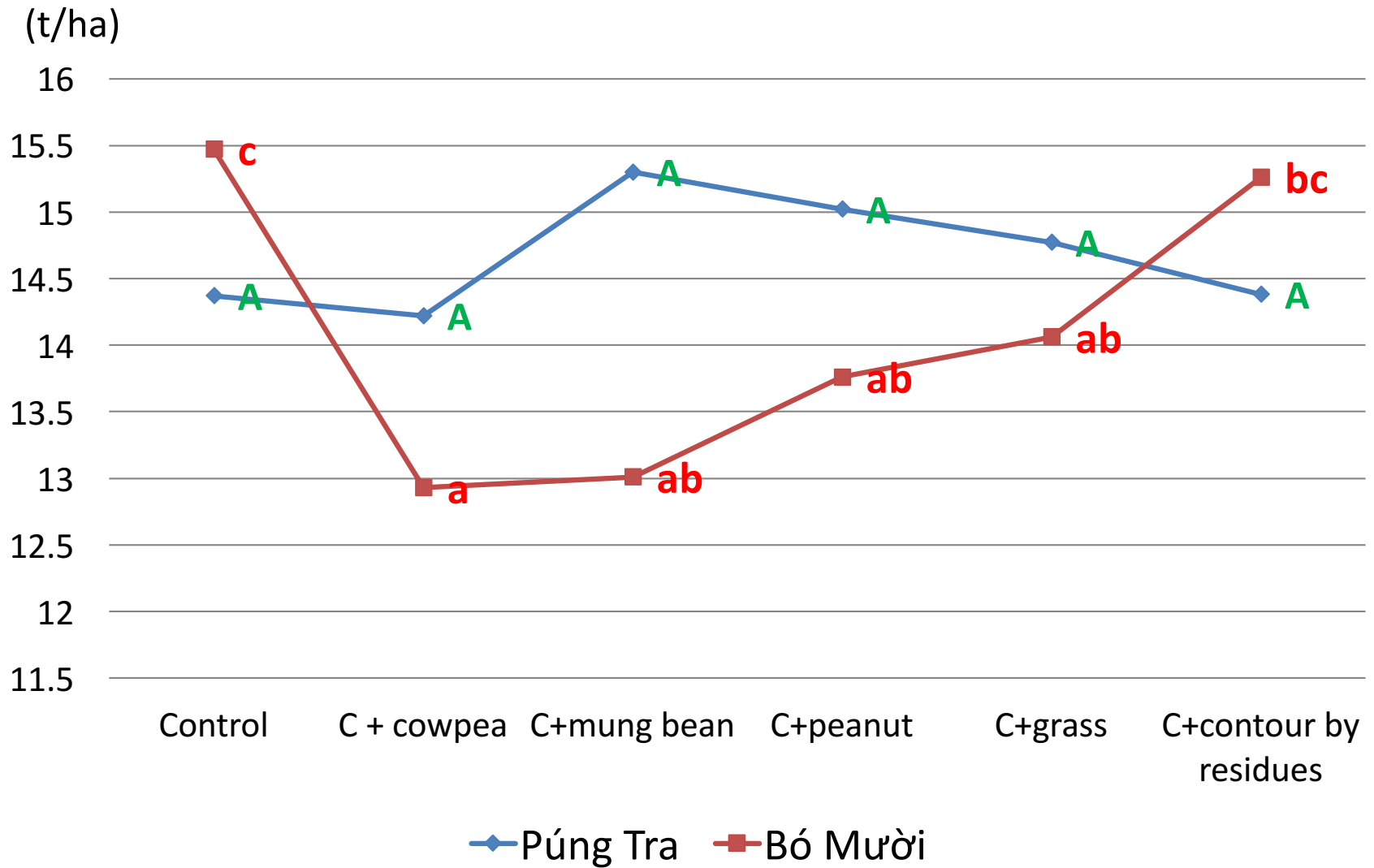
(kg/ha)



