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Farmer Incentives and Capacity to Invest: Finding a Path to Sustainable Growth in Rwanda's Coffee Sector

David L. Ortega

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UNIVERSITY OF RWANDA
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Institute of Policy Analysis and Research - Rwanda

Outline

- Background to AGLC
- Methodology
- Research findings: farmer typology
- The role of cooperatives
- Importance of coffee for agricultural growth

Background

Africa Great Lakes Coffee Support Program

- 3-year USAID-funded initiative that addresses 2 major challenges in the coffee sector in Rwanda (and the Africa Great Lakes region)
  - Raise coffee quality
  - Raise coffee productivity
- Partners
  - Numerous public and private sector partners
- Components: • applied research • policy engagement • capacity building

Applied research component

- AGLC draws upon a broad mix of quantitative and qualitative methodologies, including:
  - Coffee farmer/household surveys (and CWS survey)
  - Experimental field/plot level data collection
  - Key Informant Interviews
  - Focus Group Discussions
- Comprehensive coffee sector data base
  - Goal to integrate information from these four data collection activities
  - Provide empirical basis for policy engagement and farmer capacity building

Methodology

Survey of coffee growers

- Geographically dispersed sample across four coffee growing districts: Rutsiro, Huye, Kirehe and Gakanke.
- 4 CWSs in each District (2 cooperatives, 2 private)
- 64 HHs randomly selected from listings of each of the 16 CWSs
  - (64 x 16 = 1,024 HHs)

Fieldwork

AGLC Baseline survey interview with farmer in Gakenke

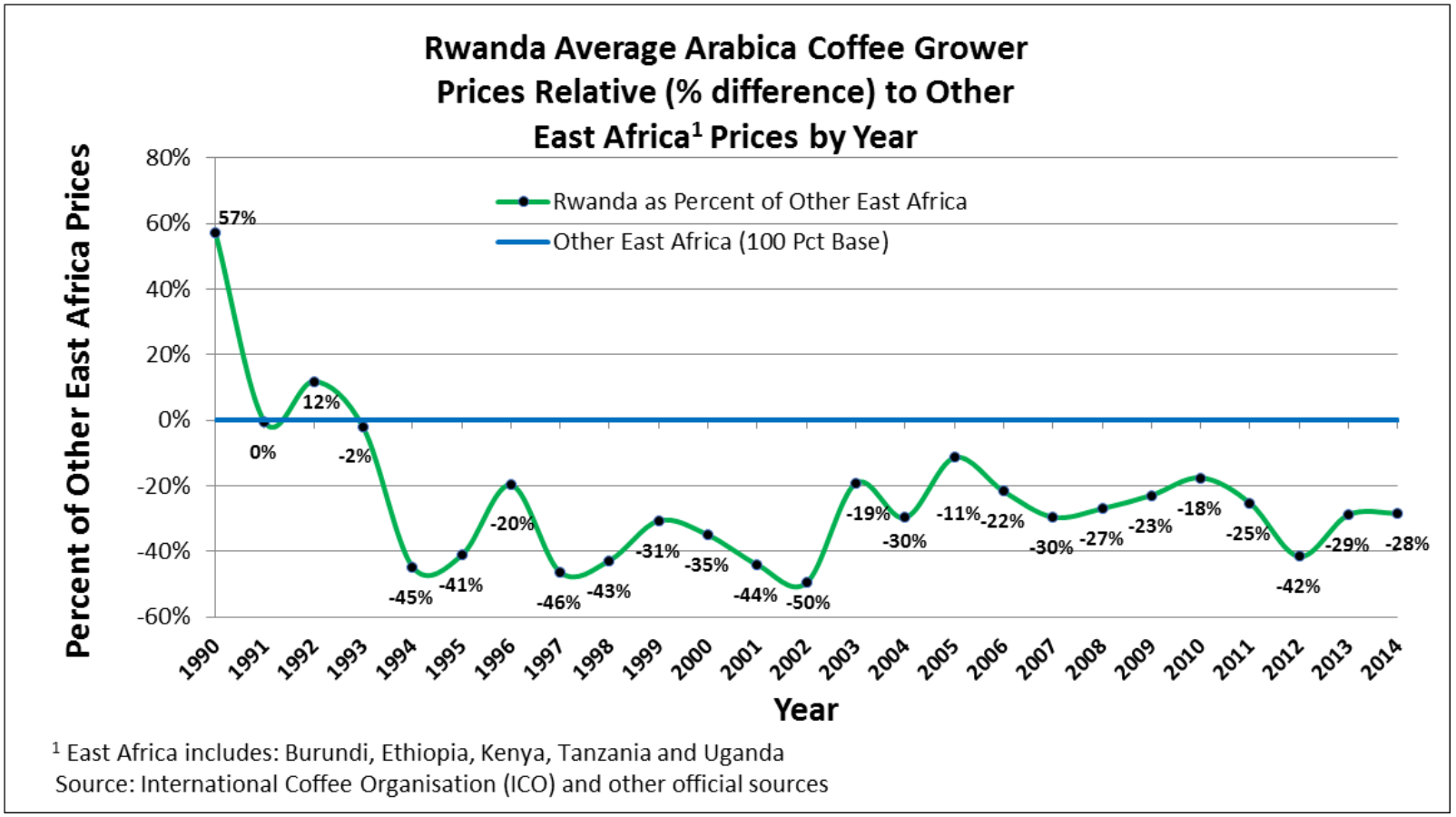
Focus group discussion with farmers at Buf Café washing station

Overview parameters of sample

- Head of HH 81.5% Male; 18.5% Female
- Head of HH completed primary school: 38.1%
- Mean age of head of HH: 51 years
- Median number coffee trees on farm: 400
- Head of HH member of cooperative: 55.4%
- Median cherry produced in 2015: 600 Kg
- Mean cherry price received in: 198 RWF (2015)/160 RWF (2016)
- Median HH cash income: 340,000 RWF
- Share of total cash income from coffee: 44%
- Percent of coffee farmers reporting antestia: 55%

