



# Mapping Cocoa Productivity: Mapping Cocoa Productivity Project

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Paul Hadley  
School of Agriculture, Policy and Development,  
University of Reading

# Mapping Cocoa Productivity Project

## Aims

- To carry out a thorough characterisation of approximately 300 contrasting cocoa farms in Ghana, Indonesia and Cote d'Ivoire (age, size, variety of cocoa used, shade species present) as well as the socio-economic background of the farmers.
- To assess the agricultural practices carried out on these farms by means of farmer interviews.
- To assess yields, cropping patterns and losses to disease across the farms in the study.
- To carry out controlled interventions on a sub-set of farms.
- To ascertain what factors underlie farm-to-farm variations in yield.
- Funded by Mondelez International.

# Ghana Component



- Has been running for over three years
- Interviews and regular yield assessments are carried out by CRIG staff

# Key Data

- Profile of Farmers & challenges faced by farmers
- Farmer practices: What are farmers doing compared with recommended practices?
- Training
- Farm to farm variation in yield
- Seasonal variation in yield
- Factors underlying farm to farm variation
- Factors underlying seasonal variation
- Losses to blackpod
- Intervention trials

# Challenges faced by farmers

Problem	% of farmers
Pest and diseases	78.0
Mistletoes	36.3
Lack of credit access	16.5

2012

Problem faced	% of farmers
Insect pests	62.4
Blackpod	43.5
Lack of credit	40.0

2014

Problem faced	% of farmers
Pests	67.4
Blackpod	55.8
Lack of credit	46.5

2015

- Pests and diseases consistently cited as major problem
- Lack of credit has increased in importance



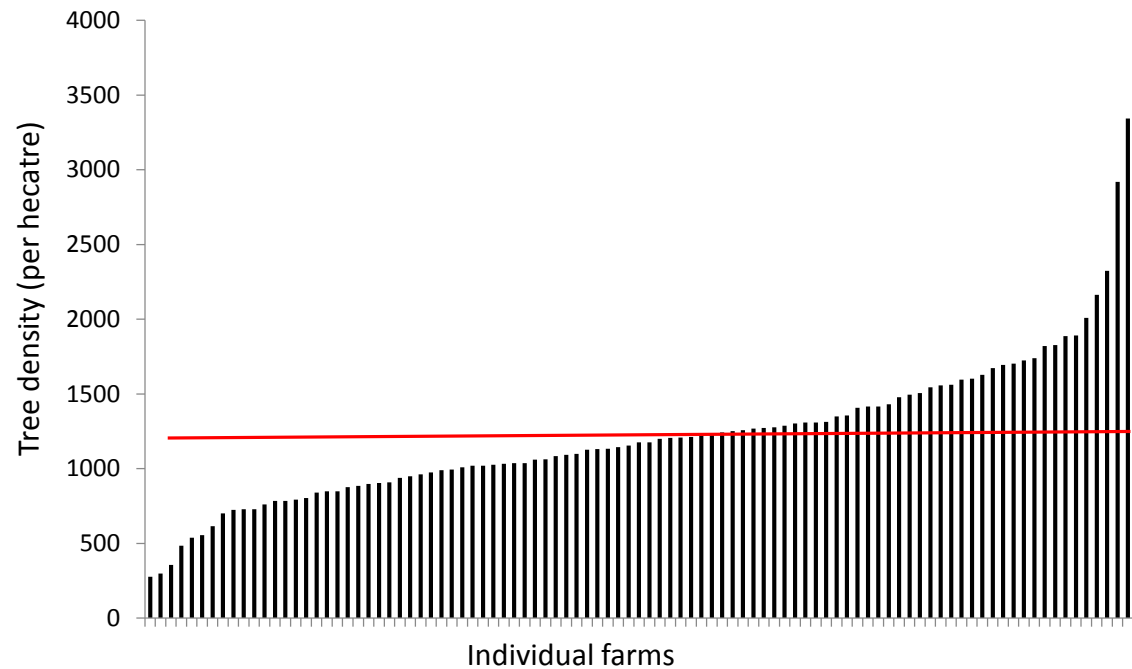
# Cocoa Tree Density

## Recommendation

Plant in rows at 3\*3 (1111 plants ha<sup>-1</sup>)

