

Adaptation to Climate Change in Guangdong Province in China : Do Property Rights Matter?



Picture Source: <http://www.nature.com>

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Road map

- Introduction
- Data and estimation
- Results
- Conclusion and policy implications

Introduction

- Land tenure in China cited as an institutional factor constraining agricultural investments (Wen, 1995, Li et al., 1995).
- A positive link between secure land rights and agricultural investment, as in both theoretical and empirical literature (Eg: Besley, 1995; Demsetz, 1967; Alchian and Demsetz, 1973 Wen, 1995; Li et al, 1995 etc)
 - Eliminate uncertainty about investment decisions
 - Improve access to credit
 - Encourage long-term investments in land
 - Gains from trade

Land tenure types in China

(Brandt et al., 2002; Ding, 2003; Dong 1996; Smyth, 1998 etc)

Contracted Land:

Determined by land reform policy of the government, not depending on farmer characteristics

Allocated for longer periods (eg: 30 years)

Size depending on HH size in early 1980s, but adjustments later due to change in population.

Rented from collective:

From lower level government with procurement quota and taxes, and subject to reallocation, held for shorter periods

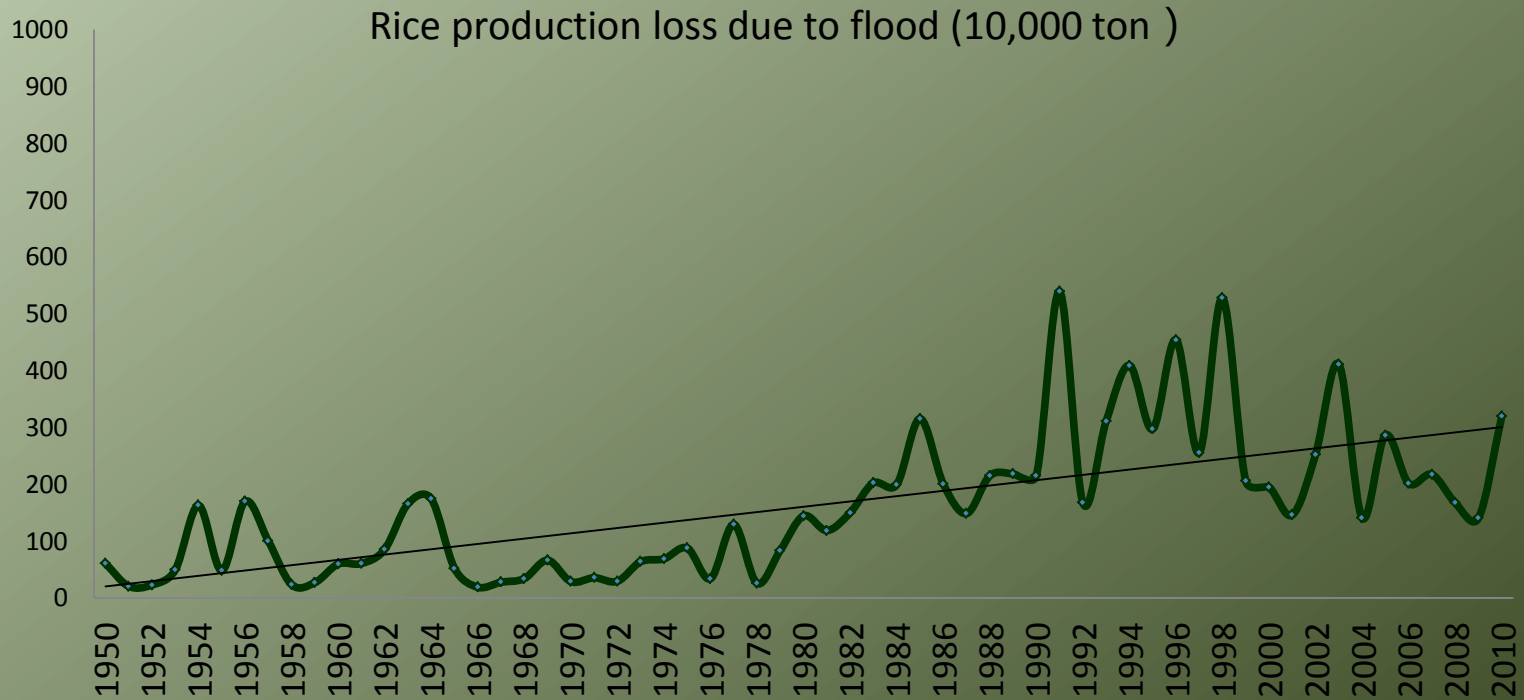
Rented from other farmers

Private plot:

with almost complete control

Importance of secure rights in the context of climate change

- Increasing frequency of droughts (NSBC, 2012) and flood events (Zhao et al, 2004) in China
- Climate change compounds the existing challenges faced by farmers in China



Source: China Statistical Yearbook (1950-2010)

What does the existing literature say?

- Little mention about the importance
 - Hassan and Nhemachena (2008), Deressa et al., (2009), Wang et al, (2008 & 2010), Saleth, Dinar and Frisbie (2011), Fleischer and Kurukulasuriya (2011), Garrido et al (2011), Wang et al, (2014), Huang et al, (2014a) Huang et al, (2014b) and Huang et al, (2015) etc
- Overlooking significance by using as a control variable
 - Gbetibouo et al (2009), Maddison (2007) and Nhemachena and Hassan (2007). Gbetibouo et al (2009) etc
- Failing to distinguish farmers' day-to-day adaptations from their adaptation to climate events (Lobell, 2014)
- Yet to be adequately and exclusively addressed in case of China

Aim of this study

- To investigate the association between the land tenure types and farmer adaptation behaviour in Guangdong Province in China

Data and estimation : Research Design



- Area of the survey:
Four counties in Guangdong province in China
- Two rice farming seasons :
early and late season rice
Extreme weather event:
Flood
- Survey period:
2010-2012
- Sample:
971 plots
347 households
1942 observations

Impact of Flood Events on Crop production in the Study Sample

- Early rice

County	Year type	Year	Percentage of plots (%)	Yield reduction (%)	Yield (kg/ha)	Yield change (%)
Average	Normal	2012	34	12	4703	
	Disaster	2011	59	19	4568	-2.87