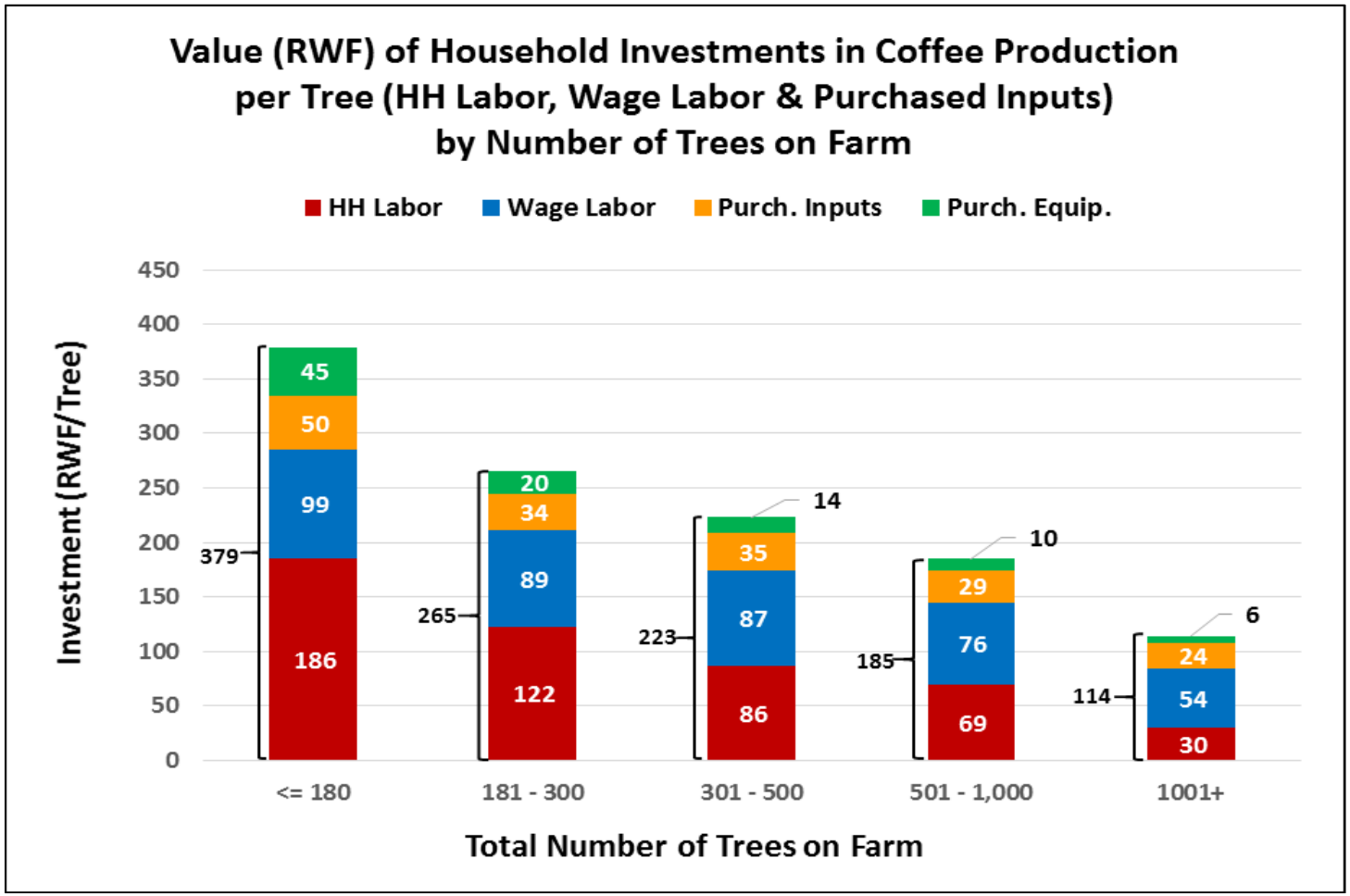
Research Findings

Coffee prices

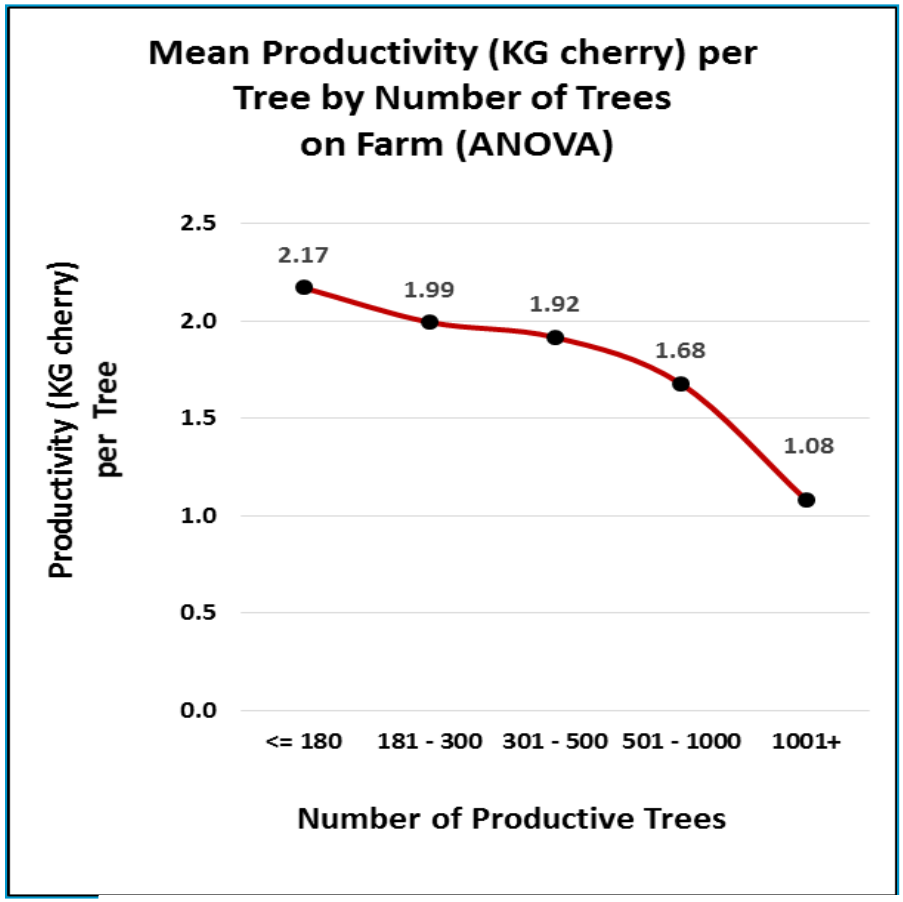


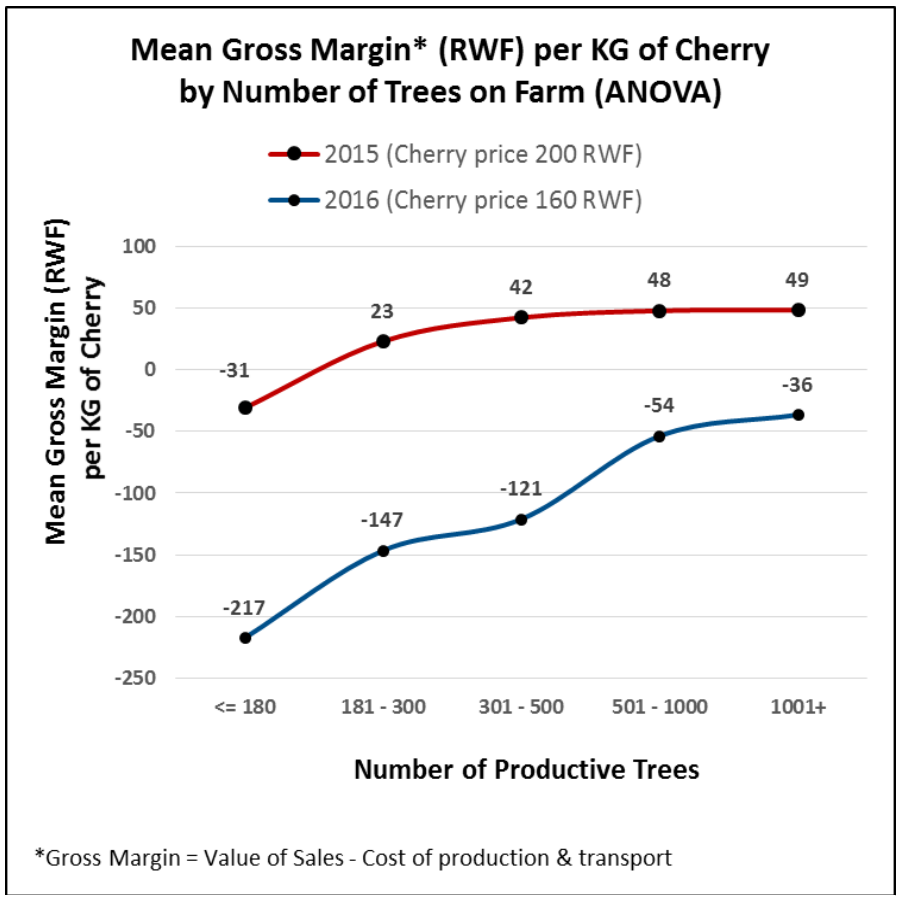
[1] East Africa includes: Burundi, Ethiopia, Kenya, Tanzania and Uganda
Source: International Coffee Organisation (ICO) and other official sources

Farmer investments



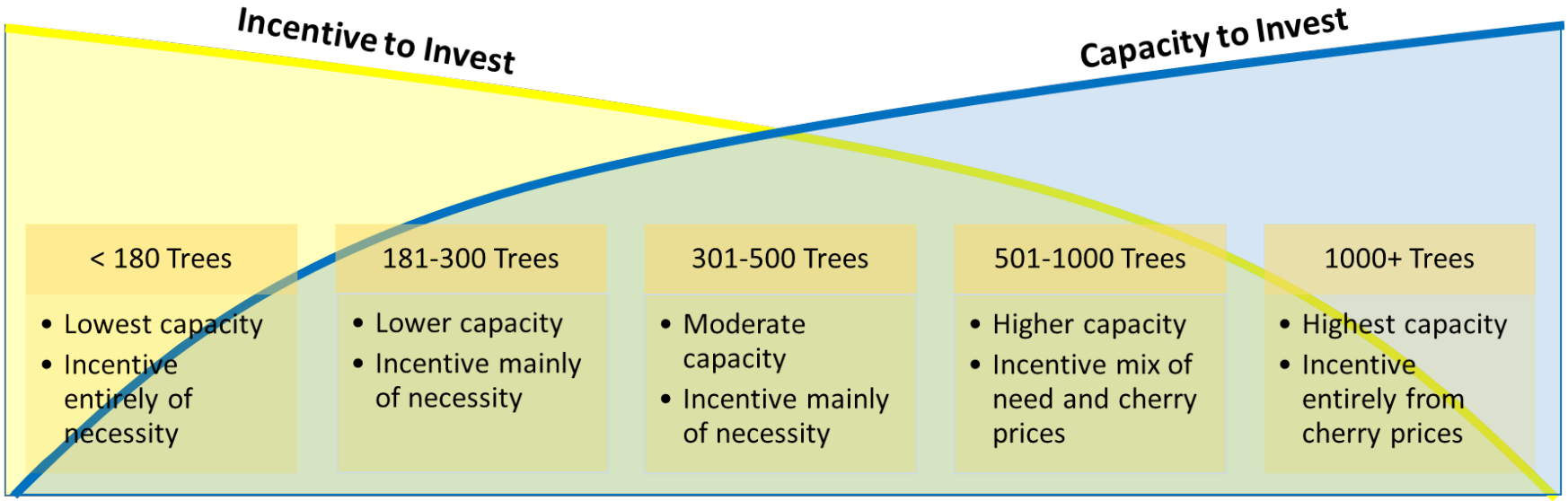
Productivity and margins





Farmer typology

Rwanda Coffee Farmer Typology: Capacity to Invest versus Incentive to Invest (*in Low Cherry Price Scenario*) by Size of Plantation

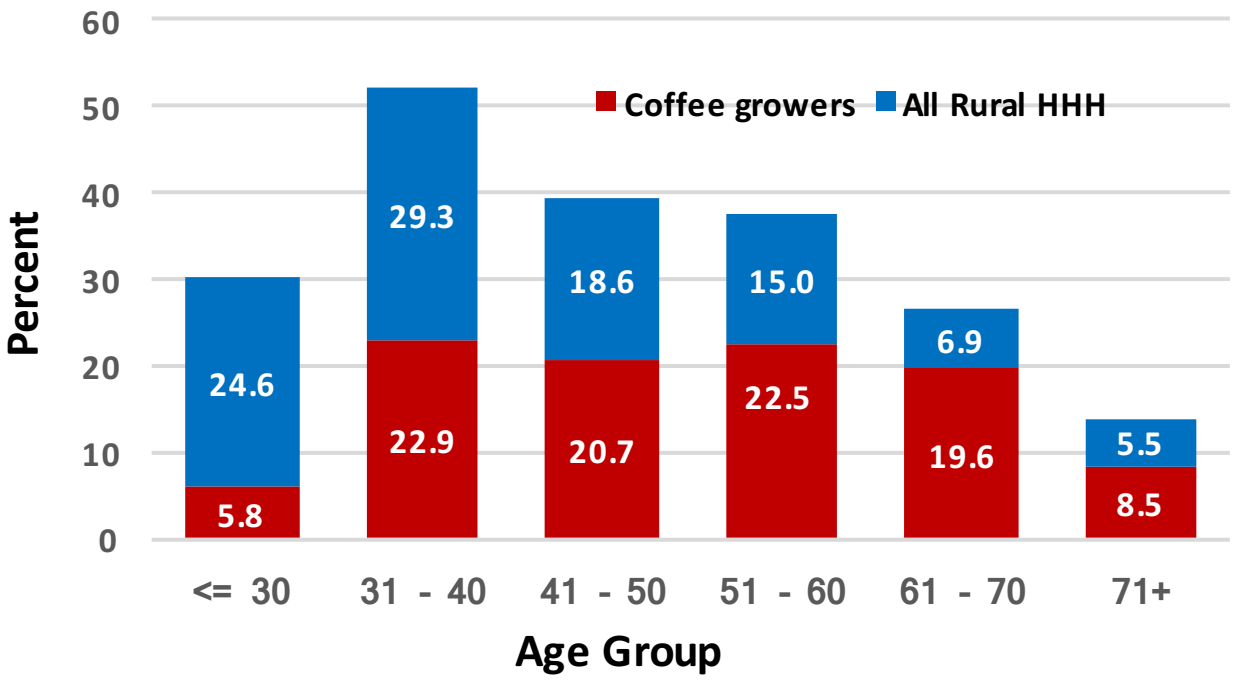


1 **Smallholder Producer**
- High Productivity
- Low Profits

2 **Mid-range Producer**
- Medium Productivity
- Higher Profits

3 **Largeholder Producer**
- Low Productivity
- Low Profits

Aging farmer population



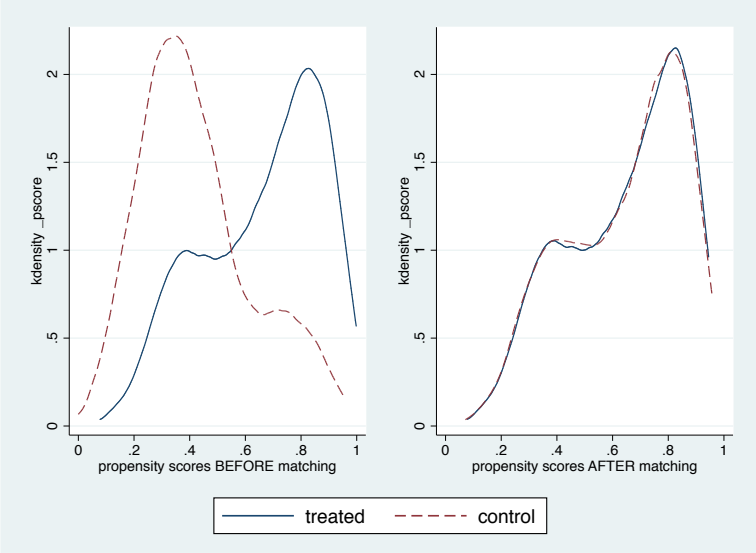
Source of rural population data: Rwanda 2012 Census