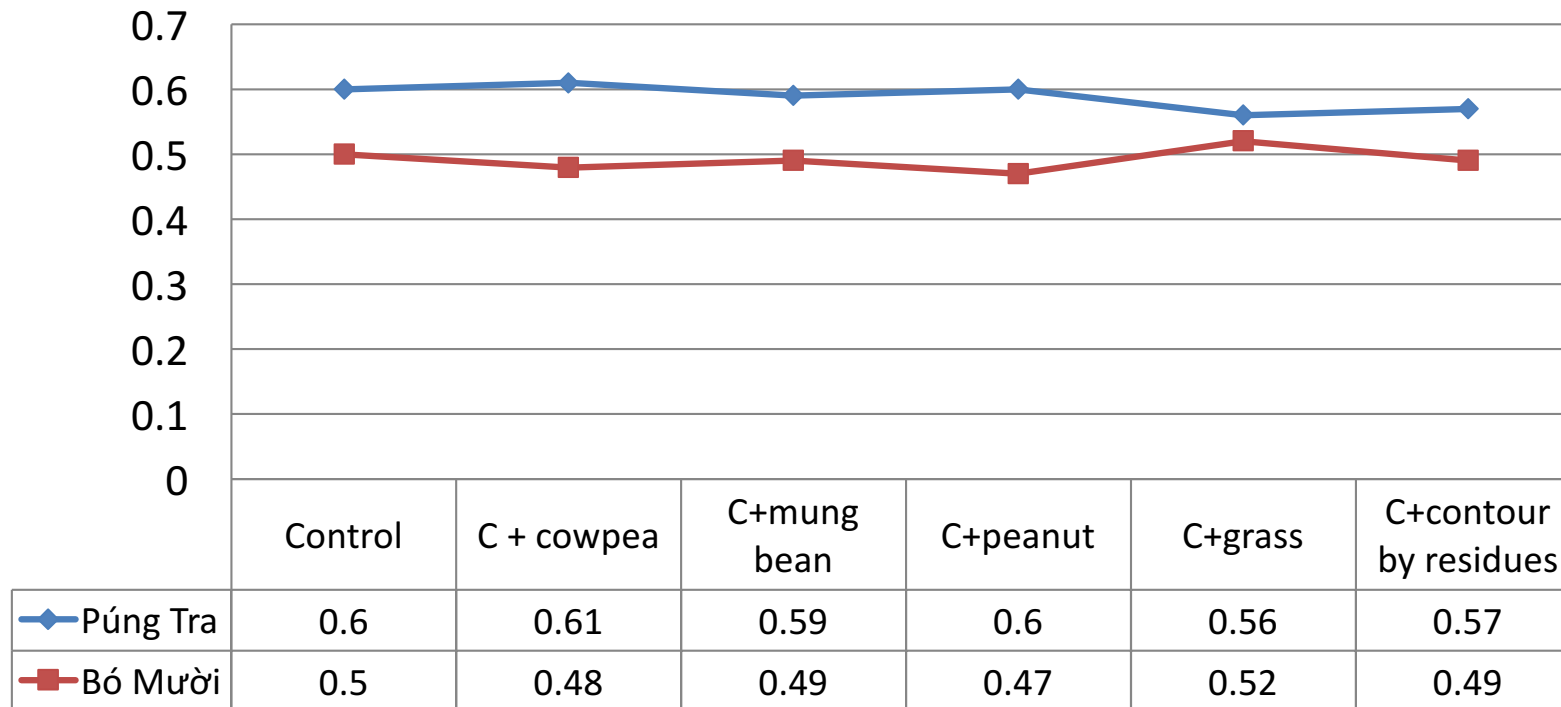
## Biomass of intercropped legumes and yield of grass



# Yield of cassava fresh roots, soil management trial



## Harvest index of cassava, soil management trial in Bo Muoi





## Income and input cost, soil management trial in Pung Tra

	Control	C+ cowpea	C+ mung bean	C+ peanut	C+ grass	C+ contour
Gross return (000vnd)	20,118	<b>27,108</b>	23,820	24,076	20,678	20,137
Total material cost (000vnd)	3,342	4,678	4,778	5,078	7,510	3,342
Total labour (working days)	200	232	227	234	215	202
Net return (000vnd)	16,776	22,430	19,042	18,998	13,168	16,796
Net return per working day (000vnd)	83.88	<b>96.68</b>	83.89	81.19	61.25	83.15
Net return per 1000vnd spent (000vnd)	5.02	4.80	3.99	3.74	1.75	5.03

*Note: price of cow pea was 30.000 vnd/kg, mung bean: 30.000 vnd/kg, peanut: 12.000 vnd/kg, cassava: 1.400 vnd/kg, grass: 0 (grass was not sold at all)*

