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# Collective Forest Tenure Reform in China:

## What has been achieved so far?

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### Abstract

In this paper, we review the evolution of the collective forest tenure system in rural China. Using data collected in eight provinces, we analyze the driving forces and outcomes of recent tenure changes. Preliminary results on changes in farmer household income and forest investment following the tenure reform are also examined.

### I. Background

Prior to the introduction of reforms in the late 1970s, most agricultural land in China was cultivated collectively. Launched in the 1950s, and based on the Soviet model, the original goal of collectivization was to establish a system of large scale farms (called people's communes in China). Catastrophic failure in agricultural production and the ensuing famine from 1959 to 1961 halted the utopian attempt and agricultural production was scaled back down to village collectives. Despite a brief recovery in early 1960s, China's agricultural production once again suffered from a continuing decline in the ensuing decade. In this latter period, agricultural land ownerships were gradually consolidated into two types, state ownership and village collective ownership (SFA, 1999).

Similar to agricultural ownership, two types of forestland ownership co-exist in China: state ownership and village collective ownership. Today, collectively-owned forests account for 58% of China's total forest area and 32% of total timber volume<sup>2</sup>. Reform of the forest tenure system in China's collective forest sector began in 1981, paralleling the reform in rural agricultural land. Much as what occurred in the reform of tenure of agricultural land, reform in collective forests tended to reduce the scope of collective management and to increase the share of individual (farmer household) management without changing the legal ownership. Unlike in agricultural land reform, however, forest tenure reform has been unevenly implemented, an issue we will elaborate on later in this paper.

In 2006, tenure reform of collectively-owned forest areas once again became an issue of high priority for the national government. There were two primary factors driving

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<sup>2</sup> State Forestry Administration (SFA), China Forest Resource Statistics (the 6<sup>th</sup> National Forest Inventory), 2005

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this renewed interest in forest tenure policy: first, that year the national government launched the New Countryside Development Initiative (NCDI)<sup>3</sup>, calling for more development assistance to be delivered to rural areas and a more favorable policy environment for the rural poor. Materializing the ideas of NCDI in the forest sector implied improving tenure rights for farmers and further reforming policies and regulations; second, constrained forest management policy has long been criticized as the main impediment to the implementation of sustainable forest management in collective forest areas and as the main reason that forests do not provide a sustainable and improved livelihood for farmers living in forest areas. These factors resulted in pressures for reform and decentralization of forest management.

Other important factors driving preceding the New Countryside Development Initiative were the introduction of the Rural Land Contract Law in 2002 and the radical central government document, the Resolution on Development of Forestry (also referred to as Document No. 9) in 2003. The spirit of these two policies has been to provide more freedom to farmers in terms of land management decisions.

Triggering the most recent wave of forest tenure reform in rural China was the decision by the Fujian Provincial Government in 2003 to decentralize the collective forest tenure system in favor of individual (farmer household) management. It should be noted that Fujian was the only province that did not participate in the reforms of the early 1980s; instead, Fujian explored an alternative path involving the distribution of “paper shares” of collectively-owned forestland to farmer households. This shareholding model did not allocate physical plots to farmers, but kept most forestland under collective (via village leaders) control. Fujian’s Sanming prefecture was even granted the status of “Forest Reform Experimental Zone” due to its high concentration of shareholding systems. However, this experimental reform failed the test of time, therefore the individualization reform began. By mid-2006 the provincial government claimed that 99% of the villages completed their reform task towards decentralization (individualization) (Chai, 2006).

Since 2004, more than ten additional provinces, with Jiangxi and Liaoning leading the way, have announced renewed initiatives aimed at forest tenure reform within village collectives. The political implications of these initiatives are important from the perspective of the New Countryside Development Initiative because of their institutional implications. The magnitude of current land tenure reallocation in these provinces, compared to Fujian, is much smaller due to the fact that individualization in these provinces had essentially been completed in the first reform period. Nevertheless, this renewed commitment to tenure reform at the provincial level is encouraging for the national government. A national guideline by the State Council on forest tenure reform is being drafted and will be issued in early 2008.

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<sup>3</sup> Central Committee of Chinese Communist Party and State Council (CCCCP&SC), “Several Points to Promote the Construction of Socialist New Countryside by Central Committee of Chinese Communist Party and the State Council”, January 1, 2006

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How important is forest tenure reform in rural China, and by which principles should collectively-owned forestland be devolved to more individual management? What is the optimal management system for village collective forests in rural China? The debate over these issues continues despite the current excitement created through the renewed reform process.

Based on rural surveys we conducted in eight provinces during 2006 and 2007, this paper provides a review and assessment of forest tenure reform over the past two and half decades. In the second section, we give an historical review of forest tenure change in rural China and provide background analysis for the tenure reform. In the third section, we describe the organization of surveys and method of data collection. In the fourth section, we describe the outcomes of tenure reform in recent years based on survey data collected. A preliminary assessment of the reform achievement is presented in the fifth section. We conclude with conjectures on future policy changes. Finally, we provide an econometric analysis of the determinants of collective forest tenure change in an annex.

## II. History of Forest Tenure Reform

### Forest tenure reform in the early 1980s

As mentioned above, there are two types of forestland ownership within China's forest sector: state ownership and collective ownership. This fundamental institutional setting has not changed since its implementation in the late 1950s. Administrative villages, usually comprised of a number of natural villages (or clusters of villager families), function as the legal owners of collective forests in the majority of rural China. Collective and household management within the villages remain the primary form of operation. However, under the current regulations, any type of economic entity has the right to manage and use a collectively-owned forest if properly contracted.

Forest tenure reform in rural China began in the early 1980s, when agricultural land tenure reform was being implemented across China. The essential element of the tenure reform, in both agriculture and in forestry, was to give farmers user rights on land collectively owned by villages. It is widely accepted that the reform of agricultural land tenure was easily achieved and largely successful. In 1984, just three years after the agricultural land reform was fully implemented, the Chinese government declared self-sufficiency in food production. However, despite being posited on the same principles as agricultural reform, the reform of collective forest areas has received mixed evaluations.

### *The "Three Fixes" Policy*

In March 1981, the State Council issued its "Resolution on Issues Concerning Forest Protection and Development", also known as the "Three Fixes" policy. This marked the beginning of a long legislative and policy process aimed at encouraging private

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sector participation by granting increasingly strong user rights to individual farmers. The “Three Fixes” policy sought to transfer responsibility, and subsequently the benefits, of forest planting and management to farmers by:

- Clarifying rights to forests, with an emphasis on mountainous areas;
- Delimiting private plots; and
- Establishing a forestry production responsibility system.

The primary objective of the policy was to establish the farmer household as a legal and basic management unit for forestlands under village collective ownership. From the goals established by the reform policy, in addition to the traditional collective management, two types of individual (household) management models were recognized. One was private plots and the other was responsibility forestland. For the latter, and in some places for both, farmers were required to sign contracts with their village council in order to obtain user rights for the forestland. By 1986, when the “Three Fixes” policy was considered fully implemented, nearly 70% of the collectively-owned forestland had been transferred to rural household management (table 1).

Table 1: Collective Forestland under Household Management by 1986

<b>Province</b>	<b>Area of Collective forestland</b> (million ha)	<b>Area of households managed forestland</b> (million ha)	<b>Household managed forests</b> (%)
<b>Zhejiang</b>	5.73	4.37	76
<b>Anhui</b>	3.79	2.8	74
<b>Fujian</b>	8.19	2.65	32
<b>Jiangxi</b>	9.27	8.58	92
<b>Hubei</b>	7.04	5.75	82
<b>Hunan</b>	11.14	8.33	75
<b>Guangdong</b>	9.27	8.17	88
<b>Yunnan</b>	20.31	11.17	55
<b>Total</b>	74.76	51.81	69

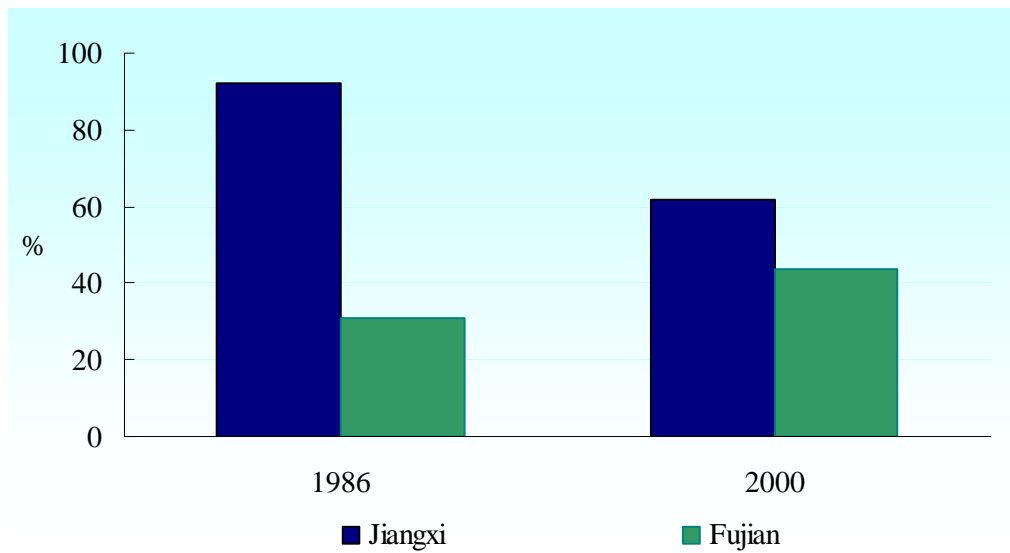
Source: China Forestry Year Book (CFYB, 1987), China Forestry Publishing House.

