Privatization or communalization: a multi-level analysis of changes in forest property regimes in China

Jun He[1]*; Bereket Kebede[2]; Adrian Martin[2]; Nicole Gross-Camp[3]

[1] National Centre for Borderland Ethnic Studies in Southwest China, Yunnan University, Kunming 650091, China

[2] School of International Development, University of East Anglia, Norwich, NR4 7TJ, UK.

[3] Department of Environmental Science & Sustainability, Allegheny College, Meadville, PA, USA

Corresponding Author: jun.he@ynu.edu.cn, tel+86-871-65034738, fax+86-871-65031748.

Abstract

Over recent decades, the Chinese government has invested heavily in improving the country's forest tenure system through the Collective Forest Tenure Reform. This reform has primarily focused on privatization of collectively-owned forests, which has been perceived to improve effective forest management by providing incentives to farmers. This paper documents results of the Collective Forest Tenure Reform and the factors that have shaped these results through a multi-level analysis: at the national, regional, community and individual levels. It was found forest privatization implemented through the tenure reform was much less than what government expected. Instead, as shown in illustrative case-studies, people intend to retain the forest as common property in a way that creates a complex communal forest management system. The paper argued that while it is good the government is willing to improve forest tenure security for local people, there is a need to better consider the local perceptions of the tenure reform policy's effectiveness and efficiency, and justice in forest management, and to understand the complexity of the pre-existing communal forest management system that exists throughout the country.

Keyword: Collective Forest Tenure Reform; communal management; community forest; property rights; effectiveness; justice;

1. Introduction

China's collectively-owned forests account for the largest share of the world's community forests, comprising over 60% of the total community forest resource in Asia and the Pacific (Sikor et al., 2013) and reaching nearly 30% of the resource among the 52 most forested countries in the world (RRI, 2014). These collectively-owned forests comprise about 60% of China's total forest area (State Council 2008) and contribute significantly to regional and global environmental services and the rural livelihoods of about 600 million households in China (Xu, 2010). Since 2003, the Chinese government has initiated a new round of Collective Forest Tenure Reform to promote tenure devolution, which follows an earlier forest reform from the 1980s. Learning from the success of privatization[1] in agricultural and industrial sectors, this reform aimed to provide incentives to farmers for forest management by promoting individual forest holdings through an egalitarian distribution of the collectively-owned forest resource[2]. The government believes this privatization of the collective forest resource would improve the forest condition and local livelihoods (c.f. Xu and Hyde, 2019). To ensure the stability and constancy of this forest tenure reform, the central government invested approximately USD 370 million in the boundary delineation, surveying, titling and registration of the new plots since 2008 (Xu et al. 2010). The government also aimed to accomplish its key mission to clarify property rights and allocate at least 80% of the collective forest to individual households by 2013 (State Council, 2008). As such, China's collective forest tenure reform has attracted considerable international attention. Research into this reform would make a significant contribution to global experiences with forest tenure reform and community forestry development (Hyde, 2019).

There is a growing international literature on China's Collective Forest Tenure Reform (CFTR). Much of this research has focused on examining the reform's outcomes in terms of incentivizing local investment in forest management and has concluded there have been positive effects as a result of improved tenure security (Qin et al., 2011; Yi et al., 2014; Qin and Xu, 2013; Xie et al., 2014; Ren et al., 2018; Huang et al., 2019; Zhou et al., 2018; Lu et al., 2016; Li et al., 2016; He, et al.. 2015; Liu et al., 2017; Wei and He 2016). Others have taken a critical perspective to investigate how local conditions may affect the reform, finding the tenure reform has led to conflict between de facto and de jure tenure arrangements (Liu et al., 2016; Luo et al., 2015). Taking a case-study approach at a local level, scholars have also revealed the local variation in governance processes have shaped the implementation of the reform and generated mixed results (e.g. He and Sikor, 2017; Zinda and Zhang, 2018). At a higher level, many others have suggested there are a range of institutional challenges with the reform, including property rights ambiguity (Ho, 2014; He, 2016), top-down implementation (Robbins

[1] This paper considers privatization to refer to the transfer of resource use rights and control from pubic or collective control to individuals, instead of a narrow definition of transferring ownership to private interests.
[2] It is the government's perspective that collective ownership leads to inefficient resource use, while forest privatization has been promoted, as influenced by Hardin (1968).

and Harrell, 2014; Yin, et al., 2013), and potential institutional conflicts (Liu et al., 2016; Hyde and Yin, 2019). However, the actual results of privatization in this reform remain unclear in terms of changing areas under different forest property regimes. In particular, there is a lack of understanding of the factors affecting those changes. Thus, new evidence supported by a novel analysis of the forest tenure reform is urgently needed to provide thoughtful insights into China's Collective Forest Tenure Reform.

