

Collective Forest Tenure Reform in China: Outcomes and Analysis of Performance

集体林权改革：结果和绩效分析

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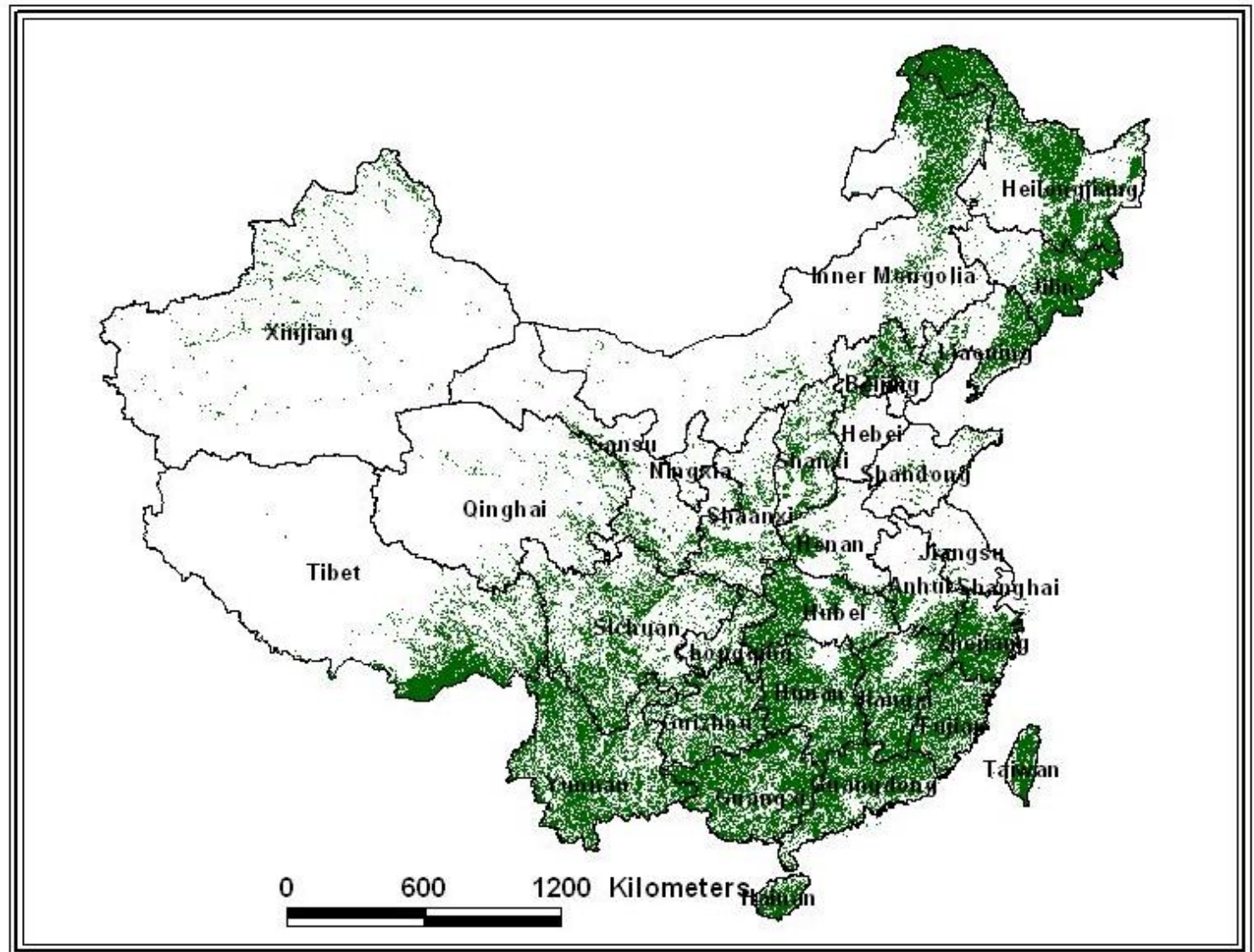
Peking University

April 15, 2010, Grey Tower

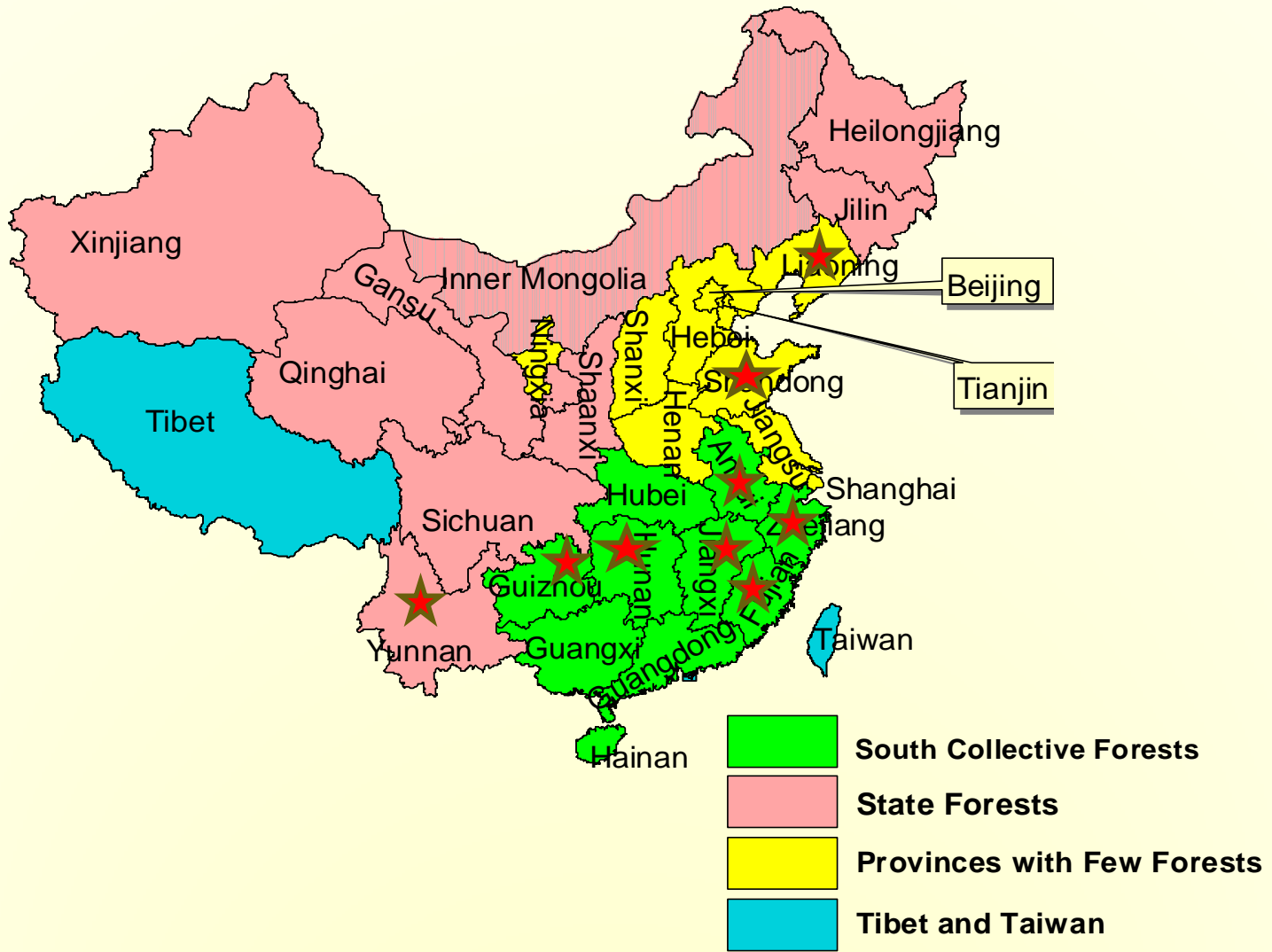
The background features a large, light-colored fan shape. Inside the fan, there is a faint, detailed illustration of a traditional East Asian landscape, showing mountains, trees, and a building. The overall color palette is muted, with shades of beige and light green.

Part I

GENERAL OVERVIEW



Forest Distribution in China



Main Forest Regions

中国林业部门特点

Forest Sector in China

- * 政府干预程度高
- * Forest sector remains highly regulated
- * 在森林资源采运，林地利用方式等方面控制很严
- * Control in logging, shipping, land use, etc.
- * 目前在国有林区实施天保工程（禁伐和限伐）
- * Logging ban and
- * 大量的政府投资林业项目
- * Lots of government programs
- * And.....

林权制度 Forest Tenure in China

- * 两种所有制 Two ownership types
- * 国有 State
 - * ~42% forest area and 68% volume;
 - * Managed by state forest enterprises and farms
- * 集体 Collective
 - * 58% area and 32% volume
 - * Growing share of timber production
 - * Diversified management schemes

集体林权改革历史

History of Tenure Reform

- * 第一次 First Round: 1981-1986
 - * 政策反复 A fluctuating process
 - * 地区间差异大 Different level of progresses among provinces
 - * 长期争论不休 Tenure remains controversial Issue
- * 第二次 Second Round: 2000-
 - * 截止2007年底，14个省参加
 - * By 2007, 14 provinces announced new reform policy
 - * 2008年6月，中共中央国务院文件出台
 - * In July 2008, Central Government Reform Policy was declared, conclusion of the policy change process promoting collective forest tenure reform

本次改革特点 What's New?

- * 福建
- * Fujian joining the mainstream of forest individualization
- * 是国家近年来加强农民土地权益努力的一个组成部分
- * Continuation of efforts to expand and strengthen forest tenure rights for farmers
- * 村级民主决策
- * Village representative committee as decision maker on land redistribution plan
- * 合同期延长
- * Longer term contracts (30,50,70)
- * 权利内容增加
- * New rights: transfer, inheritance, collateral, etc.
- * 统一的林权证的发放
- * Renewal of forest certificates (uniformed, GIS, etc.)

基本评价 So What?