The reform in collective forests served largely as an equalizer of opportunity and welfare between farmers living in heavily afforested areas and those in standard agricultural areas. In 1985, shortly after tenure reform was initiated, the government liberalized the timber market<sup>4</sup>. The liberalization of the timber market from heavy

<sup>4</sup>Central Committee of Chinese Communist Party and State Council (CCCCP&SC), “Ten Policies to Further Activate Rural Economy by Central Committee of Chinese Communist Party and the State Council”, January 1, 1985.

regulation, and the tenure reform that provided farmers with legal access to forest resources has often been blamed for the widely observed deforestation in some provinces in south China (cites....). Because of the allegations of unsustainable logging, in 1987, the government reinstated monopolistic control by local timber companies over the timber market. Furthermore, in many regions the pace of forest tenure reform was also reined in, as depicted in Figure 1.

Figure 1: Share of Household Contracts in Fujian and Jiangxi, 1986 and 2000



Source: 1986 data comes from China Forestry Year Book (CFYB, 1987), China Forestry Publishing House. 2000 data comes from the survey conducted in 2006.

In figure 1, the 1986 data comes from table 1, and the 2000 data comes from our survey conducted in 2006. Since the survey and data collection methodologies were different, we can only make qualitative comparisons. According to table 1, we can see that in the early 1980s Fujian had the lowest number of hectares designated for farmer household management. In contrast to most other provinces with large areas of collective forests, the share of forestland managed by households of was merely one third; between 1986 and 2000, this share grew only to 40 percent.

In contrast, Jiangxi was more successful province in implementing the “Three Fixes” policy in the early 1980s. By the end of 1986, forest areas under household management constituted 92 percent of collectively owned forest areas. The government decision to re-monopolize the timber market and strengthen forest regulation presented a setback for the reforms and expanding the household based forest management scheme. Our statistics (table 1 and figure 1) show that the share of household-managed forests dropped to 60 percent.

#### Fujian and Jiangxi: Main issues and the reform initiatives in the early 2000s

The essential goal of the shareholding system implemented in Fujian was to keep

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forests under collective management while distributing “paper shares” of collective forests based on family population<sup>5</sup>. At that time, this system was highly regarded by forest administrators for its ability to protect forest resources against dramatic deforestation.

Fifteen years after Fujian’s shareholding system was established, two issues became increasingly evident. First, forestry’s contribution to rural incomes was negligible in spite of the fact that forestland occupies more than 60% of the total provincial land area. Second, enforcing forest conservation had become increasingly difficult for local forest authorities due to a lack of cooperation among farmers. As a stylized example, the severity of forest fire incidents grew over the course of the 1990s. There is anecdotal evidence that more than 90% of the fires were caused by farmers (Cite..).

Jiangxi, which borders Fujian, has not fared much better. Over the course of the 1980s, the province’s forest tenure system underwent dramatic changes that resulted in tenure insecurity for farmers. Furthermore, even for the 60 percent of forested area reportedly under household management, many people have pointed out that de facto control was held by natural villages (Cite..). These collective forest areas shared the same low levels of revenue derived from forestry activities and increasing fire incidents as in Fujian Province.

Table 2 summarizes the composition of farmers’ income in Fujian and Jiangxi; figures 2 and 3 indicate the number and magnitude of fire incidents from 1990 to 2004 in these two provinces. The figures in table 2 indicate that in 2000, the share of forestry in farmer household net income was only 7.47 percent in Fujian and 2.66 percent in Jiangxi.

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<sup>5</sup> This seems to be a popular tenure choice in some former Soviet Union and East European Countries in their land tenure reform process, see Lerman (1999).

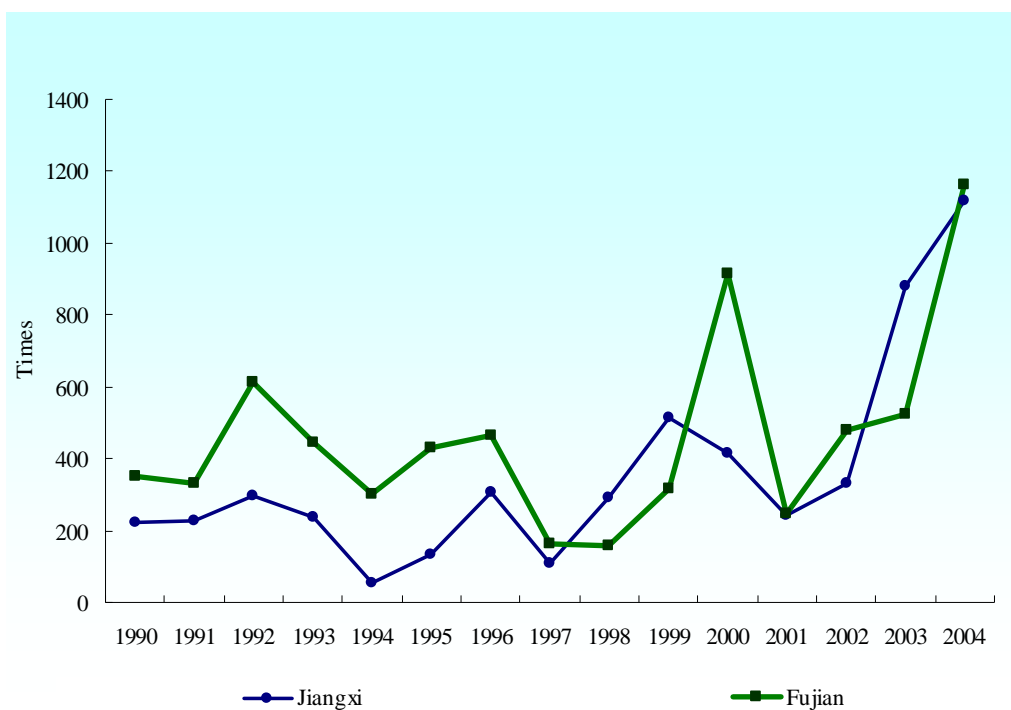
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Table 2: Farmers' Income Composition in Fujian and Jiangxi, 2000 and 2005

Region	Income Sources	2000		2005	
		Yuan	%	Yuan	%
Fujian	Forest	685.29	7.47	2532.07	16.06
	Agricultural	3054.99	33.30	5494.25	34.84
	non_Agricultural	4759.07	51.88	5952.87	37.75
	Others	674.02	7.35	1791.64	11.36
	Total	9173.37	100.00	15770.84	100.00
Jiangxi	Forest	188.29	2.66	1607.15	12.62
	Agricultural	2641.64	37.34	4157.40	32.65
	non_Agricultural	3873.22	54.75	5919.44	46.49
	Others	371.42	5.25	1050.06	8.25
	Total	7074.57	100.00	12734.06	100.00

