

A heterogeneous-agent model with district-level constraints: an application to livestock development in Gansu, China

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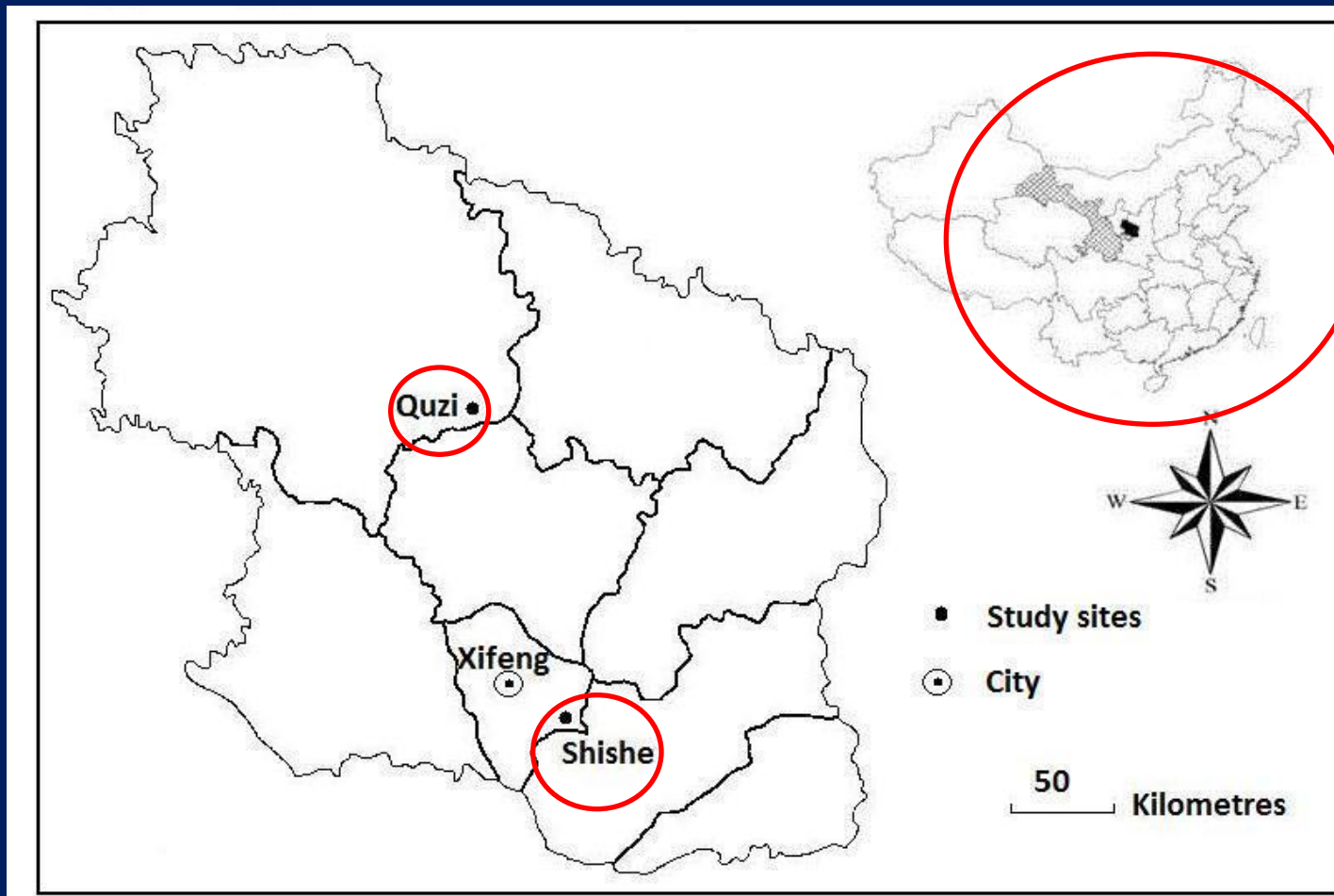
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Objectives

- Multi-period heterogeneous-agent model with township-level and district-level constraints
- Three scenarios on 96 farms
 - 1) Removing lucerne subsidies
 - 2) removing livestock feed trade barriers
 - 3) raising livestock numbers.