- * 是进步还是倒退？
- * Is this socially optimal?
- * 评判标准？
- * What will be the impacts on
 - * 森林资源经营管理的变化 forest resources
 - * 林农收入 farmer income?
- * 可持续性 Sustainability?
- * 社会稳定 Social stability?

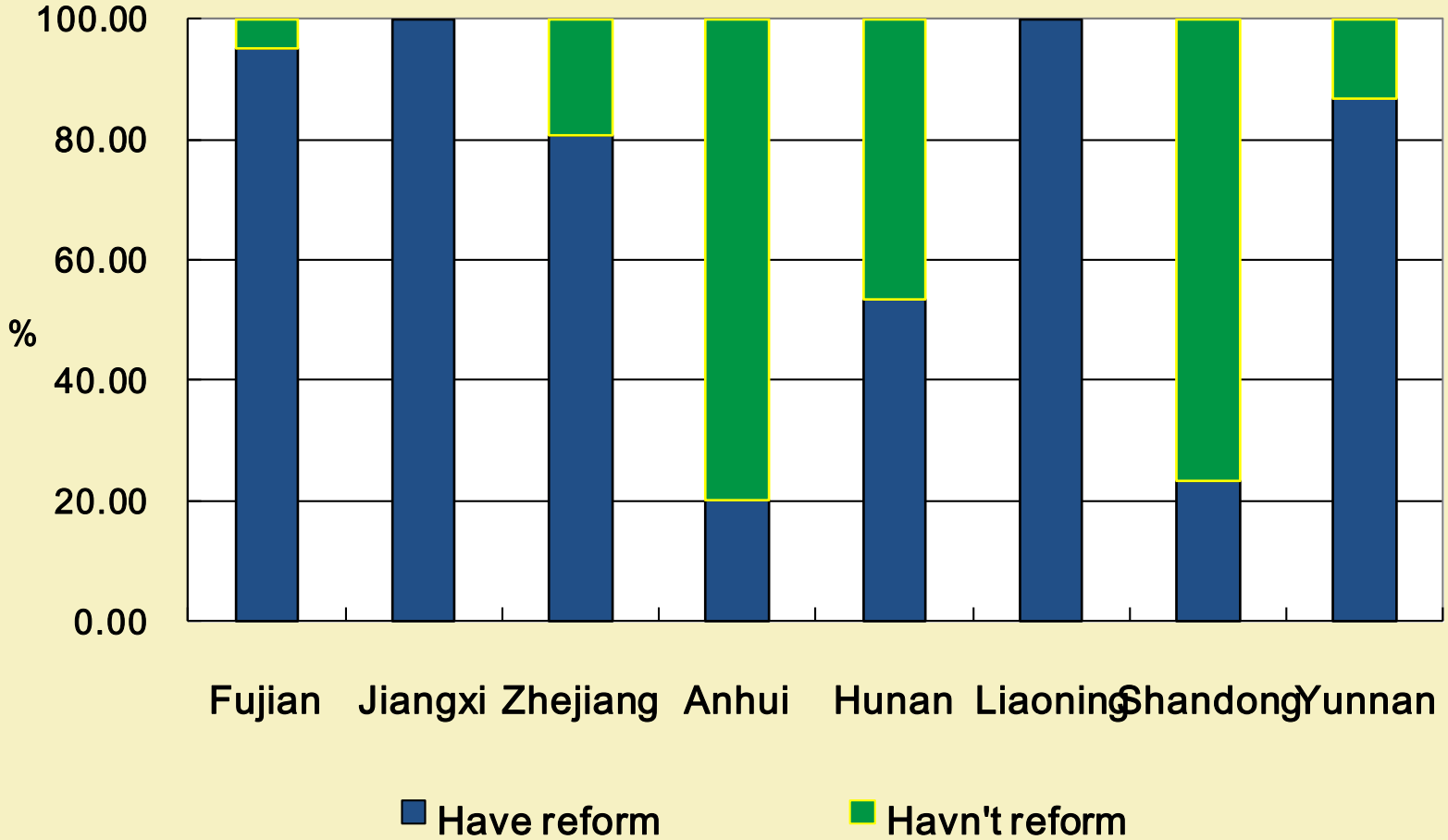
调查工作回顾

The Survey commissioned by SFA

时间 Time	省份 Province	县 County	乡 Town	村 Village	农户 HH
2006.3-4	福建 Fujian	12	36	72	720
2006.5	江西 Jiangxi	5	15	30	300
2006.10-11	浙江 Zhejiang	6	18	36	360
2007.4	安徽 Anhui	5	15	30	300
2007.4	湖南 Hunan	5	15	30	300
2007.5-6	辽宁 Liaoning	5	15	30	300
2007.5-6	山东 Shandong	5	15	30	300
2007.8	云南 Yunnan	6	12	30	600
	总数 Total	49	141	288	3180



Recent Tenure Reform Participation by Village



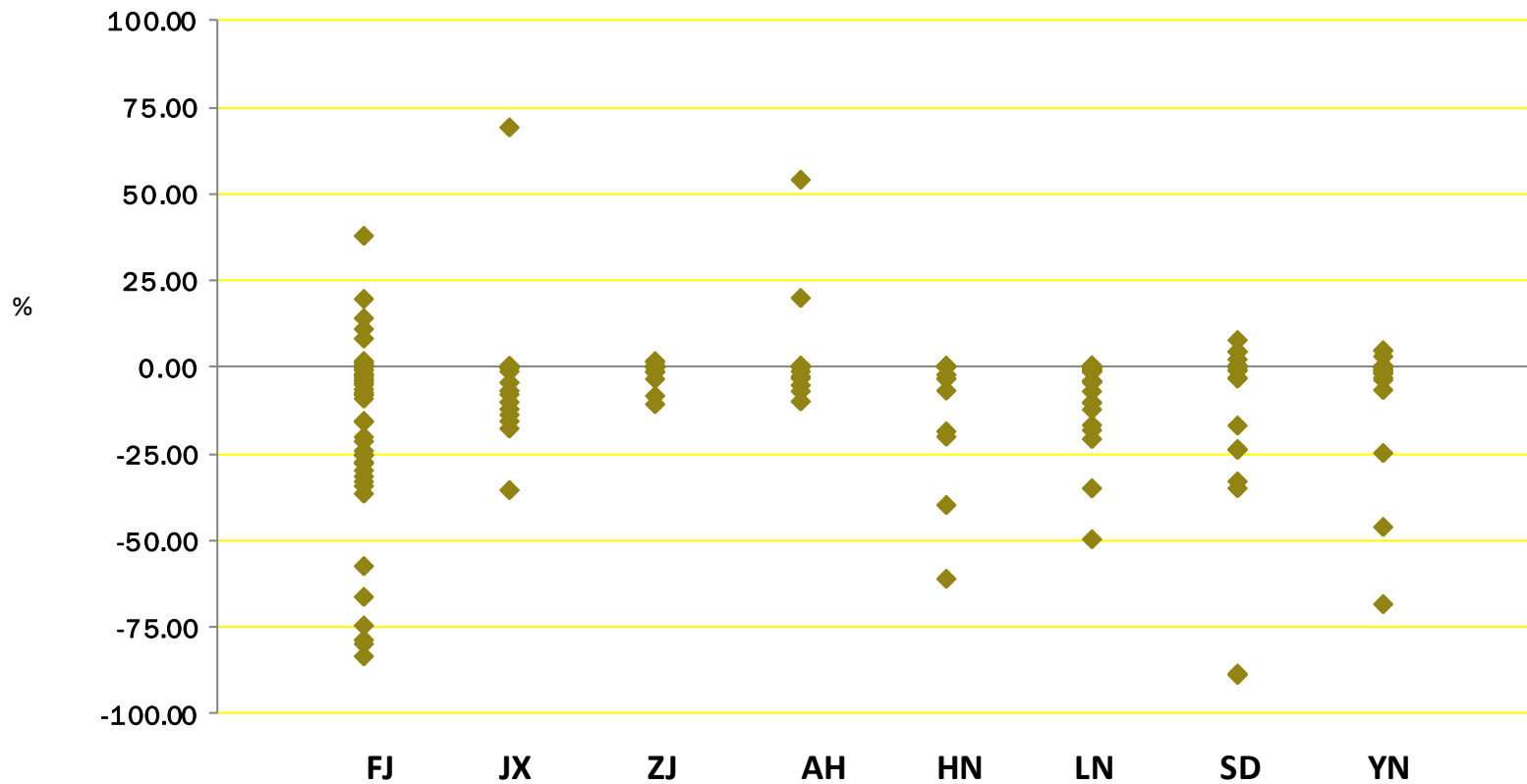
集体林经营权类型

Categorizing Forest Tenure

1. 家庭个体经营 Individual Household Management
(Small Private Plots, Responsibility Hilly Land, Contracted, Rented, Planted and Occupied)
2. 合伙经营 Partnership
3. 村民小组, 自然村 Villager Cluster, Natural Village
4. 林地流转 Outsider Contract
5. 集体经营 Collective Management
6. 生态公益林 Ecological Reserve