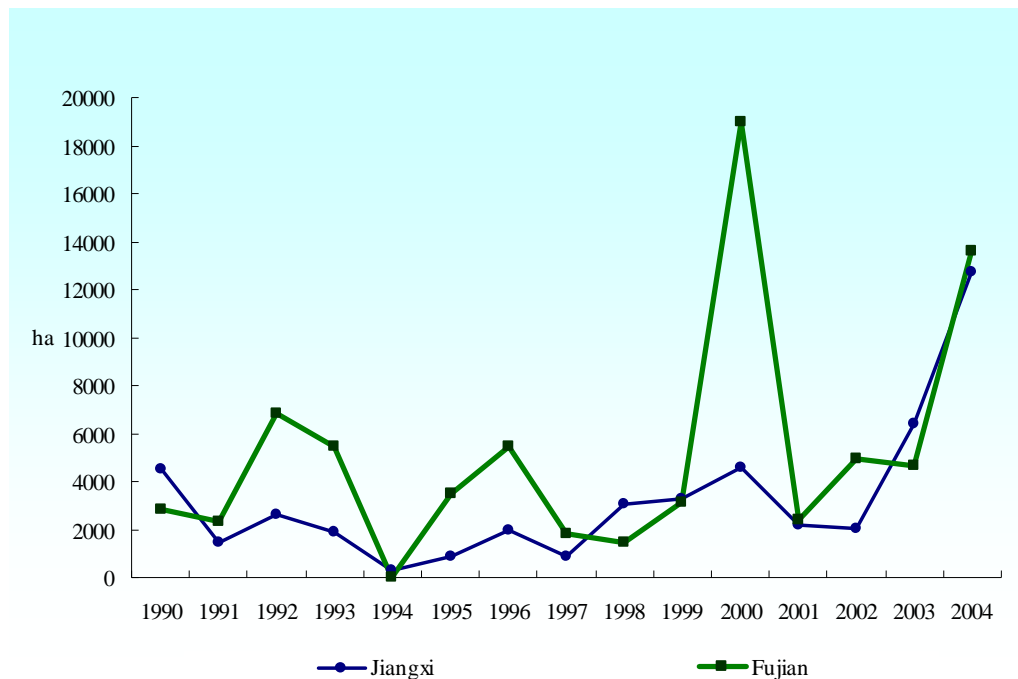
Source: 2006 Survey Data .

Figure 2: Number of Fire Incidences in Fujian and Jiangxi, 1990-2004



Source: SFA, 1990-2004.

Figure 3: Number of Hectares Affected by Fire in Fujian and Jiangxi, 1990-2004



Source: SFA, 1990-2004.

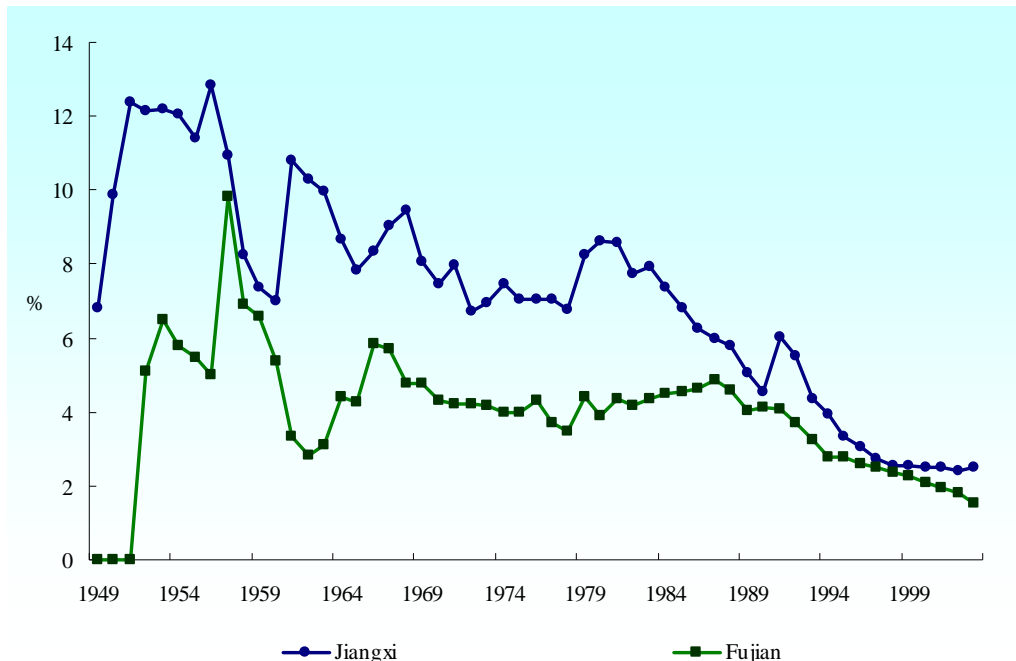
In the spring of 2003, the provincial government of Fujian formally approved the reform, but precedent had already been established in late 2002 when a rural village council suffering from severe financial deficit sold user rights to residents from outside the village. In this case, the individualization of forest management helped eliminate village debt and provided significant rents for the first time since the first year of reform. The reason was that the farmers who accepted the forest user rights were required to pay a land rental fee to the villages. The forest plots bid away to outsiders earned the village revenues in the form of lump sum stumpage payments. In our survey, many villages in Fujian enjoyed similar gains through forest tenure decentralization. A separate survey (Kong et al, 2006) confirms these findings in Fujian.

The political rationale behind support of the provincial government is also of note. Historically, these two provinces resisted tenure decentralization; in the case of Fujian, this is demonstrated by the implementation of an alternative scheme and by cutting short the scale of reform in a short period after the first reform. Why this renewed interest in reforms? The answer may be found partly in the fact that fiscal incentives for the provincial government have changed due to the declining contribution of the forest sector in regional economies (figure 4). While forestry has declined in economic importance, particularly in harvests on state-owned forests and shipping industry, there has been a concurrent growth of other sectors and creation of private economies. As a result of these transformations, the opportunity cost of reforming the forest tenure system has been greatly reduced. Combining this fiscal incentive



with factors that indicate an increasing opportunity cost of delaying reform, such as growing social unrest due to insignificant forestry-derived family income, and increasing difficulty in conservation, etc., makes the decision to extend reforms easier.

Figure 4: Forestry Share in GDP 1950s-1999



Source: SSB, 2000

Moreover, national leaders have devoted much greater attention to rural development over the past several years. The New Countryside Development Initiative has translated into serving as a more benevolent policy, since it includes the gradual elimination of agriculture taxes and fees as well as increasing investment in rural infrastructure and basic education. Farmers' rights over agricultural land has also made major progress after the issuance of the Rural Land Contract Law. These progresses in the agricultural sector make the still-stringent policies in the forest sector more susceptible for criticism.

#### The Nature of Collective Forest Tenure Reform since 2000

By the end of 2007, more than ten provinces had announced plans for collective forest tenure reform. As will be seen later, the magnitude of the current forestland reallocation is not as great as that of the first round of reforms in early 1980s. What makes the second wave reform important can be summarized by the following:

- 1) The once-resistant Fujian province adopted mainstream forest tenure reforms aimed at individualization;
- 2) Provincial decrees have stated that decisions regarding forest land reallocation

- should be made by village representative committees or by village assemblies requiring a 2/3 vote majority.
- 3) Redistribution of plots will be accompanied by legal contracts and forest certificates;
  - 4) The allowable contract period is extended to 30 or 70 years;
  - 5) Adoption of the Rural Land Contract Law has enabled expanded rights, including those of land transfer, inheritance and mortgaging.

### III. Survey and Data Collection

In March and May 2006, we surveyed twelve counties in Fujian and five counties in Jiangxi to begin studying the effects of collective forest tenure reform<sup>6</sup>. In October 2006, we surveyed six counties in the coastal province of Zhejiang, which represents an important collective forest region. In each county, we conducted interviews in three townships, each with two villages and ten households in each village. By the end of September 2007, we had surveyed five additional provinces; these included Anhui, Hunan, Shandong, Liaoning, Yunnan. Sample statistics are provided in table 3.

Our surveys focused on information at the village and household level. The village level surveys investigated information on forest resource change, village natural conditions, village social, economic and demographic characteristics, land use patterns, land use policies governing the village decisions, forest regulations, public programs, village political systems, etc. Three questionnaires were used to gather respective information on 1) village economic activities, land management, the tenure reform process, social, economic and demographic characteristics, etc., carried out using personal interviews with village leaders and covering the period from 2000 to 2006; 2) changes in forest resource and the history of forest production from 1985 to 2006, using information provided by local forestry agencies; 3) village financial information (collective revenue and expenditure), using information provided by the township government, also covering the period from 1985 to 2006.

