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# Tenure and Management of Non-State Forests in China since 1950

A Historical Review

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## Introduction

Policies for the tenure and management of non-state forests have undergone fundamental changes in China since the early 1950s. Private ownership and household management that were dominant in 1950–55 gave way to collectivization in 1956. Collective management remained dominant until reforms in the early 1980s. Since that time, rapid changes in tenure and management policy have given households more control over tree and forest resources. This high frequency of policy change has undermined farmers' confidence in policy, even policies that they favor. This has encouraged the rapid conversion of forest resources by farmers even when they enjoy management rights. Farmers try to act ahead of any attempt by the government to take away those rights again.

The increased rights of villagers to trees and land is in theory a determinant of how they are managed, the distribution of resulting benefits, and the incentives to plant or protect trees and forests.<sup>1</sup> Trees, however, are special property that is often subject to considerable regulation even when their ownership is devolved and clear.<sup>2</sup> Under such regulation, owners may not fully exercise their rights to trees. Such restrictions can have negative impacts on income generation and hence investment incentives. The regulation of harvesting and marketing of trees in China has prevented farmers from enjoying the full benefits of the shifts from collective- to household-based management and discouraged them from investing in afforestation or regeneration.

In contrast to devolution in other countries, reforms in China in the early 1980s focused on devolving authority for forest management from the collective to the household rather than from state to local community. The devolution was based on the understanding at that time that collective management was less effective than households. Collective forests were managed largely according to top-down

administrative orders or regulations. Farmers had little active participation in management. No link existed between the rights of rural households to forests, their responsibility for forest establishment and management, and their benefits from forests. Household-based management and shareholder groups created on a voluntary basis have indeed proved to be more effective than forest management during the commune era.

Despite highly uniform, centralized policies, there is a high degree of variation in practice on the ground. These practices reflect a capacity for innovation and efficient resource use among farmers that may be a source of lessons for policy makers.

### Background

Land ownership in contemporary China is simple. Land is either state- or collective-owned. Collective ownership includes the lands of townships, administrative villages, and village household groups (the equivalent to communes, production brigades, and production teams respectively in the commune era).<sup>3</sup> The tenure of trees or forest resources, however, is more complicated than land ownership and consists of four categories: state-owned, collective-owned, private-owned, and mixed ownership in the form of shareholding systems. The last two forms of tree tenure have developed since the 1980s based on policies that separate use rights to land from land ownership, and whoever plants the tree owns it. Collective-, private-, and jointly owned trees or forests are grouped as non-state forest.

Management institutions of non-state forest have differed from those of state forest. For the state forest, institutions such as state logging enterprises, state forest farms, and nature reserve agencies take responsibility for management and logging operations. In contrast, local communities or households within communities manage non-state forest. Accordingly, various forms of collective management and household management of non-state forest exist. In addition, some elements of indigenous management are retained in remote ethnic minority areas and applied in the management of collective forests. Although local management is subject to heavy regulation by the central and local authorities, communities and households still exercise significant management authority in non-state forests.

The non-state forest makes up nearly 60 percent of forest area nationally, indicating that non-state forests play an important role in forest production and environmental services in China. They are not evenly distributed throughout China. In the ten provinces of south China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, and Zhejiang), the proportion of non-state forest is as high as 90 percent. Non-state forest also represents 65 percent of forest area in Yunnan and Sichuan Provinces combined.<sup>4</sup> It is in these twelve southern provinces where non-state forests are most important. These provinces are an ideal opportunity to study local forest management.

### Prior to 1950: Private Ownership of Forests Dominated

The tenure of forests in China can be grouped into three broad categories prior to October 1949 when the Chinese Communist Party (CCP) came to power and founded the People's Republic of China. (1) Private forests owned by rural families. By land area, this was the dominant type of tenure. Wealthy families, including landlords, rich peasants, and slave owners, owned most of these forests. (2) Common forests owned by a social group, a village, or several villages. This type of tenure can be further broken down: forests owned by village(s), which were managed largely for environmental and ecological benefits, such as water conservation, or for religious and spiritual values (holy trees or forests); forests owned by a religious group as part of a temple or church; forests owned by a clan, in many cases as part of an ancestral temple; forests owned by a school, which were found in provinces of Hunan and Fujian, and were used for covering part of operational costs on a school;<sup>5</sup> and forests owned by other rural associations, which were used for public benefits such as covering operational costs on a ferry or bridge.<sup>6</sup> (3) State-owned forests.

Tenure arrangements and management institutions of forests in China have experienced a series of fundamental changes since 1950. The five decades can be divided into three periods (see Table 1).

### 1950–1955: Another Configuration of Private Forest Ownership

The Land Reform Campaign brought about another configuration of private forest ownership under which all rural households in a given geographical area were given equal forest resources. The Land Reform Campaign was initiated in 1950 and ended in late 1952. The nationwide campaign confiscated all the forests owned by landlords, part of the forests owned by the rich peasants, and the common forests. Some of the forests confiscated were nationalized. The rest was redistributed equally to rural households, with former landlords receiving the same share as everyone else. The campaign covered all of China with the exception of Tibet and the border areas in Yunnan where minority ethnic groups resided. In these remote areas, confiscated forests were not redistributed to households but were designated as common property of the village community, due largely to attention given to political sensitivity of border areas.<sup>7</sup>

Interestingly, forest ownership was still private during the period 1953–55, despite the establishment of elementary cooperatives.<sup>8</sup> Elementary cooperatives, as an agricultural production organization, appeared as early as during the Land Reform Campaign, but only an insignificant proportion of rural households joined them by 1955. The majority of rural households continued to operate individually or within mutual aid teams. By the end of 1955, proportion of rural households that joined elementary cooperatives was not more than 60 percent despite the great spur by Chairman Mao that year.<sup>9</sup> More importantly, within an elementary cooperative, member households were required to pool their forests, agricultural land, and other means of production, but they remained the owners of the properties. Income

Table 1. Trends in Tenure and Management of Non-State Forests in China since 1950.<sup>10</sup>

Time Period	Major Features and Events
1950-1955	<ul style="list-style-type: none"> <li>• private ownership of forests was single, dominant form of ownership except in border and ethnic areas.</li> <li>• integration of use rights to land and land ownership.</li> <li>• integration of tree ownership and land ownership.</li> <li>• 1950-1952: Land Reform Campaign distributed equally land, forest, and other means of production to farmer households.</li> <li>• 1953-1955: Agribultural production organized at three levels: household, mutual aid team, and elementary cooperative.</li> </ul>
1956-1980	<ul style="list-style-type: none"> <li>• collective ownership was single, dominant form of ownership.</li> <li>• integration of use rights to land and land ownership.</li> <li>• informal split in tree ownership and land ownership; de facto split in early 1960s.</li> <li>• collective management was dominant form of management.</li> <li>• 1956: 96 percent of rural households incorporated into advanced cooperatives.; land, forests, and other means of production transferred to advanced cooperatives from individual households.</li> <li>• 1958: forests further transferred from advanced cooperatives to people's commune.</li> <li>• 1961-1964: adjustment of Chinese economy in response to agricultural failure and famine in 1959-1961; forest ownership and management devolved from commune to production team or production brigade; scattered trees returned to households.</li> <li>• 1966-1979: collectivization of scattered trees owned by households.</li> </ul>
1980s-1990s	<ul style="list-style-type: none"> <li>• collective ownership dominant, but private trees and forests emerge.</li> <li>• separation of use rights and to land and ownership.</li> <li>• split of tree ownership and land ownership.</li> <li>• many forms of forest management: household-based, collective, cooperation among households, and between community and external institution.</li> <li>• 1981-1986: devolution of forest management; collective non-forested land and scrub forests distributed free of charge to households; collective forests contracted as responsibility hills; considerable deforestation.</li> <li>• 1993-present: lease of use rights to non-forested land to rural households for terms of 50-100 years.</li> </ul>

was subsequently distributed on the basis of the share contributed to the common resource pool and on work performance, with output allocated for distribution in ratios from 60:40 to 40:60.<sup>11</sup>