## Income and input cost, soil management trial in Bo Muoi

	Control	C+ cowpea	C+ mung bean	C+ peanut	C+ grass	C+ contour
Gross return (000vnd)	21,658	25302	20614	22312	19,684	21,364
Total material cost (000vnd)	3,342	4,678	4,778	5,078	7,510	3,342
Total labour (working days)	200	231	228	242	215	202
Net return (000vnd)	18,316	20,624	15,836	17,234	12,174	18,022
Net return per working day (000vnd)	<b>91.58</b>	<b>89.28</b>	69.46	74.29	56.62	89.22
Net return per 1000 vnd spent (000vnd)	5.48	4.41	3.31	3.39	1.62	5.39

1. Thêm kết luận vào đây.

2. thêm giải thích:

- tại sao Bó Mười và Púng Tra lại khác nhau

- Công lao động khác nhau là ở khâu nào, khâu nào làm tăng công, có thể khắc phục bằng cách nào không

- Trồng xen cây họ đậu làm tăng thêm thu nhập, lãi thuần so với trồng thuần; làm tăng nhu cầu lao động, giảm giá trị ngày công lao động so với trồng thuần ngoài trừ **trồng xen đậu đen**

- Các công thức thử nghiệm có tác dụng hạn chế xói mòn đất, cải thiện độ phì đất. do đó các kết quả thí nghiệm cần tiếp tục được theo dõi trong các năm tiếp theo

**Tổng số công lao động khác nhau là do:**

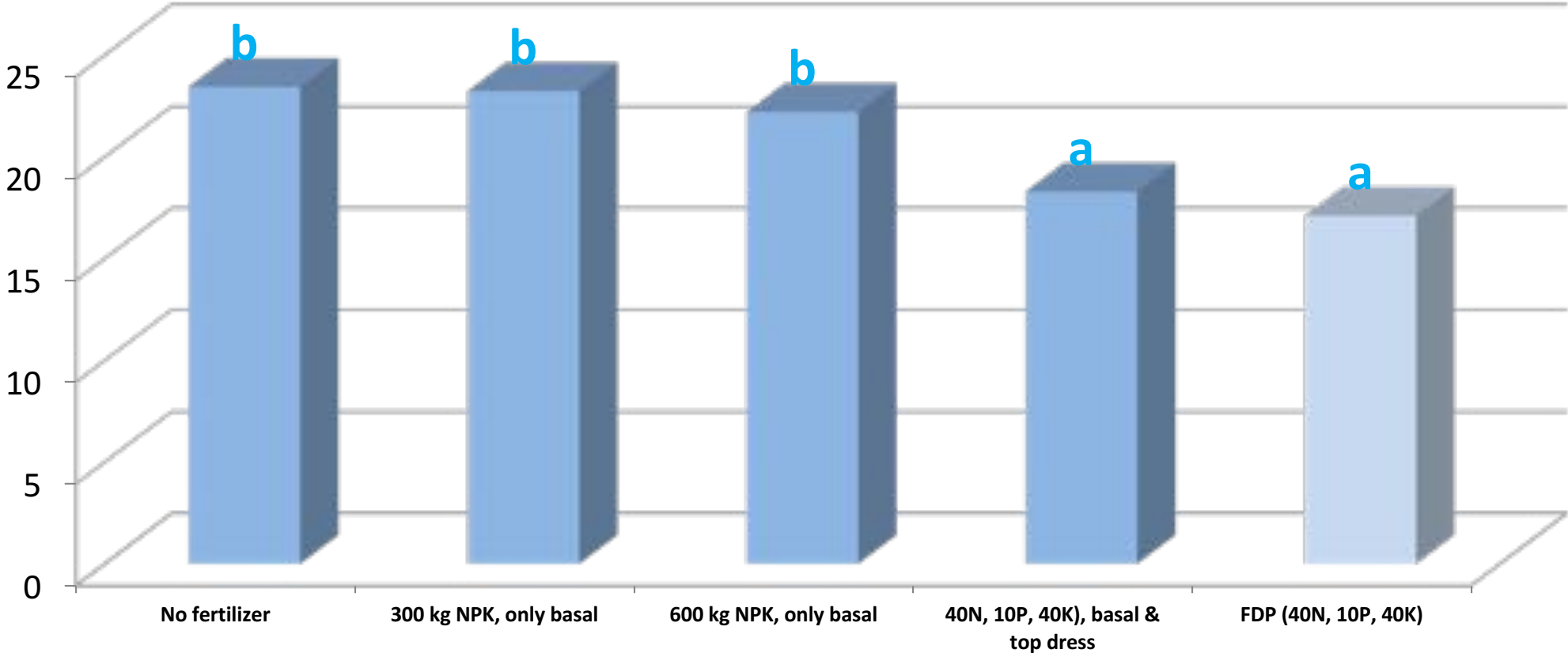
- Công trồng xen cây họ đậu, và công trồng băng cỏ, công phun thuốc cho cây họ đậu, công thu hoạch cây họ đậu, kiểm soát băng chắn cây sắn. Năng suất sắn cao sẽ phát sinh công thu hoạch cao hơn

