Sweetpotato Yield Estimation using Crop Cut Method in Malawi (2019)

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Introduction

- Need to monitor SP yields: improve productivity; check for sustainability; and profitability of new varieties

- Involves both estimation of the crop area and the quantity of SP obtained from that area

- Some common ways of estimating yield:
    - — Crop cuts;
    - — Farmer estimates; and
    - — On-farm trials or demonstration plots
- Accurate measurement of the productivity of the 6 improved OFSP varieties in Malawi
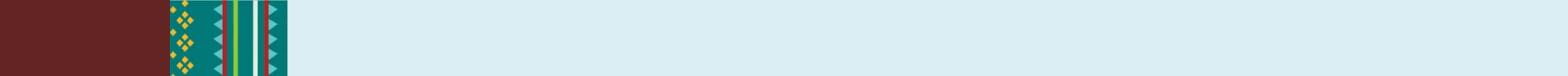
Method

- Conducted between April - May 2019 in all the 3 regions of Malawi & in 5 / 8 Agricultural Development Divisions (ADDs)

- Purposively selected 12 / 14 Agro-Ecological Zones

- Beneficiaries of years of CIP interventions through various projects

- The data was collected during the 2 visits; monitoring and harvest, using an ODK developed CAPI

Results - Demographics

- Target 768 cuts; 579 harvest visits; 75.4% of the targeted sample size

- 18 Extension Planning Areas (EPAs); 64 sections and 158 villages

- 2 AEZs in the Northern part had poor representation
    — Nkhata Bay, Mzuzu (5.2%)
    — Chintheche, Chikwangawa, Wenya (4.8%)

- *Ana Akwanire*, *Mathuthu*, and *Zondeni* unavailable in most AEZs; *Ana Akwanire* missed totally in 6 AEZs

Results – SP Plots

- In addition to 6 OFSP and Kenya varieties, 28 local varieties were cut from farmers plots

- 56% plots managed by men

- 30% of farmers got planting materials from male farmers; 21% government; 17% own source

- Labelling of sourced vines a big challenge – 69%

- 91% farmers doing rotational farming

- Less than 2% applied fertilisers or sprayed to control pests

- Plant spacing varied across AEZs with 30 cms and 100 cms common

- Months to harvest mean was 3.6 months

Foliage Yield

Overall Yield – Mean [SD]	12.1 [7.5] 4.9 [3.0]	
Non-OFSP Varieties	13.5 [8.0] 5.5 [3.2]	0.002
OFSP Varieties	11.4 [7.2] 4.6 [2.9]	

Ana Akwanire	**9.0 [5.9] 3.6 [2.4]**	
Kadyaubwerere	10.9 [7.1] 4.4 [2.9]	
Kaphulira	12.2 [7.5] 4.9 [3.0]	
Mathuthu	8.4 [5.8] 3.4 [2.4]	
Zondeni	10.1 [6.2] 4.1 [2.5]	0.004
Kenya	13.6 [7.7] 5.5 [3.1]	
Chipika	12.2 [7.2] 4.9 [2.9]	
Local	13.4 [8.2] 5.4 [3.3]	

Root Yield

Overall Yield – Mean [SD]	8.8 [6.3] 3.6 [2.6]	
Non-OFSP Varieties	9.3 [6.6] 3.7 [2.7]	0.5
OFSP Varieties	8.9 [6.1] 3.6 [2.5]	

Ana Akwanire	**8.6 [5.5] 3.5 [2.2]**	
Kadyaubwerere	7.9 [5.3] 3.2 [2.1]	
Kaphulira	9.0 [6.0] 3.7 [2.4]	
Mathuthu	11.7 [10.6] 4.8 [4.3]	
Zondeni	7.1 [5.8] 2.9 [2.4]	**0.04**
Kenya	8.4 [5.9] 3.4 [2.4]	
Chipika	9.4 [5.1] 3.8 [2.1]	
Local	9.8 [7.0] 4.0 [2.9]	