### 1956–1980: Collective Ownership and Management of Forests

The establishment of advanced cooperatives led to the end of private ownership of forests. Spurred by Chairman Mao, the number of rural households that were incorporated into advanced cooperatives increased from just 4 percent at the end of 1955 to 73 percent in September 1956, and to 96 percent by the end of 1956.<sup>12</sup> In advanced cooperatives, forests, cropping land, and other means of agricultural production ceased to be privately owned and became collective property of an advanced cooperative. An advanced cooperative was formed through the merging of a number of elementary cooperatives. Since elementary cooperatives had different endowments of forests, egalitarian objectives were pursued through redistributing forest resources among hamlets. Through this process elementary cooperatives with poor forest resources gained and those with rich resources lost.

Two important policies at that time were related to the transformation of ownership of forests and trees. In the first policy, the advanced cooperatives were required to value private forests in monetary terms and later compensate member households for the forests and trees they contributed. This policy, however, was not strictly enforced for the majority of cases. The other was that the scattered fruit trees and other non-timber trees that rural households planted around their homesteads and around village settlements were not collectivized but retained the private property of rural households. In remote border areas, all non-timber trees or plantations remained private property as well.<sup>13</sup>

The formation of advanced cooperatives changed the ways in which forest management was organized. Decision making became generally more centralized. In an elementary cooperative, twenty to thirty households often made management decision for their forests. After the formation of advanced cooperatives, decisions were made at a larger scale, involving up to ten to twenty times the number of households.

The creation of the people's commune brought about a further transformation of forest ownership. In March 1958, the CCP passed a resolution to create large agricultural cooperatives by merging advanced cooperatives.<sup>14</sup> These larger organizations later became known as "people's communes."<sup>15</sup> By the end of September, 90 percent of rural households were incorporated into 23,400 communes across China, with about 4,800 households in a commune on average.<sup>16</sup> Another 9 percent of rural households were included in further 3,000 communes in October of the same year.<sup>17</sup> The pace of change was very dramatic; almost all communes were created in a short period of three months.

The establishment of the communes led to two changes in the ownership of the means of agricultural production. First, property rights were transferred from advanced cooperatives to the commune, further centralizing ownership. In Chuxiong Prefecture, Yunnan, for example, forests that were owned by 1,536 advanced coop-

eratives in early 1957 became the property of 89 communes by the end of 1958.<sup>18</sup> Since a commune was formed through merging a number of advanced cooperatives with different property endowments, the establishment of the communes resulted in greater egalitarianism than advanced cooperatives. The second change was to collectivize fruit trees, other non-timber trees, and scattered timber trees that were retained as private property when advanced cooperatives were established. They now became the collective property of the commune, despite the CCP resolution that a rush move to collectivize family plots of cropland and trees of this kind was not necessary.<sup>19</sup>

Scholars often argue that there is a link between large-scale deforestation in the late 1950s and the radical ownership transformation that began in 1956.<sup>20</sup> In November 1957, China declared that in fifteen years or so it would catch up with the industrial level of the British, especially the output of steel. In an effort to achieve this goal, they launched a campaign in 1958 to make iron and steel with small village-based workshops and simple steel furnaces dependent on intensive fuelwood use. By October 1958, about 600,000 such backyard furnaces had been set up throughout the country, consuming a remarkable amount of wood.<sup>21</sup> The iron and steel making drive plus the clearing of forests for crop cultivation resulted in the first disastrous deforestation in the history of China since 1950, a view that is frequently expressed by relevant forest literature, foresters, farmers, and historical experts in China. For example, in Hubei province of central China, forest area and volume decreased by over 30 percent in these years.<sup>22</sup> The collective ownership of forests vested local governments with decision-making control about resource use and made this large-scale deforestation possible.

The Great Leap Forward and the birth of the people's commune were followed by agricultural failure and famine from 1959–61. These tragedies were greatly facilitated by the prior radical transformation in ownership and income distribution policies.<sup>23</sup> In response, the government readjusted China's economy in the early 1960s. The major feature of the policy reform relevant to the topic here was the devolution of forest tenure and forest management to lower levels. Specifically, forest ownership remained collective but was now distributed among communes, production brigades (the equivalent of the former advanced cooperative), and production teams (the equivalent of the former elementary cooperative). Transfer of ownership varied by province and tree species. In Suining County, Hunan, timber forests and bamboo forest were transferred one level from commune to production brigades, while plantations of camellia (a species with seeds bearing oil for cooking) were transferred two levels down to production teams.<sup>24</sup> By contrast, in Yunnan the majority of collective forests were transferred two levels from communes to production teams. In some cases, communes retained part of the forests. Ownership by production teams in the majority of China became dominant from then till the early 1980s. Scattered fruit and non-timber trees and plantations that were collectivized during the creation of the communes were returned to households. In addition, the policy was first made that trees planted by households around their homesteads, on their family plots of croplands and in cemeteries are the property of households.<sup>25</sup> The owner of the forest received rights to make decisions about forest products and income from their forest.

The Cultural Revolution (1966–1976) saw another reversal of policy on household ownership of forests. Leftists claimed that household ownership of trees and plantations conflicted with socialism. Hence fruit trees and other non-timber trees and plantations owned by households were once again re-collectivized, with ownership assumed by production teams or production brigades.<sup>26</sup>

The frequency of such policy reversals on forest and tree ownership since 1956 is astonishingly high. The history of change regarding the ownership of fruit trees in the Dengguang production brigade of Chuxiong County, Yunnan, is an example. Ownership of fruit trees was transferred from households to advanced cooperative in 1956 and further to commune in 1958; commune back to households in 1961; households to production team in 1969; production team to households in 1971; households to production team in 1977; and production team to households in the late 1970s.<sup>27</sup>

Such radical and frequent changes in property rights over a very brief period of time have had profound impacts on forest management and the livelihoods of rural people. In the long term, the most serious consequence is that frequent policy reversals have left rural people with a complete lack of confidence in the security of the ownership rights they currently enjoy. Under such conditions, it may seem quite reasonable to some farmers to “mine” forest resources for as much benefits as quickly as they can, before the policy changes again and leaves them with less control over their forests and trees. Insecure tenure may also make rural people reluctant to invest in reforestation, as they may feel uncertain as to how they will benefit from their labor.

These cycles of centralization and decentralization have implications for our understanding of local social capital as well. One conclusion is a relationship between group size and successful collective management.<sup>28</sup> Elementary cooperatives, advanced cooperatives, and communes functioned alternately as owner or manager of collective forests during the period under discussion. When the ownership of land and forest were transferred back to production teams or production brigades, it was recognized that the commune was too large in size and performed much poorly than production teams (the equivalent to elementary cooperatives) in agricultural production.<sup>29</sup> The commune was not able to perform as well as elementary cooperatives in forest management, in terms of maintaining forest cover, as discussed above. For China at least, this suggests that group size has been inversely related to successful collective management.