- Trồng xen cây họ đậu làm tăng công làm cỏ so với trồng thuần do làm cỏ khó hơn, vì phải dùng nhiều đến tay, thay vì sử dụng công cụ là cuốc sỏi

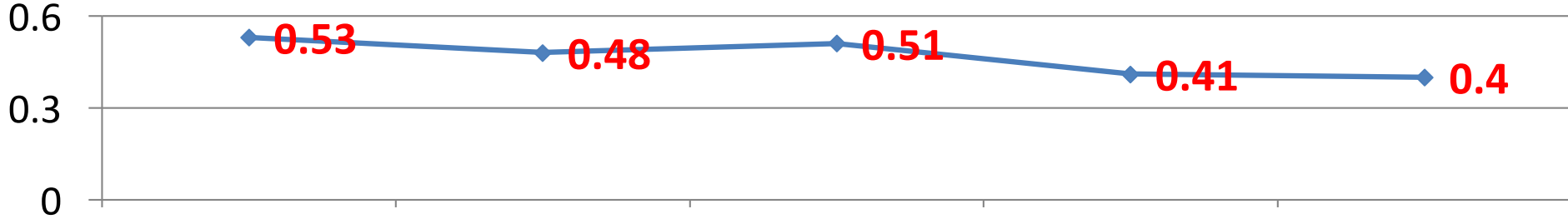
**RESULTS OF  
FERTILIZER  
TRIAL**



# Cassava fresh root yield, fertiliser trial in Bo Muoi



## Harvest index

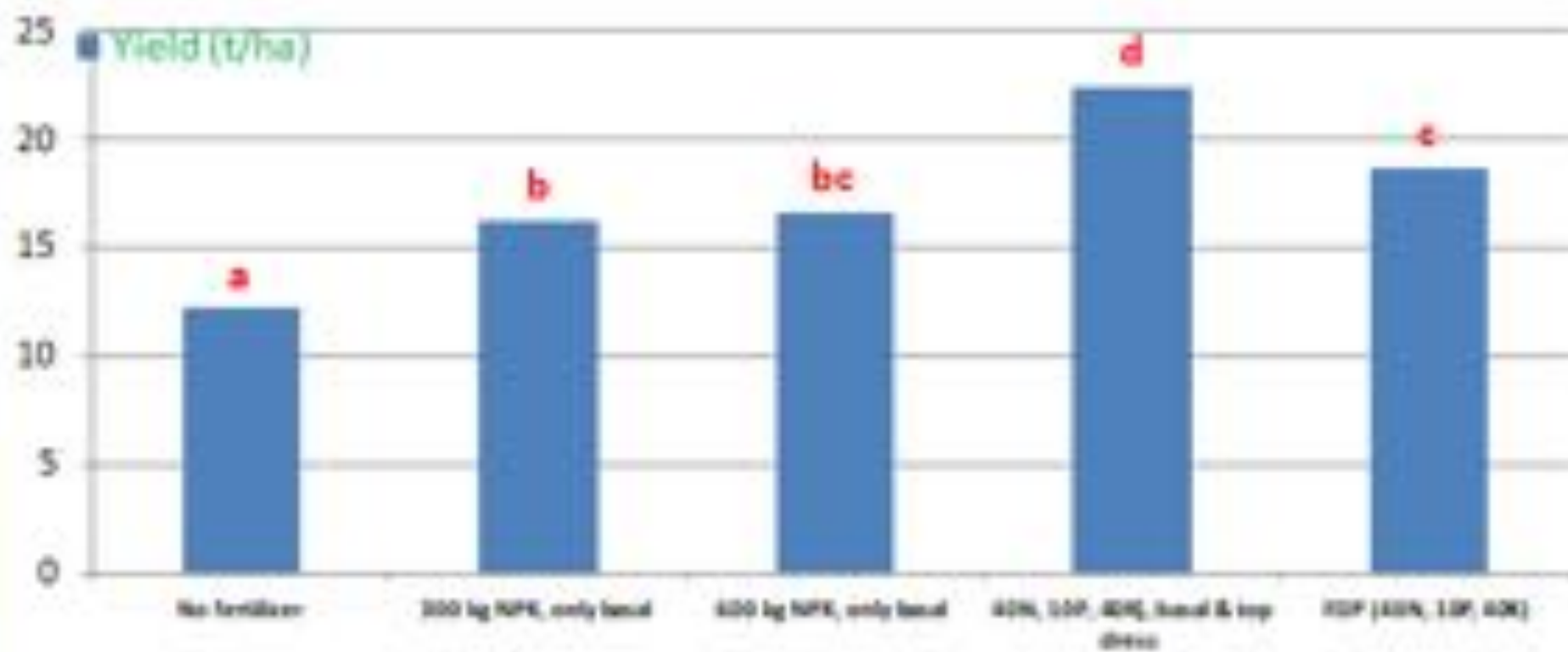


## Cost and return, fertilizer trial in Bo Muoi

	No fertilizer	300 kg NPK, only basal	600 kg NPK, only basal	(40N, 10P, 40K), basal & top dressing	FDP (40N, 10P, 40K)
<b>Gross return (000vnd)</b>	32,802	32,508	31,080	25,592	23,940
<b>Total material cost (000vnd)</b>	1,455	2,715	3,975	3,406.8	4,545
<b>Total labour (working days)</b>	210	210	208	207	205
<b>Net return (000vnd)</b>	31,347	29,793	27,105	22,185	19,395
<b>Net return per working day (000vnd)</b>	149.3	141.8	130.3	107.2	94.6
<b>Net return per 1000vnd spent (000 vnd)</b>	21.54	10.97	6.82	6.51	4.26

*Note: the price of cassava fresh roots was 1,400 vnd/kg*