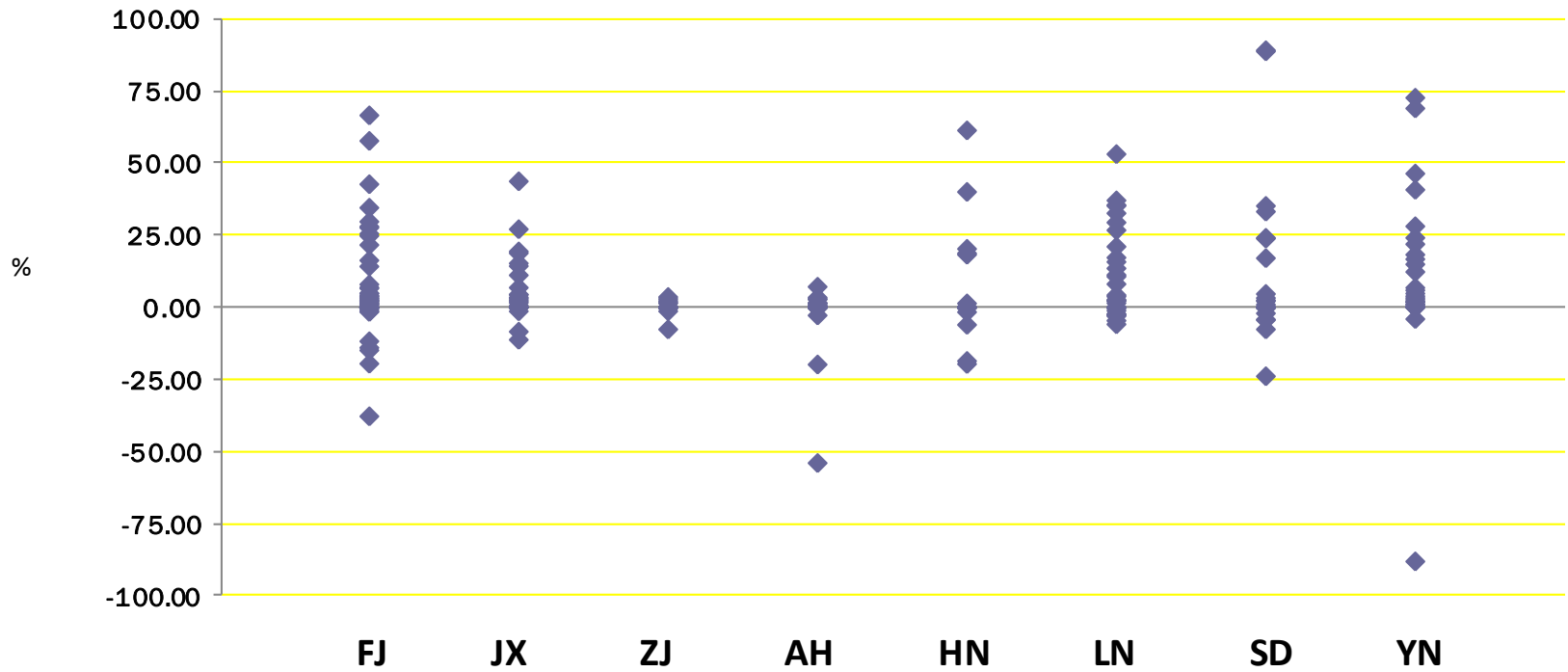
集体经营比例变化 (各省村级数据)

Share Change: Collective Management 2000-2005(2006)



家庭个体经营比例变化

Share Change: Individual Household 2000-2005(2006)



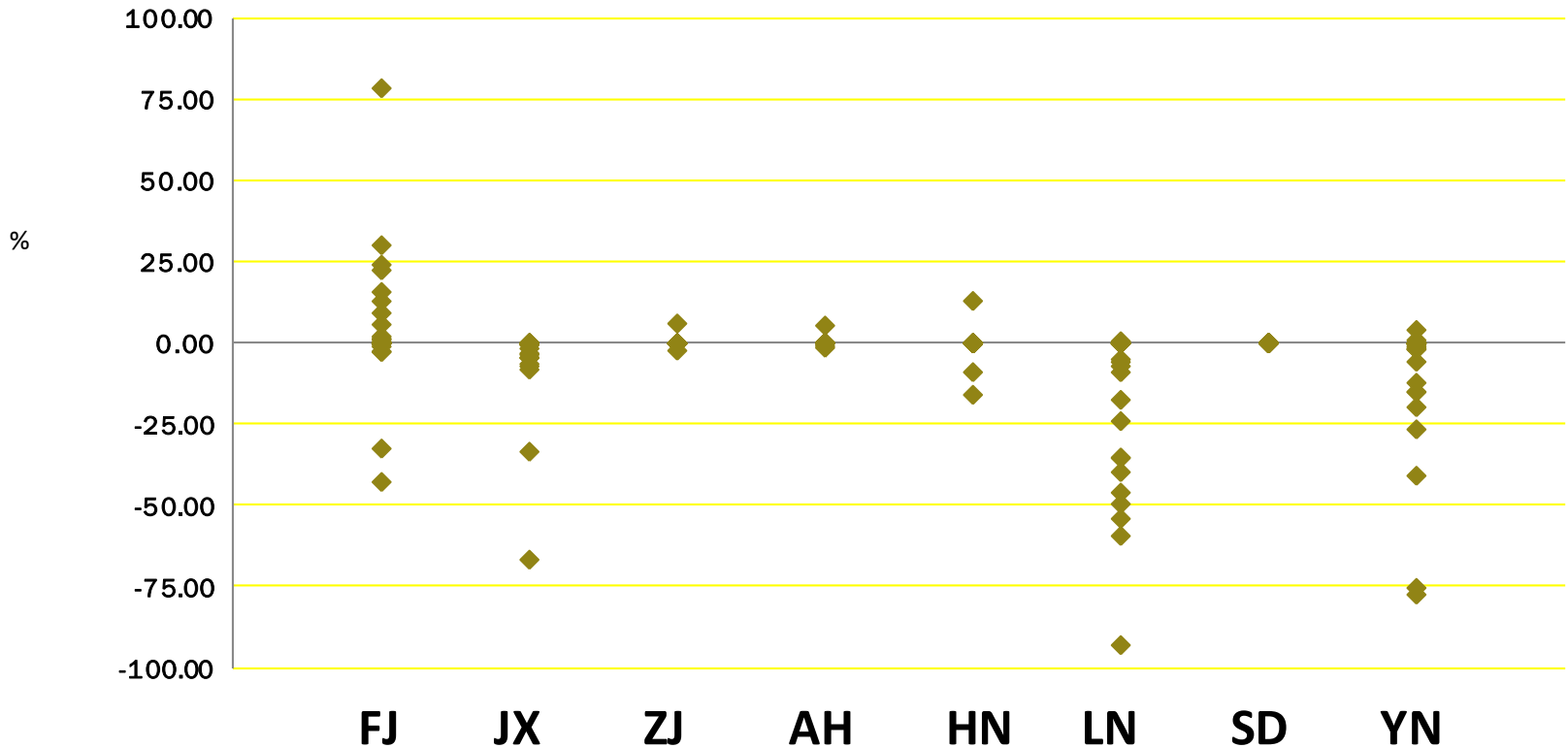
合伙经营比例变化

Share Change: Partnership 2000-2005(2006)



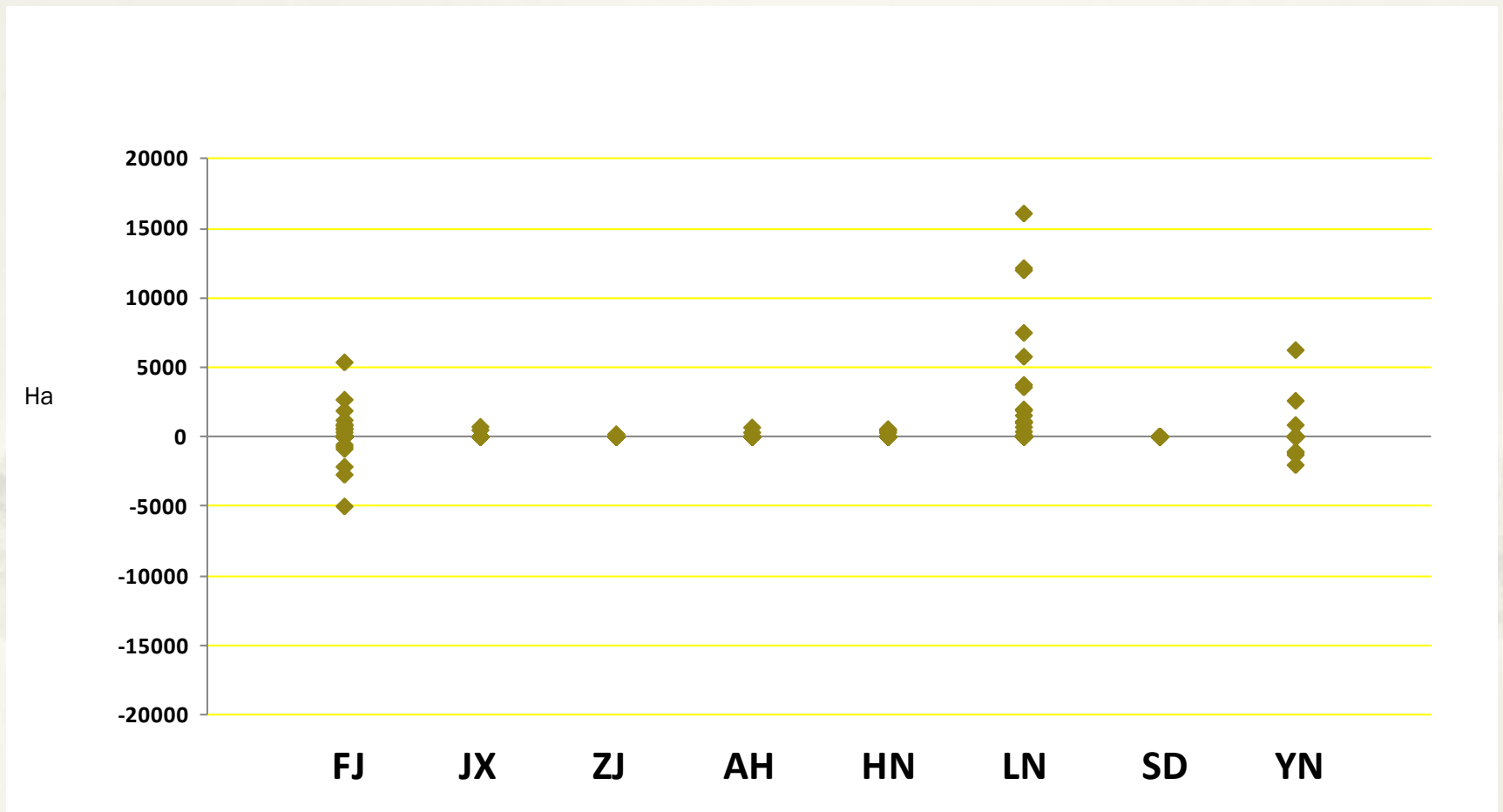
村民小组经营比例变化

Share Change: Villager Cluster 2000-2005(2006)