At a global level, forest tenure reform has been widely implemented to allocate forests to Indigenous people and communities across the world (Yin et al., 2016; Larson and Dahal, 2012; Sikor et al., 2017; RRI, 2014). While existing literature has evidenced the positive aspects of tenure reform in improving forest condition and local livelihoods (Blackman and Veit, 2018; Mistry and Berardi, 2016; Robinson et al., 2014, 2018), research also calls for particular attention to understanding legal pluralisms (Gebara, 2018), customary institutions (Linkow, 2016), local governance (Larson, 2011), forest tenure diversification (He et al., 2014), and conflict between formal and actual tenure (Sikor, 2006). Taking the analytical framework of forest decentralization, scholars have highlighted that positive effects of devolving forest tenure systems can be limited by a lack of downward accountability mechanisms (Ribot et al., 2006), elite capture (Lund and Saito-Jensen, 2013), institutional constraints (Sahide et al., 2016) and insufficient power transfer (He and Xu, 2017). Among these studies, devolving forest tenure to local communities is a primary focus, while rare attention has been paid to forest devolution through privatization. There is a gap in understandings of the factors affecting the implementation of forest privatization, particularly in the case of China, the country with the largest share of community forests in the world. To fill the gap, there is a need to obtain thoughtful insights into forest tenure reform by combining large-scale analysis with local case-studies. Doing so in a way that combines qualitative and quantitative approaches would provide additional evidence-based knowledge to the international literature.

Unlike the existing literature, this study examines the results of CFTR via a multi-level analysis conducted at the national, regional, community and individual levels. This multi-level analysis enables a comprehensive understanding of the connectivity of the social-ecological system, as what happens at one level can affect the result at another level (Young, 2006; Ostrom et al., 2007; Brondizio et al., 2009). As such, the research aims to answer two key questions: 1) What is the actual result of privatization through the CFTR at the national and regional levels?, and 2) What factors affected the tenure reform result, in terms of learning from empirically-grounded analysis at the village and individual household levels? Thus, the central contribution of this research is to provide thoughtful insights into those two questions as additions to the existing literature. The research also makes an empirical contribution to the policy debate on forest devolution and provides timely information to Chinese policymakers for improving the current CFTR policy. The policy implications are also globally relevant.

2. China's Collective Forest Tenure Reform (CFTR): A historical overview

China's collective forests emerged in the 1950s alongside the establishment of the People's Republic of China, when the government transferred individually-managed forestland to collective management under the communist system (Liu, 2001; Miao and White, 2004). Within the commune system, village cooperatives were established as the forestland holders, and farmers enrolled as cooperative members to secure their access to farmland and forestland (Grinspoon, 2002). This collectivization policy continued throughout the years of the Great Leap Forward and the Cultural Revolution from the mid-1950s to the end of the 1970s. However, the forest collectivization created problems in the form of environmental degradation and slow economic development (e.g. Menzies, 1994; Shapiro, 2001; Grinspoon, 2002).

Following the success in agricultural privatization, the forestry reform began in 1982 with the reallocation of the collective forestland to individual households across the entire nation to ensure the individual use rights to forests (Liu et al., 2019). The reform aimed to promote afforestation and effective forest management to alleviate poverty. As such, the reform attempted to provide incentives to farmers through the "Three Fix" (*Linye shanding*) approach: 1) clarifying forest boundaries, 2) distributing collective non-forested land to rural households (called "Private Freehold Mountain" or *Ziliushan* *自留山*), and 3) introducing the "Responsibility System" to set up "Responsibility Mountain" (*Zerenshan* *责任山*) for the collectively-owned forest by using contracts to allow individual forest management (Liu et al., 2019).

The first tenure reform did not achieve the objective expected by the government and its outcome was less than positive. The rural people's lack of confidence in the security of their tenure meant that the Freehold Mountain allocations did not generate much enthusiasm for tree plantations (He, 2016; Liu et al., 2019). Studies reported a decline in forest areas as market forces and badly-defined tenure arrangements led to many forests under the Responsibility Mountain policy being felled for cash income (e.g. Xu et al., 2005; He, 2012). The overexploitation and short-sighted management of the forests was encouraged by the policy's short periods of tenure and various ambiguities (Ho, 2001; Liu et al., 2019). In 1985, a harvest quota system was imposed to halt the rapid cutting of collectively-owned forests, but this policy change again led to tenure insecurity (He, 2016). The central government stopped allocating forest rights to individual households in 1987, and thus titling the forest to the holders was ceased. The problems of the lack of institutional credibility and the uncertain benefits of forest management called for improvements to the forest sector reform policy.

