

Contract farming in Mozambique: implications on gender inequalities within and among rural households

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Conference on Poverty and Inequality in Mozambique. What is at stake?

Maputo, 27^o November 2017

Focus of the paper

- Gender inequalities in rural Mozambique among smallholders' farmers in terms of agrarian production, control over resources, access to markets.
- Focus on contract farming
- Focus on gender inequalities in ...
 - «access to»
 - «impact of»
 - ... contract farming
- Focus on gender inequalities both
 - across households
 - within households

The research questions

- Inequalities across households:
 - Are there systematic differences in access to contracts between female-headed and male-headed households?
 - Do these differences persist also after taking into account the possible other factors that may affect selection into contracts?
- Inequalities intra-households:
 - Do contract farming affect within-households women empowerment indicators on women's access to productive resources and agrarian services?
 - Do these impacts persist after controlling for selection bias?

Why is this relevant to policy in Mozambique?

- Women play an important role in agriculture but have little control over resources (*inter alia* Aarnd et al, 2011, de Brauw, 2015)
- Female-headed households are 26% in 2005 (probably more now) and are poorer, have smaller plots, lower productivity (Morgado and Salvucci, 2016)
- Contract farming gained policy attention since 2007
WDR: value chain development to integrate smallholders in the markets and is central in *Plano Estratégico Para o Desenvolvimento do Sector Agrário* (PEDSA)
- Can they contribute to “close the gender gap in agriculture”?

What are the possible expected effects?

- A. Exclusion from contracts of women farmers and female-headed households
- Empirical evidence of lower participation into CF (Schneider and Gugerty 2010, Boughton et al, 2007) and of lower returns (Benfica et al, 2006)
 - Lower access to land, productive resources, labour force, higher transport costs,.. (Evers and Walters, 2000)
- B. Contested effects on impact on women empowerment in rural households

- i. Relax income constraint
- ii. overcome marketing barriers for women (FAO, 2011)
- iii. Formalize previously unpaid work (Reynolds, 2002)

- i. Shift control over resources in favour of men: cash crop income is more likely to be controlled by men (Warner and Campbell, 2001, Njuki et al, 2011,)
- ii. Increase work load on women (Evers and Walters, 2001)
- iii. Competitive advantage of smallholders who can exploit unpaid family labour (Key and Runsten, 1999)

The data and the context

- Trabalho de Inquérito Agrícola (TIA) -Mozambican Ministry of Agriculture
- Panel (2002, 2005) N = 4014 rural households
- Important rates of growth in 2000s with limited poverty reduction, especially rural
- Small landholdings:
 - Hanlon and Smart (2014): median size = 1 ha
 - TIA sample (2002-2005): median size = 1,75 ha

	2002	2005
Total income	9,220 (24,500)	10,760 (25,999)
Farm income	5,051 (11,423)	6,207 (16,970)
Female-headed h	0.23 (0.42)	0.27 (0.44)
Size of h	5.76 (3.51)	7.18 (4.24)
Land (ha)	2.46 (5.54)	2.94 (4.20)
Has radio	0.54 (0.50)	0.56 (0.50)
Has irrigation	0.16 (0.37)	0.08 (0.27)
Hires workers?	0.23 (0.42)	0.23 (0.42)
Uses fertilizers	0.05 (0.22)	0.05 (0.22)
Association member	0.05 (0.22)	0.09 (0.29)
Received extension	0.15 (0.36)	0.19 (0.39)
Cultivates cash crops	0.40 (0.49)	0.23 (0.42)
At least one plot managed by a woman	0.50 (0.50)	0.44 (0.50)
At least one plot managed by a woman (incl. sales)	NA	0.11 (0.31)
Does a woman in the hh receive extension services?	NA	0.11 (0.31)
Is a woman in the hh member of association?	0.034 (0.18)	0.053 (0.226)