Note: Age categories for coffee growers and all rural HHs differ by one year

The Role of Cooperatives

Effect of cooperative membership

- Matching cooperative members and non-members on observable characteristics
- Sensitivity analysis to non-observable characteristics



Cooperative members…

- Adopt best practices
- Are 14% more productive per tree
- Receive 52% more income from coffee
- Have 22% lower cost of production

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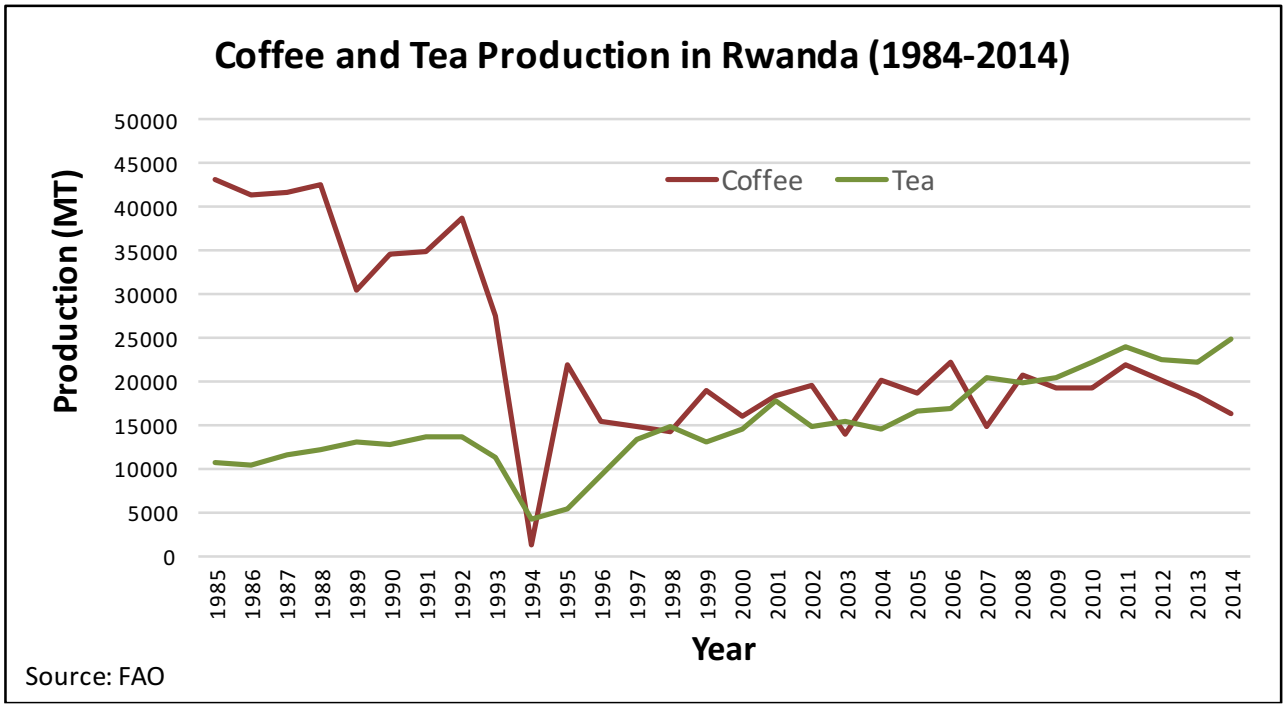
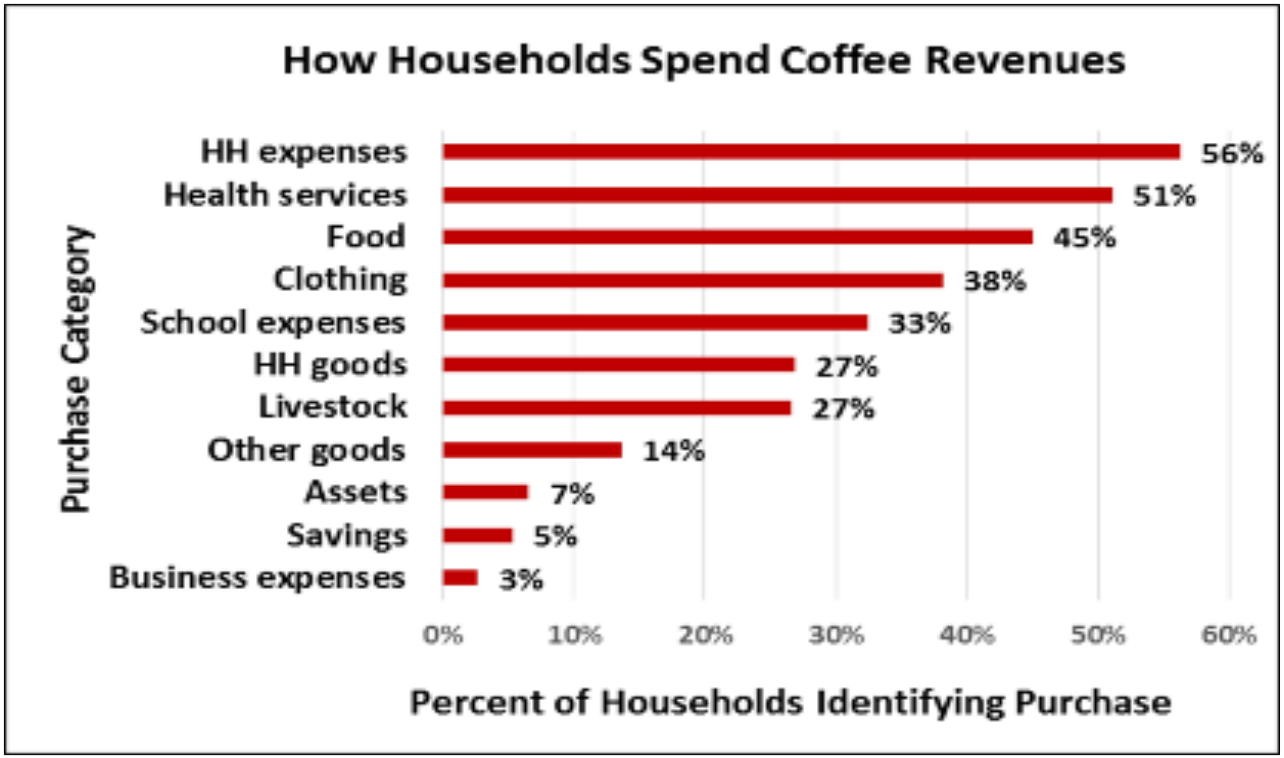
Importance of Coffee to Rwanda's Agricultural Growth

#1. Coffee is a longstanding source of export earnings and economic growth



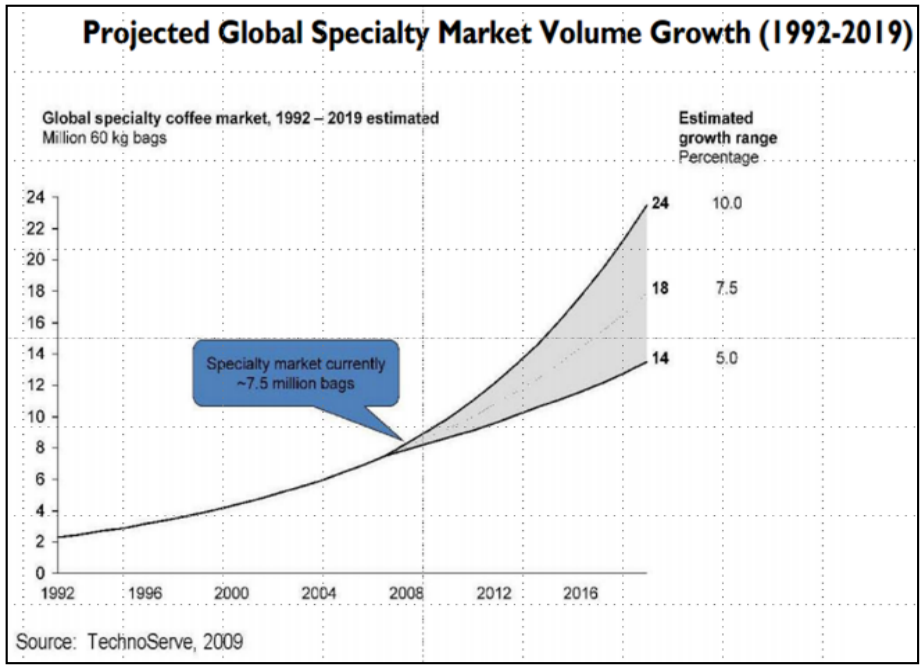
- Despite recent struggles, this downward trend can easily be reversed under the right policy framework