Table 3: The Survey on Collective Forest Tenure Reform: Sample Statistics

Time	Province	County	Township	Village	Household
2006.3-4	<b>Fujian*</b>	12	36	72	720
2006.5	<b>Jiangxi*</b>	5	15	30	300
2006.10-11	<b>Zhejiang*</b>	6	18	36	360
2007.4	<b>Anhui*</b>	5	15	30	300
2007.4	<b>Hunan</b>	5	15	30	300
2007.5-6	<b>Liaoning*</b>	5	15	30	300
2007.5-6	<b>Shandong*</b>	5	15	30	300
2007.8	<b>Yunnan</b>	6	12	30	600

<sup>6</sup> Funding for the survey in Fujian was provided by Ford Foundation. RRI funded the subsequent surveys and researches in 2006 (in Jiangxi and Zhejiang).

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Sum	8	49	141	288	3180
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Note: \*=Provincial decree has been issued by the time the survey was being conducted.

Household interviews covered information on social, economic and demographic characteristics, production and consumption, land use practices and land rights, forest management activities and rights, asset changes, basic social relationships, and information on participation in the tenure reform. The survey asked farmers to provide information for two years: 2000 (before tenure reform) and 2005 or 2006 (after tenure reform)<sup>7</sup>.

#### IV. Change of Collective Forest Tenure since 2000

##### 1. Categorization of Forest Tenure Types

Based on the information collected in the survey areas, we ascertained more than ten different tenure types (or management arrangements). For purposes of analysis, we have grouped them into six broad categories. Relationships between these six categories and existing tenure types are as follows:

Private Plot (Zi-Liu-Shan): similar to private plots in the agricultural land tenure system, farmers managing this type usually enjoy rights similar to private ownership and comparatively stable tenure rights;

Individual Household Management (Dan-Hu-Jing-Ying): forestland managed by individual farmer households within the village, this includes responsibility forestland and farmer-managed forestland negotiated either through a special contract or with a rental agreement. Responsibility forestland is a standard tenure type and is similar to what is referred to as responsibility land in the agricultural sector. The other type is less standard and the terms of the contract or rental agreement are, to a larger extent, subject to village council discretion. In the current round of reforms, a common element in individual contracts is the issuance of forest certificates and the allowance of a long contract periods (30-70 years); these developments has meant that these types are now converging toward the private plot system described above.

Partnership (Lian-Hu-Jing-Ying): forestland managed by a group of farmers formed on voluntary basis. These groups usually contain five to ten households.

Villager Cluster (Zi-Ran-Cun, Xiao-Zu): forestland managed by a cluster of families living in the same neighborhood; these clusters are the outgrowth of a form originally used to organize collective production in the planned economy era. In many, but not all, places the villager cluster coincides with natural villages. In the current rural system, these are sub-branches of an administrative village and are usually the main form of land holdings with clear boundaries between each other. Forestland managed by villager clusters is considered the same as being collectively managed,

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<sup>7</sup> Four questionnaires used in the survey are available from the authors upon request

but at a smaller scale.

Outsider Management Contract (Lin-Di-Liu-Zhuan)<sup>8</sup>: forestland contracted out for utilization and management by individuals and organizations residing outside the villages.

Collective Management (Ji-Ti-Jing-Ying): forestland managed directly by an administrative village council.

It is generally understood that, since the reforms, the first three categories provide direct benefits to ordinary farmers, while the various levels of village leadership are the direct beneficiaries of the latter three categories. To what degree the reforms have redistributed welfare within villages largely hinges upon these two broad divisions of management.

There is another category of forest use, which is referred to as ecological reserve forest (Sheng-Tai-Gong-Yi-Lin), newly imposed in collective forest areas by the government in late 1990s and early 2000s. Between 10-50 percent of collective owned forestland is classified as ecological forests and is prohibited from commercial use. Although this policy was applied universally, villages with their forests within close proximity to major road and rivers were most affected. Since this new zoning policy was primarily a government initiative, the extent of the ecological reserve forest in the villages under survey is used as an exogenous variable demonstrating the level of regulatory intrusion in collective forest areas.

## 2. The bundle of rights in each tenure types

Associated with each tenure type is a bundle of rights (transferability, inheritance, mortgageability, harvest rights, freedom of production decision, contract length, etc.) specified in the contracts. These rights reflect the level of rigor of tenure for the contractors. In fact inclusion of such concrete rights into the different tenure types has marked significant progress over the previous round of tenure reform and may be the element making the recent round more successful. Based on our survey, the combination of elements associated with different types of tenure arrangements is listed in table 4.

Table 4: Distribution of Tenure Rights as Perceived by Villagers

Right	Response	Individual	Villager Cluster	Partner	Outsider	Eco Reserve	Collective
	Yes	35.01	11.11	24.32	18.60	4.17	3.23
Conversion to Ag land	Yes with Village Approval	1.71	3.70	2.70	0.00	2.08	0.00
	No	57.77	79.63	70.27	70.93	87.50	51.61
	Others	5.51	5.56	2.70	10.47	6.25	45.16

<sup>8</sup> This type is sometime under the categorization of "market allocated plot".

Conversion to Other Forest Type(e.g. orchard )	Autonomous	67.44	59.26	56.76	50.00	43.75	19.35
	Yes with Village Approval	4.77	14.81	8.11	4.65	8.33	0.00
	No	20.32	20.37	32.43	32.56	39.58	38.71
	Others	7.47	5.56	2.70	12.79	8.33	41.94
Autonomy for Tree Species Seletion	Autonomous	74.30	68.52	70.27	63.95	47.92	25.81
	Yes with Village Approval	3.43	11.11	5.41	4.65	2.08	0.00
	No	16.03	14.81	21.62	22.09	39.58	32.26
	Others	6.24	5.56	2.70	9.30	10.42	41.94
Right to Manage NFTP	Autonomous	89.84	88.89	83.78	77.91	81.25	54.84
	Yes with Village Approval	1.96	1.85	0.00	1.16	2.08	0.00
	No	3.67	5.56	13.51	9.30	10.42	3.23
	Others	4.53	3.70	2.70	11.63	6.25	41.94
Right to Mortgage Forest	Autonomous	52.14	40.74	43.24	27.91	41.67	25.81
	Yes with Village Approval	5.39	7.41	8.11	4.65	8.33	0.00
	No	35.25	31.48	35.14	47.67	41.67	54.84
	Others	7.22	20.37	13.51	19.77	8.33	19.35
Transfer Right within Village	Autonomous	66.10	46.30	64.86	45.35	47.92	61.29
	Yes with Village Approval	15.30	14.81	10.81	3.49	16.67	9.68
	No	15.54	27.78	21.62	38.37	27.08	29.03
	Others	3.06	11.11	2.70	12.79	8.33	0.00
Transfer Right Outside Village	Autonomous	50.18	38.89	54.05	33.72	47.92	48.39
	Yes with Village Approval	15.06	5.56	13.51	4.65	12.50	22.58
	No	31.46	42.59	29.73	48.84	31.25	29.03
	Others	3.30	12.96	2.70	12.79	8.33	0.00
Right to Harvest	Yes	78.21	79.63	78.38	60.47	70.83	45.16
	No	16.03	16.67	13.51	30.23	20.83	19.35
	Others	5.75	3.70	8.11	9.30	8.33	35.48
Right to Abandon Forestland	Yes	30.35	14.81	16.22	15.12	14.58	19.35
	No	65.61	79.63	75.68	75.58	68.75	74.19
	Others	4.04	5.56	8.11	9.30	16.67	6.45

Source: Survey conducted in 2006 and 2007.

Table 5: Distribution of Contract Length for Different Tenure Types

Province	Description	Individual	Villager Cluster	Partnership	Outsider Contract
<b>Fujian</b>	Mean	34.26	27.46	33.47	31.58
	Min	1.00	2.00	3.00	1.00
	Max	70.00	50.00	50.00	50.00
<b>Jiangxi</b>	Mean	35.11	40.00	50.00	30.00
	Min	15.00	30.00	30.00	30.00
	Max	72.00	50.00	70.00	30.00
<b>Zhejiang</b>	Mean	31.84	50.00	50.00	13.60

	Min	1.00	50.00	50.00	5.00
	Max	50.00	50.00	50.00	23.00
	Mean	35.22	25.00	21.86	26.60
<b>Anhui</b>	Min	10.00	25.00	1.00	1.00
	Max	50.00	25.00	40.00	50.00
	Mean	35.02	30.00	30.00	-
<b>Hunan</b>	Min	10.00	30.00	30.00	-
	Max	70.00	30.00	30.00	-
	Mean	41.66	-	-	33.50
<b>Liaoning</b>	Min	2.00	-	-	1.00
	Max	70.00	-	-	50.00
	Mean	26.04	-	-	9.00
<b>Shandong</b>	Min	6.00	-	-	8.00
	Max	50.00	-	-	10.00
	Mean	42.16	70.00	47.67	54.44
<b>Yunan</b>	Min	1.00	70.00	3.00	30.00
	Max	70.00	70.00	70.00	70.00
	Mean	35.41	43.35	33.32	43.70
<b>Total</b>	Min	1.00	3.00	1.00	1.00
	Max	72.00	70.00	70.00	70.00

Source: Survey conducted in 2006 and 2007.