## Actual

Considerable deviation from recommended density, few farmers plant in rows



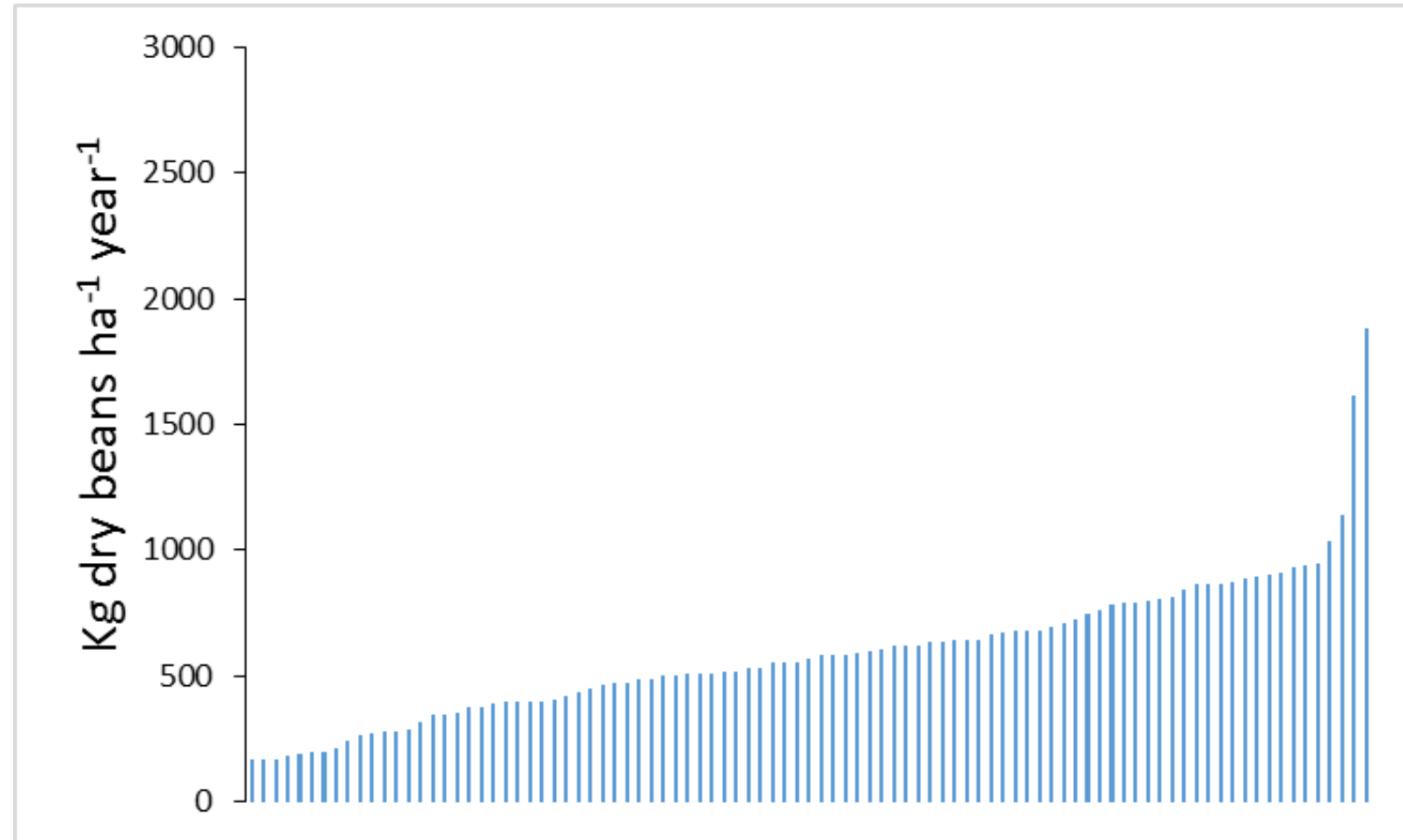
# Yield Variation

Variation in yield 2012/13 based on  
pod count data

Range approx. 63- 1887 kg ha<sup>-1</sup>

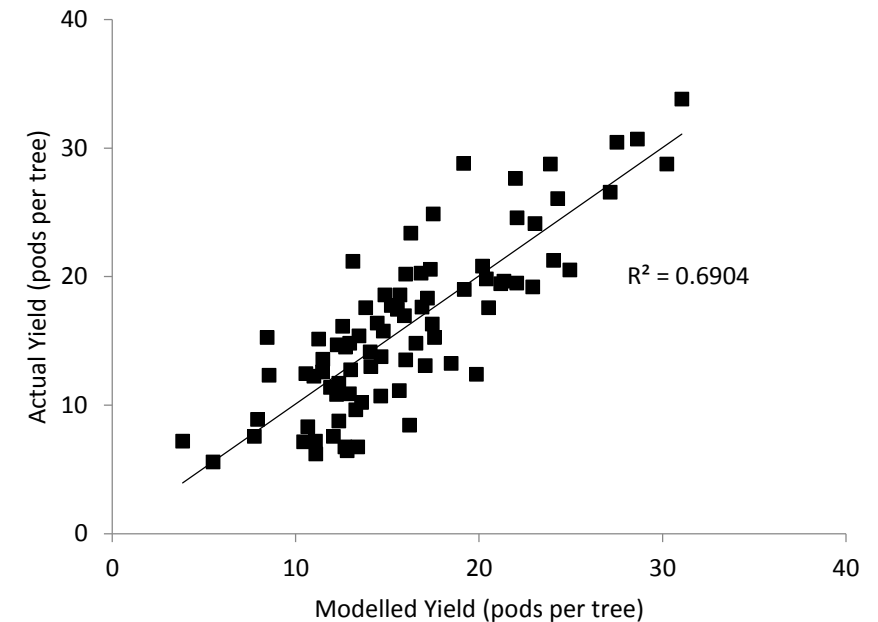
Average ~580 kg ha<sup>-1</sup>

**Based on pod value of 30**



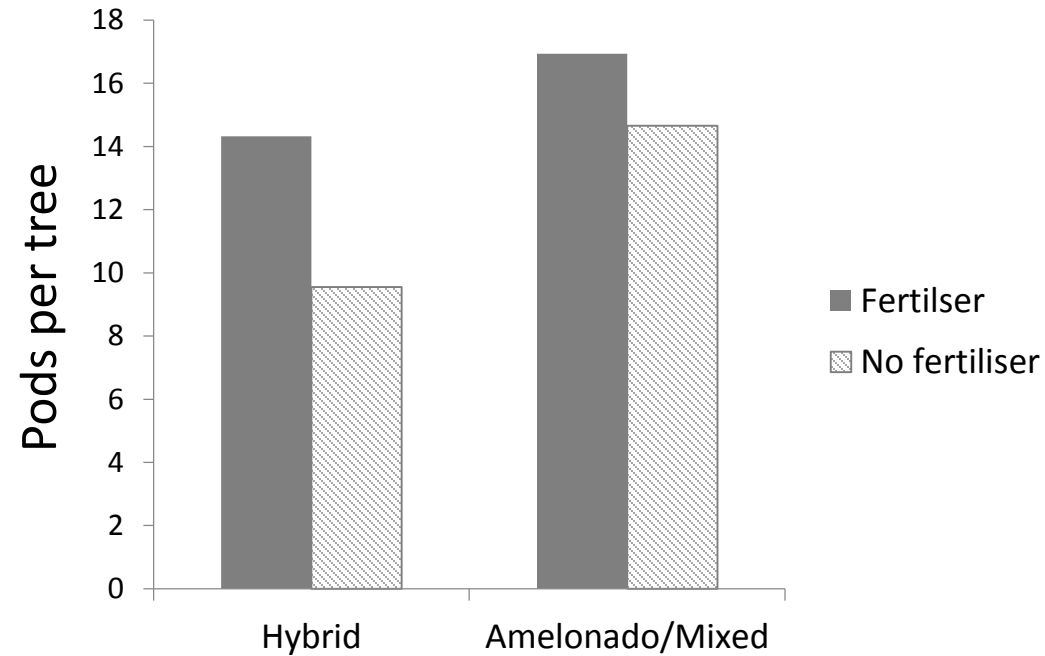
# Year-2 Regression model

Parameter	Estimate
Constant	-22.2
Tree Age (years)	0.1005
Density (trees per hectare)	-0.00286
Fertilizer = Yes	9.60
Ln (Nitrogen)	-12.67
Ln (Phosphorus)	2.850
Sqrt (Rainfall) mm	-0.455
Sqrt (Shade) % light interception	0.16
Variety: Hybrid	56.5
Variety: Mixed	-11.6
Weeding	-4.27
pH	0.94
Age * Variety: Hybrid	-0.137
Age * Variety: Mixed	0.390
Fertilizer = YES * Variety: Hybrid	-9.96
Fertilizer = YES * Variety: Mixed	-1.20
Ln (Nitrogen) * Variety: Hybrid	18.13
Ln (*Nitrogen) * Variety: Mixed	13.35
Sqrt (Rainfall) * Variety: Hybrid	0.642
Sqrt (Rainfall) * Variety: Mixed	-0.315
Sqrt (Shade) * Variety: Hybrid	19.4
Sqrt (Shade) * Variety: Mixed	20.78
Weeding * Variety: Hybrid	4.95
Weeding * Variety: Mixed	5.79
pH * Variety: Hybrid	-3.93
pH * Variety: Mixed	4.73