#2. Coffee directly affects the lives of over 350,000 farmers and their families



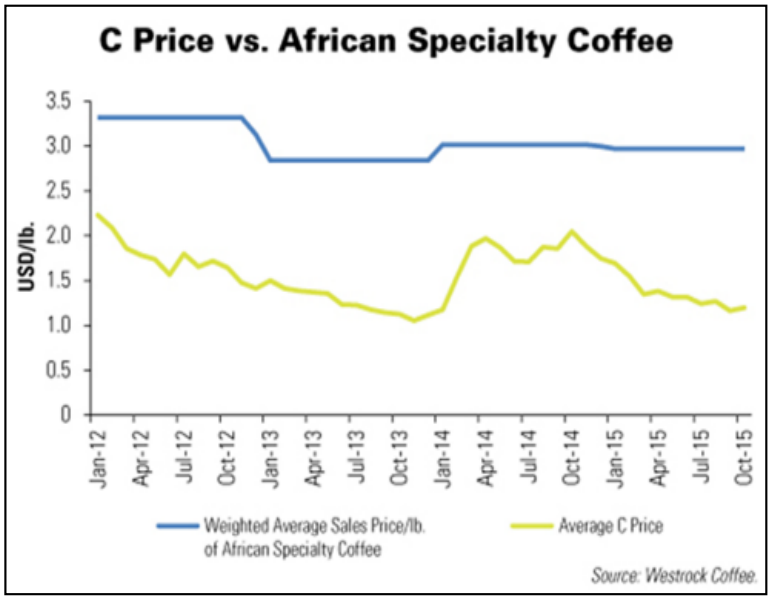
- Rwanda's coffee sector promotes food security and economic development

#3. Specialty coffee is in high and growing demand worldwide



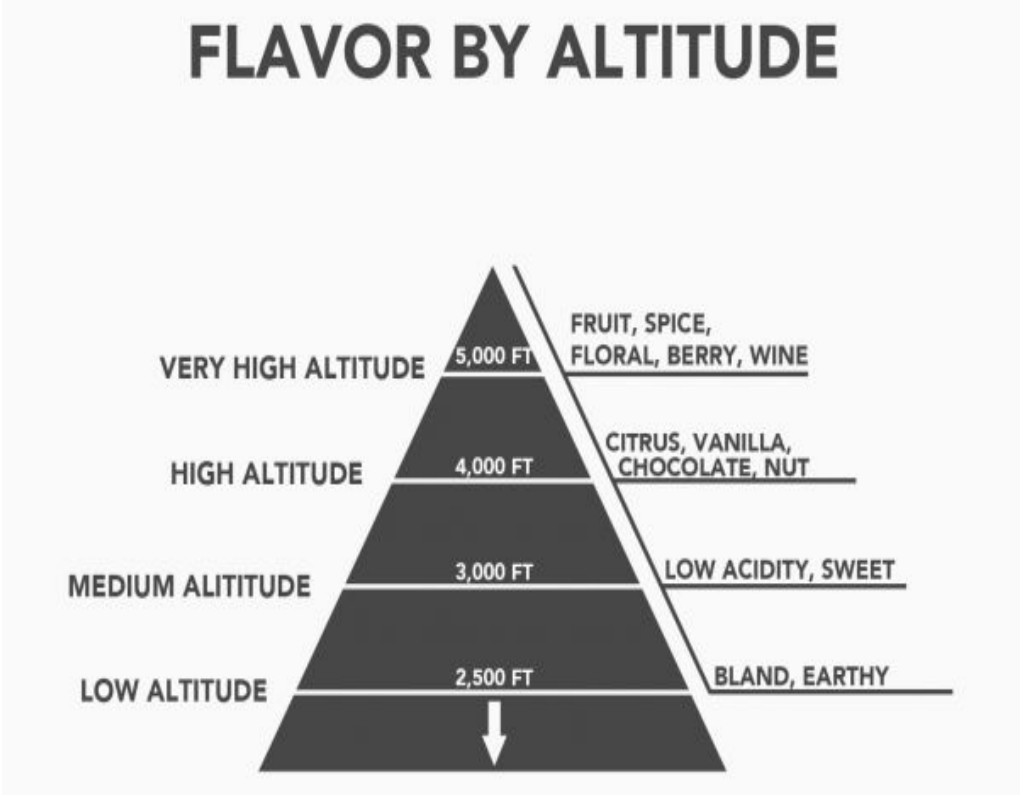
- Rwanda is synonymous with high quality specialty coffee
- 250+ coffee washing stations
- Attracted major companies

#4. Specialty coffee has price stability in global markets (compared to ordinary)



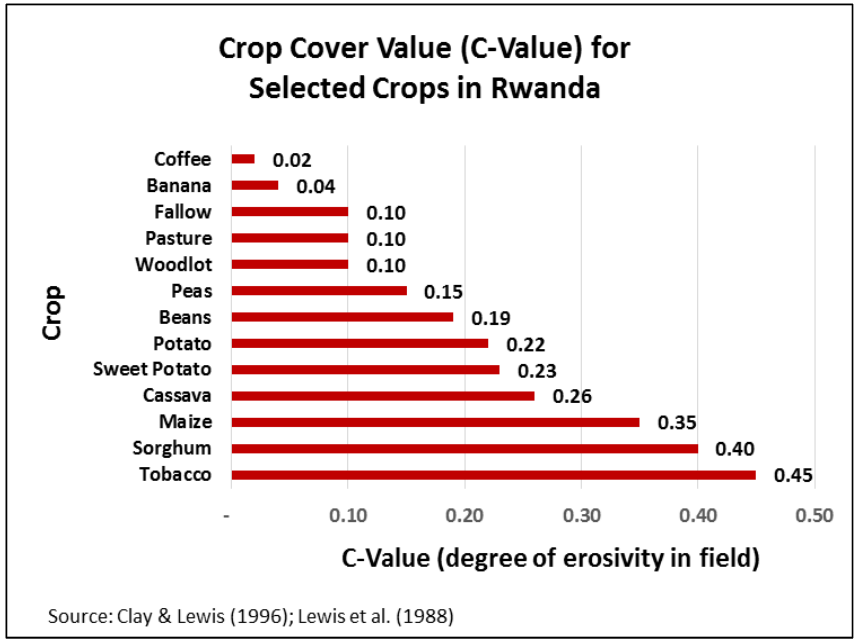
- Ordinary coffee price has more fluctuations.
- Specialty coffee:
  - Higher price
  - More stable
  - Decoupled from NY C

#5. Comparative advantage: Rwanda stands out in specialty coffee



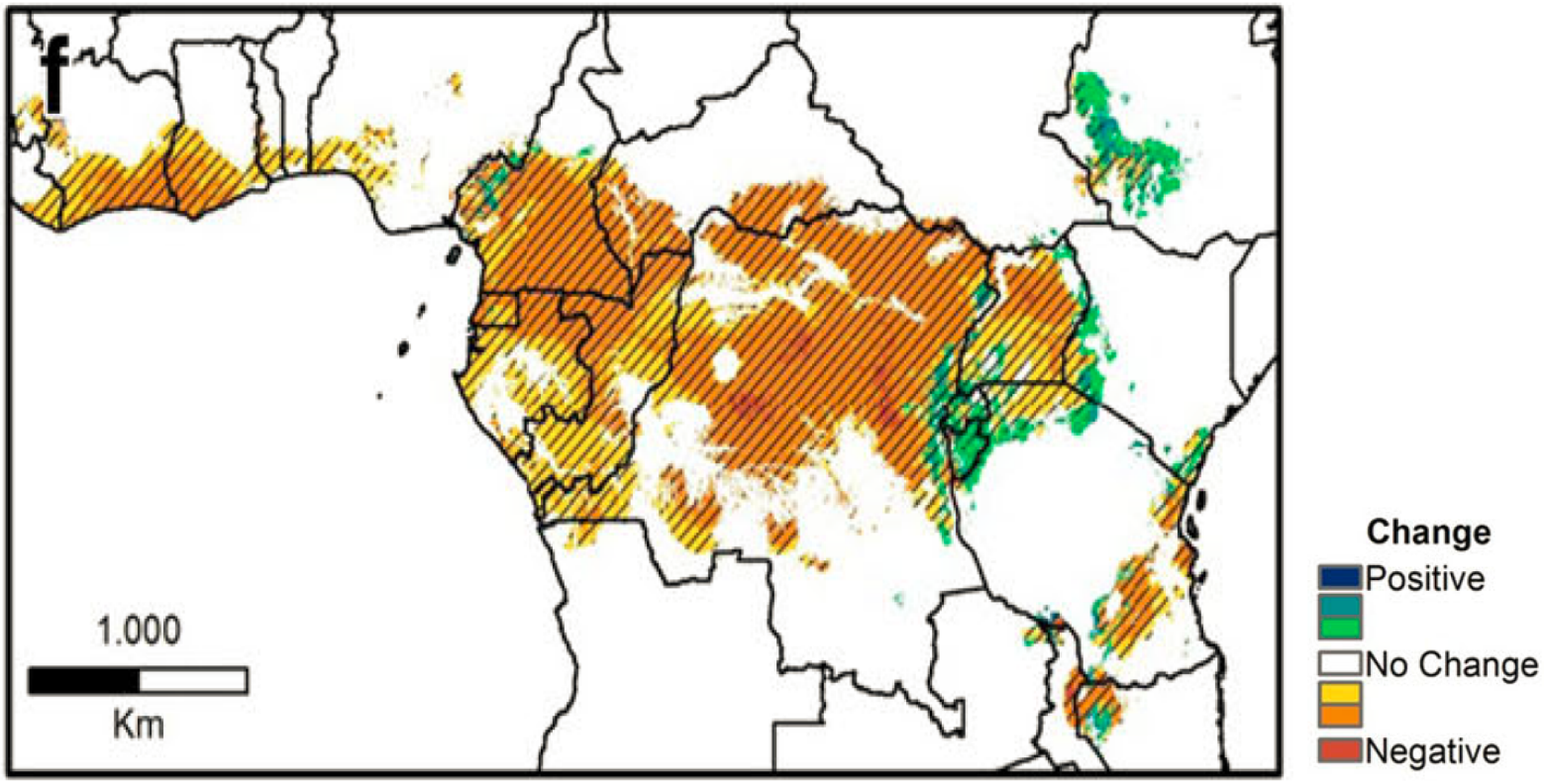
Source: DT Coffee Club

#6. Coffee is environmentally superior to most other crops grown in Rwanda



Source: Clay & Lewis (1996); Lewis et al. (1988)