More importantly, these cycles of centralization and decentralization represent attempts by the government to create social capital at different scales and through different institutional forms. The problems encountered by these forms of collective action may point to the limits of the government’s ability to create social capital from scratch. If the types of farmer-initiated shareholding systems that are being tested in southern China today turn out to be more effective than earlier government-directed efforts at collectivization, government should concentrate on facilitating farmer-initiated collective action, rather than developing new institutional forms.

Table 2. Current Forest Tenure and Management Institutions in China.

<b>Management Arrangements</b>	<b>Use Rights and Ownership</b>	<b>Developments after the Forest Reform in Early 1980s</b>
<b>Household-based management</b>		
Family plot	Use rights to collective wastelands allocated free of charge to households.	Use rights to family plots leased to households.
Responsibility hills	Tenure not well defined; existing trees collectively owned.	<ul style="list-style-type: none"> <li>· Merged with family plots.</li> <li>· Remained household-based management.</li> <li>· Reverted to collective management.</li> </ul>
Contract/lease by individuals of collective wastelands.	Use rights to collective wastelands leased or contracted to individual people.	
<b>Collective management</b>		
Modified collective management	Collective property	
Shareholding system	Collective forests distributed in form of share, rather than physically, to households.	
<b>Self-initiated shareholding system</b>		
<ul style="list-style-type: none"> <li>· Farmer-farmer collaboration</li> <li>· Company-community partnership</li> <li>· Collaboration between outside individual(s) and community/households</li> </ul>	Use rights to collective wastelands distributed physically to households.	



### 1980s and 1990s: Diversification of Forest Tenure Arrangements and Management Institutions

In March 1981, the Central Committee of CCP and State Council issued a document that marked the start of a period of reform in China's forest sector, reform that paralleled changes in the agricultural sector in the late 1970s. The forest sector reform comprised three components:<sup>30</sup> (1) Stabilizing forest tenure. The existing forest boundary was confirmed and property certificates were issued to owners if their property rights were not disputed. Where disputes occurred, local governments helped reconcile parties concerned, on which boundaries were marked to confirm ownership rights. For example, 7,021 disputes in Guizhou Province were recorded at that time, 6,868 of them were resolved in this way;<sup>31</sup> (2) Allocating collective non-forested lands (wastelands and degraded lands) to farmer households. These lands were allocated as "family plots" (*ziliushan*); and (3) Introducing production responsibility systems into silvicultural operations and forest management. These systems took many forms, one of which was the contracting of collective forests to farmer households, which is called "responsibility hill" (*zerenshan*).

Forest reforms since 1981 have resulted in a diversified pattern of forest tenure and management arrangements. In the main reform, forestlands remain collective property, but use rights to them often have been distributed or contracted to households. Hence, in addressing forest tenure in the 1980s and 1990s, the changes have focused on use rights to forestland and ownership of trees and forests rather than land ownership. Arrangements for forest management can be grouped into collective management and household-based management (see Table 2). Though the tenure structure and management arrangements described apply widely in non-state forests, there is some variability in how they are interpreted and enforced, particularly in ethnic minority areas, where traditional systems have persisted and where central government policy is not so vigorously communicated or pursued.

#### Family Plots

Distributing collective wastelands and degraded forestlands to rural households as family plots was the second component of the forest reform in the early 1980s. The policy was first made during the economic adjustment in the early 1960s but implemented only in a few areas during that time. Several provinces such as Yunnan and Shaanxi revived the policy in the late 1970s, in the context of the agricultural reform.<sup>32</sup> This was earlier than the central authorities' enactment of the policy in 1980 and again in 1981.<sup>33</sup> In early 1983, the central authorities required forestry authorities to increase the family plot area for each household.<sup>34</sup>

At the national level, 470 million *mu* (1 *mu* = 1/15 ha) were distributed to 57 million households by the end of 1984 when this component of the forest reform came to an end.<sup>35</sup> In some areas, family plots represented a substantial proportion of forestlands. In Chuxiong Prefecture, Yunnan, for example, family plots represented one-third of the total land area that was designated for forest use.<sup>36</sup>

The objective of the family plot policy was to encourage farmers to plant trees to meet their needs for fuelwood and timber. The major feature of family plots was individualization of use rights to family plots and of the ownership of trees and plantations established on family plots. The term “family plots” is only partly appropriate because land is still owned by the collective. In contrast, trees planted by a household on a family plot are private and inheritable. Households have rights to decide which species to plant on their family plots, though they are not allowed to plant food crops on such lands. They also have rights to dispose of forest products and enjoy the full benefits from that disposal. The newly revised Forest Law of China (1998) even allows households to transfer use rights to family plots, something that was not possible earlier. Village collectives as the owners of land can take control of family plots from households if they do not plant trees on their family plots, but they do not share benefits from family plots with families.

#### Forest Production Responsibility System and Responsibility Hills

The introduction and adoption of the forest production responsibility system—the third component of the forest reform in the early 1980s—was aimed largely at improving the management of existing forests through modifying management methods within the collective system.

The forest production responsibility system has experienced more policy shifts than have family plots. In the early 1980s, efforts to improve silvicultural operations and forest management focused on the development of collective forest farms, with professional groups of farmers acting as managers and forest guards appointed by the village collective. Collective management of forests was generally preferred prior to mid-1983. By late 1982, however, the agricultural sector (cropping and animal husbandry) had made significant breakthroughs in developing new institutions. Nearly 80 percent of farmer households had adopted the household-based production responsibility system.<sup>37</sup> The success of household-based management within the agricultural sector led many farmers to demand that the forestry sector follow suit. Many CCP leaders and government leaders at that time tended to support the idea. In June 1983, forestry authorities agreed, or were forced to agree, to contract to households non-timber plantations, fuelwood forests, and tiny patches of timber forests that were not suitable for collective management, with the prerequisite that the village collective remained the owner of the forests and would make decisions on cutting and product sales.<sup>38</sup> Some local governments were more dynamic in this regard. For example, provincial authorities in Yunnan adopted the “household contract” as its primary form of collective forest management. As a result, a forest production responsibility system with household management being dominant was formed. No statistical data are available on forest responsibility system by type for China as a whole. In Chuxiong Prefecture, Yunnan, responsibility hills represent one-third of the lands allocated for forest use.<sup>39</sup>

The village collective is the owner of responsibility hills, and contractual households share benefits from responsibility hills with the collective. The terms of benefit sharing have varied significantly among collectives as defined in their contracts with households.

Responsibility hills have evolved in three directions. The first is that they were incorporated into family plots in many areas. This practice began in 1984 in Anhui Province where the household-based agricultural responsibility system was initiated.<sup>40</sup> Statistics from sixteen provinces indicate that 59 percent of collective forestlands were distributed as a combination of family plots and responsibility hills by 1987.<sup>41</sup>

The second direction in which responsibility hills have moved is to return to collective management from household-based management. In response to the rapid increase in deforestation and illegal cutting after household-based management of responsibility hills was widely adopted, the central authorities banned the allocation of new responsibility hills to households in 1987.<sup>42</sup> Based on this policy, some local governments decided to restore collective management of responsibility hills that had been contracted to households. Eshan County, Yunnan, and Suining County, Hunan, are examples.<sup>43</sup> Eshan County allocated about 120,000 ha of forest to households in 1983 and 1984.<sup>44</sup> However, in 1988, the county government decided to regain collective management of all the responsibility hills. Under the new arrangements, the village collectives take responsibility for forest management, harvesting, and sale of products (mainly of timber). Part of the profit from these forests is used to pay forest guards, and the rest is shared between the village collective and farmer households.<sup>45</sup>

The third direction taken by responsibility hills is to retain household-based management. This is the direction that has been most often taken.