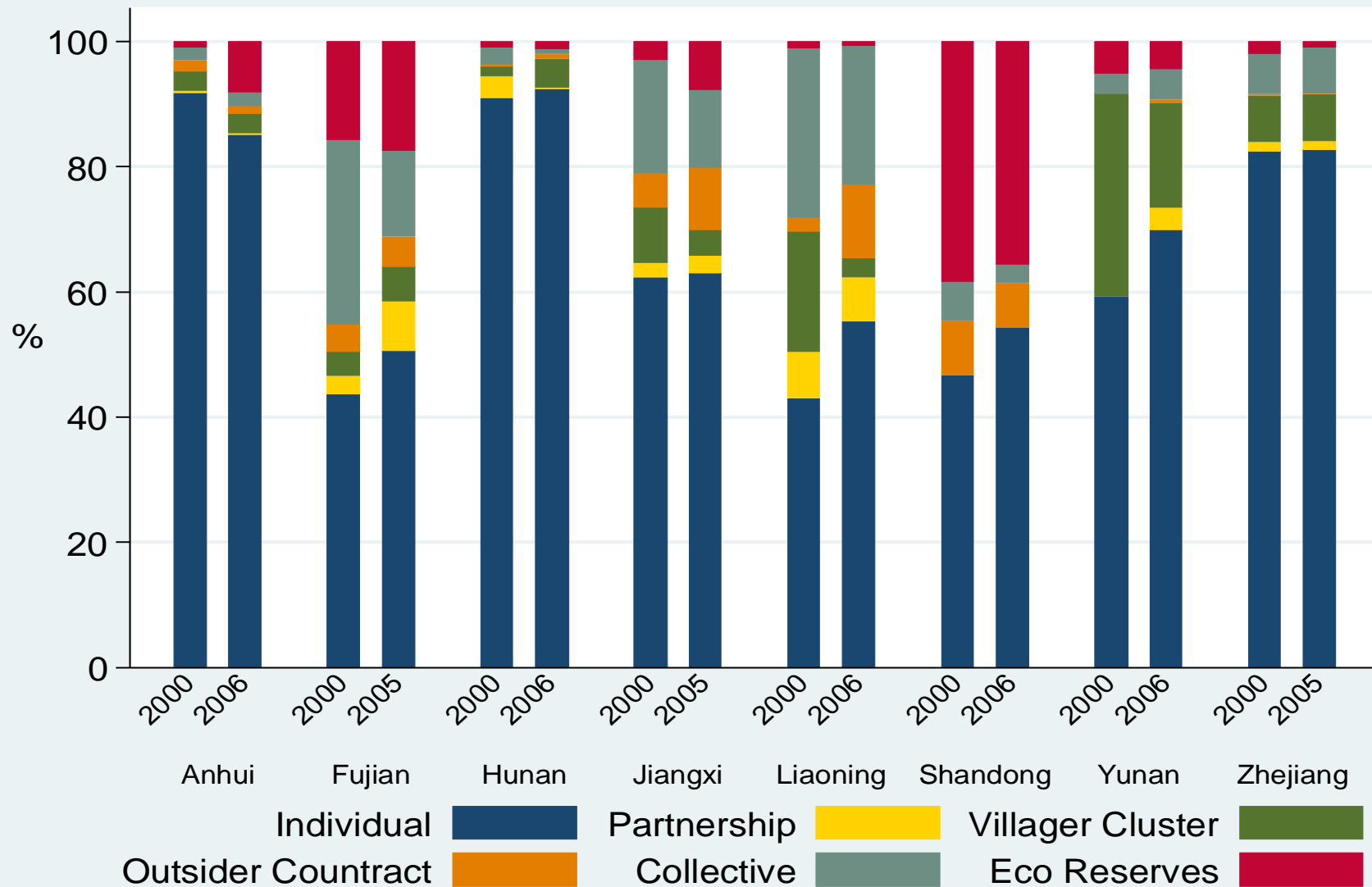
林地流转比例变化

Share Change: Outsider Contract 2000-2005(2006)

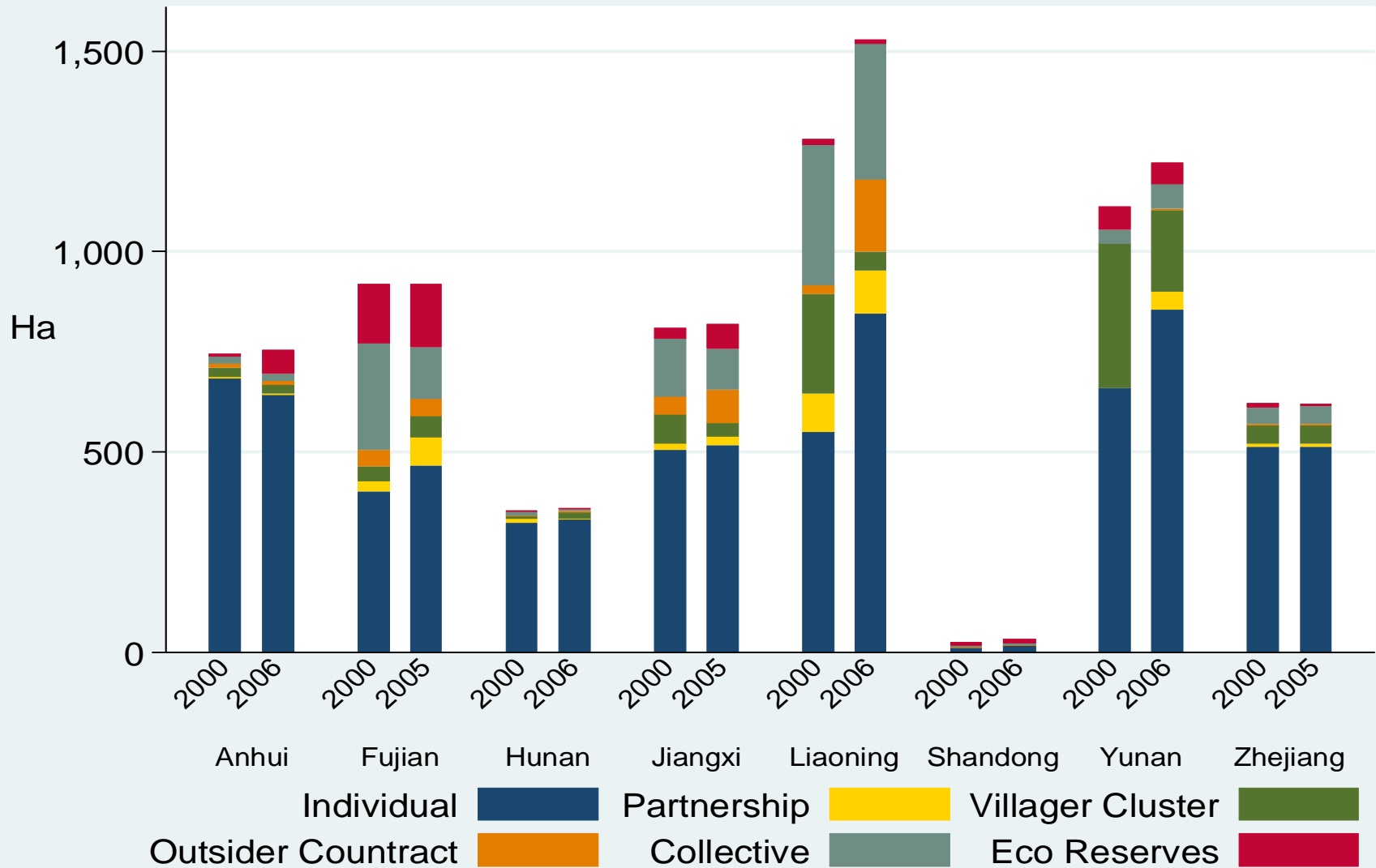


各省变化总体情况

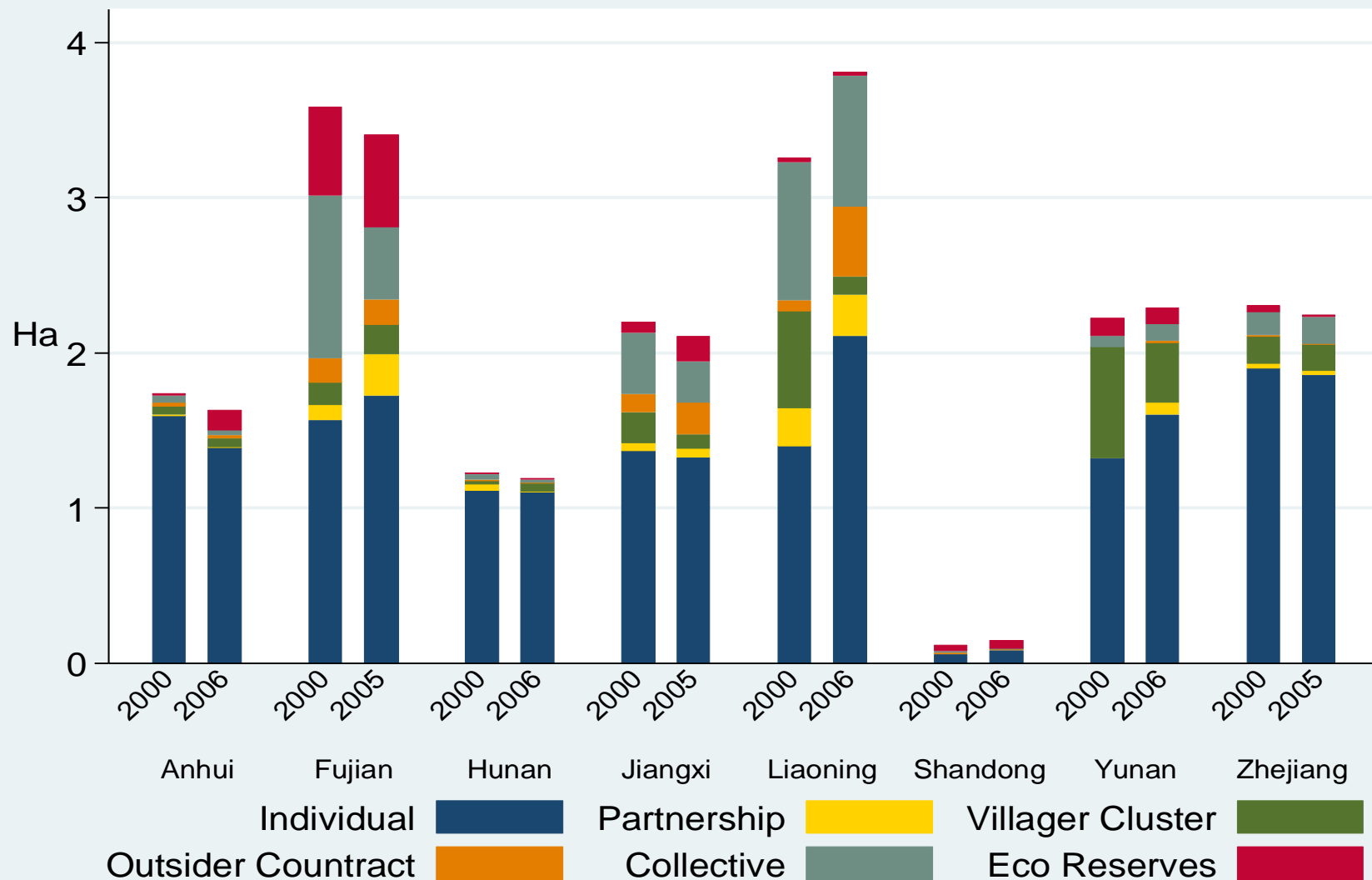
The Change of Area Share by Tenure Type, 2000-2005(6)