#7. Positive climate change effects for Rwanda coffee



Source: Bunn et al. 2015

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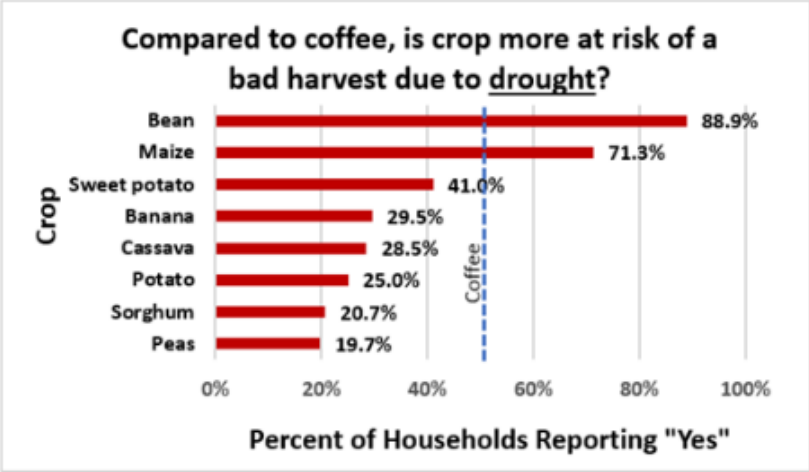

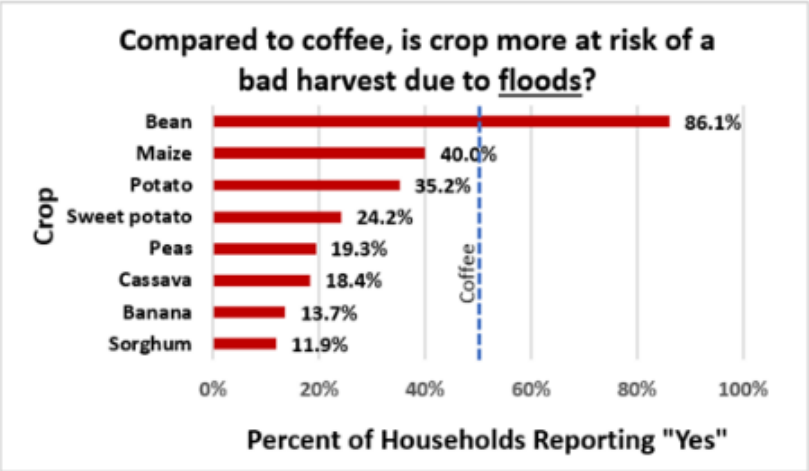

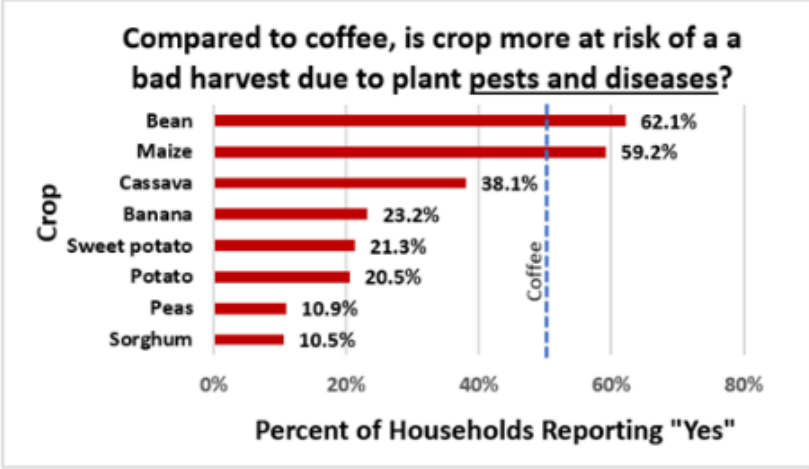

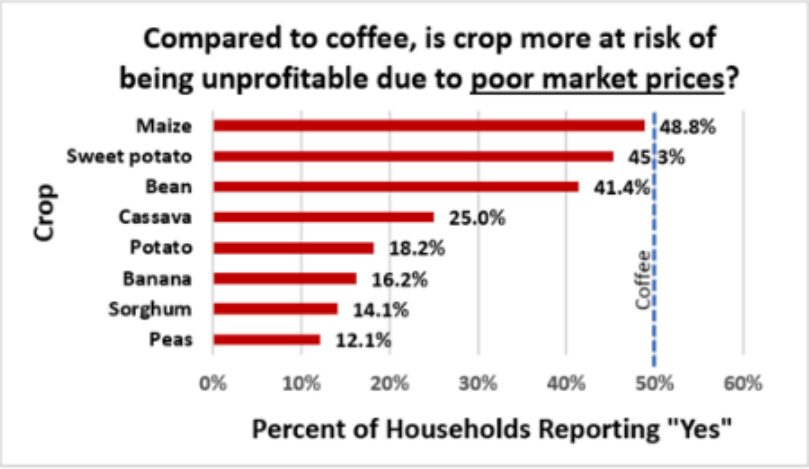

#8. Dedicated coffee producing households have better food security

Logistic Regression Model: Household Experienced Long-term Food Shortfall (> 1 month) by Coffee Income Share and Selected Covariates

Regressors	B	S.E.	Wald	df	Sig.	Exp(B)	Inverse Odds Ratio‡
Coffee share (%) of total HH Income	-1.077	0.421	6.524	1	0.011**	0.341	2.93
Member of coop	-0.289	0.200	2.085	1	0.149	0.749	1.34
Total land owned (Ha)	-0.297	0.110	7.325	1	0.007***	0.743	1.35
Income 2015 (not including coffee)	0.000	0.000	3.884	1	0.049**	1.000	1.00
Gender of HH head	0.866	0.265	10.680	1	0.001***	2.377	-
Age of HH head	0.000	0.010	0.000	1	0.994	1.000	-
Active adults in HH	0.081	0.066	1.511	1	0.219	1.084	-
Education of HH head	-0.209	0.096	4.776	1	0.029**	0.811	1.23
Years growing coffee	0.011	0.009	1.477	1	0.224	1.012	-
Elevation of HH (m)	0.000	0.001	0.268	1	0.605	1.000	1.00
Constant	0.608	1.182	0.265	1	0.607	1.837	-

*, **, *** indicates significance at the 10%, 5% and 1% levels, respectively.

‡ For ease of interpretation inverse odds ratio computed for covariates with negative log odds (B).

N=508 housholds

Summary and Discussion Points

- Commitment from all stakeholders to ensure that producers are compensated fairly, with prices commensurate with those paid elsewhere in East Africa, and set above farmer's cost of production.

- Coffee sector must once again become a high priority for strategic thinking and support in Rwanda.

Thank You!

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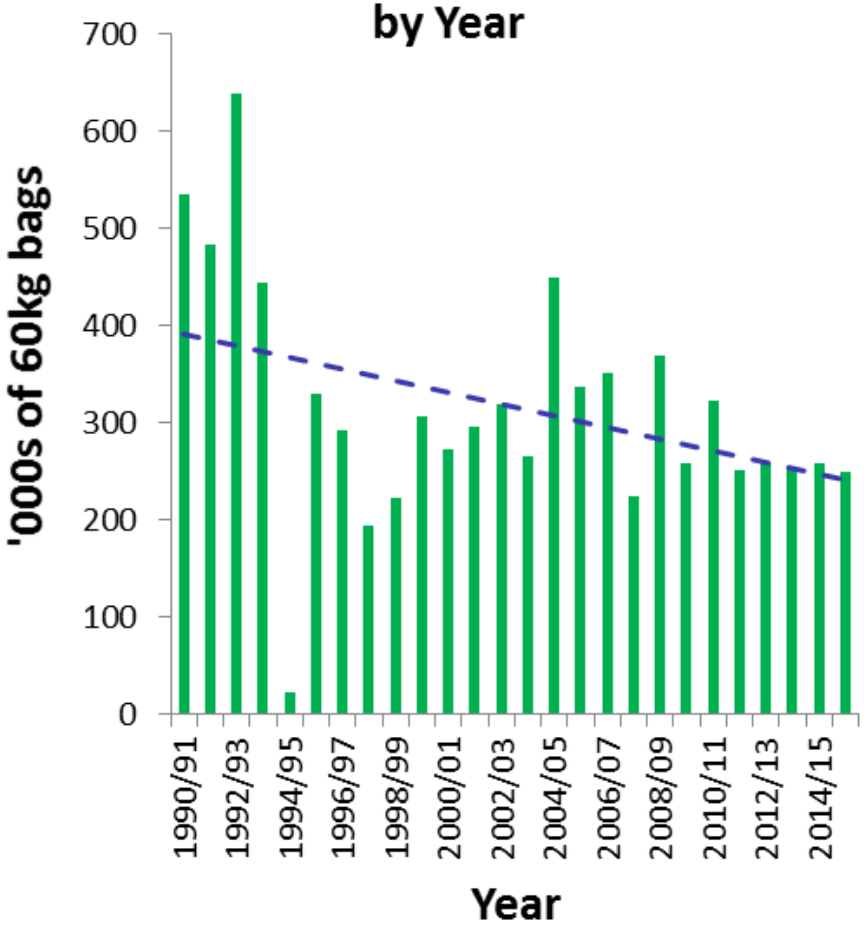
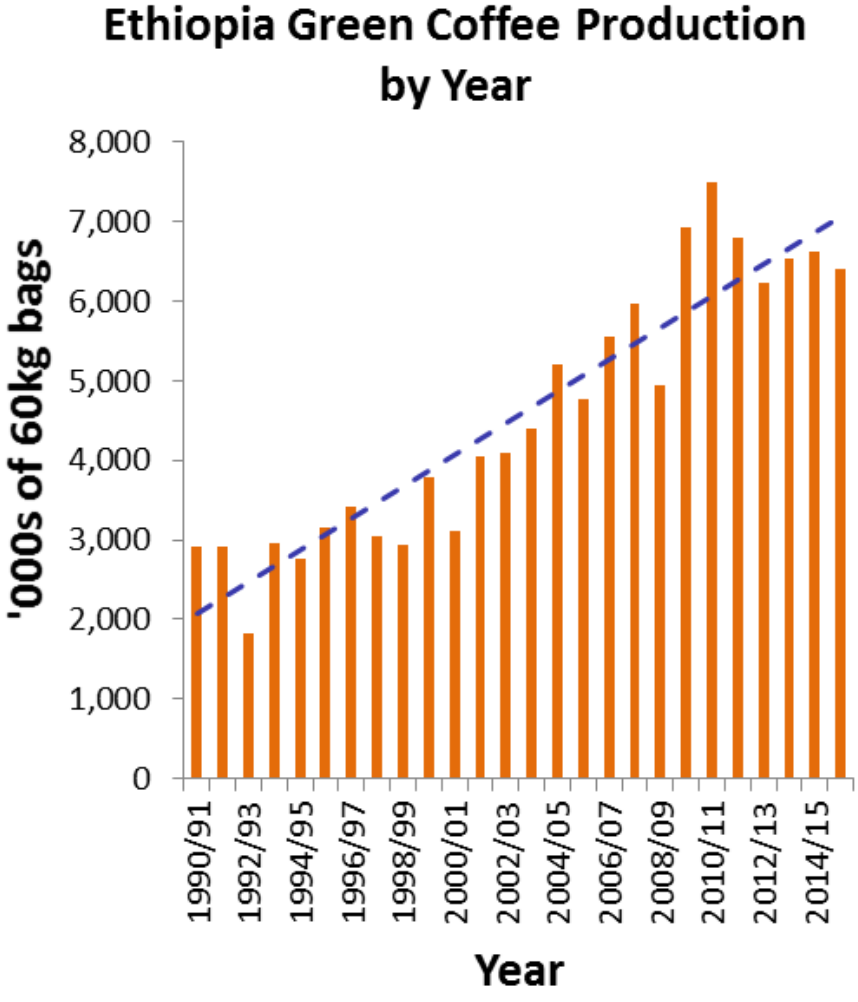
Trends in coffee production