Contract farming

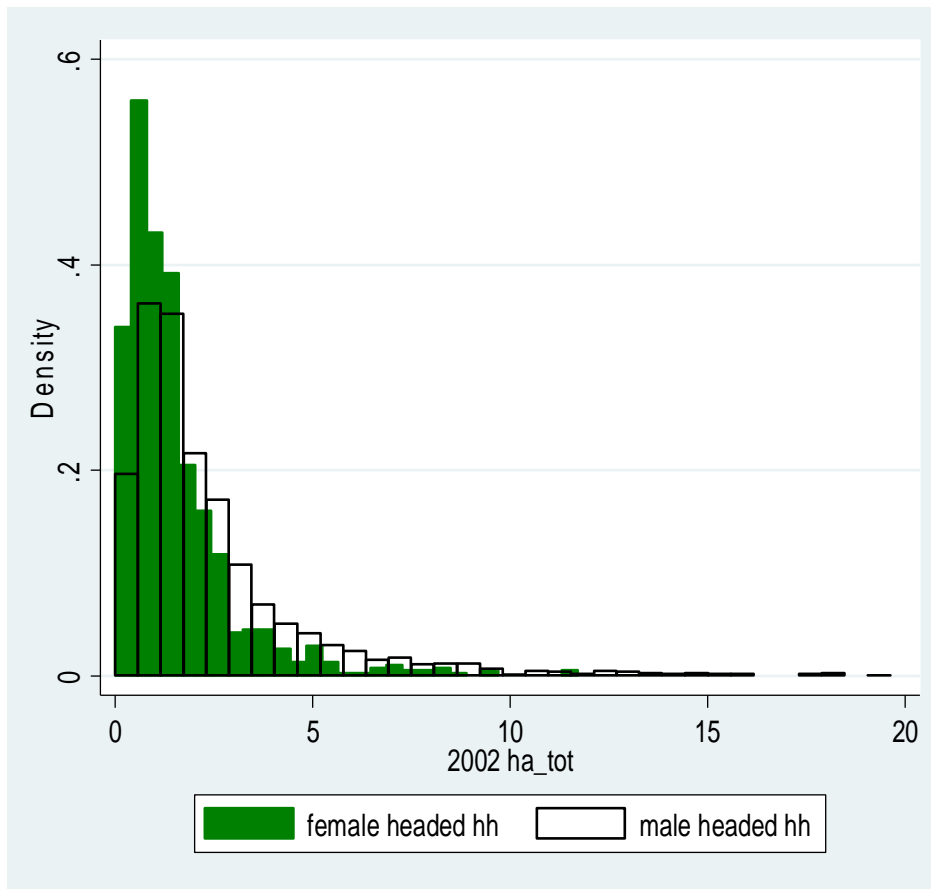
- Incidence: 6,2% in 2002 and 7,8% in 2005
- Especially in tobacco and cotton production
 - In 2005, 76% of cotton growers and 67% of tobacco growers are under contract
 - centre/north
 - Concession system to private companies: exclusive sale + support to smallholders

	Non CF	CF	
Female-headed household	0.24	0.11	***
Education household head	2.75	3.17	
size of the household	5.76	5.80	
land size (ha)	2.38	3.75	***
number of plots	2.49	3.15	***
owns a radio?	0.54	0.69	***
has irrigation (at least on one plot)?	0.15	0.25	***
hires workers?	0.21	0.44	***
uses fertilizers?	0.03	0.34	***
is association member?	0.05	0.11	***
receives extension services?	0.14	0.30	***
produces cash crops?	0.37	0.85	***
N	3850	254	

A) Inequality across households:
female-headed households and
selection into (and out of) contracts

Lower participation of female-headed households into CF

- Evidence of lower participation of female-headed households in CF:
 - 7.2% male-h households vs 2.9% female-h households



Quartiles of land size	Share of male-headed households in contract farming	Share of female-headed households in contract farming	
I	0.022 (0.006)	0.009 (0.005)	*
II	0.059 (0.009)	0.027 (0.010)	**
III	0.086 (0.010)	0.053 (0.015)	*
IV	0.108 (0.010)	0.049 (0.020)	**

Determinants of participation in CF

	(2)	(3)	(4)
CF in 2002?	0.0628***	0.0659***	0.0952***
Log of income 2002	-0.00436	-0.000300	-0.0136
Female-headed household 2005	-0.0441***	-0.0453***	-0.0673***
Household characteristics			
Size of the household 2005	0.00319**	0.00220*	0.00376
Asset endowment			
Size of landholding (ha) 2002	-0.000984	0.000910	0.00238
Number of plots 2002	0.00938**	0.00727*	0.00768
Owns a radio? 2002	0.000205	0.00103	0.0194
Has irrigation (at least on one plot)? 2002	-0.0241	-0.0235	-0.0439*
Has at least one titled plot? 2002	0.0126	0.0162	0.0199
Inputs			
Hires workers? 2002	0.00346	0.00956	-0.00867
Uses fertilizers? 2002	0.0299*	0.0305*	0.00741
Services			
Received extension services? 2002	0.0123	0.0134	0.0283
Member of association? 2002	-0.000405	0.00112	-0.0215
Food production per capita (ton) 2002	0.0386***		0.0523**
Productivity in food production 2005		-2.25e-05*	
PROVINCE FE	YES	YES	NO
DISTRICT FE	NO	NO	YES

B) Inequalities within-households:
impact of contract farming on women
empowerment

Intra-household measures of empowerment

- Women's control over assets
 - Dummy variable indicating if at least one plot is under the responsibility of a woman both for production and sales
 - Change in the number of plots under the responsibility of a woman for production
- Women access to agrarian services
 - Dummy variable indicating if at least a women in the households is member of an association (conditional on the fact that the households has at least a member)
 - Dummy variable indicating if at least a women receives extension services (conditional on the fact that the households receiving extension services)