#### Dealing with Tenure Insecurity: The Effects of Family Plot and Responsibility Hill Policy and Related Responses

There are many views on policy for family plots and responsibility hills in China, and experiments with alternative arrangements for forest development and management are underway. Among the views, three are important, especially given the responses that they have provoked. These are that (1) family plots have not achieved their objectives, (2) responsibility hills have contributed to further degradation, and (3) household-based forest operation has led to increased management costs.

First, the family plot policy has not been successful in achieving its stated objective to encourage villagers to plant more trees and establish plantations. Allocating family plots did not generate much enthusiasm among rural people for tree planting, with tree planting taking place on only 20 to 50 percent of wastelands allocated. Their lack of confidence in tenure security has been one of the many reasons villagers did not plant trees.<sup>46</sup> In response, local governments at county and prefecture levels began in 1992 to lease land use rights to make rural people have a greater incentive to make the best of their investment. The national political context at that time favored such reforms as well. Deng Xiaoping launched a new round of economic reform in China in 1992 favoring policies conducive to productivity growth. The political climate made it possible to lease use rights to wastelands to individual people and institutions. By 1995, the area of lands leased in this way totaled 730,000 ha in more than ten provinces.<sup>47</sup> Three years later, the number for Yunnan alone had risen to 634,000 ha.<sup>48</sup>

Table 3. Standing Tree Volume in China over Time, 1977–93 (million m<sup>3</sup>).  
Volume of collective forests in parentheses.<sup>49</sup>

Regions	1977-1981	1984-1988	1989-1993
all of China	9,571 (n/a)	9,418 (3,010)	10,736 (3,222)
10 provinces in south China	1,871 (n/a)	1,685 (1,427)	1,827 (1,473)
Yunnan and Sichuan	2,857 (n/a)	2,759 (1,029)	2,823 (1,112)

By paying for use rights on leases that ranged from thirty to one hundred years, some farmers have greater incentive to invest in forestation, with increasing tree planting observed. The locally initiated policy has now been endorsed by the central authorities and incorporated into the newly revised Forest Law of China. However, there is a need for more studies on the impact of the leasing policy. It is not clear to what extent the leasing of use rights has reassured villagers, nor which villagers have benefited from the practice. Even if the impact of leasing on tree planting is positive, it may have negative effects as well, especially on the livelihoods of the poorest. For example, it may deny poor farmers access to former common lands on which they grazed their livestock, or exclude them from tree planting if they can't afford to lease a piece of land. The gap between the wealthy and the poor may grow as a result.

The second view is that household management of responsibility hills did not improve forest management in most cases, as expected by policy makers. The result was rather an increase in deforestation and illegal logging and a rapid decrease in forest resources.

Table 3 illustrates changes in forest volume during the 1980s and early 1990s. Initial declines in forest volume have been attributed to the household management of responsibility hills. Yet forests recovered in 1989–93 when household management was still widespread. This suggests that household management of responsibility hills was not the primary cause of the decline. An alternative explanation is that farmers were uncertain about their tenure security after so many changes in policy over the proceeding years. They decided to harvest trees as quickly as they could before the government took back control over forests. Thus, there was a dramatic decline in forest volume immediately after the introduction of household management. However, as farmers felt more secure about their tenure, together with strict regulations on forest harvesting, forests recovered. Household-level management may promote good forest cover, but only if farmers feel secure in their rights to use forests.

The third view is that forests and forestlands became very fragmentary as a result of the distribution of family plots and the contracting of responsibility hills. This has made silviculture, guarding, and logging less cost-effective and extremely difficult. In the attempt to achieve equity, collective forestlands and forests were physically divided into tiny plots according to species, site, age, density, soil quality, distance from the village, among other criteria. These plots were then matched to families of different size. A family's forest plots were often highly fragmented and scattered. Forests on one mountain belonged to many families in a village, and one family had several tiny plots on different mountains. The costs to each family of guarding these fragmented plots were high relative to the costs under village management of forests. It also has proven difficult to organize forest production at an economically efficient scale.

Some forest authorities, local governments and academics have called on the government to promote new cooperation among households in the form of a shareholding system. Farmers themselves seem to realize the problem and are beginning to spontaneously establish shareholder groups in some areas.

#### Contract or Lease by Individual People of Collective Wastelands and Degraded Lands

The contracting or leasing of collective wastelands and degraded lands to individual people is another form of household-based plantation establishment and management that has developed since the late 1980s. After family plots were allocated in mountainous areas rich in land resources, there were still wasteland resources available. At the same time, new degraded lands appeared as a result of increasing deforestation and illegal logging following the contracting of responsibility hills to households. A part of such lands was contracted to individual people to green the countryside and increase the role of trees and forests in rural development. This kind of contract provides the same tenure rights as family plots: use rights to land are contracted to individual people and trees and plantations developed on such lands are the property of contractors. It is different from family plots in the way in which use rights to land are obtained and in the scope of the contracts. Contractors must pay for use rights to land rather than getting them free of charge, as was the case for family plots. Priority to contract lands is given to members of community that owns land, but individual people from outside the community can also contract lands. There is no limitation on the area that can be contracted. Currently, household-based forest management (family plots, responsibility hills, and collective wastelands leased to individual people) continues to play a critical role in forest management in China, despite the return of some responsibility hills, to collectives.

#### Collective Forests

Collective forests refer to forests owned and managed by the village collectives. They include those collective forests that were never contracted to households as

responsibility hills and those forests that were allocated as responsibility hills but reverted to collective management later. These collective forests are not only the legacy of agricultural collectivization in the 1960s and 1970s. They are managed in ways similar to those during the collective era or in the form of shareholding system.

In the case of shareholding system, there is no physical redistribution of land and forests to households. The forests are instead divided into monetary shares that are distributed equally among villagers. Dividends from the forests are divided among the villagers as shareholders once a year or when dividends are available.<sup>50</sup> At the beginning of the forest reform in the 1980s, only two areas across China adopted this type of system. They were Sanming Prefecture, Fujian Province, and Liujia Village, Shaanxi Province. Forest authorities at the central level favored the model and have advocated it as a model of new cooperation necessary for forest development and management. In the shareholding system in Sanming, however, farmer participation in management has been limited. Typically, farmers as shareholders have had limited decision-making authority over forest management, product use, and income distribution.<sup>51</sup> The shareholding system has been merely a disguised form of former collective management.<sup>52</sup> Farmers have shown little enthusiasm for the system.

In addition, during the 1990s, some of the collective-owned forest farms in other provinces that were established during the 1960s and 1970s were transformed into this type of shareholding systems. The village collective distributed shares to all villagers of the community that owned the forest farm. Qingchong Forest Farm of Jinzhai County, Anhui and Dicha Village Forest Farm of Jinping County, Guizhou, are two examples of this first kind of shareholding system.<sup>53</sup>

### Self-Initiated Shareholding Systems

The locally initiated shareholding systems are at an experimental stage, covering a small but growing proportion of forest area in China today. They have developed where family plots and responsibility hills were physically distributed to households. Under this system, the shares of each of the parties concerned are obtained in proportion to their inputs. Inputs are typically use rights to land on which trees are planted, land ownership, capital, labor, and the technologies necessary to plant trees. The rights of all participating parties to forest resources are clear and secure in principle. In many cases, participation is voluntary, though the level of participation varies from region to region.