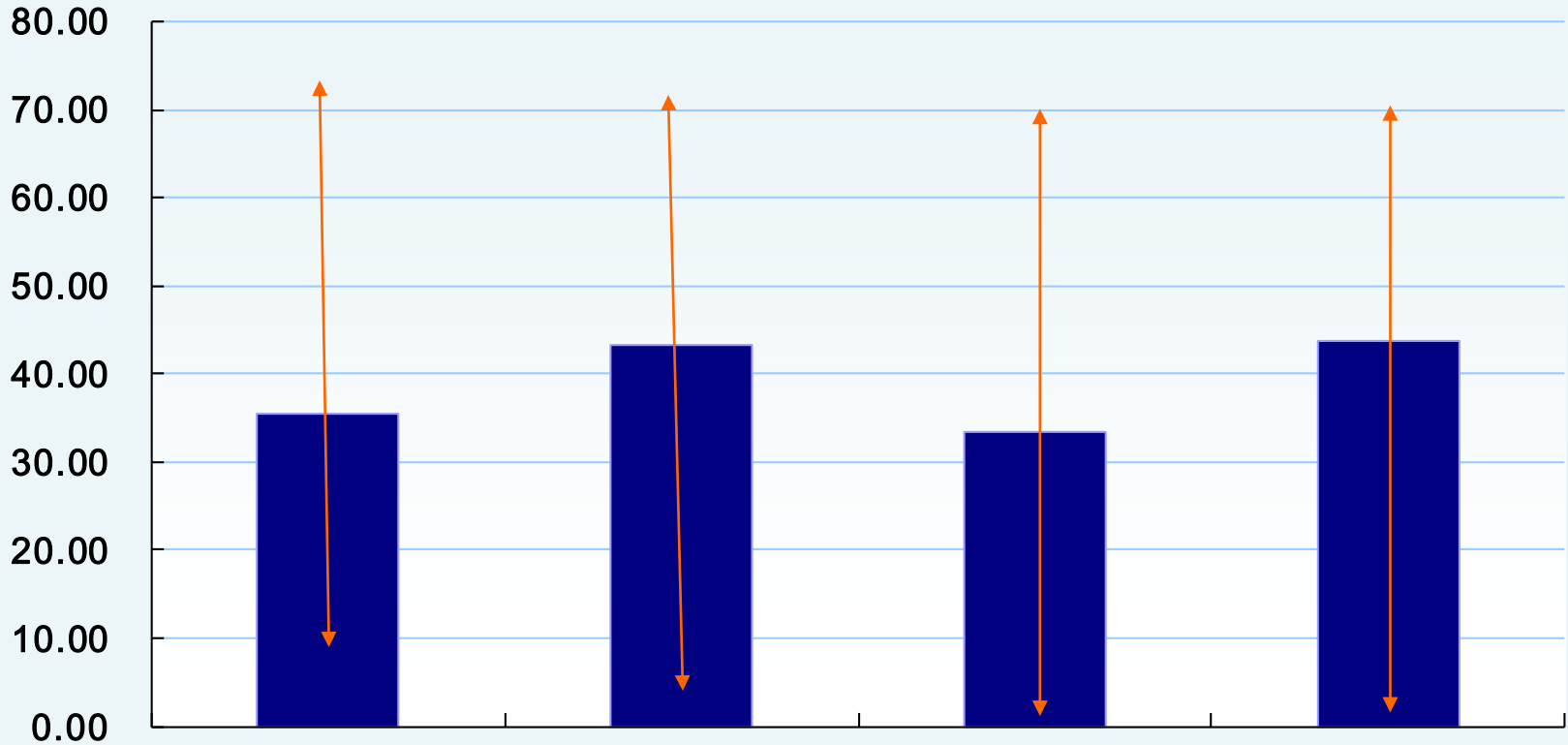
Forest Area by Tenure Type (ha. Village Average)



Forest Area by tenure type (ha. Household average)