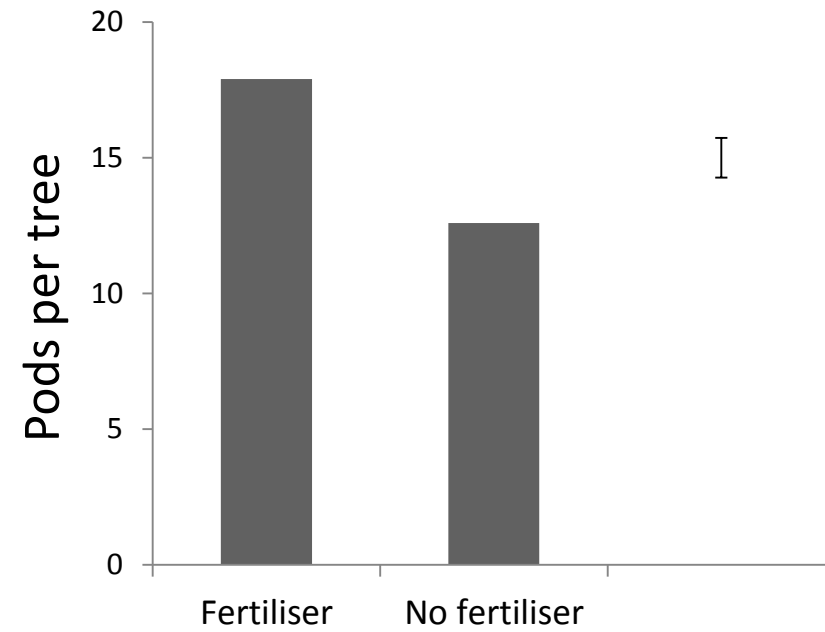




# Effects of fertiliser pods per tree

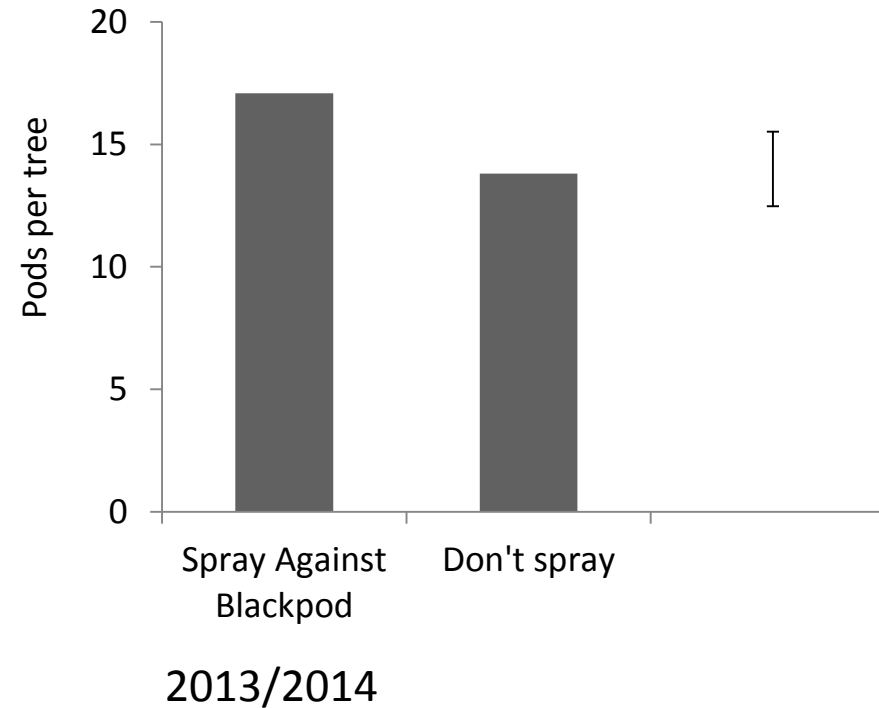
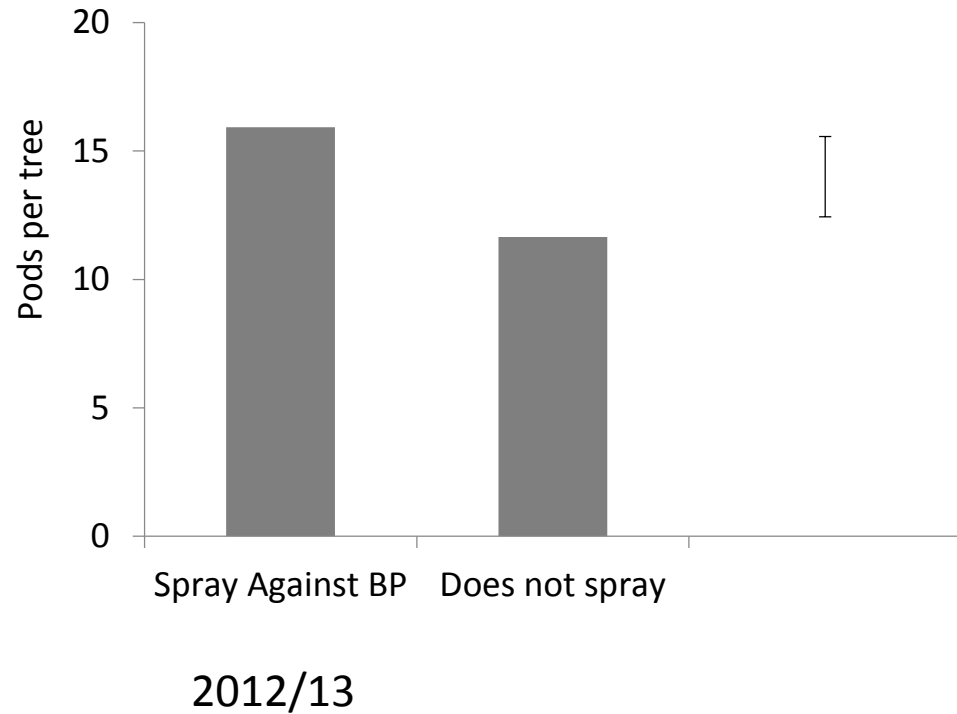


2012/13



2013/2014

# Effects of spraying against blackpod on pods per hectare



# Consistent features of the models

## Impact of tree density

Simulated density (trees per hectare)	Pods per Tree	Pods per Hectare
<b>Year 1 Model</b>		
500	17.6	8,831
1111	15.6	17,350
	% Increase:	96%
<b>Year 2 Model</b>		
500	18.1	9,061
1111	16.4	18,192
	% Increase:	100%

- Small negative impact of increased density on pods per tree
- However large positive effect on pods per hectare
- Increasing tree density on under-planted farms a route to increased yields

## Association between Intervention Programme Followed and Yield

- When the data from the two years were combined, no significant differences in yields in terms of pods per hectare were found between the different agricultural intervention programmes followed by the farmers.
- There was a trend of lower yields on those farms that follow Organic and UTZ interventions.

# Relationship between socio-economic factors and yield

Relationship between level of education and cumulative yield over two years.

Level of Education	Yield (pods per hectare over two years)	Approx. Beans ha <sup>-1</sup> equivalent over two years
No formal	32350	1078
Primary/middle	35118	1171
Secondary	44696	1490
University/ College	51777	1726



Thank you for your attention