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What Kinds of Rural Irrigation Infrastructure Have Played Role on Dealing with Drought ?

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Selected Poster prepared for presentation at the International Association of Agricultural Economists (IAAE) Triennial Conference, Foz do Iguaçu, Brazil, 18-24 August, 2012.

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What Kinds of Rural Irrigation Infrastructure have Played Role on Dealing with Drought?

Huang Chen^{1*}, Jinxia Wang¹, Jikun Huang¹

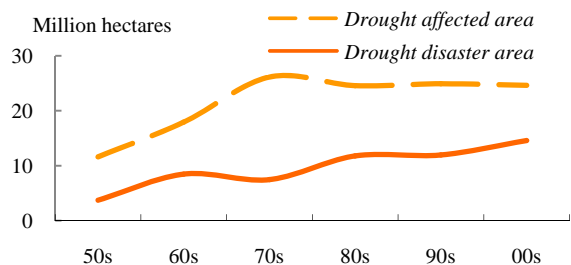
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Motivation

- Drought became increasingly frequent in China.



- The Chinese government will invest 4 trillion Yuan on irrigation infrastructure for enhance resistance to the drought in next ten years.

Research Questions

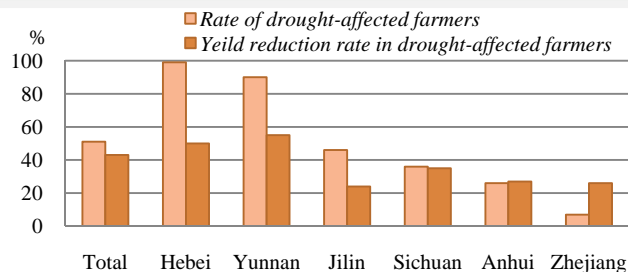
- How did the drought occur and its influence on crop production during the past few years?
- What about the current situation of irrigation infrastructure?
- Which kinds of irrigation infrastructure have played significant roles?

Methods and Data

- Econometric model analysis.
- Data come from a face to face field survey conducted in 2010, covered 1,118 farmers, 107 villages and 18 counties in 6 provinces in China.

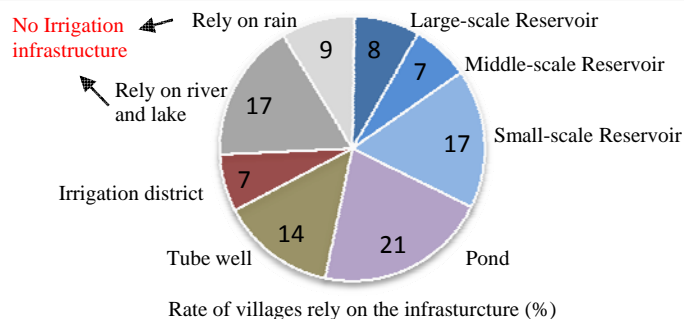


Drought Influence in 2006-2010



- Half of farmers have been affected by drought in past 5 years.
- The most severest drought cause 40% yield reduction

Utilization Status of Irrigation Infrastructure



Descriptive Analysis

	No reduction	1%-33% reduction	34%-66% reduction	67%-100% reduction
Larger scale reservoirs	12	7	3	6
Middle scale reservoirs	9	9	4	2
Small scale reservoirs	12	17	14	38
Pond	25	18	18	7
Tube well	3	22	31	17
Irrigation District	9	6	4	0
Rely on river and lake	19	15	15	19
Rely on rain	12	6	11	12

Econometric Analysis

- Econometric model (OLS):

$$y_{ij} = \alpha + \beta W_{ij} + \gamma V_{ij} + \delta H_{ij} + \lambda D_{ij} + \varepsilon_{ij}$$

where y_{ij} is yield reduction rate of farmer i in village j ; W_{ij} is a vector of irrigation infrastructure dummy variables (set “rely on rain” as control group); V_{ij} , H_{ij} and D_{ij} are (village, household and regional) control variables.

- Estimation results of key variables:

	Coefficient	T Value
Larger scale reservoirs	-0.106	(2.64)***
Middle scale reservoirs	-0.068	(1.73)*
Small scale reservoirs	-0.051	(1.35)
Pond	-0.047	(2.41)**
Tube well	-0.061	(1.80)*
Irrigation District	-0.05	(1.12)
Rely on river and lake	-0.12	(3.55)***
Adjusted R ²	0.55	

Note: “*”, “**” and “***” respectively means P<0.1, P<0.05 and P<0.01.

Conclusions and Political Implication

- Nearly half of farmers suffered drought in 2006-2010, and the drought caused 40% yield reduction on them.
- 26% villages have not been covered by irrigation infrastructure yet, which need more investment in future.
- Large-scale and middle-scale reservoirs, pond and tube well play significant role in dealing with drought, comparing with the type of “rely on rain”.
- Expanding investment on irrigation infrastructure is a wise choice under the increasing threat of drought. It should not only focus on larger scale facilities, e.g. reservoirs, but also consider small one, such as pond and tube well.