Contract Length by Tenure Type



type1

Type1:Individual HH

Type3:Partner

type2

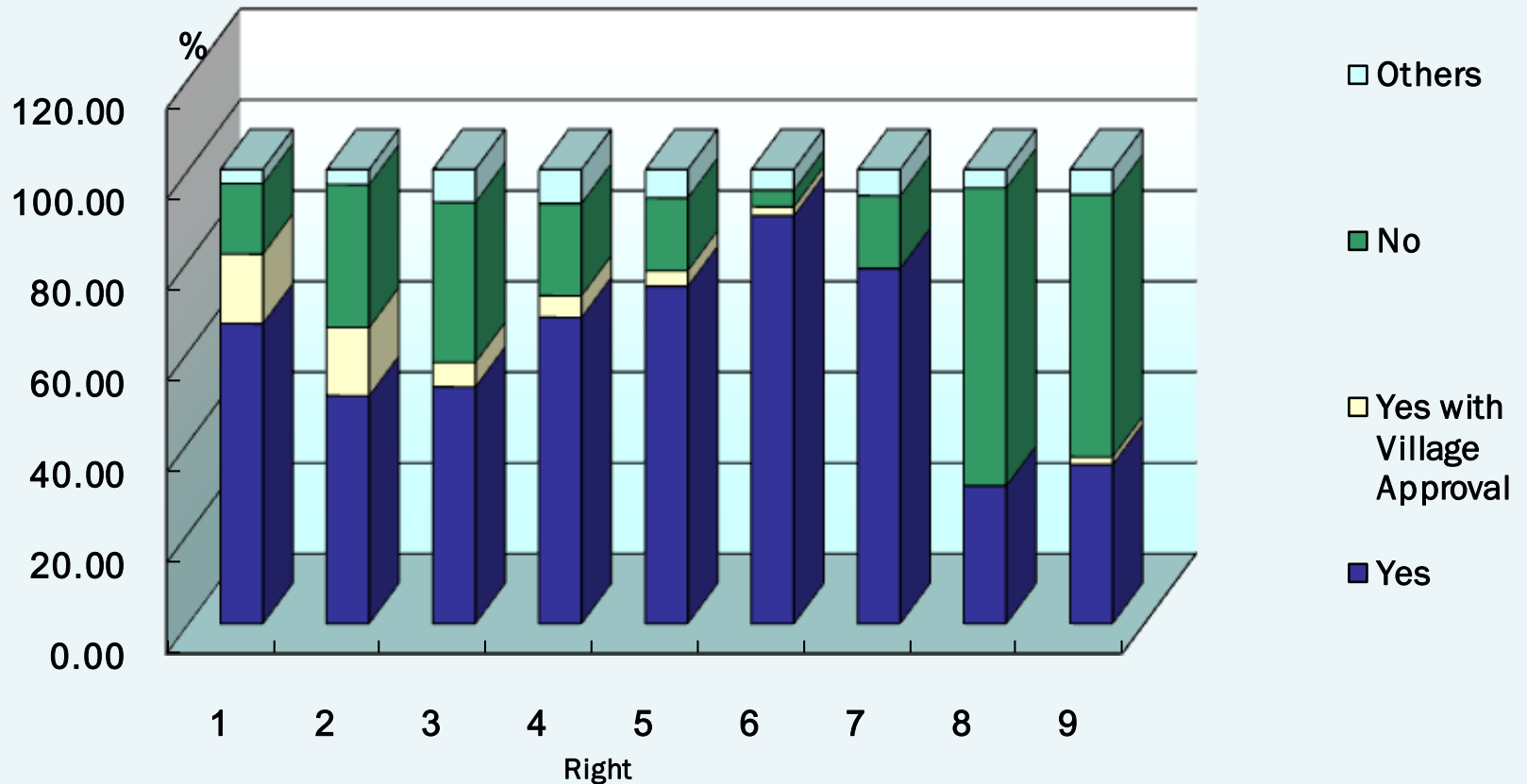
Type2:Villager cluster

Type4:Outsider contract

type3

type4

Knowledge of Tenure Rights by Household



1 : Transfer Right within Village

3 : Right to Mortgage Forest

5 : Autonomy for Tree Species Selection

7 : Right to Harvest

9 : Conversion to Ag land

2 : Transfer Right Outside Village

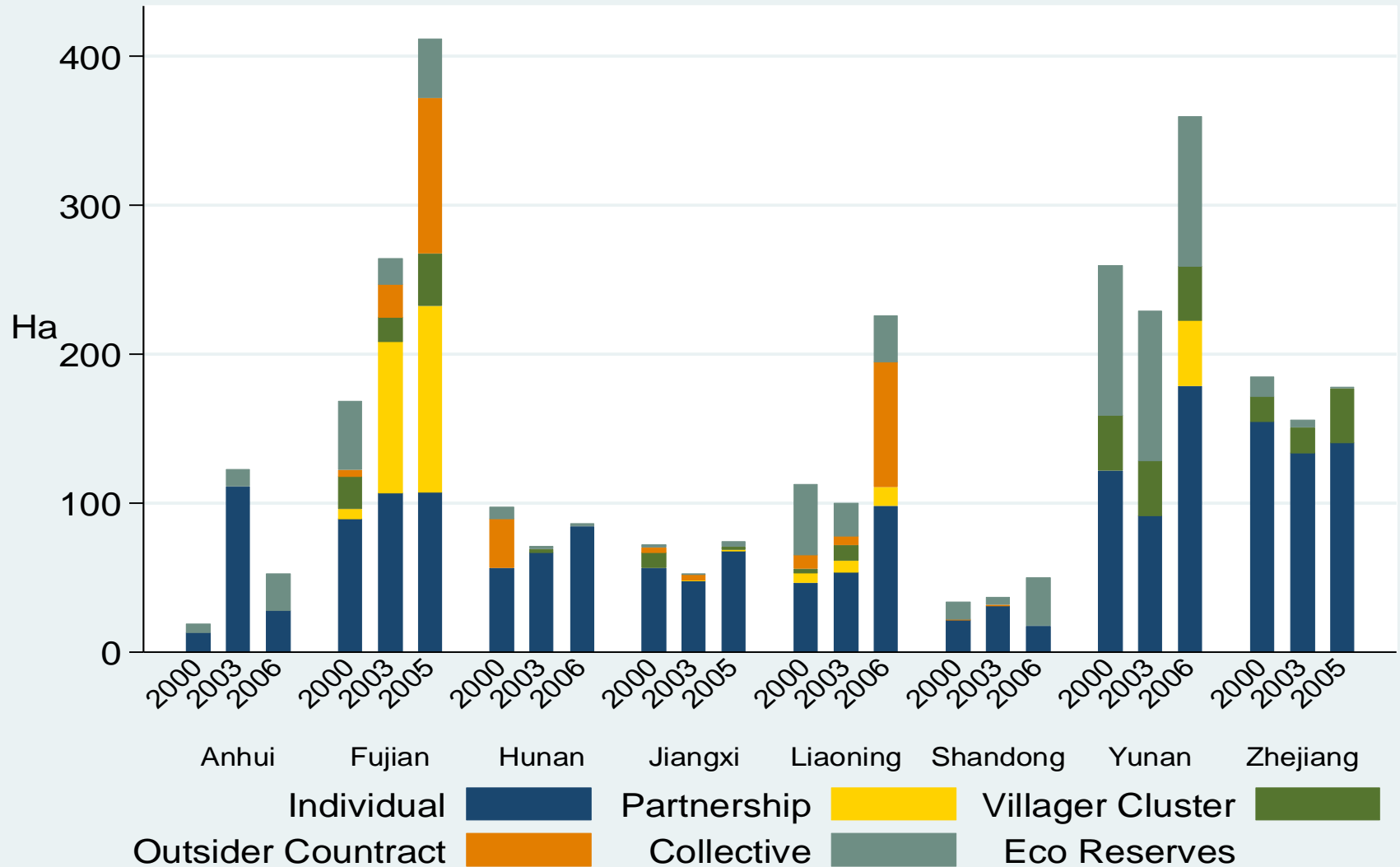
4 : Conversion to Other Forest Type(e.g. orchard)