Study sites







Model

- Maximise the net present value of all 96 household net incomes from 2004 to 2008
- Allocate household resources to farm and off-farm activities

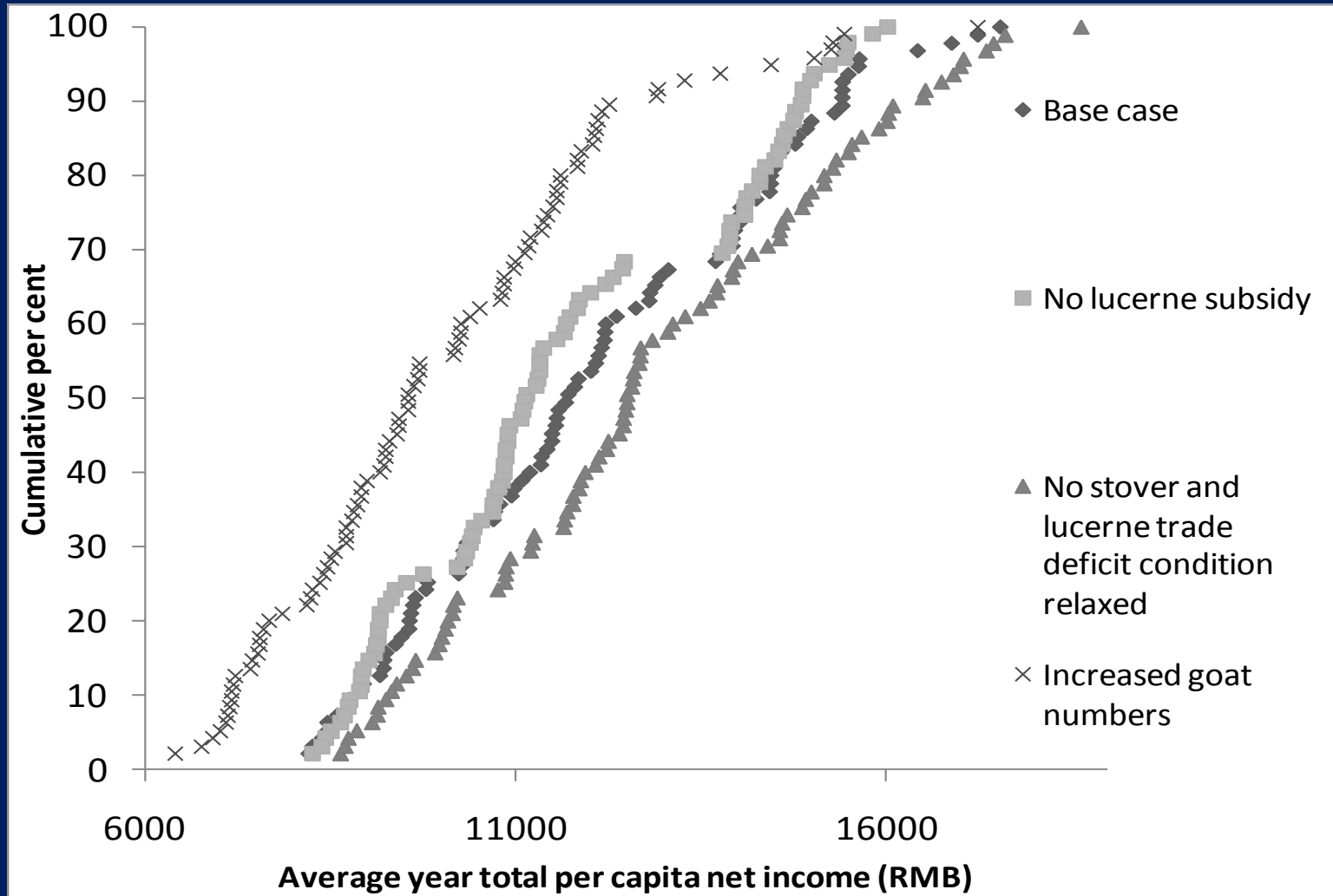
Trade conditions

Factor	Inter-town trade	Inter-district trade
Stover (crop residue)	no	no
Lucerne	yes	no
Grain	yes	yes
Agricultural labour	no	no
Land	no	no

Base-case results

Variable	Unit	Whole sample
Total income	000 RMB/capita	11.8
Ag income	000 RMB/capita	1.2
Off-farm employment	years/household	1.9
Goats	total number	502
Area lucerne: grain	total ha	81:23
Net stover traded	total tonnes	0
Net lucerne traded	total tonnes	0

Changes in net income



% changes from base case

Variable	No lucerne subsidy	No local feed market	Increased livestock numbers
Total income	-3	6	-17
Ag income	-29	59	-6
Off-farm employment	0	0	-21
Goats	-9	167	26
Area lucerne: grain	-18:64	-10:1	-1:2
Stover traded	0	0 to 195 tonnes	0
Lucerne traded	0	0 to 115 tonnes	0

Shadow prices

Scenario	Maize stover	Lucerne
Base case	0.19	0.22
Increased livestock numbers	0.25	0.42

Conclusions

- Livestock numbers vs. incomes
- Increased access to crop forages improves incomes
- Lucerne subsidies
- Scale up farm models to the district level in a multi-year setting