## 2. Tenure Change since 2000

Table 5 and Figure 5 demonstrate the change in the share of different tenure types during 2000 and 2006 in the eight provinces surveyed<sup>9</sup>.

Based on table 6 and figure 5, if we view individualization (including voluntary partnerships) as the main objective for reform over the period from 2000 to 2006, then it would appear that Fujian, Liaoning, Shandong and Yunnan experienced significant progress toward this goal. Although Jiangxi and Zhejiang were in the first group to announce tenure reform, they did not experience significant changes in their management categories. In Jiangxi, significant inter-category conversion occurred between Villager Cluster and Outsider Contract. In Zhejiang, individualization has not increased, likely due to the fact that individual management had already been implemented in more than 80 percent of the collective forests prior to the onset of the current reforms, making only limited room for further reform. Similarly, we can attribute the same reasons to the insignificant changes seen in Hunan. In Anhui, individual management decreased, stemming from a conversion of collective forests into eco-reserves. This is consistent with the fact that south Anhui has been a major tourist destination; setting aside a bigger share of forestland as eco-reserve demonstrated the effort to preserve the tourism value of the forests.

<sup>9</sup> In the ensuing presentation, we merge private plot with individual tenure due to the fact that these two converge in their characteristics.

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Shandong was a particularly interesting case in that it is a province in northern China with historically little forest coverage. Afforestation efforts have been focused on establishing shelterbelts surrounding cultivated land. Therefore, prior to the reforms, eco-reserves occupied a large share of forestland. Evidently, a large share of the eco-reserves (shelterbelt), as well as some of the collectively managed forests, has been transferred to individuals for management.

We can observe that in Yunnan, the share of collective management actually increased, accompanied by increases in individual and partnership management. Reductions in tenure type were largely in the Villager Cluster category. It is our assessment that collectivization occurred in places where large areas of forests were affected by the Natural Forest Protection Program and fall under the category of eco-reserve.

Table 7 and figure 6 show changes of actual area per village in each type of forest tenure.

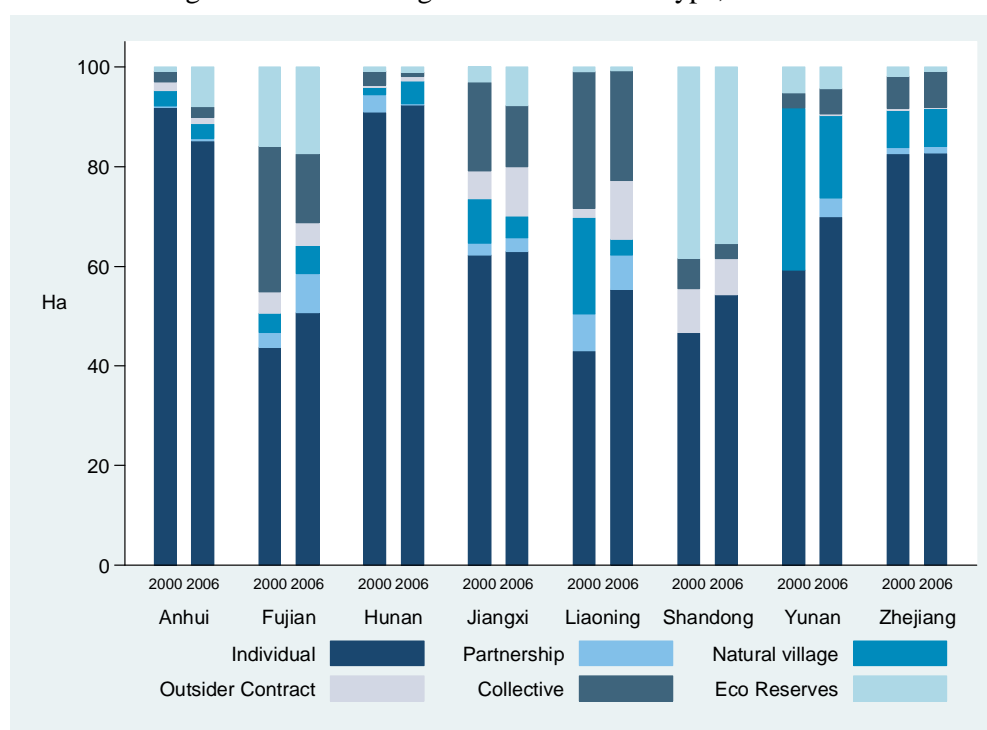
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Table 6: Share Change of Forest Tenure Types in 2000-2006

Province	year	Individual	Partnership	Villager Cluster	Outsider Contract	Collective	Eco-Reserve	Total
Fujian	2000	43.61	2.94	3.97	4.29	29.27	15.93	100.00
	2005	50.63	7.81	5.62	4.72	13.78	17.44	100.00
Jiangxi	2000	62.23	2.31	8.93	5.49	17.93	3.12	100.00
	2005	62.97	2.77	4.16	9.95	12.47	7.67	100.00
Zhejiang	2000	82.45	1.37	7.43	0.26	6.62	1.86	100.00
	2005	82.66	1.37	7.48	0.25	7.37	0.87	100.00
Anhui	2000	91.81	0.40	3.08	1.58	2.24	0.89	100.00
	2006	85.07	0.40	3.06	1.28	2.07	8.12	100.00
Hunan	2000	90.89	3.41	1.66	0.38	2.78	0.88	100.00
	2006	92.43	0.27	4.46	0.74	0.98	1.11	100.00
Liaoning	2000	42.93	7.52	19.27	1.94	27.37	0.97	100.00
	2006	55.21	7.04	3.08	11.90	22.09	0.68	100.00
Shandong	2000	46.58	0.00	0.00	8.77	6.17	38.47	100.00
	2006	54.30	0.00	0.00	7.05	3.08	35.56	100.00
Yunan	2000	59.22	0.00	32.44	0.00	3.05	5.29	100.00
	2006	69.87	3.68	16.63	0.45	5.03	4.35	100.00

Source: Survey conducted in 2006 and 2007.

Figure 5: Share Change of Forest Tenure Type, 2000-2006<sup>10</sup>



Source: Survey conducted in 2006 and 2007.

<sup>10</sup> Surveys in Fujian, Jiangxi and Zhejiang were conducted in 2006. Final year of data was 2005 for these three provinces. Same applies in all the subsequent charts. The final year was labeled “2006” due to rigidity of chart making technique.

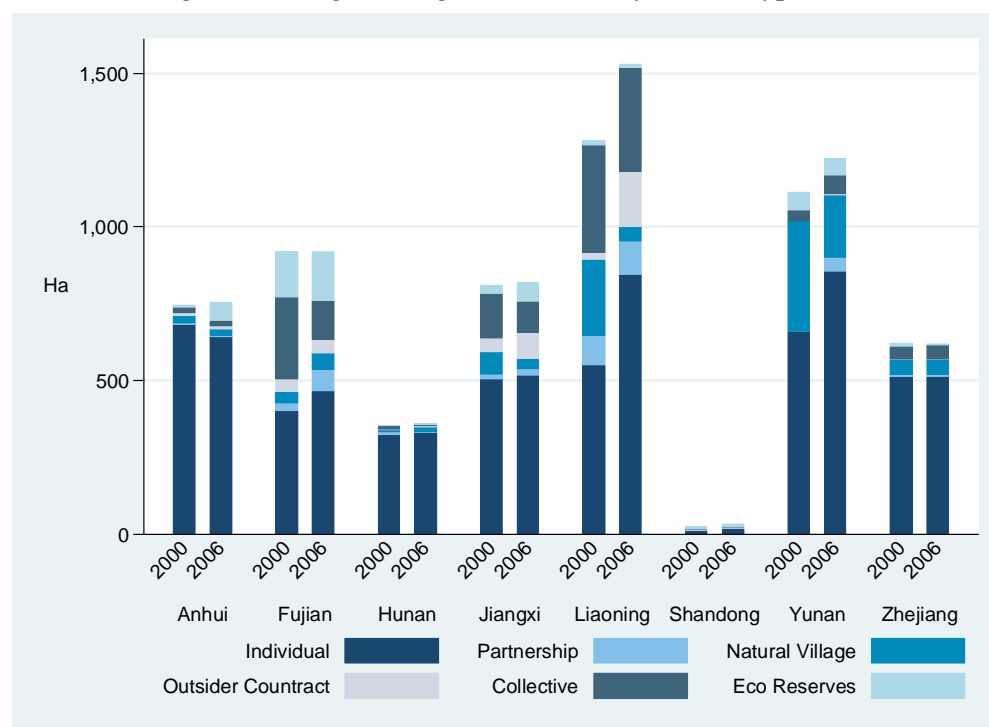


Table 7: Village Average Forest Area by Tenure Type, 2000-2006 (ha)