6 : Right to Manage NTFP

8 : Right to Abandon Forestland

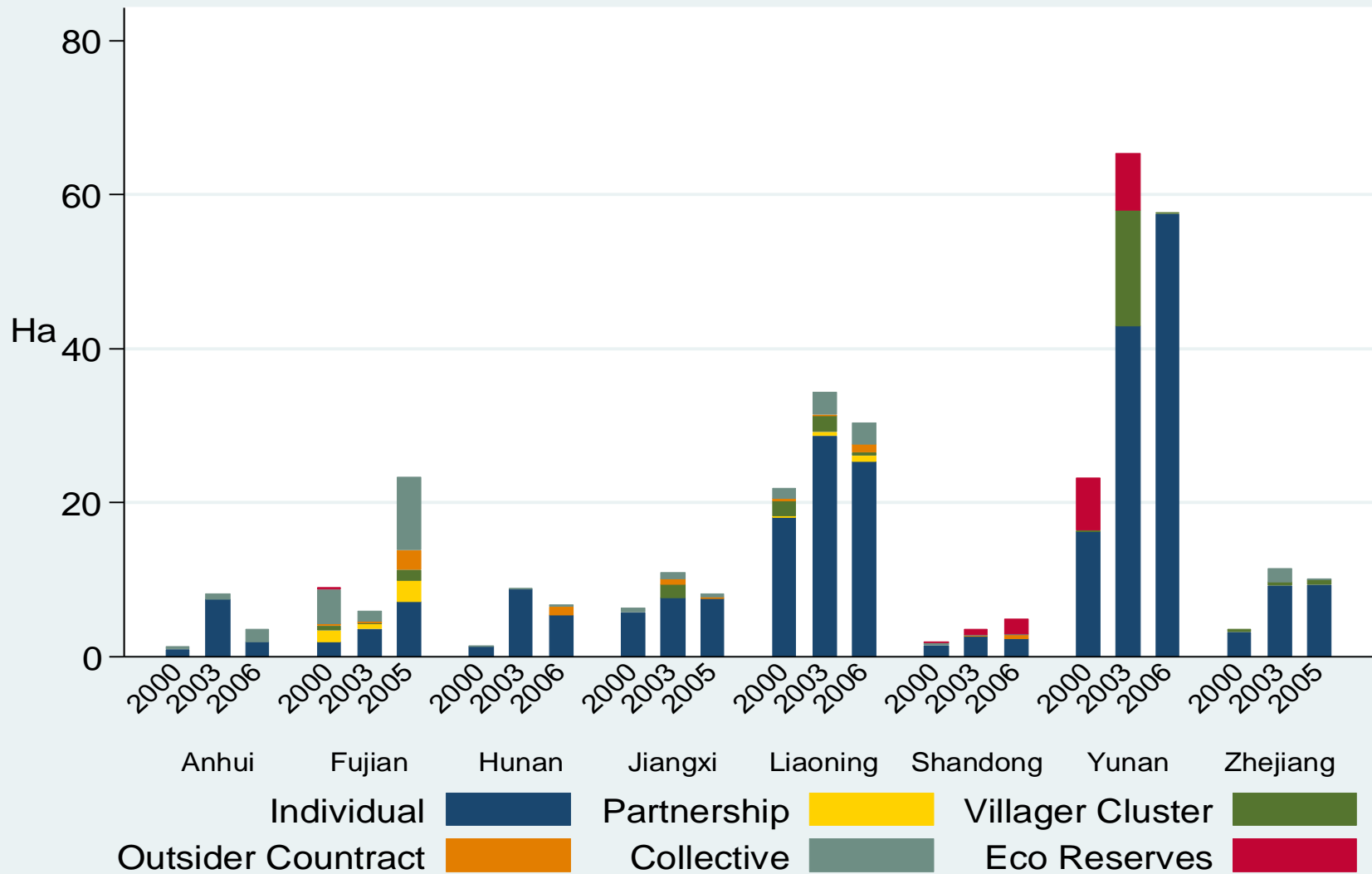
结果一，木材采伐量变化

Results 1 : Timber Harvest Before and After by Village



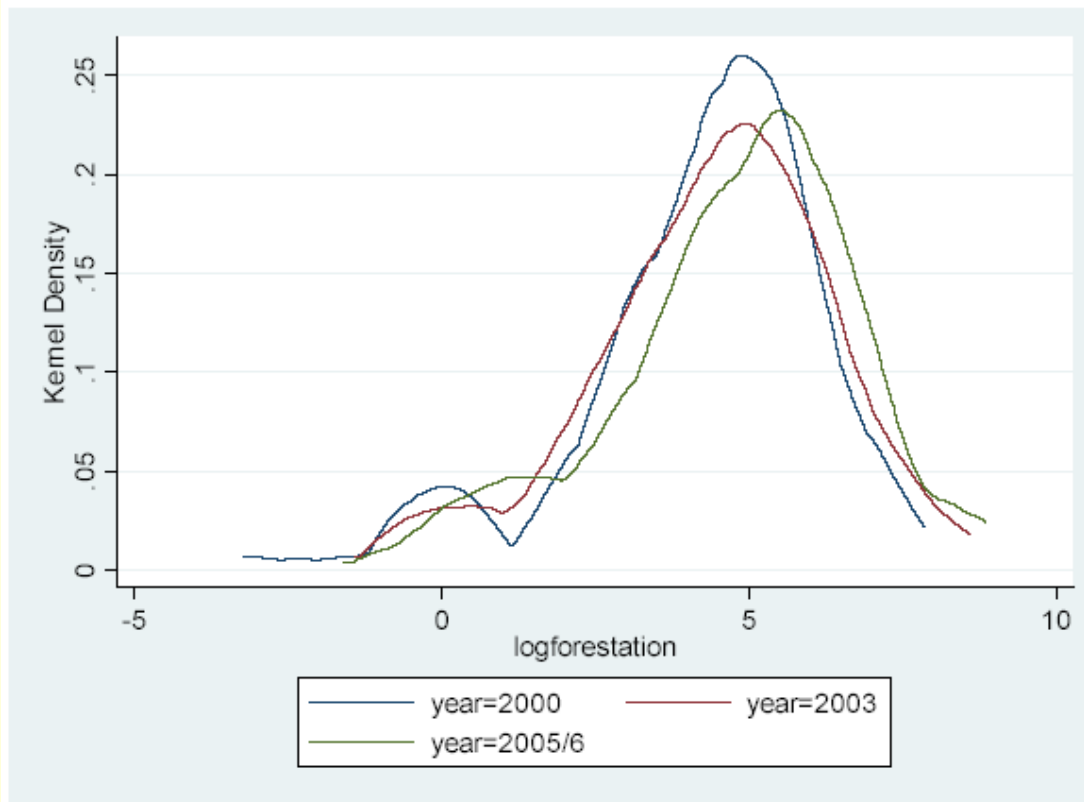
结果二，造林面积变化

Result 2 : Afforestation Before and After by Village



Distribution of log forestation in each year 造林面积分布图

Figure 1: Distributions of log (Forestation)* in each year

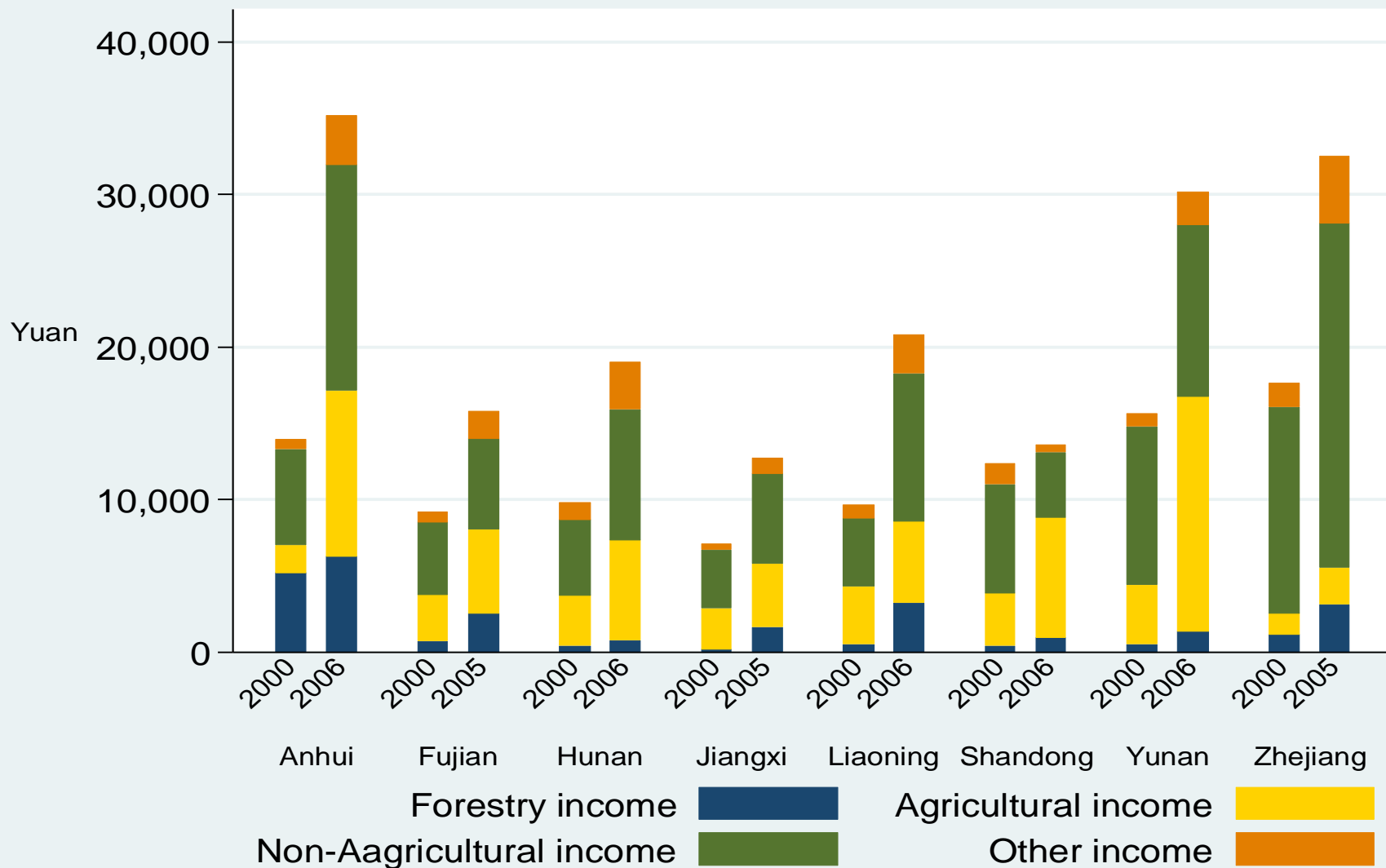


Econometric Estimation of Afforestation Effect

- * Central finding is that the reform causes the villages to increase forestation by 262 mu, which is a 150% increase from no reform to reform.
- * 核心发现：改革使村均年造林面积增加262亩，相比未改革村造林面积增加150%；
- * Plan to study long-run effect as more data become available.
- * 对改革对造林结构的影响、以及长期影响有待进一步分析

结果三，林农家庭收入结构变化

Result 3 : Change in Household Income Structure



初步评判

Preliminary Observations

- * 在本次改革力度大的地方，采伐量大幅度上升
- * Harvest increased a lot
- * 造林面积大幅度上升
- * So was afforestation
- * 林农林业收入比例提高
- * And farmer income from forests
- * 出现了可持续经营的迹象
- * Signs of sustainability
- * 仍然遗留很多分配不公现象，是社会不稳定的隐患
- * Social stability a concern due to equity in the reform process

对林业管理体制的影响

Induced Changes

- * **采伐限额制度** Relaxation of Logging Quota Control
 - * To be replaced by management plan
- * **林地流转** Increase land transaction
 - * If there is scale economy
 - * Empirically testable
- * **劳动力转移** Implication on labor reallocation
 - * The safety net hypothesis under economic depression
 - * Empirically testable
- * **林业管理体制的适应性变化** Governance structure changes
 - * Re-allocation of forest management staff
 - * Service oriented agency
 - * Increased role of eco-compensation scheme
- * **国有林区改革** State Forest Reform

Thank You!





Part II

**EMPIRICAL ANALYSIS I
VILLAGE TENURE CHOICE**

林权模式形成的决定因素分析

Tenure Choice: Motivating Empirical Analysis

- * 林权改革的方向仍存争议
- * Strong disbelief still exists toward promises of forest tenure reform
- * (foresters, social elites, etc.)
- * 中国改革与世界其他发展中国家林权变化的异同
- * In literature, “community forestry” seems to be the solution for developing countries
- * 以墨西哥、印度和许多非洲国家为代表，社区林业是改革目标模式
Outstanding examples: Mexico, India, Africa
- * China is moving toward individualized tenure system in all land. (ag, forest, grassland, even sea shore). Can this be successful?
- * 中国走向个体经营为主的经营体制的驱动因素是什么？
And Why?

Some Explanations

* Historical Background

- * Private ownership 50 years ago
- * Similar to East European Countries
- * Human Capital: Farmer Individual entrepreneurship
- * While most developing countries are with history of colonial regime. State-ownership was dominant in natural resource sector and devolving down to community is already a big and difficult step

* Institutional Learning: success of agricultural reform

* Equity issue: agricultural land tenure

* Efficiency issue: failure of collective management

- * Ineffectiveness of Income generation and forest conservation

* Political-economic factors: declining share of forestry in regional economy

改革原因的思考

Speculating on Reform Rationale

- * 集体土地所有制下，普通农民是名义所有人，集体经济组织的领导人行使实际所有者的权力
- * In a collective system, land is so called “collective owned”. Ordinary farmers are de jure owner, but the leaders of the collective (administrative village) practice de facto decision making power.
- * 集体经济组织的领导人受私利驱动，在经营集体林地过程中各种行为偏离集体利益最大化的目标，导致经营效率低下，林份质量下降，最终“两危”的局面
- * The leaders are self interested. Without sufficient monitoring and sanctioning mechanism, the collective leaders will function in a way far from maximizing collective interests.

集体经营林地的问题

Failure of Collective Forest Management

- * 经营规模偏大，在疏于管理的情形下，形同产生公地悲剧的制度框架
- * The size is too large, if no management, easily tragedy of commons problem
- * 集体森林资源规模越大，普通林农的声音越小，其利益诉求越不容易得到反映
- * When managed by village leaders, the voice of individual farmers gets smaller once the scale of collective operations gets larger.
- * 存在集体经济组织成员和领导阶层信息不对称
- * Information asymmetry between farmers and leaders, lack of accountability
- * 腐败现象普遍发生
- * Widespread corruption
- * 由于上级政府的影响，村集体领导阶层的权利缺乏监督而后制约
- * Lack of check and balance because village leaders are backed by upper level government
- * 管理效率下降，收益下降
- * Management efficiency is low and declining, so is the rent
- * 社会矛盾日增
- * Rising social conflict and farmer resentment
- * 森林资源保护的成木增加
- * Rising cost of forest protection

改革的预期效果

Potential Benefit of Reform

- * 克服公地悲剧问题
- * Hopefully, individualization solves the tragedy of commons problem (NTFP for example)
- * 减少腐败空间
- * It reduces room for corruption
- * 提高农民投资造林和再造林的积极性 (效率改进1)
- * It provides incentives for individual farmers to invest in forest planting and re-planting--efficiency gain (1)
- * 诱致林地市场形成和林地流转, 产生规模效益 (效率改进2)
- * It creates forestland market so that scale economy might be achieved--efficiency gain (2)
- * 林农可以使用林权证抵押贷款, 提高融资和投资能力 (效率改进3)
- * Farmers can use forest certificate as collateral, therefore their ability to invest increases--efficiency gain (3)
- * 也是公平性的改进
- * And it is more equitable a system than the previous one
- * (revenue distribution, bargaining power for farmers, safety net, etc.)
- * 增强森林经营的可持续性
- * Better prospect of sustainable development
- * 局部最优
- * Local Optimum