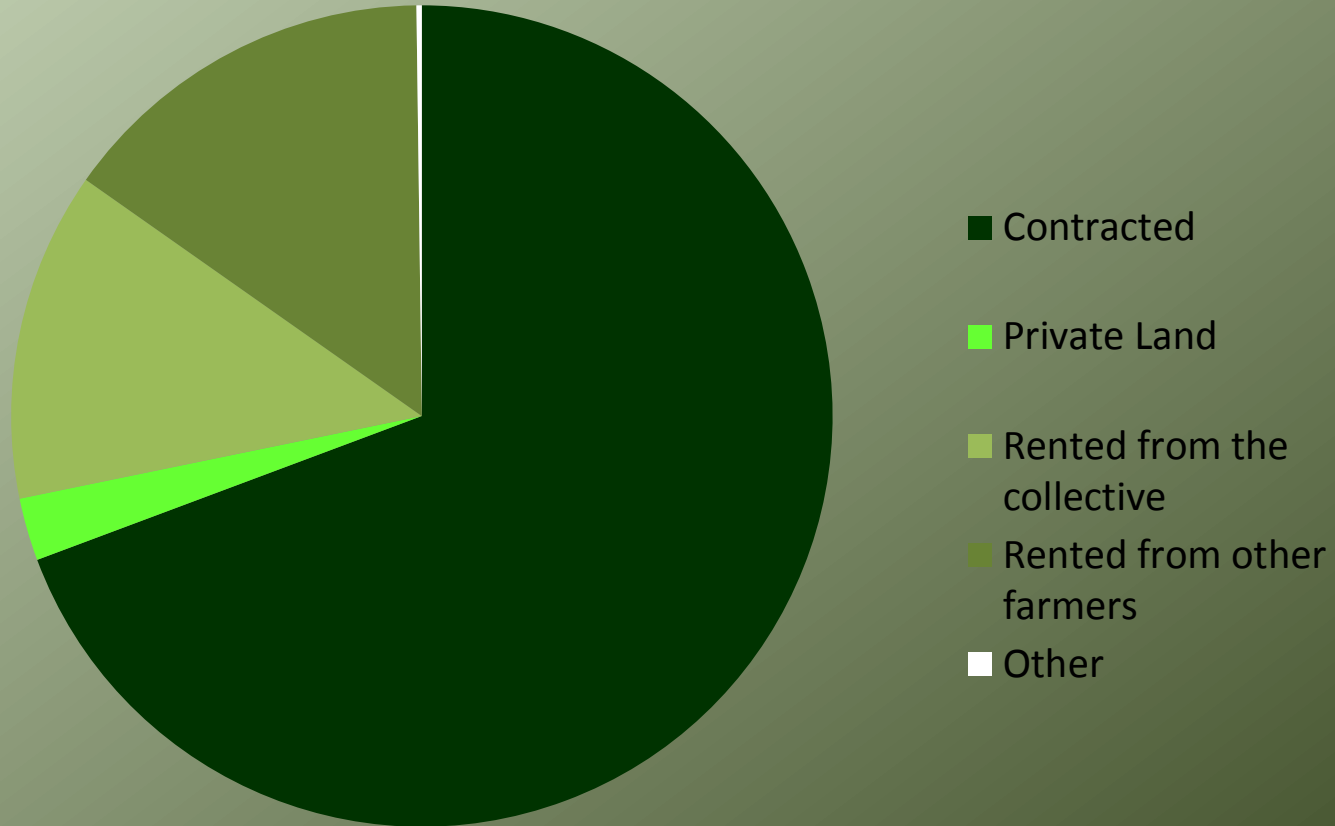
- Late rice

County	Year type	Year	Percentage of plots (%)	Yield reduction (%)	Yield (kg/ha)	Yield change (%)
Average	Normal	2012	30	9	4545	
	Disaster	2011	55	17	4433	-2.46