Under this shareholding system, capital investments and technical inputs are often introduced by outsiders, complicating the picture of forest tenure in China. This shareholding system has the following forms: farmer-farmer collaboration, company-community partnership, and between outside individual(s) and community/household.

Under the farmer-farmer collaboration system, farmers pool their lands and forests on a voluntary basis and establish their share in the system based on the amount and quality of resources they invest, including land, labor, and capital. Farmers not

only hold shares but also manage their common property themselves. Through democratic decision making, they achieve full and equitable participation in tree planting and resource management. This kind of system is now emerging in several provinces, including Anhui, Fujian, and Guizhou.<sup>54</sup>

These local, voluntary initiatives among farmers may be more promising than the other two. As noted above, past government efforts to build social capital and organize collective action from scratch had limited success, suggesting that the government may need to take a more facilitative role in supporting local initiatives, such as this type of shareholding systems. If this is the case, more work needs to be done to understand what that facilitative role might look like, what policies and other interventions are needed and appropriate.

Company-community partnership is collaboration between an external institution and rural community. The external institution, usually government forestry institutions (forest bureaus, state-owned timber companies or state-owned forest farms), contribute capital and technologies, while rural communities contribute lands (and often labor) for plantation establishment and tending. Benefits are shared between parties based on the resources contributed and agreements reached. Such cooperation is seen in provinces such as Anhui, Fujian, Guizhou, and Yunnan.<sup>55</sup>

In Luoping County, Yunnan, a reforestation program is under way with the assistance of a World Bank loan. The partners involved in the program include the County Bureau of Forestry and local rural communities. The bureau takes responsibility for repayment of the loan that was used to establish and manage plantations, while the rural communities provide the land on which the trees are planted. Farmers within the communities work as paid laborers. Based on an agreement among them, for the case of Chinese fir, the bureau is entitled to 60 percent of the profits from the first cropping, while the villages get the remaining 40 percent of profits from the first cropping and all produce from the second harvest.<sup>56</sup> In the case of pine plantations that can be harvested only one time, the ratio of profit distribution is 40 percent for the bureau and 60 percent for the village involved. Village profits are distributed to all village households.<sup>57</sup>

Collaboration has also developed between state-owned forest farms and rural communities. An example is the cooperation between the County Forest Farm and several dozen local villages in Shizong County, Yunnan. By agreement, the farm used lands contributed by the villagers (to which they held use rights) to establish Chinese fir plantations. The farm is entitled to 80 percent of the profits from the trees planted, while villagers obtain 20 percent of profits. In addition, villagers are given priority to get employment in land preparation and tree planting.<sup>58</sup>

The collaboration leads to effective resource allocation by taking full advantage of the resources of parties involved, while improving the access of villagers to markets for forest products. To some extent, it also improves the relationship between forest authorities and villagers, which has been tense in the past. Under this form of collaboration, however, farmers' participation in management is limited. They are made aware that they will share profits from trees and other forest products but are excluded from making decisions on forest management.

### Regulations and Other Policies that Limit the Effectiveness of Tenure Policies

The rights of rural people to trees and forests in China vary over time, across species and the types of land on which trees grow or are planted. In general, there is little restriction on gathering non-timber forest products from and grazing in both collective forests and state forests that are not nature reserves. Rural people are allowed to collect medicinal herbs, mushroom and fungi, edible vegetables, wild nuts, and fruits from forests. They are also allowed to graze their domestic animals in state forests and collective-owned forests. Hunting in forests is permitted except for protected animal species and in protected forest areas.

Rights to non-timber trees and plantations are more certain than to timber species and can be exercised by their owners with few restrictions. Rural people harvest their nuts, fruits, bamboo shoots, and other non-timber tree products when the need arises and sell them when prices are good. Some non-timber tree products such as walnuts and other oil-bearing seeds were subject to monopoly purchase by government, but the practice has ended following the market-oriented economic reforms.

In sharp contrast, the rights of rural people to timber trees and forests are rather limited, even where they own trees and forests. Harvesting and marketing of timber trees and forests are subject to heavy regulation because timber is the primary product of forests and, perhaps, because forest departments tend to look at forests as mainly timber. The regulation of timber trees and forests differs on different types of land. Different regulations apply to collective and private forests and trees other than scattered trees, and scattered trees on family plots of crop lands and around homesteads

Harvesting, marketing, and even on-farm consumption of wood obtained from forests outside family plots of croplands and homesteads are strictly restricted through regulations and legal provisions. These include cutting permits, cutting quotas, transport permits, and monopoly purchases of wood by timber companies that are owned by forestry authority.

Cutting permits apply to all sorts of cutting, and cutting without a permit is illegal and subject to severe punishment ranging from fines to jail.<sup>59</sup> These permits are troubling to rural people in several ways. First, cutting permits are issued by the county bureau of forestry (or township forest station, the bureau's representative in the township), which means rural people often have to travel a long way to obtain the permit. Second, one must submit a number of documents when applying for a cutting permit, a requirement that many rural people are often not able to meet.<sup>60</sup> Third, a cutting permit specifies the time and location of harvesting or logging that must be undertaken, which means rural people are not able to cut trees when prices for wood are favorable or when they need trees urgently.

The application of the cutting quota makes it more difficult to get a cutting permit. The cutting quota scheme was first introduced in 1985 and implemented in 1987 in response to the rapid decline of forest volume.<sup>61</sup> An annual quota is set once every five years. The scheme at that time was that the county is the lowest level at which the quota is planned, and its plan is then sent to the provincial department of forestry that sets a provincial quota. The plan made by the county is subject to



significant adjustment if the total of the quotas set by all counties in the province is larger than the provincial quota that the provincial department of forestry wants to set. Similarly, the provincial plan is subject to adjustment unless the total quota of the plans of all provinces is not larger than the national quota that Ministry of Forestry wants to set. The national quota must be endorsed by the central government. The approved quota is then allocated back down through the county bureau of forestry to the township that, in turn, distributes its quota among its villages.

The quota scheme has evolved since then. The first quota plan that was for 1987–1990 set total annual cutting volume only. The second (for 1991–1995) and the third (for 1996–2000) set not only total cutting volume but also volume by type. An annual cutting quota comprises five types of wood consumption: commercial timber, timber consumed on farm, wood for sideline production such as fungi and mushroom cultivation, fuelwood, and wood for other uses. By regulation, the quota scheme must be strictly implemented. Quota volumes cannot be exceeded, nor can any redistribution of quota between types of wood consumption be made. No redistribution among quota for different years is allowed either. The unmet portion of a quota for a given year is not valid for next year, nor can any person or institution cut trees in a given year with part of its quota for the following year.<sup>62</sup> There have been moves to reform the latter two regulations since 1994, but these are still at an experimental stage.<sup>63</sup>

The cutting permits and quotas are not all that frustrate rural people when they want to harvest their trees or forests. A transport permit is also required if one wants to transport timber or wood products to market. Railway, highway, and sea transportation agencies are not allowed to transport timber or wood products for their clients if they do not have a transport permit certificate.<sup>64</sup> In order to prevent wood transport without permits, forestry authorities have established numerous checkpoints along roads and railway lines throughout the country.