The largest yield was from Lilongwe Plain AEZ (section: Katope and village: Mphere). The total foliage and root weights of the *Mathuthu* variety were 5.1 and 24.5 Kilograms respectively and was harvested at 4 months.
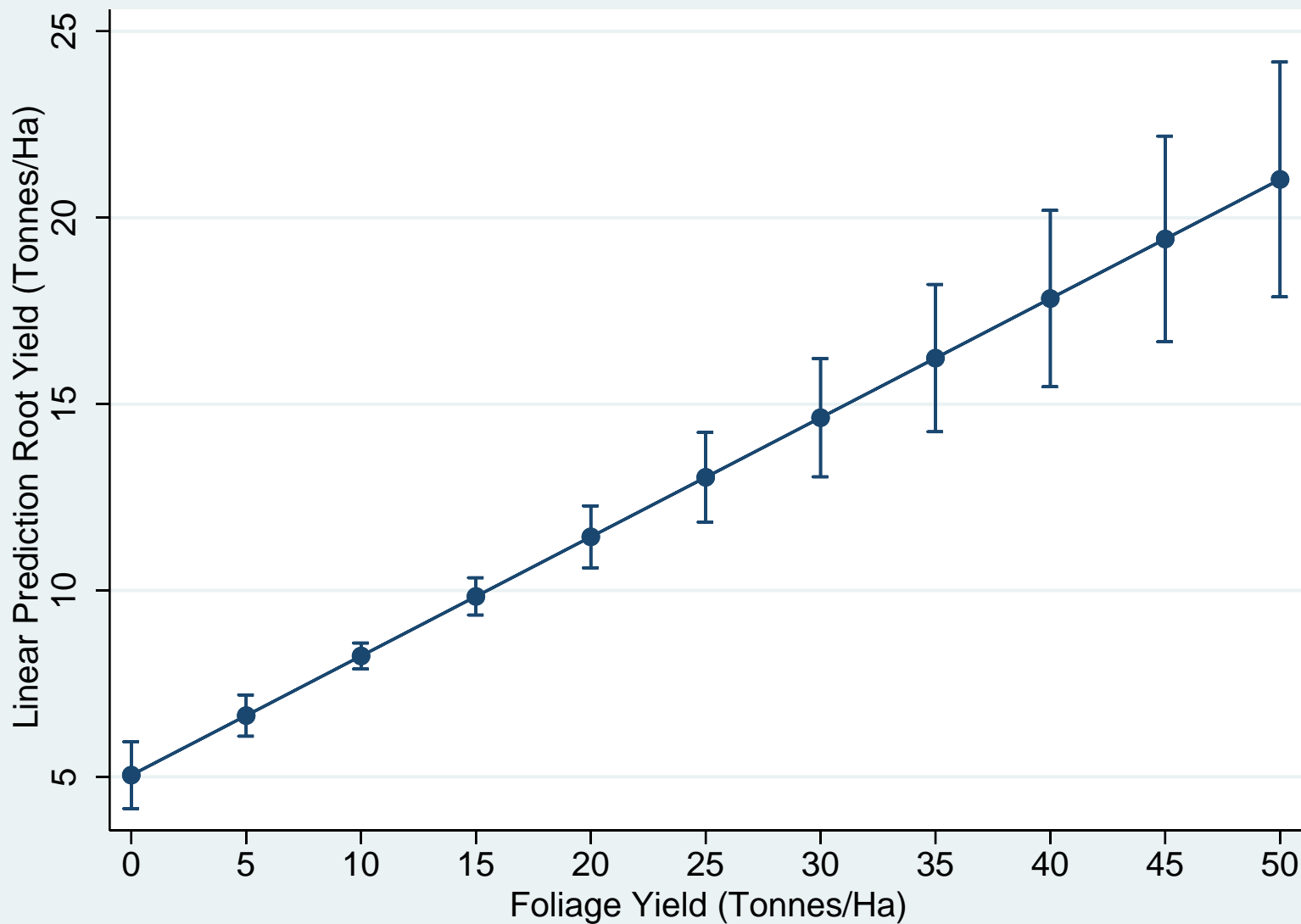
NO yield was from Lilongwe East, Masiku AEZ (section: Mnkhupa and village: Chamkoma). The total foliage weight of the Semusa variety was 7.0 Kilograms and was harvested at 3 months.