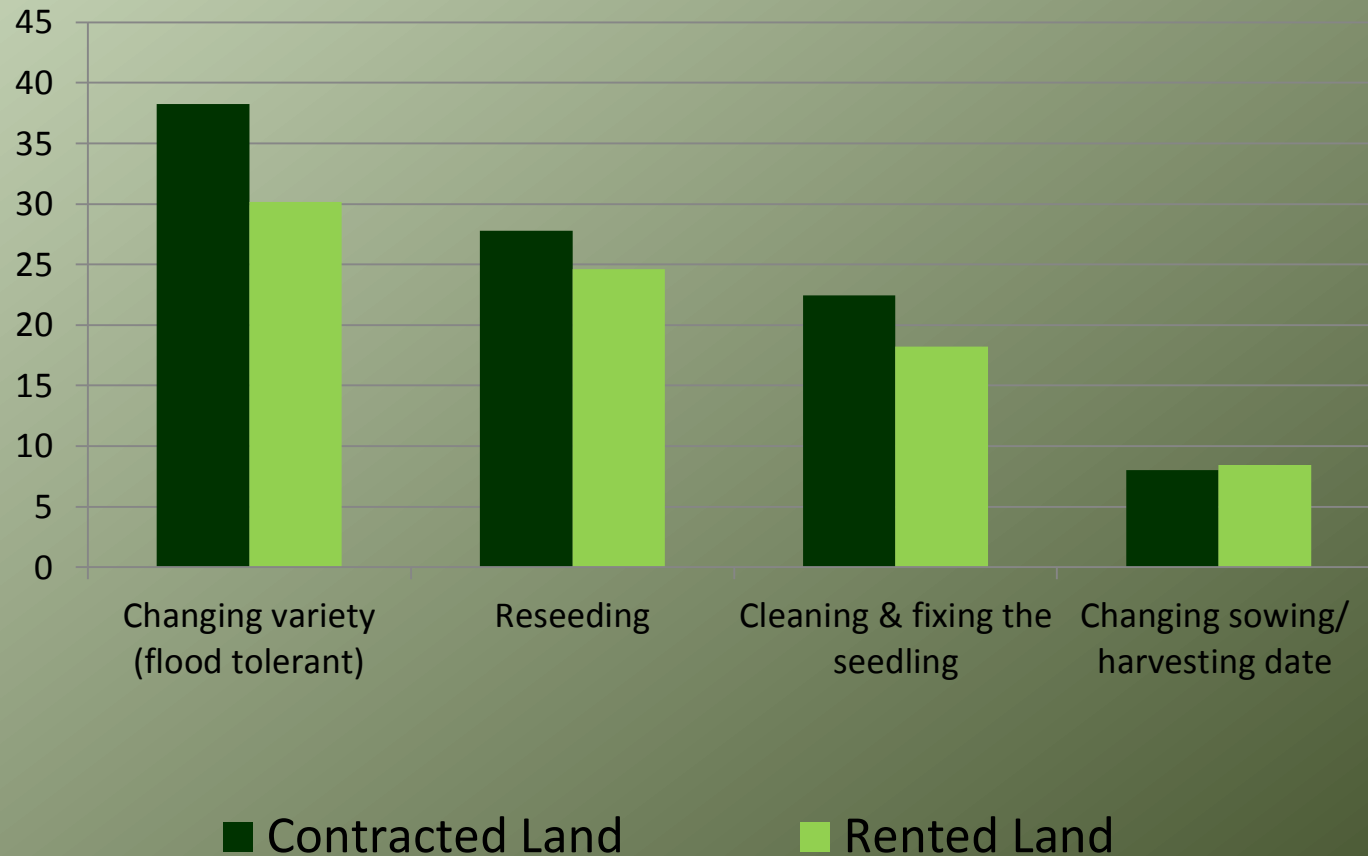
Adaptation measures

Most common (62 % of the sample) farm management measures
changing crop variety (flood tolerant)
changing sowing or harvesting date,
reseeding and
fixing the seedling

The distribution of land procurement of the study sample (%)

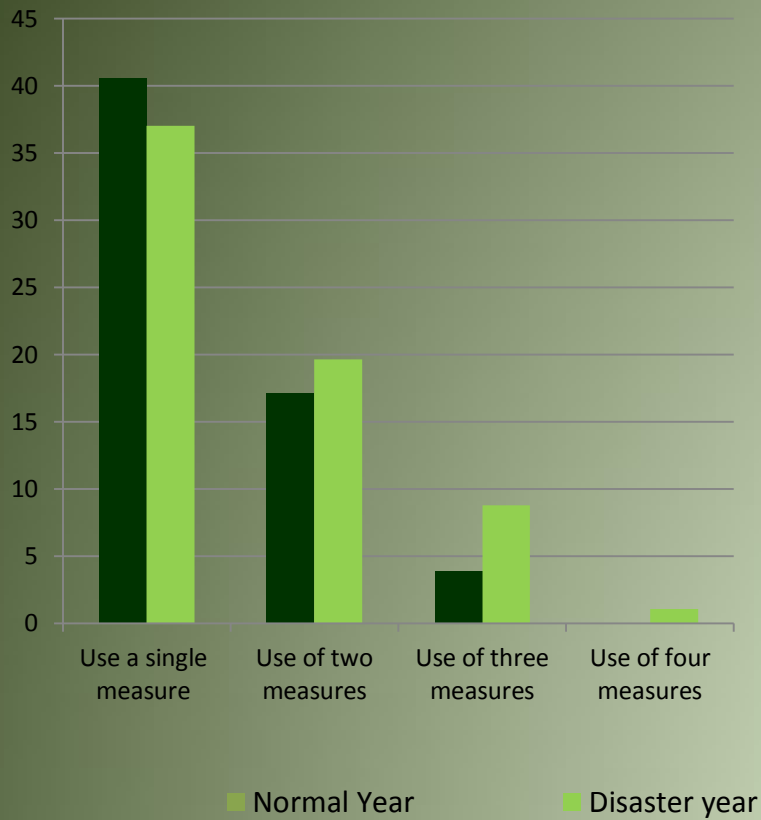


Adaptation of measures and tenure types (%)