## Cassava fresh root yield, fertiliser trial in Pung Tra



## Harvest index (HI)



## Cost and return, fertilizer trial in Pung Tra

	No fertilizer	300 kg NPK, only basal	600 kg NPK, only basal	40N, 10P, 40K), basal & top dressing	FDP (40N, 10P, 40K)
Gross return (000vnd)	17,080	22,792	23,338	31,318	26,180
Total material cost (000vnd)	1,455	2,715	3,975	3,407	4,545
Total labour (working days)	190	193	198	200	198
Net return (000vnd)	15,625	20,077	19,363	27,911	21,635
Net return per working day (000vnd)	82.2	104.0	97.8	139.5	109.3
Net return per 1000vnd spent (000vnd)	10.73	7.39	4.87	8.19	4.76



1. Thêm kết luận vào đây.

2. Thêm giải thích:

- Tại sao Bón Muri và Púng Tra lại khác nhau, hay không khác nhau
- Các mức phân bón, cách bón có cho tác động khác nhau k, tại sao

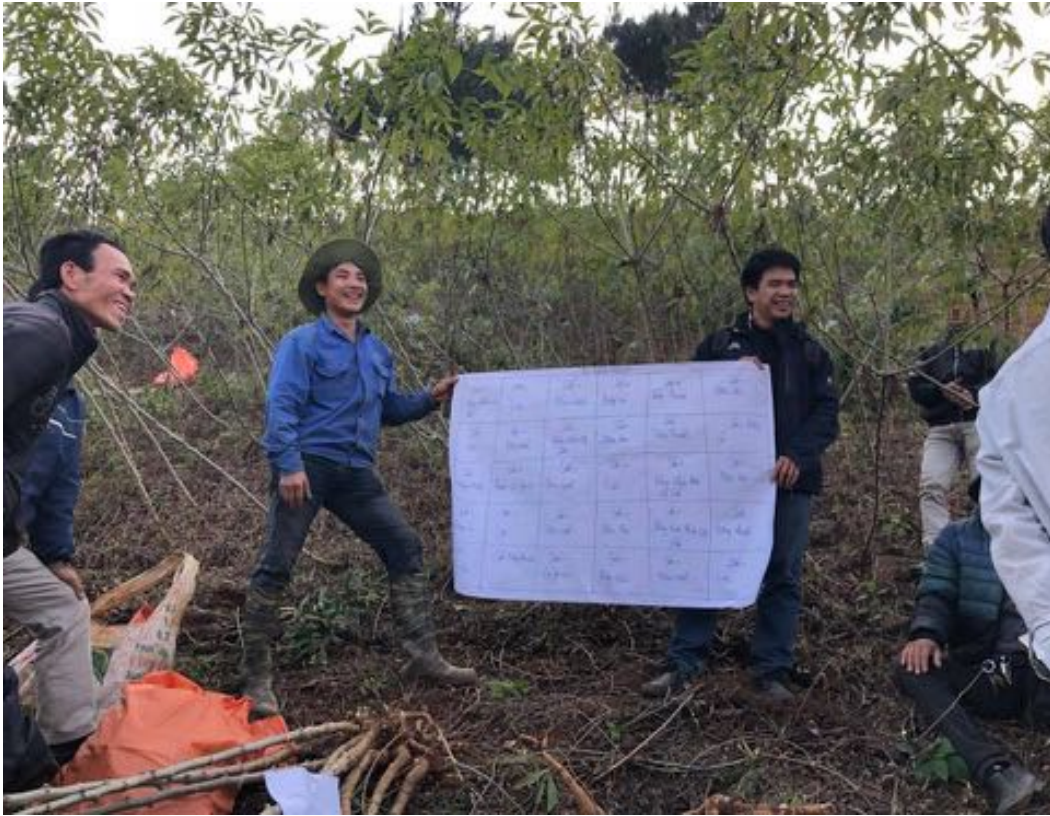
Bón phân đơn riêng rẽ, có bón thúc làm tăng năng suất sản hơn so với cùng lượng ở dạng FDP, và các mức phân bón thấp hơn khi được thử nghiệm trên đất canh tác sản nhiều năm; Tuy nhiên kết quả trên lại không đúng với thử nghiệm trên đất có luân canh với ngô. Do đó cần xem xét lại kết quả phân tích đất cũng như cần theo dõi thêm năng suất sản ở các năm tiếp theo