In 2003, the second round of the CFTR commenced. Learning from the previous reform attempts, the second round paid great attention to forest privatization as part of a

broader social and political trend, aiming for privatization of the rural landscape and the establishment of a free market (Xu et al., 2010; He and Sikor, 2017). This reform was originally initiated as a pilot study in Fujian Province, where the provincial government allocated collectively-owned forests to individual households with clarification of the individual households' rights to use and benefit from their forest. This pilot privatization of forest tenure improved the incentive for farmers to invest in their forests. The central government then called for nationwide reform in 2005. In July 2008, a new national policy was officially publicized by the Central Committee of the Communist Party of China and the State Council. Up to the end of 2010, the forest tenure reform had been implemented in 28 provinces involving around 500 million rural forest dependents (Xu et al., 2010).

The second forest tenure reform emphasized a rights-based approach, differing from the previous reform in its purpose: to ensure meaningful individual rights over forest resources. To ensure the privatization of forests, the key task identified by the government was to clarify and secure farmers' meaningful rights to forest management and securing farmers' ownership of forests and their right to use forestland, with a 70-year contract and the forestland remaining under ownership of the collectives (Yin, 2014; He and Sikor, 2017). The privatization effort therefore took a form of the government clarifying and securing the farmers' four rights of forest tenure, including: use rights of forestland, management rights of forest and forestland, the right to forest disposal, and the right to benefit financially from the forest (State Council 2008)[3]. Also, the second reform enabled local autonomy and self-governance in forest redistribution. This reform policy gives village assemblies full decision-making power regarding how much collective forest should be turned over to individual households and how much should remain as a collective resource. The rights to the latter portion remain vested in the democratically-elected village committee. With this, the central government aims to create a meaningful forest decentralization, ensuring local benefits while also meeting the variability in regional needs (He, 2012).

Although there is goal of promoting local participation and securing local rights to forest resources, the central government has established a range of principles for implementing the forest tenure reform policy that have limited local decision-making[4]. The central government also encourages the privatization of collective forests by defining a percentage of privatization of the total collective forest area as key indicator to evaluate the achievement in each province. At the national level, there is a goal of privatizing 80% of the collective forest in each province. In addition, while the central government has proposed a five-year period for the task of clarifying property rights,

[3] The four tenure rights differed from Schlager and Ostrom's bundle of rights (1992), where the Chinese Government emphasized the right to use and benefit from the forest.

[4] In practice, to meet the high rate of privatization and fast accomplishment of forest titling, the village level plan of reform is mainly implemented in a top-down approach (see also Robbins and Harrell, 2014, He and Sikor 2017).

the provincial and local governments are pushing for a shorter period to demonstrate their local capability so they can request further investment from the central government (He and Sikor, 2017). The clash between the state's goal and local practices might cause a mismatch between the national-level intention of securing forest tenure for individual holdings and the local-level preference for more complex tenure arrangements. Thus, there is an urgent need to examine the actual property regime changes through the tenure reform and the local dynamics shaping the implementation of the national tenure reform policy.

3. Methodology

This research applied a multi-level analysis to examine the outcomes of CFTR, focusing on the changes in property regimes and the local dynamics that have shaped those changes. A combination of qualitative and quantitative methods was applied to generate a robust dataset for providing empirically-grounded and evidence-based results. To achieve this, different methods of data collection were applied at different levels to obtain rich insights into the tenure reform from different perspectives.