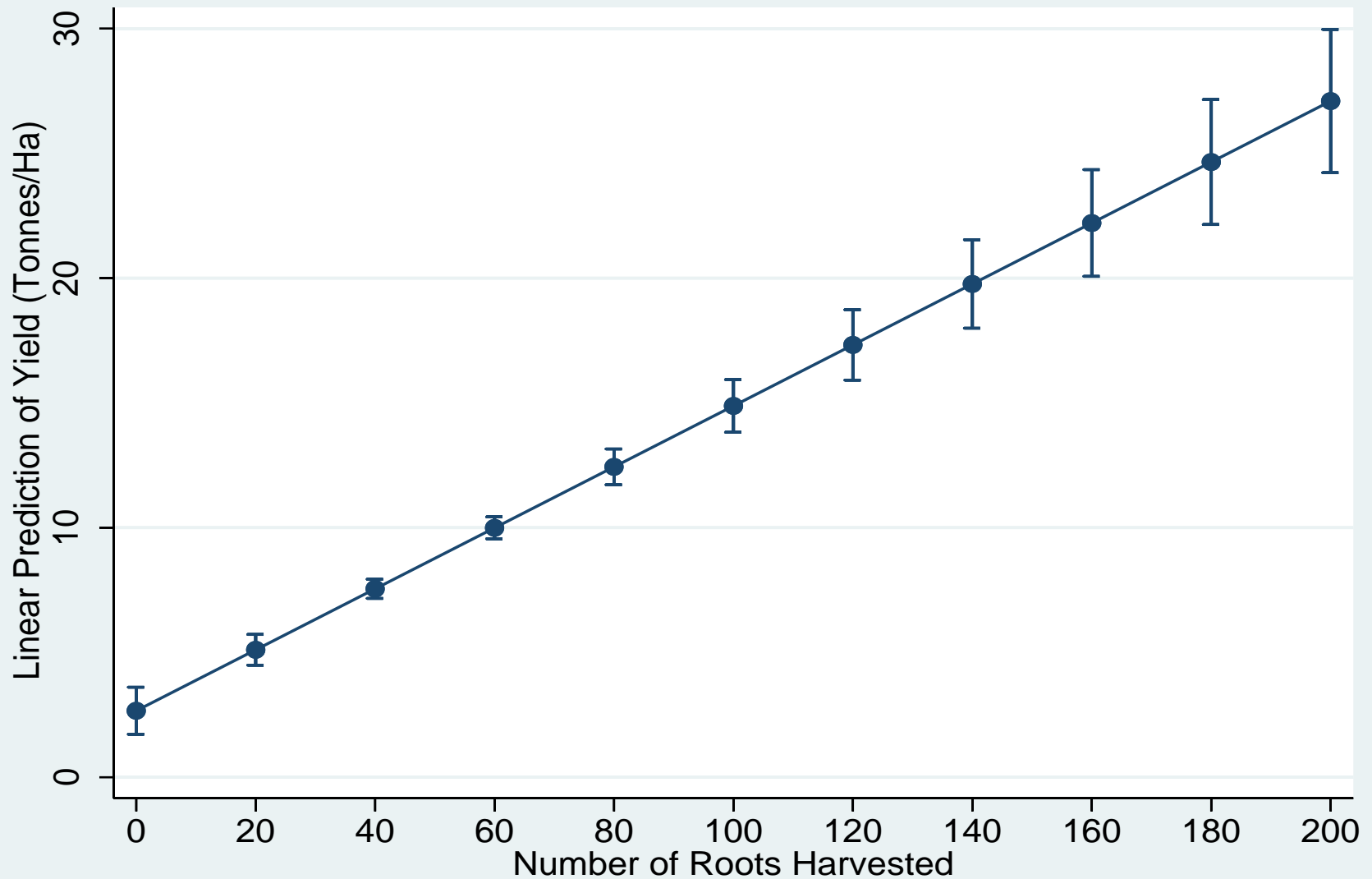
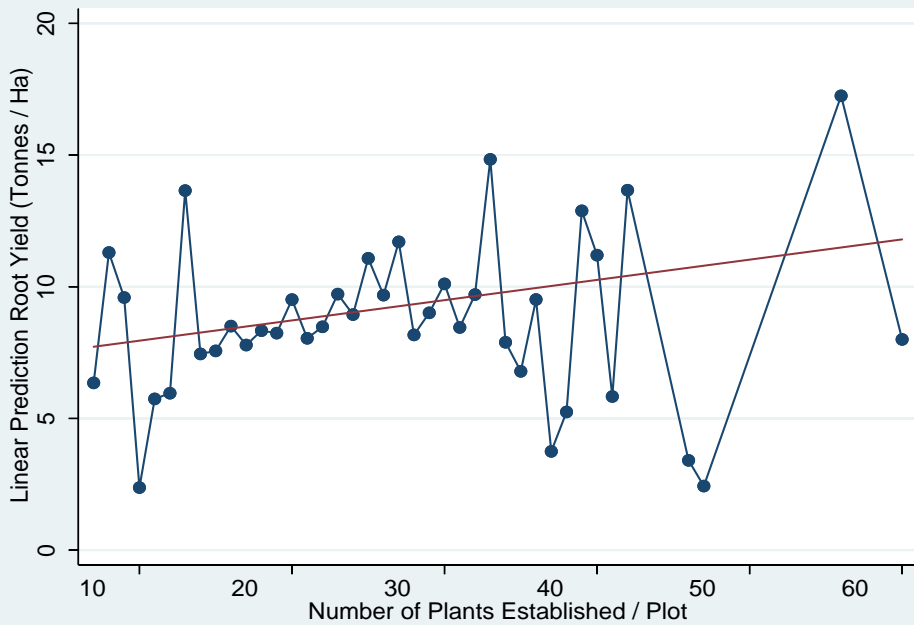# Factors affecting sweetpotato production in Malawi
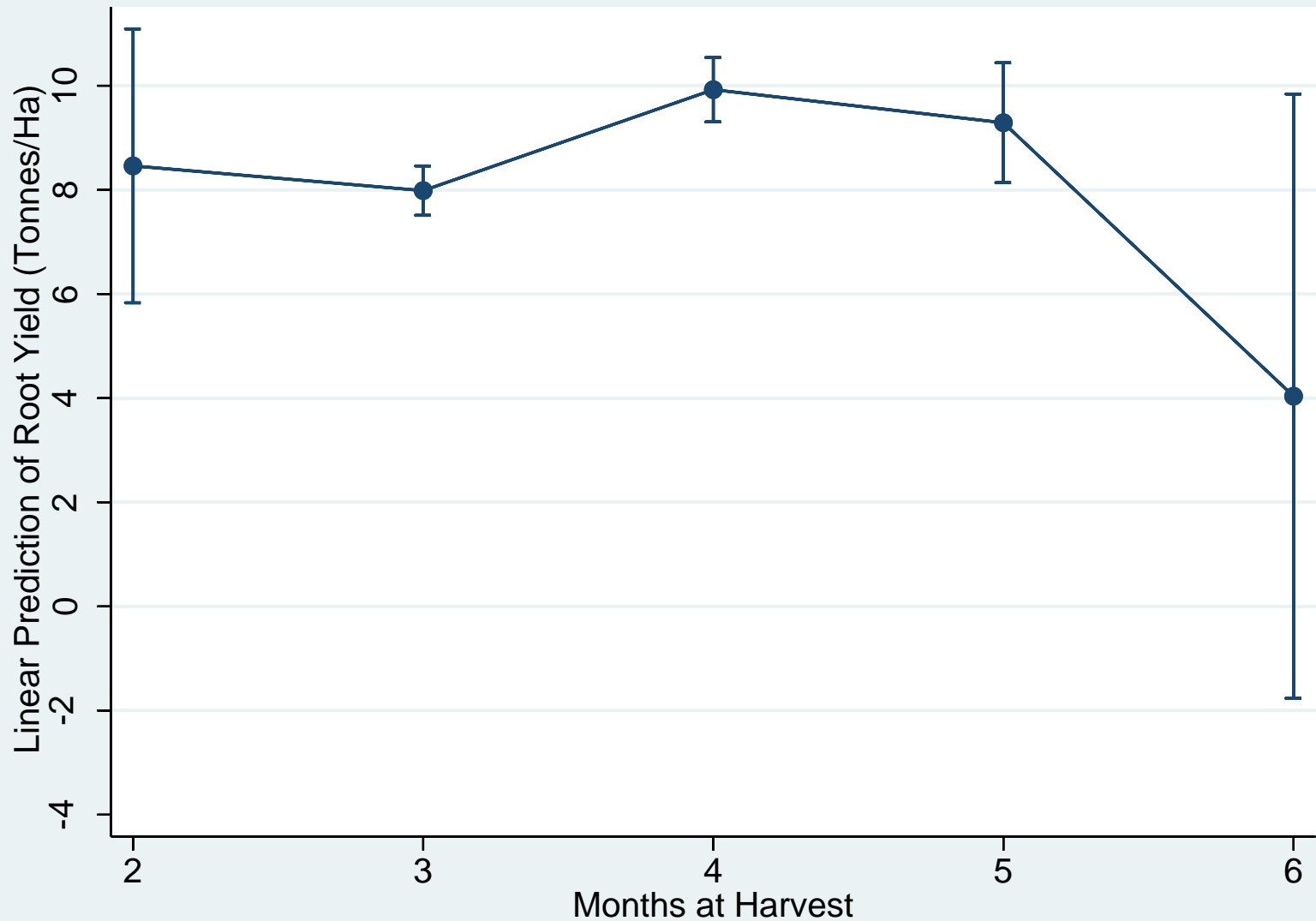
Adj. Coefficient: 1.2 [0.7 − 1.8]