Sử dụng phân bón chậm tan như NPK, FDP có hệ số thu hoạch cao hơn so với việc sử dụng phân bón riêng rẽ, có bón thúc. Như vậy có thể nghiên cứu xác định thời điểm, liều lượng bón phân riêng rẽ để nâng cao hệ số thu hoạch

Đề xuất cách bón phân riêng rẽ : bón lót 100%P +1/3 N; thúc lần 1 sau trồng 2 tháng: 1/3 N + 1/3 K, thúc lần 2 sau trồng 3 tháng: 1/3 N + 2/3 K

# FIELD DAY





# Challenges and constraints

***Climate:*** All the crops were sown/grown during 3 April – 7 April, and shortly after germinating/spouting there was a long spell of drought (during 20 April – 10 May) which caused high rate of mortality of plantlets. Vice versa, during the harvesting period of legumes it was rainy a lot, almost every day, and this may cause some reduction in the yield and quality of legumes.

**Grass** was to re-sown few times because of the high mortality rate caused by drought and latter-re-sown one died due to the lack of sun (cassava plants covered well the ground and little grass seedlings were completely shaded).

# Challenges and constraints (cont.)

**Lands:** Most of the cases of fertilisers and soil management trials, block are too steeply sloping (45 – 60 degrees) and located far from farmers' houses. This caused difficulties for farmers to visit the fields, especially for harvest and take grass home to feed their cattle.

**Fertiliser application:** Soil conditions are different between sites, but the same rates were tested in all sites. Might this not be a right way for defining appropriate fertilizers levels?

**Cassava density:** The density of 10000 plants/ha (1m x 1m distance) seems to be low and might cause low yield of cassava?

**Increased labour requirement** for planting and managing intercrops and grass strips, and this seems to be one of the factors hindering the adoption of practices.

# Main points

- Trialled varieties:
  - 3 varieties (Rayong9, 13Sa05 and BK) had yield and starch content higher than the current locally popular varieties;
  - 1 variety had the same yield and starch content as the controls
  - Some farmers wish to test in their field these varieties
  
- Fertilizers rate and formulation:
  - Impacts of fertilizer treatments were different between trial sites, perhaps due to the difference in soil conditions. In Pung Tra all treatments increased the yield and income, but not in Bo Muoi.
  
- Soil management practices:
  - Legumes (cowpea in particular) as intercrops brought additional income and biomass
  - Grass yielded green feeds for cattle
  - Grass and contour barriers by cassava plant residues of last year could retain significant soil amount from be washing off away.
  - Some farmers wish to test cowpea as intercrop in their cassava field

# Plan for 2018

- Repeat the trials
- Soil analysis
- Support some farmers to pilot new varieties and intercropping (cowpea, grass):
  - providing seeds and technical guidance
  - Capacity building
- Strengthen links between stakeholders

**THANK YOU FOR YOUR  
ATTENTION**