The marketing of timber and other wood products is also strictly controlled. Prior to 1985, China pursued a policy of state control of the purchase of timber. As a way to reduce state intervention and increase the role of the market, such control was abolished in 1985 in all provinces in southern China. Timber markets were opened and farmers were allowed to sell their timber in markets.<sup>65</sup> In 1987, however, free timber markets were shut in an attempt to reduce illegal cutting and considerable deforestation. Only forest departments and state timber companies are now allowed to collect timber from farmers and act as wholesaler. All other institutions and individual people have been banned from purchasing timber directly from farmers. Those who want to run an enterprise of wood processing or to be a timber retailer must get a permit from forestry authorities and buy timber from state timber companies.<sup>66</sup> As a result, the prices farmers receive are lower than market prices, and sometimes significantly lower.<sup>67</sup>

Few studies examine the impacts of such regulations, especially their negative impacts. Preliminary observations, however, indicate that the regulations discourage farmers from establishing timber plantations. A study in Yao'an County, Yunnan, showed that farmers' priorities for tree species to be planted were fruit trees, nut trees, spice trees, and eucalyptus for the production of oil for industrial or medical

purposes. The farmers interviewed complained about needing permits to cut trees they planted on wastelands. They said they would not be able to cut trees when prices were high because it took too long to get cutting permits, and they could not harvest the volume they wanted. This was why some of the rural households interviewed planted mainly non-timber trees.<sup>68</sup> Another survey in Shizong County, Yunnan, showed that local villagers had five hopes in developing forestry, two of which were the opening of the timber market and making cutting permits easier to obtain and in amount they wanted.<sup>69</sup> The boom in reforestation in two townships of the same county following the adoption in 1993 of a policy to allow transactions of standing trees, and thus avoid cutting quotas and permits, also suggests that regulations are a barrier to tree planting. The area of plantation establishment in the two townships doubled or tripled from 1993 to 1995.<sup>70</sup>

More empirical studies are needed of the impacts of these regulations on rights to trees, as the number of the observations above is not sufficient to draw firm, generalizable conclusions. What evidence is available, however, indicates that regulations on the cutting, transport, and marketing of wood may help protect existing forests but are a disincentive for farmers to establish new timber plantations. Why would farmers decide to not give priority to timber trees when they are cheap and easy to establish, appreciate in value rapidly, and are divisible such that they can meet needs closely?<sup>71</sup> It is critical to reform these policies and laws if more plantations are to be established and trees are to be a source of farmer income. Villagers should have complete rights including those to harvest, cut, sell, and mortgage when needed, rather than “ownership” alone. A distinction needs to be made between regulations on existing natural forests and regulations on artificially established plantations, as these forests differ in relative importance of protection and production. Only full rights to trees, however, will be effective in encouraging farmers to grow more trees on lands of low forest production.

Rights to scattered trees on family plots of croplands and around homesteads are more certain, clear, and credible than those for the type of trees and forests discussed above. Cutting permits are not needed to cut trees on family plots of croplands and homesteads, and accordingly no cutting quota scheme applies. Villagers are allowed to sell timber produced on such lands in markets if they hold a document from the office of the administrative village to prove that timber is from either family plots or homesteads. A certificate is needed when transporting the timber, but the certificate can be obtained from township government rather than county bureau of forestry, and so poses less of a problem for farmers than obtaining a permit to transport timber from other forests.<sup>72</sup>

Since tenure is more certain and credible over these trees, rural people usually give priority to planting in family plots of croplands and land around homesteads. A survey in two villages in Sichuan showed that farmers’ enthusiasm for planting trees in family plots of croplands was greater than on other types of lands and performed better in tree planting on their family plots of croplands.<sup>73</sup> Unfortunately, family plots of croplands are tiny and primarily for growing vegetables for household needs. Tree growing in these areas has a limited impact on forest cover.

## Conclusion

More empirical studies are needed to better understand the impacts of tenure and management arrangements of forests in China since 1950, especially since the early 1980s. However, several policy implications can be drawn from this preliminary review of experience.

The insecurity of land and tree tenure and the uncertain tenure environments affect incentives to plant new trees and manage existing forest resources sustainably. Policies for forest tenure and management have changed frequently in China since 1950, causing a complete lack of confidence on the part of villagers in tenure security. While some researchers and forest administrators argue that the allocation of family plots did not bring about a boom in tree planting as expected, and they blame the contracting of responsibility hills to households for increased deforestation and illegal cutting, they may only see the proximate causes for these problems. From a tenure perspective, the underlying cause of forest degradation is the lack of confidence in property rights that resulted from the frequent and sometimes radical changes in policy in the past. Where tenure security has been greatest, in family plots of croplands and near homesteads, tree planting has been more successful. When leases were introduced for household use rights, tree planting appears to have increased. These patterns suggest that a lack of tenure security, rather than household management per se, has discouraged farmers from managing timber forests as expected by the government. Though the impact on social differentiation has not been investigated, a positive relationship between household management and forest cover where tenure is secure appears to exist.

Where household management is of fragmented plots and therefore expensive and difficult, some kind of new collaboration in forestry is required. The government and forest departments have responded by promoting various shareholding systems and farmer households are also trying out new forms of collaboration of one kind or another. Available empirical evidence, however, shows that self-initiating shareholder system created on a voluntary basis, with or without the involvement of government and forestry departments, perform better than those shareholding systems that are merely a disguised form of former collective management. This suggests that only the shareholding systems organized by villagers voluntarily will be effective institutions for the establishment and management of common forests. They build on existing, local, social capital. Groups promoted and directed by government officials will not work or not work well because they lack the necessary social capital. Furthermore, with household-based forest management and well-organized shareholder groups, farmers are able to participate in making decisions about planning, management activities, product use, and income distribution, which is the core of local forest management. In contrast, the old-style collective management and those government-initiated shareholding systems often excluded villagers from planning, management, and decision making about benefit distribution. As a result, villagers usually received fewer benefits than they should have, which in turn further discouraged them from investing their labor and capital. This may explain, at least in part, why the old-style collective management performed poorly in many

cases. Therefore, government should refocus its attention on facilitating these farmer-initiated forms of collective action rather than trying to promote shareholding systems of those characteristics during the agricultural collectivization.

Improved tenure security is essential, but it is not sufficient to achieve the desired results in the case of timber trees. These trees are subject to many regulations that discourage investment in them. It is critical to vest villagers with full rights to their trees (i.e., rights to harvest, mortgage, or sell trees when a need arises), and to give them a greater stake in them. Otherwise, villagers choose to plant fruit trees and other non-timber tree species where no cutting quotas or permits apply. An option worth exploring in China today is to apply separate regulations to natural forests and artificial plantations that are established from now on, in terms of cutting permits, quotas, and transportation permits. The government can continue to protect natural forests while providing for farmers the incentives they need to plant trees on deforested lands.

Forest policy is no longer a monolithic institution in China. Local governments are experimenting with changes in forest tenure and management arrangements, even when such experiments contradict national policy. Farmers are also developing their own variations of official policy, as when they form voluntary shareholding systems. While some kinds of experimentation by official policymakers can lead to insecurity among farmers, experimentation that has the voluntary, active, and significant input of farmers can only help in the search for solutions to the problems that face forestry in China. It is an exciting and promising time for forestry in China.

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## Notes

I am grateful to Lini Wollenberg and David Edmunds for their encouragement and insightful comments on earlier versions of this article. I also wish to acknowledge their help in editing this paper.

1. Timothy Besley, "Property Rights and Investment Incentives: Theory and Evidence from Ghana," *Journal of Political Economy* 103, no. 5 (1995): 904–937; Louise Fortmann and John W. Bruce, eds., *Whose Trees?: Proprietary Dimensions of Forestry* (Boulder, Colo.: Westview Press, 1988); Abwoli Banana and William Gombya-Ssembajjwe, "Successful Forest Management: The Importance of Security of Tenure and Rule Enforcement in Ugandan Forests," working paper for the International Forestry Resources and Institutions Research Program, Indiana University, Bloomington, Indiana, 1996.
2. Robert Chambers and M. Leach, "Trees as Savings and Security for the Rural Poor," *Unasywa* 41, no. 161 (1990): 39–50.