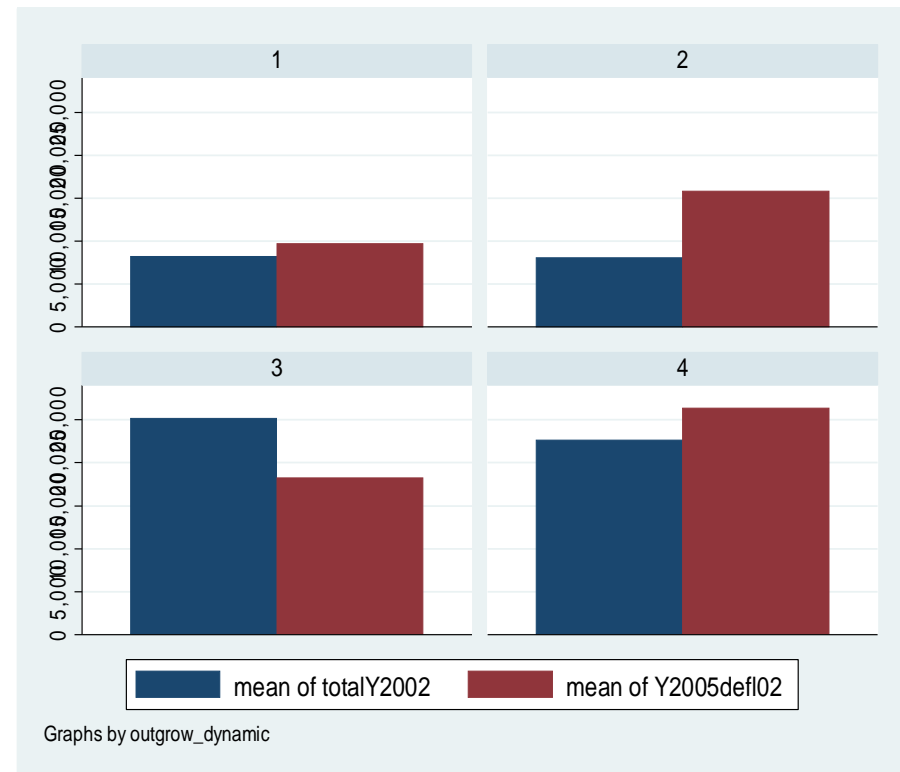
Correlations with CF in 2005

	CF	Non CF	
At least one plot is under women's responsibility both for production and sale (2005)	0.13	0.10	*
Change in the number of plots under the responsibility of a woman for production	-0.08	- 0.25	***
Woman is member of association (2005) (if the household is)	0.5	0.64	**
Woman receives extension services (2005) (if the household does)	0.5	0.62	***

- Positive correlations of measures of access to resources
- Negative correlations of measures of access to services

Movements «in» and «out» of contracts

1	Never outgrow	3618
2	Start outgrow in 2005	232
3	Were in outgrow in 2002, but stopped in 2005	163
4	Always outgrow	91



Effect of CF accounting for selection bias

- Propensity score matching after having identified $P^{(outgrow=1)}/X_{2002}$
- If possible difference in difference : $Y = Y_{2005} - Y_{2002}$
- Selection on observables based on pre-treatment variables
 - Income
 - Food production
 - Asset endowment
 - Access to input
 - Household characteristics

	(1)	(2)	(3)	(4)
	one plot under women's control (prod and sale)	Difference in the number of plots controlled by a woman	Woman receive extension services	Woman association member
Contract farming in 2005	0.0217 (0.0276)	0.0696 (0.121)	-0.185** (0.0724)	-0.250 (0.160)
Observations	3,153	3,114	605	332

Robustness checks

- Unobservable variables affecting the participation into contracts impact our results
- Abadie semi-parametric difference-in-difference
- Only when we have variation over time

Difference in the number of plots controlled by a woman

Contract farming in 2005	0.0974
	(0.0729)
Observations	2,513

Conclusion and discussion (A)

- Female-headed households have lower probability to enter into contract farming arrangements after controlling for assets, access to inputs, education level, connection to the market, productivity
 - Since CF produces Y increases → inequality increasing effect
 - There is some “pure discrimination” effect, or some variable that is not captured e.g. social capital?
 - Consistent with literature
 - Consistent with qualitative observation (Navarra & Pellizzoli, 2012):
 - in the absence of specific actions devoted to women inclusion, women farmers are drop out of contract
 - Not a matter of “disconnection from the market” or lower productivity (“women are excellent farmers”)
 - “Burden of traditions”? According to private sector actors yes, but according to interviewed women “things are changing”: it is more a matter of education

Conclusion and discussion (B)

- Within households, entering into contract farming does not have a significant impact on control over land, but has a significant negative impact on the probability that women receive extension services
 - Significant correlations but not robust to identification
- Consistent with qualitative obs (Navarra and Pellizzoli, 2012): usually contracts are in the man's name and services are channelled towards men
- Can imply inequality increasing effect because extension defines "who" is the knowledgeable person in the households, can provide social capital, connections, and mobility opportunities