Source: International Coffee Organisation (ICO)

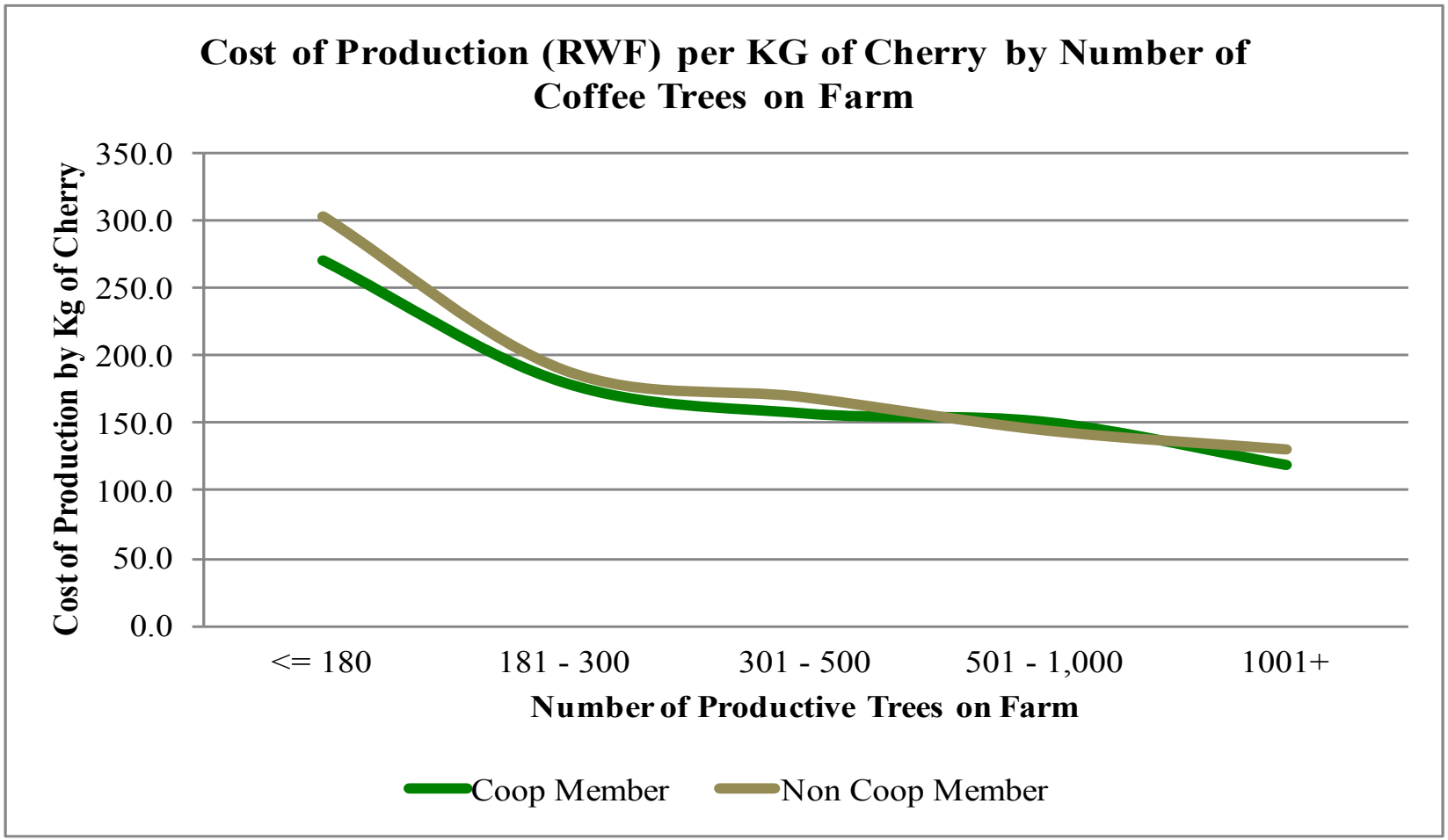


Source: International Coffee Organisation (ICO)

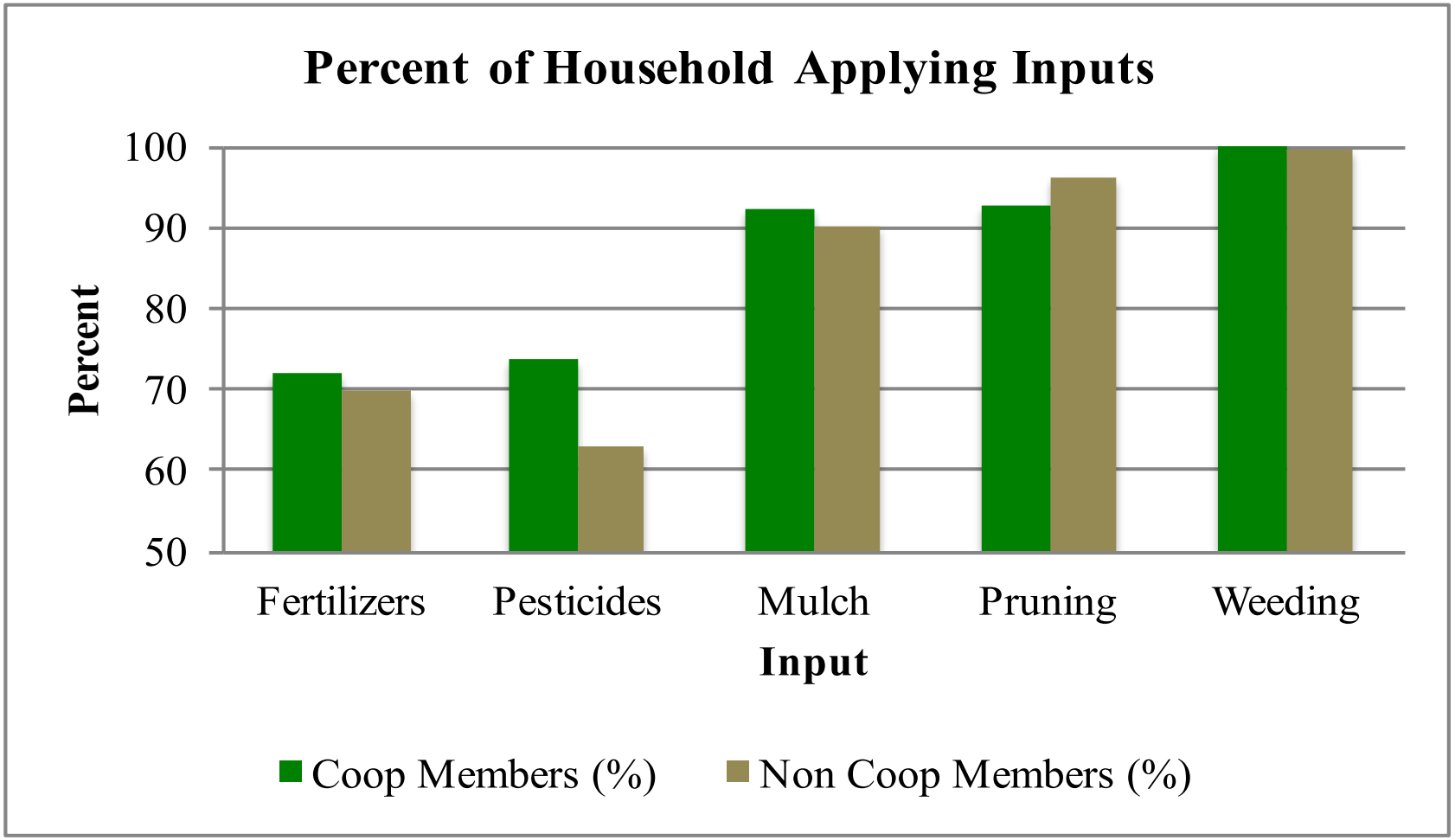
Summary Descriptive Parameters of Selected Determinants/Covariates

	N	Min	Max	Percent	Mean	Median	S.D.
Gender of head (% female)	1024	1	2	18.5%	-	-	-
Age of head (years)	1024	22	94	-	51.1	51	14.18
Education of head (% primary complete)	1024	1	10	39.1%	-	-	-
Member of coop (%)	1024	0	1	55.4%	-	-	-
Cooperative ownership of CWS (%)	1024	1	2	50.0%	-	-	-
Income 2015 (not including coffee)	1023	0	4,350,000	-	318,726	180,000	452,385
Income 2015 from coffee	1021	0	2,945,000	-	200,286	125,000	256,166
Share of total income from coffee	1022	0	1		44.5	42.0	27.5
Nbr of productive coffee trees	1022	0	9,320	-	706	400	945
Total cherry production 2015 (KG)	1022	0	15,500	-	1,025	601	1,448
Total land owned (sq meters)	1024	0	80,000	-	11,986	9,449	10,673
Received premium (%)	1016	0	1	26.9%	-	-	-
Price per kg of cherry 2015	1005	100	300	-	198	200	32.49
Applied fertilizers (%)	1024	0	1	71.0%	-	-	-
Applied pesticides (%)	1024	0	1	68.8%	-	-	-
Applied manure (%)	1024	0	1	59.4%	-	-	-
Elevation of HH (m)	1024	1,310	2,179	-	1,712	1,721	165

Hypothesis: Cooperative members have lower costs of production



Hypothesis: Cooperative membership increases adoption of best management practices.