province	Year	Individual	Partnership	Villager Cluster	Outsider Contract	Collective	Eco-Reserve	Total
Fujian	2000	400.21	26.99	36.40	39.36	268.63	146.16	917.74
	2005	465.54	71.82	51.67	43.41	126.71	160.33	919.48
Jiangxi	2000	503.25	18.65	72.19	44.43	145.03	25.20	808.74
	2005	515.66	22.70	34.04	81.51	102.13	62.85	818.88
Zhejiang	2000	512.00	8.50	46.16	1.63	41.10	11.57	620.95
	2005	511.92	8.50	46.34	1.56	45.62	5.37	619.31
Anhui	2000	684.30	3.00	22.92	11.79	16.66	6.64	745.33
	2006	642.23	3.00	23.08	9.70	15.64	61.32	754.97
Hunan	2000	321.83	12.09	5.88	1.33	9.83	3.11	354.06
	2006	331.79	0.98	16.01	2.67	3.53	3.98	358.96
Liaoning	2000	549.47	96.22	246.69	24.86	350.34	12.39	1279.97
	2006	844.27	107.69	47.04	181.95	337.83	10.35	1529.13
Shandong	2000	11.48	0.00	0.00	2.16	1.52	9.48	24.64
	2006	17.39	0.00	0.00	2.26	0.99	11.39	32.03
Yunan	2000	659.09	0.00	361.02	0.00	33.99	58.92	1113.02
	2006	853.68	44.90	203.15	5.46	61.42	53.17	1221.78

Source: Survey conducted in 2006 and 2007.

Figure 6: Village Average Forest Area by Tenure Type (ha)



Source: Survey conducted in 2006 and 2007.

## V. Observable performance of the tenure reforms so far

In this section we will primarily examine changes in forest management (harvest and afforestation) and changes in farmer income derived from forestry.

1. Timber harvests have increased dramatically in provinces with significant recent reform.

As demonstrated in table 8 and figure 7, average timber harvests in villages increased dramatically in Fujian, Liaoning, Shandong and Yunnan during the 2000 to 2005/2006 period. This trend of increasing harvest coincided with the trend toward individualization, since individual and partnership management became the main source of timber production. In Fujian and Liaoning, there has also been spectacular growth in timber production by those holding outsider contracts; this is particularly noteworthy given the decline of this sector in the other provinces, except Shandong, which experienced only a very minimal growth. This finding is consistent with field observations that large shares of outsider contracts were granted for harvest rights (concessions).

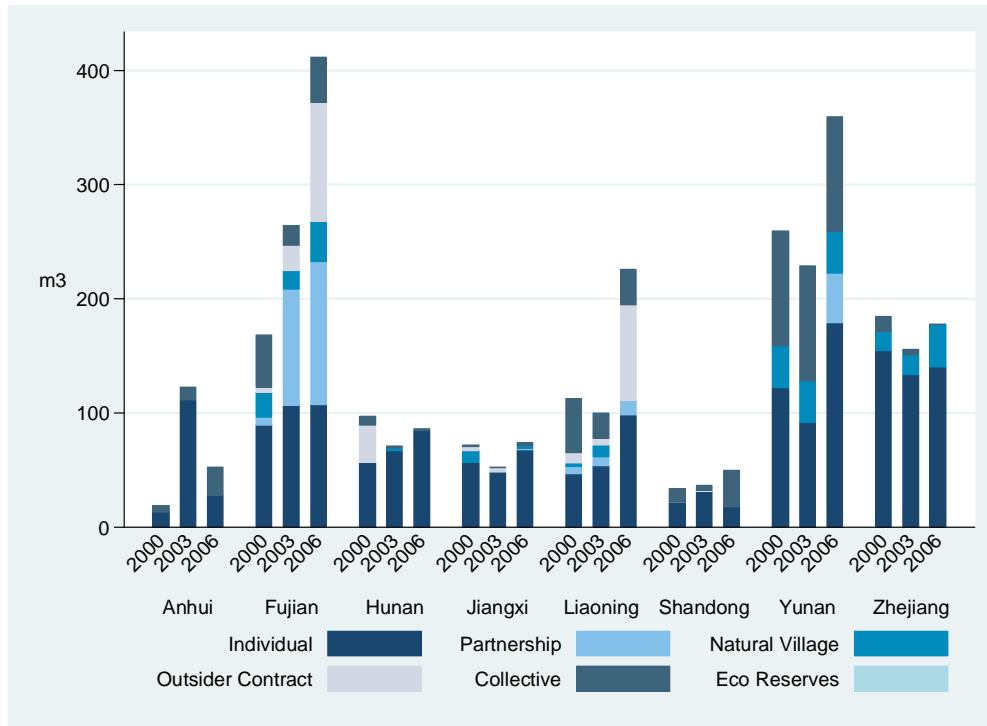
Table 8: Timber Harvest per Village during 2000 and 2005(6), in cubic meters

prov	Year	Individual	Partnership	Villager Cluster	Outsider Contract	Collective	Total Forestland
<b>Fujian</b>	2000	89.14	6.73	21.67	4.42	46.60	168.56
	2003	106.70	101.55	16.67	21.73	17.52	264.17
	2005	107.33	124.97	35.00	104.48	39.97	411.75
<b>Jiangxi</b>	2000	56.07	0.00	10.50	3.33	2.00	71.90
	2003	47.70	0.67	0.00	3.33	0.50	52.20
	2005	67.84	0.62	2.00	0.00	3.33	73.80
<b>Zhejiang</b>	2000	154.86	0.00	16.67	0.00	13.33	184.86
	2003	133.75	0.00	16.75	0.00	5.28	155.78
	2005	140.56	0.00	36.25	0.00	0.83	177.64
<b>Anhui</b>	2000	12.83	0.00	0.00	0.00	5.67	18.50
	2003	111.02	0.00	0.00	0.00	11.48	122.51
	2006	27.80	0.00	0.00	0.00	24.67	52.47
<b>Hunan</b>	2000	55.95	0.00	0.00	33.33	7.93	97.22
	2003	66.50	0.00	2.49	0.00	1.74	70.73
	2006	83.90	0.00	0.00	0.00	2.00	85.90
<b>Liaoning</b>	2000	46.20	6.67	2.67	9.33	47.57	112.43
	2003	53.33	7.33	11.00	6.00	22.00	99.67
	2006	97.53	12.67	0.00	84.33	31.07	225.60
<b>Shandong</b>	2000	21.61	0.00	0.00	0.50	11.43	33.54
	2003	30.66	0.00	0.00	0.93	5.13	36.72
	2006	16.99	0.00	0.00	0.00	32.67	49.66
<b>Yunnan</b>	2000	121.27	0.00	37.33	0.00	100.70	259.30
	2003	91.53	0.00	36.67	0.00	100.70	228.23