3. In general, governance hierarchy below county in rural China consists of three levels, and each of them has different names over time in the last half century, summarized as the following: A township governs a number of administrative villages, each of which is a collection of a number of natural villages or hamlets. In most cases, a village households group comprises all households in a natural village. However, there are two exceptions. First, a village households group consists of households in several natural villages that are very small. Second, a village households group consists of just some households in a natural village that is very large.

Similarly, the commune was a three-tier system, with the commune as the highest level, followed by the production brigade and the production team in descending order. A production bridge (formerly the advanced cooperative) consisted of ten to twenty production teams. Generally, a production team (formerly the elementary cooperative) included all households in a natural village or hamlet, but could include just some households in a natural village if it was large.

1950-58	1958-83	1984-present
Township	Commune	Township
Advanced Cooperatives	Production Brigade	Administrative Village
Elementary Cooperatives	Production Team	Village Households Group ( <i>cunminzu</i> )

4. Ministry of Forestry (MoF), *China Forestry Yearbook 1994* (Beijing: China Forestry Publishing House, 1995), 85–105.
5. Compiling Board of Suining County Annals, *Suining County Annals* (Beijing: Publishing House for Local Annals, 1997); Compiling Board of Fujian Provincial Annals, *Fujian Provincial Annals of Forestry* (Beijing: Publishing House for Local Annals, 1996).
6. Compiling Board of Suining County Annals, *Suining County Annals*.
7. Nujiang Prefecture Bureau of Forestry, *Nujiang Prefecture Annals of Forestry* (Kunming: Yunnan Ethnic Publishing House, 1996).
8. The Agricultural Collectivization Campaign in China started with the establishment of elementary cooperatives, followed by the formation of advanced cooperative, and ended with the creation of the people’s commune. An elementary cooperative consisted of twenty to thirty households on average, with its boundary equal to a natural village or hamlet.
9. State Statistical Bureau, *Statistical Data on Agricultural Collectivization and Income Distribution of Agricultural Cooperatives in 1955* (Beijing: China Statistical Publishing House, 1957).
10. Terms for different categories of land are confusing, especially to those outside China. Usually, Chinese call forestlands “*shan*” (mountain or hill) since they are all mountainous or hillside land. Lands cultivated for food are called “*di*” (land) and “*tian*” (paddy field) despite the fact that many croplands are scattered on steep slopes in mountainous areas.

Croplands (*di* and *tian*)

· **Family plots of crop lands** (*ziliudi*): a tiny plot of land that has been kept for a farmer household since the Agricultural Collectivization Campaign to grow vegetables and other food crops, making up for any deficit of food produced by collective agriculture. They are

also called kitchen gardens in some areas. The family plot often is located around the homestead, with use rights to it being most secure among the all types of land.

· **Contracted crop lands** (*chengbaodi* or *zerentian*): collective crop lands that were first contracted to farmer households for agricultural production in the late 1970s and early 1980s when collective agriculture was replaced by household-based agriculture.

Forestlands (*shan*)

· **Family plots** (*ziliushan*): collective non-forested mountainous land that was allocated to rural households in the early 1980s in an attempt to encourage farmers to plant trees to meet their needs for tree products, especially fuelwood. Some literature in English calls this type of forestland “freehold land.” Given the restricted tenure of this type of land, the term is not appropriate.

· **Responsibility hills** (*zerenshan*): collective forests (and non-forested lands in some cases) that were contracted to households for management in the first half of 1980s, in an effort to improve management of existing forests and to establish new plantations.

Both terms (family plots of croplands and family plots of forestlands) have to be used in this article. To avoid confusion, “family plots of croplands” is used for this category of croplands (*di*), while “family plots” is used to refer to “family plots of forestlands” (*shan*).

11. Liu Dachang, “Aspects of Economic Development in China 1950–92,” CSAME Occasional Paper No. 1, 1995, Center for the Study of Asia and the Middle East, Deakin University, Geelong, Australia; Diana Hunt, *Economic Theories of Development: An Analysis of Competing Paradigms* (Savage, Md.: Barnes & Noble Books, 1989).
12. State Statistical Bureau, *Statistical Data on Agricultural Collectivization and Income Distribution of Agricultural Cooperatives in 1955*.
13. Nujiang Prefecture Bureau of Forestry, *Nujiang Prefecture Annals of Forestry*.
14. Li et al., eds., *A Chronology of P. R. China (zhonghua renming gongheguo shilu)*, vol. 2 (Chnagchun: Jilin People’s Press, 1994), 163–64, 570–71.
15. The Great Leap Forward that is well documented in literature was launched in May 1958. In the context, the phrase “people’s commune” first appeared in 1 July 1958 in CCP Central Committee’s magazine *Hongqi (Red Flag)* and was to be the name of the innovative communes that would be organized. Since then, communes were created throughout China. Henan Province in central China led the move, with all rural households of the province incorporated into communes by the end of August before the formal CCP resolution to create communes throughout China was released in 1 September 1958.
16. *People’s Daily*, 1 October 1958.
17. Anon., *A Brief Introduction to Major Historical Events of Chinese Communist Party* (Chengdu: Sichuan People’s Press, 1982).
18. Chuxiong Prefecture Bureau of Forestry, *Chuxiong Prefecture Annals of Forestry* (Kunming, 1990).
19. Li et al., eds., *A Chronology of P. R. China*.
20. Nicholas K. Menzies and Nancy Lee Peluso, “Rights of Access to Upland Forest Resources in Southwest China,” *Journal of World Forest Resource Management* 6 (1991): 1–20.
21. Edmund Clubb, *20th-Century China*, 2d ed. (New York and London: Columbia University Press, 1972).
22. Compiling Board of Hubei Provincial Annals of Forestry, *Hubei Provincial Annals of Forestry* (Wuhan: Wuhan Publishing House, 1989).
23. Justin Yifu Lin, “The Household Responsibility System in China’s Agricultural Reform: A Theoretical and Empirical Study,” *Economic Development and Cultural Change* 36 (1988):