可能产生的问题

Points of Concern

- * 林地细碎化，导致经营效率损失（1）
- * Forestland fragmentation, at least in near term—some efficiency loss (1)
- * 缺乏金融系统支持，经营者融资能力降低（2）
- * Credit market not developed so well, therefore lack of funding for investment—delayed efficiency gain (2)
- * 在改革过程中，有权势者获得大量林地（公平问题1）
- * Social elites capture large area of forests--equity issue (1)
- * 对弱势农民群体失地大担心（潜在的社会不稳定因素，公平问题2）
- * Concerns about weak farmers losing land quickly—social stability and equity issues (2)
- * 大量小农经营面对市场波动，会否产生大量毁林？（可持续性问题）
- * Market volatility leading to deforestation, concerns about sustainability

理论框架

Theoretical Framework

- * 两种理论 Two lines of literature
- * 土地租佃理论 Land Tenancy Theory (Otsuka 等)
 - * 假定村领导阶层是地主，村民或村民小集体是佃农，双方的能力差异决定合同的特征 Contract types reflect relative ability
 - * 风险的影响，Nature of risk (political vs. natural)
- * 激励理论 Incentive Theory (Lafont, Acemoglu, etc.)
 - * 假定村集体领导层是政府，农民是私人部门，研究政府在什么情况下决定私有化，选择何种合同形式
 - * In collectives, there is a government and a private sector
 - * Government with private agenda
 - * 寻租的动机和提高效率的动机的互相替代
 - * Rent-seeking efficiency trade-off

村集体林权改革模式选择的计量分析

Empirical Analysis of Farmer Collectives' Choice

- * 改革的基本原则是村集体决策制，便于检验村级特征（特别是村级民主发育水平）对产权体系形成的影响
- * The principle of reform (VRC, VA) allows testing the impacts of the following factors:
 - * 村级民主发育程度 Quality of Village Democracy
 - * 有私利的政府 Non-Benevolent Village Government
 - * 精英掠夺 Elite Capture (outsider contract)
 - * 村级政府不独立
 - * Non-Independent Village Government (government interference)
 - * 寻阻与效率的替代 Rent Seeking-Efficiency Trade-off
 - * Low efficiency of collective management leading to wide spread financial deficit
 - * In Fujian, most of the village council improved their financial situation after reform, by collecting fees and charging prices on forest land
 - * Opportunity cost of reform for village management important factor

其它因素 Empirical Analysis (cont'd)

- * 体制风险 Institutional Risk (- household)
 - 产权稳定性 Tenure insecurity
 - 政府干预程度 Government Intervention
 - * 采伐限额 Logging quota
 - * 生态公益林圈地 Eco-reserve
- * 社会资本 Social Capital (+ community)
- * 市场发育 Market Development (+ household)
- * 替代收入 Alternative Income (- household demand)
- * 一般村级特征 General Village Characteristics

计量模型 Econometric Model

- 产权选择的联立方程组
- 分析经营权类型的比例变化的驱动因素
- Estimation of a system of tenure share change
- $\text{Type}(i, 2005) - \text{Type}(i, 2000) = f(6 \text{ categories of determinants, } 2000)$
- $i=1, 2, \dots, 5$.
- The Sample:
 - Fujian and Jiangxi
 - 90 villages

Tenure Change: Impacts of Driving Factors (2 Provs)

Variable	Individual	Partner	Villager Cluster	Outsider Contract	Collective
Village Characteristics					
Share of Laborer	0.218	0.092	-0.080	0.051	-0.329**
Education Attainment	0.543*	-0.063	-0.089	0.269**	-0.075
Slop of Forestland	0.001	-0.039**	0.051*	0.034*	-0.011
Market\ Alternative Income					
Commercial Rate of Crop	0.102	-0.031	0.097	-0.081*	0.043
Off-Farm Employment	-0.589**	0.002	0.140	0.044	0.200
Social Capital					
Informal Credit Attainability	-0.202	0.014	0.324**	-0.016	-0.030
Tenure Security/Policy					
Cropland Adjustment	-0.004	-0.000	0.008***	-0.000	0.001
Area of Eco-Reserve	-0.004	0.006*	-0.001	0.001	0.003
Forest Conflict	0.073**	-0.035**	-0.024	0.022	-0.039
Logging Quota Attainability	-0.072	0.061	0.053	-0.012	0.039
Village Politics					
Fairness	0.014	-0.017*	-0.004	-0.015*	0.018
Forestry Income Share	-0.120*	-0.026	0.150***	0.030	0.013
Land Rent					
1=Yes; 0=No	0.095	0.114**	0.087	-0.043	-0.149*

* significant at 10%; ** significant at 5%; *** significant at 1%

初步分析结论 Conclusion

- * 替代收入降低农民个体对林地需求
- * Higher alternative incomes reduce individual demand for forestland;
- * 社会资本好的地方，社区经营多
- * Good social capital is conducive to community management (village cluster)
- * 政府干预、产权不稳定减少个体经营需求，增加集体经营比例（风险分担机制）
- * Government interference, tenure insecurity, tend to induce increase in group management (risk sharing), but reduce demand for individual tenure
- * 村级政府的质量有影响
- * The quality of village government matters
- * 寻租-效率替代关系存在
- * Rent Seeking-Efficiency Trade-off Seems to Exist
- * 加速改革须补偿既得利益者的机会成本
- * Compensation for opportunity cost of collective leadership will reduce collective management and increase new tenure types.

Thank You!





Part III

EMPIRICAL ANALYSIS II
PERFORMANCE ANALYSIS

The Effect of the Collective Forest Tenure Reform in China on Forestation



Lunyu Xie (UC Berkeley)
Peter Berck (UC Berkeley)
Jintao Xu (Beijing University)

* Collective Forest Tenure Reform

- * Individualize collective-owned forests
- * Policy delivery process: State, Province, County, Township and Village
- * Village representative committees or village assemblies vote for or against the reform
- * Goals
 - * Stimulate investment in forests
 - * Improve forest conservation
 - * Increase forest income

* Forestation

- * Afforestation and reforestation
- * Newly planted forest land in a year, in unit of mu (1 mu = 1/15 hectare)

Research Questions

- * What is the effect of the reform on forestation?
 - * Whether forestation is increased by the reform significantly?
 - * If so, what is the magnitude of the effect?

Data



- * The data is from the surveys done by the Environmental Science and Engineering unit of Beijing University, China.
- * They surveyed 49 counties in 9 provinces. In each county, they conducted interviews randomly in 6 villages, and 10-20 households in each village.

Exposure to the policy and reform

Table 1: Exposed Villages and Reformed Villages in Each Year in Sample

	Villages observed			Villages exposed to reform			Villages that have taken the reform		
	Year00	Year03	Year05/6	Year00	Year03	Year05/6	Year00	Year03	Year05/6
Total	192	192	192	30	93	165	10	42	138
Fujian	72	72	72	12	72	72	6	34	70
Jiangxi	30	30	30	0	0	30	0	0	30
Anhui	30	30	30	0	0	6	0	0	6
Yunnan	30	30	30	0	0	30	0	0	24
Shandong	30	30	30	18	24	24	4	8	8

The variations are due to the delivering process of the reform policy and the villages' voting decisions.

Estimation

- * The estimating equation is

$$fa_{icpt} = \alpha + \beta reform_{it} + c_i + \eta_t + \chi_{pt} + \varepsilon_{icpt}$$

fa_{icpt} : newly forested area in village i in county c of province p at time t

$reform_{it}$: binary variable. 1 if village i takes the reform at time t ;

0 if not taking the reform before or at time t .

c_i : village fixed effects

η_t : time effects

χ_{pt} : province-by-year fixed effects

ε_{icpt} : least squared residual

- * Self selection problem: It is up to the villages to decide whether to take the reform or not.

- * IV: The exposure to the reform policy.

$exposure_{ict} = 1$ if county c where village i is
has been exposed to reform at time t or before
 $=0$ otherwise

- * First stage regression shows significant coefficient of exposure.

- * IV justification

Table 4: Determinants of the Timing of Exposure

	In Levels		In Changes		In Percentages	
	1	2	3	4	5	6
Forest	-0.0847 (0.0953)	-0.0376 (0.0628)				
Private Forest	0.1003 (0.1286)	-0.0936 (0.1253)				
Distance to County	0.0009 (0.0071)	0.0071 (0.0041)				
Price	-0.0185 (0.0039) **	-0.0073 (0.0058)				
Income	-0.0002 (0.0001) **	-0.0001 (0.0001)				
Timber Volume	0.0071 (0.0112)	-0.0138 (0.0205)				
Change of Timber Volume (from 1995-2000)			0.0377 (0.0611)	-0.0914 (0.0582)		
Forest/Land					0.0262 (0.2599)	0.0485 (0.0653)
Private Forest/Forest					0.4009 (0.8225)	-0.36 (0.2249)
Volume/Forest					0.1561 (0.0364) **	0.0306 (0.037)
Province Fixed Effect		Y		Y		Y
Number of observations	130	130	118	118	121	121

OLS and IV Regressions

Table 7: OLS and Instrumental Variable Regressions

	Forestation in Level				
	OLS		IV		
	1	2	3	4	5
Reform	235.2406 (103.0658)**	259.6335 (149.4253)*	243.2676 (140.9092)*	249.9306 (141.2598)*	265.6652 (148.5201)*
Land				-0.02477 (0.157097)	-0.02451 (0.119413)
Price					-1.24563 (0.637633)**
Village Fixed Effect	Y	Y	Y	Y	Y
Year Dummies	Y	Y	Y	Y	Y
Province-by-year Fixed Effects	Y	Y	Y	Y	Y
R-square	0.109	0.1089	0.1269	0.1372	0.1555
Number of Observations	576	576	451	451	451

Conclusion

- * Central finding is that the reform causes the villages to increase forestation by 262 mu, which is a 150% increase from no reform to reform.
- * Plan to study long-run effect as more data become available.

Ongoing and Future Efforts

- * Impacts of Forest Tenure Reform on Labor Market
- * On land market
- * Forest investment
- * On state forest reform
- * Follow-up surveys and assessment needed to obtain understanding of full results of forest tenure reform

**Thank You
Again!**