2006 178.17 44.57 36.00 0.00 100.70 360.10

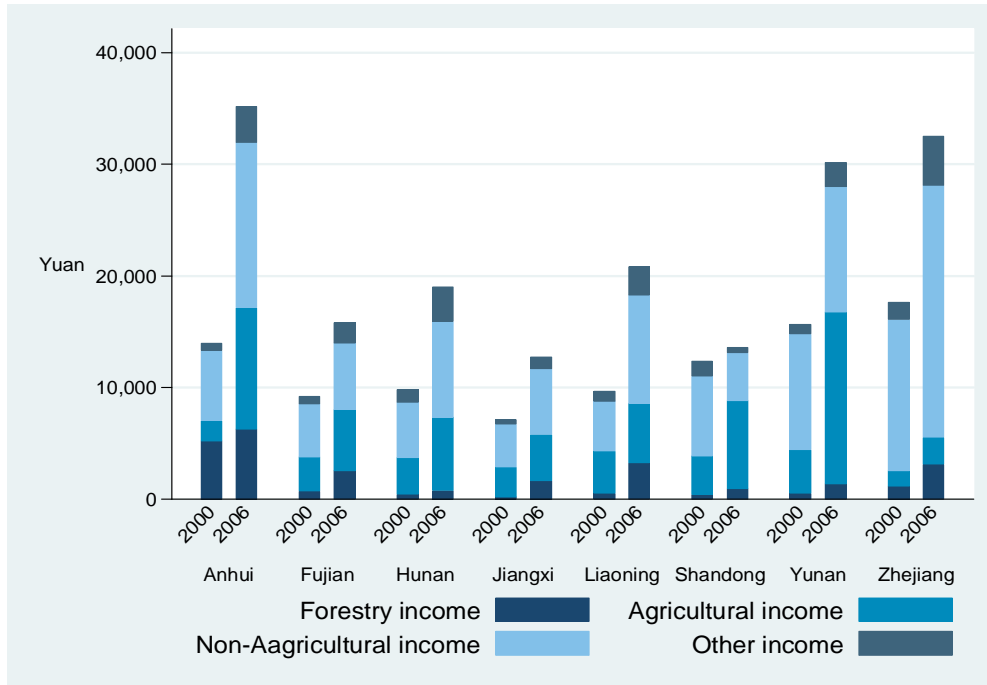
Source: Data was from the survey conducted in 2006 and 2007.

Figure 7: Timber Harvest per Village in 2000, 2003, 2005(6)



Source: Survey conducted in 2006 and 2007.

Figure 8: the Change in Household Net Annual Income, 2000-2005(6)



Source: Data comes from the survey conducted in 2006 and 2007.

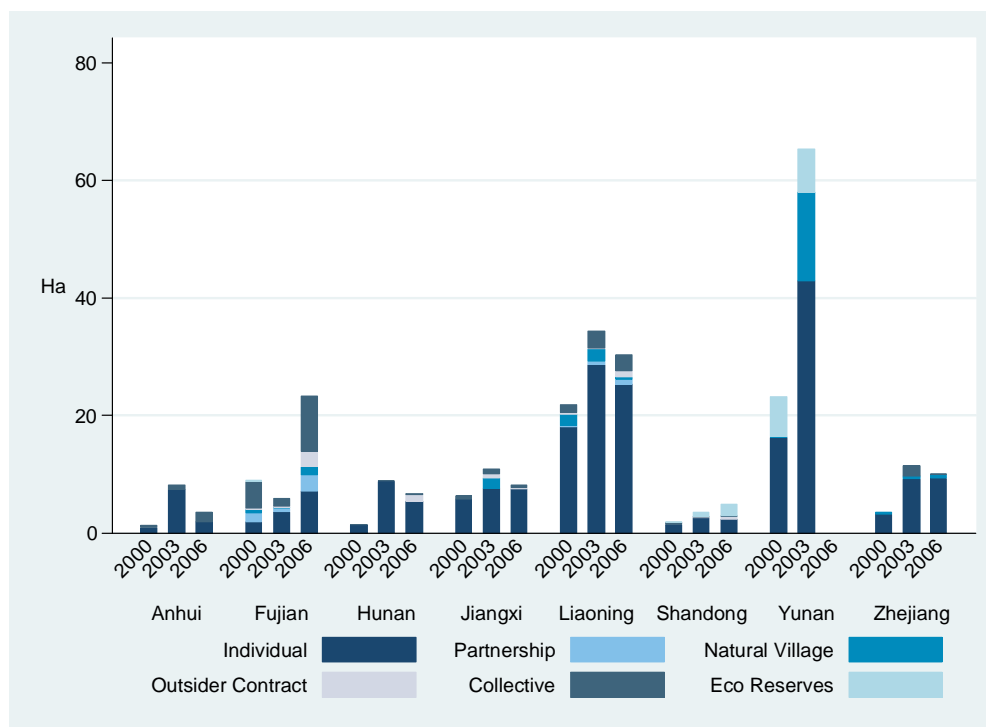
## 2. Forest shares in farmer household income increased greatly

In the five to six year period of study, farmers' net income increased dramatically as a whole. However, the share of forest income (forest product sales) increased at a higher rate in areas where the reforms had a significant impact during this period. From figure 8 we can see that, in general, net household income rose, with off-farm income rising the fastest. Only in Fujian, Jiangxi, Liaoning, and Shandong did income generated from forestry occupy a larger share of total net income. Concurrent with the reduction of production forests, forestry-derived income declined in Anhui Province.

## 3. Afforestation increased greatly too, mainly by farmers and farmer groups

According to the results from our survey, afforestation in general rose during the period 2000-2006, with the exception of Anhui. Afforestation by individuals increased the most in Fujian, Hunan, Liaoning and Yunnan. As depicted in figure 9, afforestation by other tenure types also increased in Fujian, Liaoning, Shandong and Yunnan. This indicates that other factors aside from tenure reform played a role in the recent afforestation boom. We believe this to be due to market growth, and we will examine this empirically later).

Figure 9: Area of Afforestation per Village, 2000, 2003 and 2005



Source: Survey conducted in 2006 and 2007.

## VI. Conclusion

1. The structure of collective forest tenure has changed over the last five to six years, with each participating province experiencing different trends of change. Individual management and partnership, the targeted tenure models, increased most significantly in Fujian, Liaoning, Shandong and Yunnan. Outsider contracts increased the greatest in Jiangxi. Eco-reserve forests expanded most dramatically in Anhui. No major changes in tenure type occurred during this period in Zhejiang and Hunnan.
2. Farmer revenue from forests, including timber harvests, increased in the areas that experienced significant changes in tenure type; this posits serious challenges to existing policy regarding limits on harvesting (e.g., logging quotas).
3. Tenure reform, which created many more small forest landowners in a relatively short period, now poses regulatory challenges for forest authorities. It will become increasingly difficult to implement key forest policies, such as the logging quota system, due to the fact that forestland subject to the quota has been further decentralized and the cost of regulating harvests has increased.
4. Afforestation by farmer households, farmer groups and other private entities increased significantly during this period of tenure reform, which is a good sign for the long term sustainability of forest management. The contribution of other potential factors driving the increased private interest in afforestation still requires identification and analysis.
5. Forest tenure reform will be a longer process than some expected. Many newly created or rising tenure types, such as partnerships and outsider contracts, are

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intermittent arrangements. When socio-economic factors change, relationships among partners change, and some of these partners will undoubtedly separate. As contract periods expire, outsider contracts will have to be renegotiated and their forestland may be returned to the original community. All these changing factors will require redistribution of management rights. Other factors, such as widespread forestland conflicts, can also cause shifts in the tenure system.

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## Annex 1: Empirical Analysis of Forest Tenure Change

### **Background: Debate over Collective Forest Tenure Reform**

1. Arguments in favor of maintaining collective management: 1) efficiency reason: economy of scale; 2) provision of environmental services; 3) protection from dramatic deforestation; 4) low cost of implementation of policy, regulation and administration.

Likely sources of the arguments:

- 1) Sociologists and Anthropologists with experiences working in other developing countries: their experiences told that community-based management has been good model. China's collective management looks similar to community management model. The collective forest management should be refined, improved and strengthened in stead of being discarded.
- 2) Some local foresters and village leaders: They mostly argue against privatization and devolution for the sake of i) public interests (ecological benefits); ii) efficiency (economy of scale), and iii) their own private interest (revenue from forest resources used to be significant source of income for local forest authority and village leaders).
- 3) Some foreign country examples against privatization (India's JFM, Mexico Regulations against privatization on community owned forestland).

2. Arguments in favor of individualization: 1) equity reason: forest contribution to farmer income too low under collective management; 2) efficiency reason: low incentive for farmers and private sectors to invest in forest resource development therefore decline of forest quality over time; 3) increased cost of forest protection due to non-cooperation of farmers.

Likely sources of the arguments

- 1) Farmers: in areas where forestland is abundant but remains under collective management, farmers' income opportunity is constrained, especially compared to farmers living in agricultural areas;
  - 2) Some local foresters and village leaders: they are facing increasingly higher cost of forest protection due to non-cooperation of farmers;
  - 3) Some village leaders: declining revenue from collectively owned and managed forests were also critical factors for some village leaders to be in favor of privatization.
  - 4) Local government: as economy grows, importance of forest sector as a source of financial revenue had been fallen. Therefore the incentive to control the forest resources via collective management was reduced. In the interest of reducing protection cost and improving farmer livelihood, local (especially provincial) governments became pro tenure privatization.
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## **Natural Experiments**

Reform in Fujian and other provinces of China provided unique opportunity to empirically examine the evolution of tenure system in collective forests. Utilizing the fruits of the development of village democracy in China over the past decade, governments of these provinces put the decision making power with regard to forest tenure reform plan into the hands of farmers. In Fujian, for example, two thirds of the village representative committee members have to vote yes in order for a reform plan to be implemented. If the village representative committees, elected to represent all village members, do their job, the outcome of the tenure reform plan will represent the best interest of the villagers as a whole. It is expected that due to the wide variation of natural, social, economic and institutional conditions, tenure arrangement newly emerged from the reform will vary tremendously across village collectives and reflect these affecting conditions.