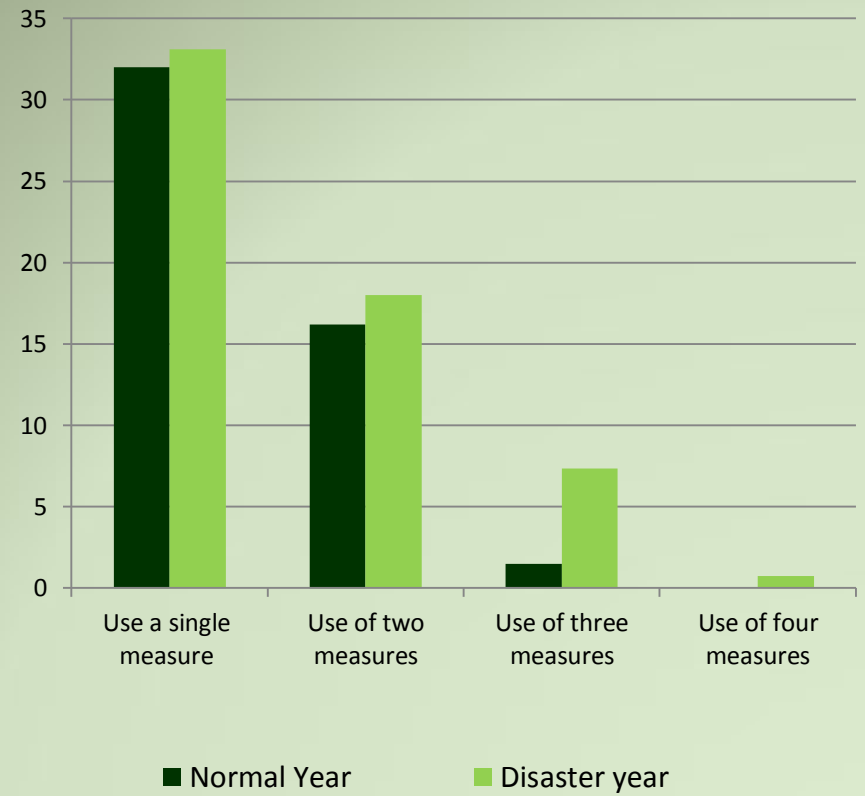


Adaptation of measures, and disaster and normal years (%)

Contracted Land



Rented Land



Main hypotheses

1. Farm households with contracted land are more likely to implement adaptation measures.
2. Farm households with land rented from the collective and from other farmers are less likely to implement adaptation measures.

Estimation

- A regression analysis using OLS

$$Adaptation_{ijt} = \alpha + (\beta_1 + \beta_2 Contracted) Flood_{ijt} + \beta_3 Z_{ijt} + U_{ijt}$$

- Dependent variable:

Adaptation: Degree of adaptation

- Explanatory variables

Contracted: a binary variable for land tenure (1= contracted land, 0 =rented land)

Flood: a binary variable for disaster year (1=flood year, 0 = otherwise)

Contracted x Flood : Interaction term

Z: control variables

- Household characteristics: Age, education, HH size, Wealth per capita
- Plot characteristics: Plot size, plot quality, land form (hilly or flat land)
- Institutional factors: Access to information, Social capital
- Other: Late rice

Regression Results

Dependent Variable: Adaptation

Main variables	Sign of the effect
Flood disaster	↑
Contracted land and flood disaster	↑
Control variables	
Moderate plot quality	↑
Household size	↓
Access to information	↑
Social Capital	↑
Late Rice	↑

Results are also robust for alternative econometric specifications with Tobit and Probit models

Concluding Remarks

- Farmers with contracted land are more likely to implement adaptation measures than those who have rented their land from the collective and from other farmers.
- Farmers are more responsive to disaster years
- Access to information, social capital and middle plot quality positively influence the adaptation decision.
- We do not find statistically significant evidence to suggest that age, education, wealth, land area, best plot quality, and land form affect the adaptation behaviour of farmers in our study sample.

Policy Implications

- State interventions to secure land rights
 - To improve the likelihood of the implementation of adaptation measures and agricultural productivity
 - To improve the effective use of extension services and awareness programmes and policy programmes designed for correcting market failures
- State level interventions to provide better information services
- Interventions to focus on farming communities to raise farmers' social capital

Thank you

Comments and questions?