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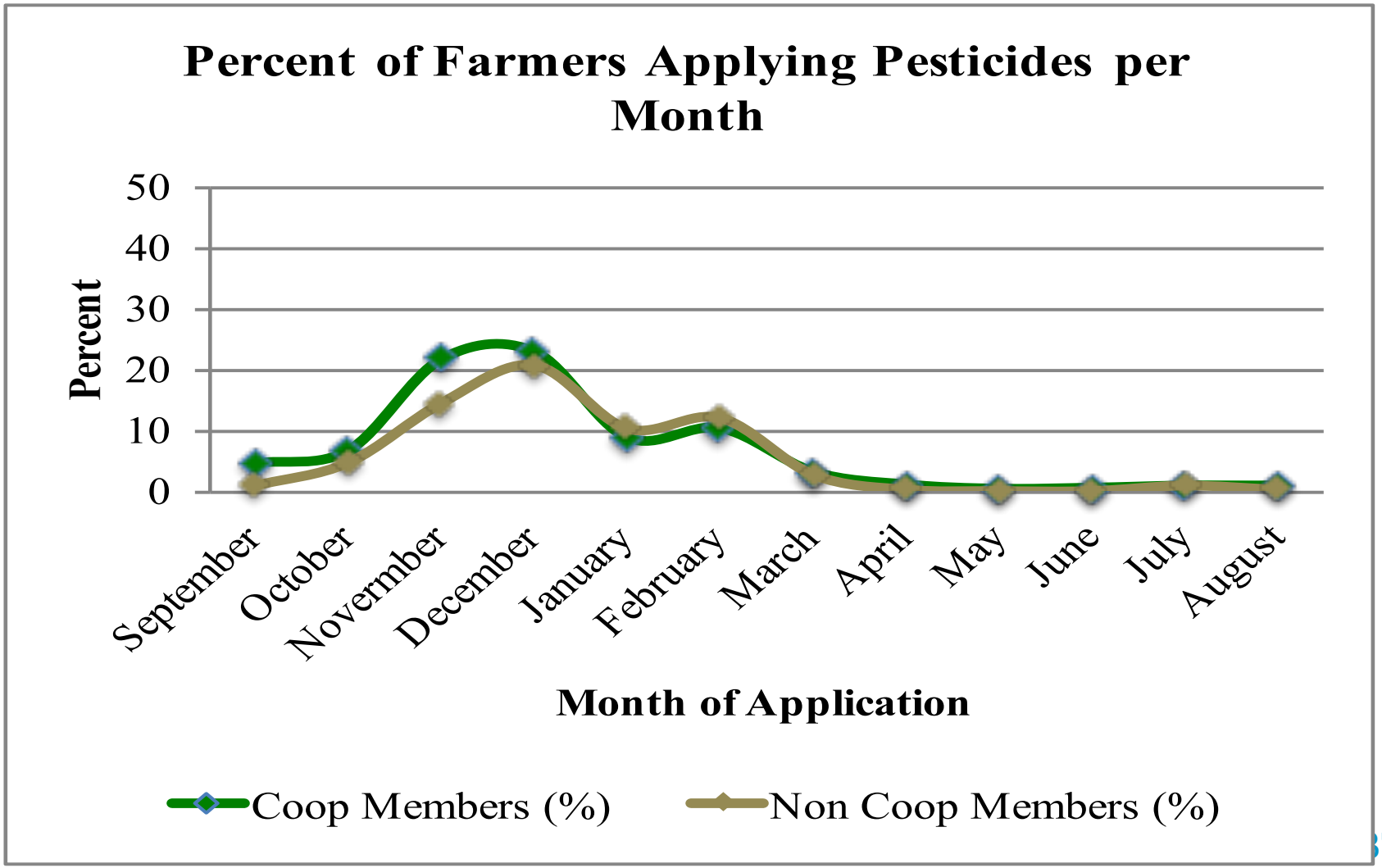
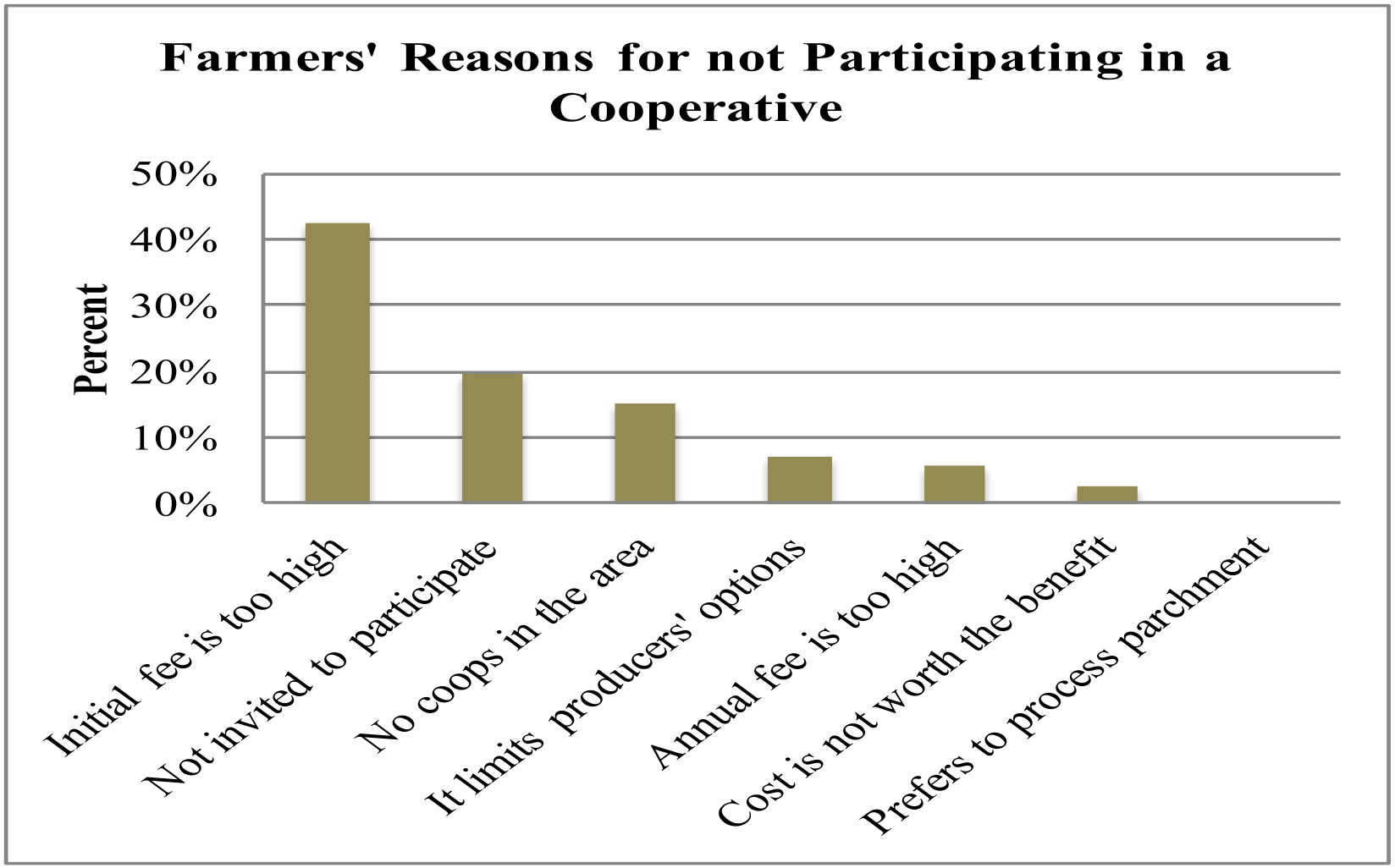
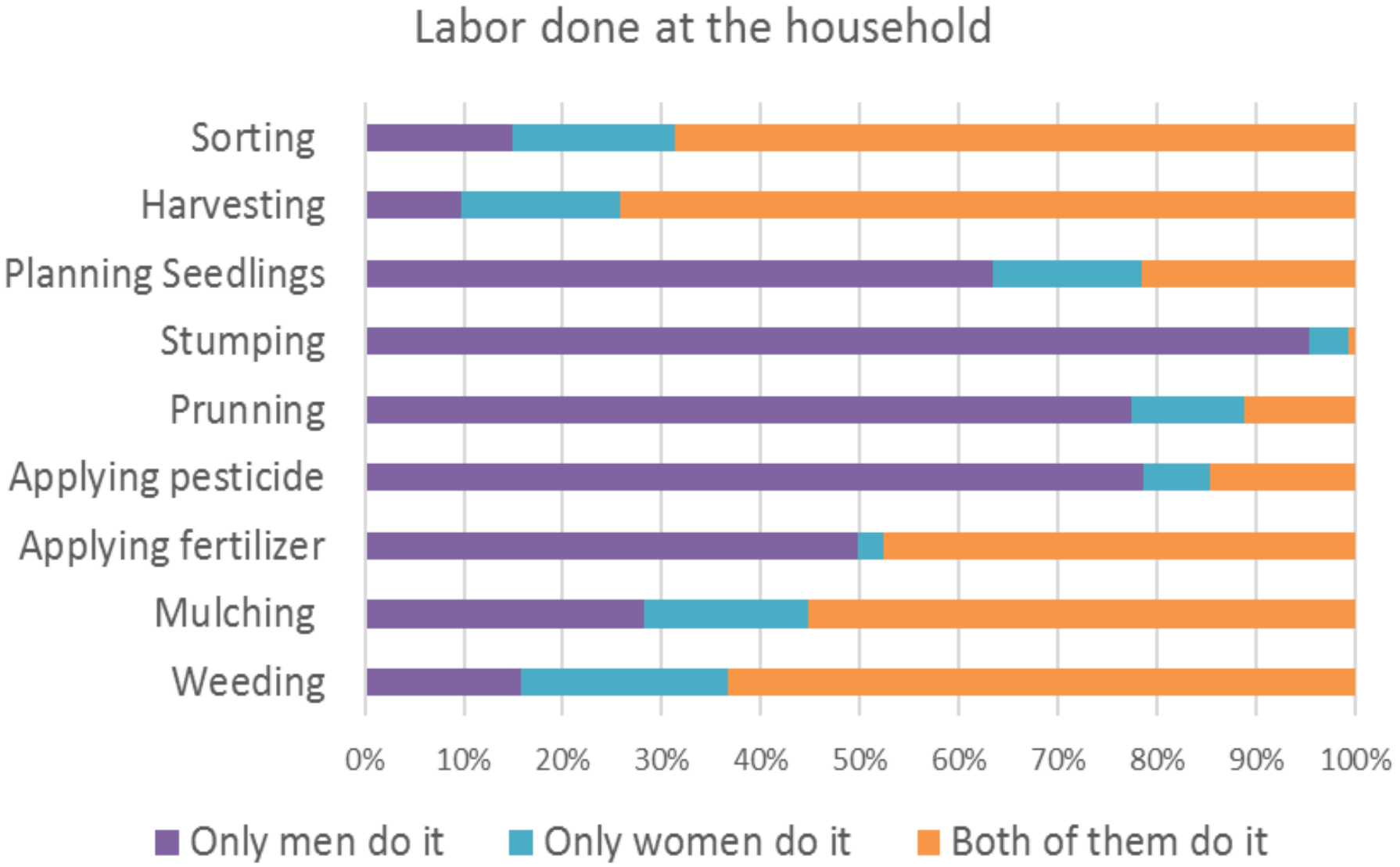
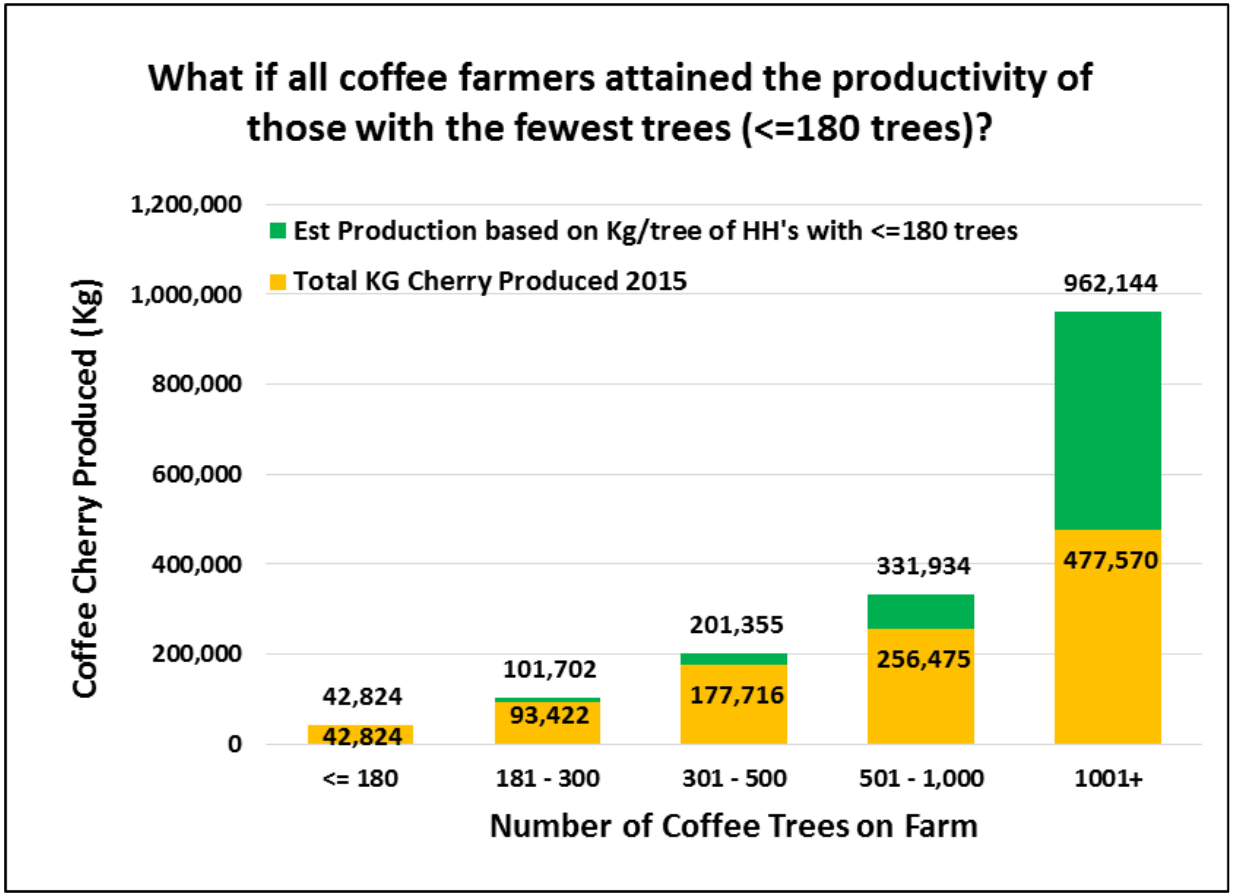
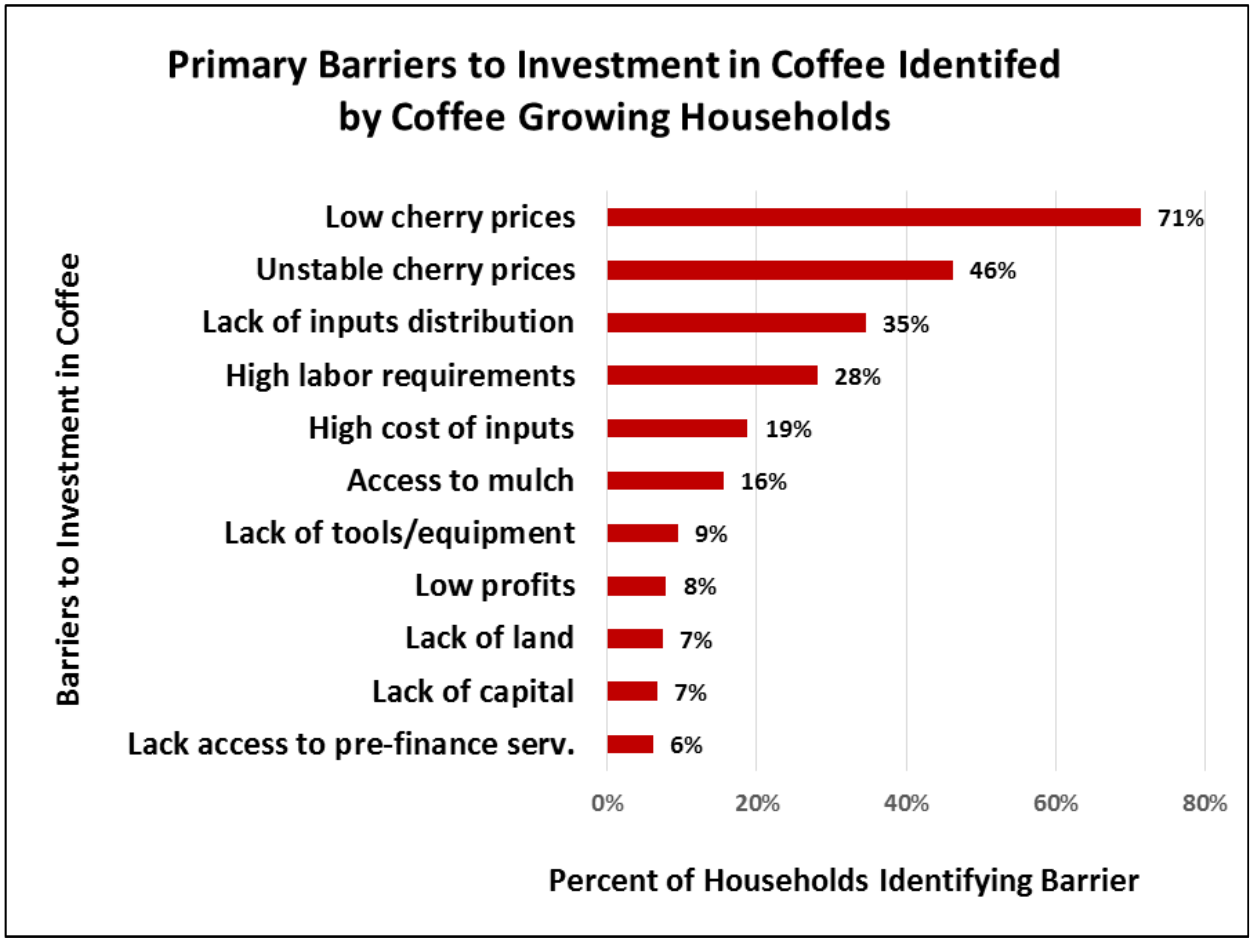