## **More Rationales**

1. Academic Rationale: the debate over optimal or feasible model of forest management in rural setting largely resulted from heterogeneity of studied areas by different scholars and organizations. Understanding of socio-economic and historical foundation of tenure changes in China and pertinent data have been limited.

Using data collected from Fujian and other reforming provinces, we have the opportunity to separate impacts of factors that drive tenure structure changes. The analyses will provide information on what type of change is occurring in what areas and for what reason. Given the fact that village collectives were making autonomous decisions (at least by policy), we will be able to develop sound understanding of optimal structure of forest tenure, with quality of village democracy being controlled.

2. Practical Rationale. Once relationship between the determining factors and tenure structure changes is established, government agencies in charge of tenure reform policy will have more realistic view of what will be happening in what area and for what reason. If certain tenure type is of particular importance, policy maker can look to the right instrument to promote the targeted model.

## **Theoretical thinking**

1. Supply and demand of forest tenure

Forest plots in collective forest areas are legally owned by administrative villages. By existing regulations all types of economic entities, including: farmer households, farmer households group, private business, state forest farms, etc. have the right to manage these collective forests if properly contracted with the village councils. The demand for forest plots will be high when forest products market is good, just like the case nowadays. The nature of the economic entity which raises demand for a piece of collectively owned forest plot largely determines the form of contract (or tenure type) that is going to be established. For example, a single household in the village

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of question receives a forest plot will sign a contract (and be given forest certificate) with village council as legal user of the plot for the specified contract period. With this contract a tenure type of individual household management is established.

The demand for any given tenure type will depend on attributes of the tenure type (including potential gains and risks from managing the forest plots), characteristics of farmers and villages, policy environment, etc. These affecting factors can be grouped into the following general categories:

Village Characteristics  
Market Development  
Farmer Alternative Income  
Social Capital  
Tenure Security  
Policy Environment  
Quality of Village Leadership

On the other hand, supply of forest plots by village collectives is a function of opportunity cost of tenure change (due to transfer of forest plots to entities other than village councils), village characteristics, political and policy environment, level of social and economic development.

## 2. Hypotheses underlying the analyses

i. Since village representative committees are the legal entities to make decision, the outcome of tenure reform is dependent on the quality of these rural committees. In more democratic villages, decentralization is deeper, therefore more household or group contracts will be given instead of market allocation to outsiders and direct collective management.

ii. Rent seeking-Efficiency trade-off behavior of village leadership group is assumed to be major driving forces for forestland supply.

iii. In villages with good social capital, more community management (e.g. partnership, village cluster and collective).

iii. In villages with good alternative income (off-farm job, higher ag productivity, etc.), farmer demand for forest land will be lower, hence there will be more collective managed land and market allocation, less individual and partnership contracts.

iv. Lower per capita income leads to higher demand for forestland (more individual and partnership).

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v. In areas with tight government control, less demand for forestland (or more transfer-out afterwards)

vi. Tenure insecurity is negatively affecting individual contracts (frequency of land adjustment, eco-reserve, etc.)

vii. In villages where opportunity cost of tenure reform for village council is small, more forestland will be given to households and farmer groups.

### **Empirical Methods and Results**

#### 1. Analyzing the driving factors of tenure changes

We demonstrate our empirical analysis results for Fujian and Jiangxi for the reason that these two provinces are the ones with highest political will. Analytical results on these two provinces are more informative.

Equilibrium outcomes of tenure structure change were estimated through a reduced form equation systems for a sample of 90 villages (60 in Fujian and 30 in Jiangxi). The left hand side variables are share change of tenure types between 2000 and 2005. The right hand side variables are the factors believed to be driving tenure changes. The driving factors are grouped into six broad categories (see annex table 1). Besides the main driving factors, baseline information such as base year area share by tenure type and the county level dummy variables are used in the regression as control variables. Main results of the estimation are displayed in Annex Table 1.

Annex Table 1: Determinants of Tenure Structure Change in Fujian and Jiangxi (2000-2005)

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Variable	Individual	Partner	Villager Cluster	Outsider Contract	Collective
<b>Village Characteristics</b>					
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
<b>Market\ Alternative Income</b>					
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
<b>Social Capital</b>					
Informal Credit Attainability	-0.202	0.014	0.324**	-0.016	-0.030
<b>Tenure Security/Policy</b>					
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
<b>Village Politics</b>					
Fairness	0.014	-0.017*	-0.004	-0.015*	0.018
Forestry Income Share	-0.120*	-0.026	0.150***	0.030	0.013
<b>Land Rent</b>					
1=Yes; 0=No	0.095	0.114**	0.087	-0.043	-0.149*

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

## 2. Interpretation of the results

### Village Characteristics:

*The share of labor* in total population represents pressure on employment and source of income. Higher labor share induces increase in household managed forests and reduction in collective managed forests;

*Villager education level* represents human capital, therefore ability to manage forests well. Private plots and outsider contracts were increased in villages with higher education attainment, reflecting high recognition of efficiency by more highly educated villagers.

*Slop* is proxy for cost and potential gain for forest management. Higher average slop in the village forestland will reduce the will of villagers to manage forests, leaving more forests managed by collectives (villager clusters here) and contracted outward.

### Market Development and Alternative Income

*Commercial rate of crops* generally approximates market accessibility for the villagers. The estimation indicates higher commercial rate of crops reduced supply to outsiders.

*Off-farm employment* represents potential of alternative income. Higher off-farm employment rate reduced demand for household contract.

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### Tenure Security and Policy

*Cropland adjustment* here is the variable capture frequency of cropland holding adjustment over the last 25 years in the village. It represents a local tradition the treatment of issues such as land equity. Our estimation indicated that when frequency of land adjustment was high, demand for household contract will be less and more forests will be left for villager cluster management. This is understandable since land adjustment is generally practiced within villager cluster boundary. Higher frequency of land adjustment creates expectation of insecure tenure rights and is not encouraging to individual management scheme.

*Eco-Reserve* is generally imposed by local government for the purpose of forest protection against commercial use. Here the area of eco-forest is used as proxy for government intrusion on the property right of village collectives. It is considered another exogenous source of tenure insecurity. The estimation indicated that in villages where eco-reserve is large, demand for individual household management will be insignificant but for partnership will be higher, due to its ability to deal with tenure risk.

*Quota index* is calculated as share of harvest permit granted in the total amount of harvest volume applied. This variable represents the level of government control over villager use of forests. There were no significant estimates for this variable.

### Village Politics

*fairness* was the evaluation of farmers on village leadership quality. The variable were calculated through grading methods based on the interview with farmers. In a village where leadership was considered fair, allocation of forestland to partnership and outsider contractors would be less. This is consistent with our field observations (there might be endogeneity issue here).

### Social Capital

*Informal credit* is used to measure trust among farmers in a village. It was calculated through rating of farmers on possibility of borrowing from fellow villagers in case of emergency. Higher possibility of informal borrowing (better social capital) leads to higher share of villager cluster management. This is where community management should develop.

### Land Rent or Not

*Jiangxi* provincial government prohibited village council from collecting land contract fee (rent) from farmers newly allocated forest plots, setting a different example from Fujian. This leaves village councils higher opportunity cost of forestland decentralization. The estimation indicated that if all other factors were the same, a village in Fujian will be less inclined to maintain collective management and more inclined toward partnership. So, prohibition of land rent was seemingly deterring the process of efficiency improvement in forest management.

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## **Conclusion**

1. In places where social capital is sound, community management seems to be the rational choice, whereas when this is not the case, individualization will be optimal;
  2. In places where alternative income is good, demand for forestland will be low, in favor of collective management;
  3. In places where land rights are insecure, individual demand for forestland will be low;
  4. In places where government interference is intensive, interest of individuals on forest management will be low;
  5. Lack of consideration of opportunity cost of village leadership and local authorities will lead to low willingness to reform.
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