- 199–224; Louis Putterman, “Does Poor Supervisability Undermine Team Work? Evidence from an Unexpected Source,” *American Economic Review* 81 (1991): 996–1001.
24. Compiling Board of Suining County Annals, *Suining County Annals*.
  25. Central Committee of CCP, 1961, quoted in Li et al., *A Chronology of P. R. China*.
  26. Nujiang Prefecture Bureau of Forestry, *Nujiang Prefecture Annals of Forestry*; Lanping County Bureau of Forestry, *Lanping County Annals of Forestry* (Kunming: Yunnan Ethnic Publishing House, 1997); Shizong County Bureau of Forestry, *Shizong County Annals of Forestry* (Yunnan, 1993).
  27. Chuxiong Prefecture Bureau of Forestry, *Chuxiong Prefecture Annals of Forestry*.
  28. Arun Agrawal and Sanjeev Goyal, “Group Size and Collective Action, Workshop in Political Theory and Policy Analysis, Bloomington, Indiana, USA,” paper presented at the conference on “Local Institutions for Forest Management: How Can Research Make a Difference?” CIFOR, Bogor, Indonesia, November 19–21, 1997.
  29. Li et al., *A Chronology of P. R. China*, 570–571.
  30. Ministry of Agriculture (MoA), *China Agricultural Yearbook 1981* (Beijing: China Agricultural Publishing House, 1982), 361–64. The forest reform is called *sanding* in much of the Chinese literature since each of the three components contains the Chinese character “*dīng*.” It is also called *liangshan* (two categories of mountains or hills, i.e., family plots and responsibility hills).
  31. Compiling Board of Guizhou Provincial Annals of Forestry, *Guizhou Provincial Annals of Forestry*, 291.
  32. MoA, *China Agricultural Yearbook 1981*, 231.
  33. *Ibid.*, 361–64.
  34. In Yunnan, for instance, area the provincial government decided to allocate each rural household was 1 to 2 *mu* in 1979 and 3 to 5 *mu* in 1981. After June 1983, standardized limitations on the area to be distributed as family plots were lifted, and allocations were determined by the availability of local hillside land resources. As a consequence, up to the end of 1983, 4.84 million ha of hillside lands was distributed to 3.57 million rural households, with an average area of about 20 *mu* per household and the maximum area being as much as up to 800 *mu* (about 53 ha) in a remote area (Yunnan Provincial Department of Forestry, *Yunnan Forestry Yearbook* [Kunming, 1987], 321).
  35. MoF, *China Forestry Yearbook 1949–86* (Beijing: China Forestry Publishing House, 1987): 479.
  36. Chuxiong Prefecture Bureau of Forestry, *Chuxiong Prefecture Annals of Forestry*.
  37. MoA, *China Agricultural Yearbook 1983* (Beijing: China Agricultural Publishing House, 1984).
  38. *Ibid.*, 322–23.
  39. Chuxiong Prefecture Bureau of Forestry, *Chuxiong Prefecture Annals of Forestry*.
  40. In addition, it is worth noting that in some areas, collective forests were distributed to households without a distinction of family plot and responsibility hill at all in the course of the forest reform.
  41. MoF, *China Forestry Yearbook 1987* (Beijing: China Forestry Publishing House, 1988), 536–37.
  42. *Ibid.*, 7–8.
  43. Wenhong Li, “Several Practices in Tightening Up Forest Management in Eshan County,” *Yunnan Forestry* no. 3 (1995): 13–15; Compiling Board of Suining County Annals, *Suining County Annals*.
  44. Li, “Several Practices in Tightening Up Forest Management in Eshan County.”
  45. *Ibid.*

46. MoA, *China Agricultural Yearbook 1995* (Beijing: China Agricultural Publishing House, 1996), 64–65; Qiming Liu, “An Observation on the Leasing of Use Rights to Four Kinds of Wastelands in Luliang Prefecture, Shanxi Province”; Xuexi Wang and Luxiang Jiang, “Auction Using Rights of Four Kinds [of] Wasteland and Countermeasures in Shanxi Province,” *Forestry Economy* no. 1 (1996): 37–42.
47. Yunhang Ai, “Auction the Use Right of Four Kinds of Wasteland to Speed Up the Development of Four Kinds of Wasteland Resources,” *Forest Economy* no. 3 (1995): 1–6.
48. *Yunnan Daily*, 21 June 1998, 1.
49. MoF, *China Forestry Yearbook 1989*, 106–132; MoF, *China Forestry Yearbook 1994*, 85–105.
50. Fangming Chen and Qian Gao, “Viewpoint Shared by Studies of Stocked Cooperative Economics in China,” *Forestry Economy* no. 1 (1997): 65–68.
51. Hong Jiang and Pingkang Liu, “A Study on Collective Forest Property and Income Distribution,” *Forest Economy* no. 4 (1997): 31–39.
52. Changjin Sun, “Community Forestry in Southern China,” *Journal of Forestry* 90, no. 6 (1992): 35–40.
53. Qian Gao et al., “Investigation and Analysis on Stocked Cooperative Forestry in Anhui Province,” *Forestry Economy* (1997): 40–44; Lanli Li, *Report on CIFOR/IFAD Project on Making Devolution More Effective* (Jinping, Guizhou: unpublished memo, 1999).
54. Qian Gao et al., “Investigation and Analysis on Stocked Cooperative Forestry in Anhui Province”; Jiang and Liu, “A Study on Collective Forest Property and Income Distribution”; Lanli Li, *Report on CIFOR/IFAD Project on Making Devolution More Effective*.
55. Qian Gao et al., “Investigation and Analysis on Stocked Cooperative Forestry in Anhui Province”; Jiang and Liu, “A Study on Collective Forest Property and Income Distribution”; Li, *Report on CIFOR/IFAD Project on Making Devolution More Effective*.
56. The tree species can be harvested twice or more because it is able to coppice after first harvesting.
57. Author’s survey note, 1995.
58. *Ibid.*
59. MoF, *China Forestry Yearbook 1989*, 37–39; MoF, *China Forestry Yearbook 1986*, 477–78; *Forest Law of China*, revised edition (Beijing: Legal and Law Press, 1998 [1984]).
60. In fact, in some cases, farmers opt for cooperation with forest agencies to establish plantations largely because they want to avoid the difficult process of getting a permit to cut. In Shizong County, Yunnan, for example, local farmers and the County Forest Farm jointly established Chinese fir plantations in the early 1990s. By the agreement reached by them, farmers are entitled to only 20 percent of profits through contributing land on which plantations were established. They accepted this agreement that seems unfair to them largely because this would release them from struggling for a cutting permit.
61. MoF, *China Forestry Yearbook 1987*, 11–12, 485–86.
62. Junde Chen, “Current Issues with Cutting Quota System and Countermeasures,” *Resource Development & Market* 11, no. 4 (1995): 194–95; Zenqian Shanguan, “Market Economy and the System of Forest Cutting Quota,” *Forest Economy* no. 1 (1995): 45–49; MoF, *China Forestry Yearbook 1990*, 16–18.
63. MoF, *China Forestry Yearbook 1997*, 27–28; MoF, *China Forestry Yearbook 1994*, 30.
64. MoF, *China Forestry Yearbook 1995*, 26–29; MoF, 1990, 40–41, 46–47; *Forest Law of China*; MoA, *China Agricultural Yearbook 1983*, 411; MoA, *China Agricultural Yearbook 1981*, 424.
65. MoF, *China Forestry Yearbook 1949–1986*, 210–11; MoA, *China Agricultural Yearbook 1986*, 77–78.
66. MoF, *China Forestry Yearbook 1990*, 16–18; MoF, *China Forestry Yearbook 1989*, 47–48, 53–54; MoF, *China Forestry Yearbook 1987*, 7–8, 488–89.



67. Zenqian Shangguan, "Market Economy and the System of Forest Cutting Quota."
68. Di Dong, "A Survey on Farmer Households after Wasteland Leasing in Banliu Village, [Yao'an County, Yunnan]," *Economic Studies in Yunnan* no. 2 (1997): 70-78.
69. Yaoguang Liang, "Five Hopes of Forest Farmers in Shizong County, [Yunnan]," *Yunnan Forestry* no. 1 (1995): 3.
70. *Yunnan Daily*, 7 December 1994, 7.
71. Chambers and Leach, "Trees as Savings and Security for the Rural Poor."
72. MoF, *China Forestry Yearbook 1994*, 72-74; MoF, *China Forestry Yearbook 1989*, 40-41, 47-48.
73. Shougu Du, "A Survey on Tenure of Forest Lands and Trees in Pingxi Township, Zixian County, Sichuan," *Forestry and Society* no. 4 (1994): 3-4.