Adj. Coefficient: *0.3 [0.2 − 0.4]*

Adj. Coefficient: 0.1 [0.1 – 0.1]
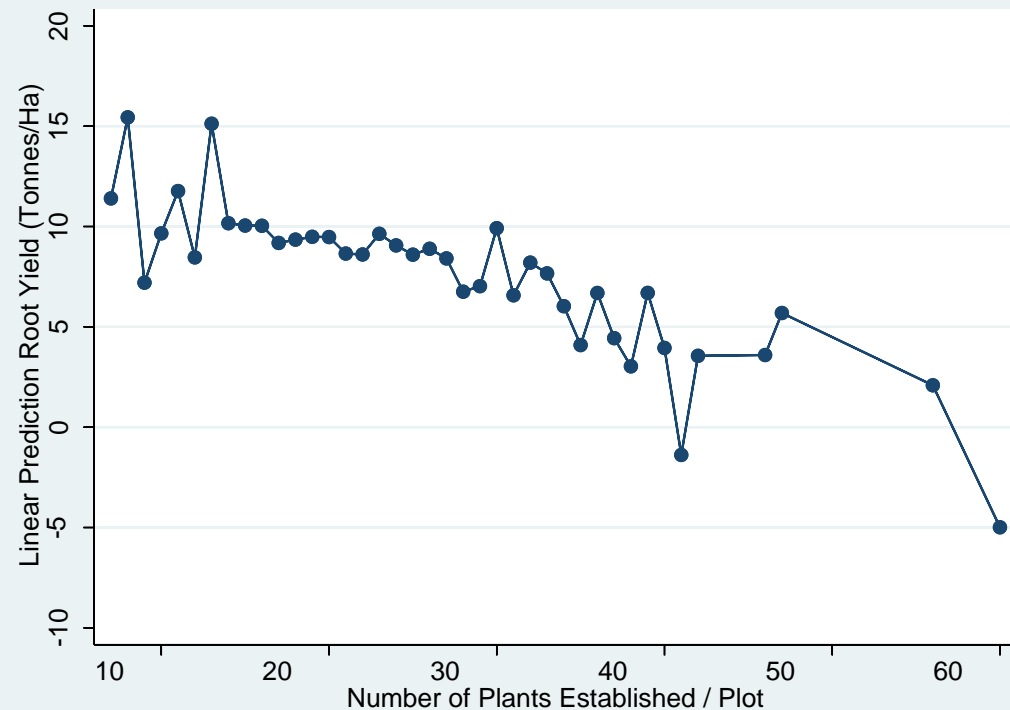
The prediction for root yield from a univariate linear regression on number of plans established (x) and x2

UnAdj. Coefficient:
                    0.1 [-0.0 – 0.2]

The prediction for root yield from a multivariate linear regression

Adj. Coefficient:
                    -0.2 [-0.3 - -0.1]

Conclusion

- Another statistics in SP production
  - FAOSTAT (2017)   → 20.2 tonnes per hectare
  - D. van Vugt and A.C. Frankec (2017)   → 5.9 to 9.6
  - Crop cut (2019)   → 8.9 (7.9 to 11.7)

- Difference in root production between AEZs advocates for our recommendation despite lack of power in analysis
  - Kaphulira is most promising – foliage & root; availability
  - Chipika is 2nd option

- Timely planting of SP is vital for root production if our analysis is but just an indicator

- Confounding effect of plant density on root yield needs further investigation

- Since varieties have different maturity periods, yield assessment may have been better by harvesting each variety at the optimal harvest time