Farmers' Reasons for not Participating in a Cooperative
Percent
50%
40%
30%
20%
10%
0%
Initial fee is too high
Not invited to participate
No coops in the area
It limits producers' options
Annual fee is too high
Cost is not worth the benefit
Prefers to process parchment


Labor done at the household
Sorting
Harvesting
Planning Seedlings
Stumping
Prunning
Applying pesticide
Applying fertilizer
Mulching
Weeding
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Only men do it
Only women do it
Both of them do it


What if all coffee farmers attained the productivity of those with the fewest trees (<=180 trees)?
Est Production based on Kg/tree of HH's with <=180 trees
Total KG Cherry Produced 2015
Coffee Cherry Produced (Kg)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
42,824
42,824
101,702
93,422
201,355
177,716
331,934
256,475
962,144
477,570
<= 180
181 - 300
301 - 500
501 - 1,000
1001+
Number of Coffee Trees on Farm


Primary Barriers to Investment in Coffee Identifed by Coffee Growing Households
Barriers to Investment in Coffee
Low cherry prices
Unstable cherry prices
Lack of inputs distribution
High labor requirements
High cost of inputs
Access to mulch
Lack of tools/equipment
Low profits
Lack of land
Lack of capital
Lack access to pre-finance serv.
71%
46%
35%
28%
19%
16%
9%
8%
7%
7%
6%
0%
20%
40%
60%
80%
Percent of Households Identifying Barrier

ANOVA: Estimated Productivity (KG/Tree) by Premium Received, Adjusted for Gender and Covariates*

Productivity measure	Premium Received	N	Predicted Mean Productivity (KG/Tree) Unadjusted	Adjusted for Factors (Gender of HHH)	Adjusted for Factors and Covariates*	Sig.
Productivity (KG cherry) per tree	No	722	1.64	1.63	1.63	0.000
	Yes	269	2.09	2.10	2.11	

*Covariates: Nbr of trees on farm, Total HH non-coffee income, Total land owned, Age of HHH, Educ. of HHH, Active adults in HH, Elevation