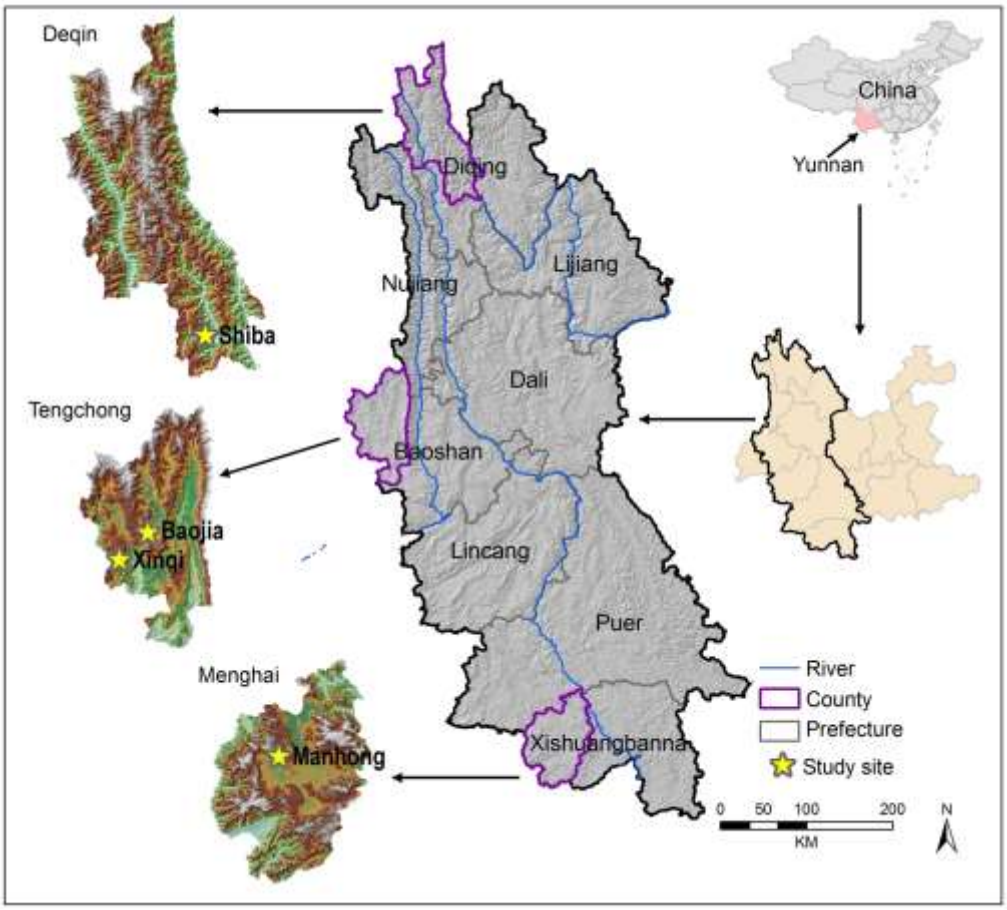
3.1 Data collection

First, at the national and the regional levels, the data on changes in forest area under each forest property regime were obtained from three time periods – the 6th (1999-2003), 7th (2004-2009) and 8th (2010-2014) National Forest Inventories carried out by the State Forestry Administration. Through comparison of the forest areas under each property regime, an overall picture of the outcome of the forest privatization was obtained for the entire country as well as the regional variations. As the actual result of privatization from the tenure reform, this provides clear statistics to evidence if the national goal of privatization has been achieved. Additionally, policy documents on the CFTR were investigated to understand the nature of the policy. Progress reports prepared by different levels of the government were reviewed for insights into the process and implementation of the policy change. The study of policy documents and reports from the central and regional levels provided for a sound understanding of the policy's intentions and allowed examination of differences in implementation of the policy at different levels of government. At the national and the regional levels, 12 in-depths interviews were conducted with key informants (i.e. government policymakers and forest sector officials) to obtain a deep understanding of the policy and the history and dynamics of the policy's implementation.

Second, at the village level, as informed by Magliocca et al. (2018), this research applied an in-depth ethnographic approach in four villages in Yunnan Province to provide knowledge of the CFTR using case-studies. These four villages were chosen as illustrators that cover a diversity of biophysical and socioeconomic conditions that are characteristic of rural China. Although these four case-studies are not statistically

representative of China as whole, they provide rich insights into the dynamics and diversity of the forest tenure reform. In particular, they help to capture a wide range of factors affecting the results of the reform. The illustrative case-studies represent different ecological zones and different ethnic groups, including Lisu people in the highland alpine zone in Deqin County, Han-Chinese in the uplands of the subtropical zone in Tengchong County, and Dai (Thai) people in the lowland tropical zone in Xishuangbanna Prefecture (Figure 1 and Table 1). Also, the four villages are engaged in different livelihood strategies and farming practices, which lead to different types and levels of forest use and management and different local economic conditions. The village-level case-studies used qualitative data collection to understand the local-level policy implementation processes and responses to the policy. A total of 54 interviews were conducted with key informants, including the village leaders at both the Natural Village and Administrative Village levels[5], villagers involved in the reform, village elders, and leaders involved with the Village Forest Association. In addition, a total of four focus group discussions were conducted, with each consisting of four to five people and designed to gain deeper insight into the local perspectives of the reform policy's implementation.

[5] Natural Village is a natural settlement of several households ranging from 5-10 households, while several Natural Villages comprises an Administrative Village, which is the lowest administrative unit in the Chinese government structure. The ownership of collective forests can be held at both the Administrative and Natural Village levels.



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263 **Figure 1. Locations of the study sites**

264 **Table 1. Biophysical and socioeconomic characteristics of the four case-study villages.**

Study site characteristics	**Shiba** (Deqin County)	**Baojia** (Tengchong County)	**Xinqi** (Tengchong County)	**Manhong** (Xishuangbanna Prefecture)
Geography				
Area (km^2)	202	24.05	53.19	1.91
Elevation (m.a.s.l.)	3300-3800	1782-2506	1692-2546	1255-1500
Socioeconomics				
Ethnicity	Lisu	Han-Chinese	Han-Chinese	Dai (Thai)
Total households (2015)	303	1212	1183	58
Total population (2015)	1091	5180	4577	286
Net income per capita	305(USD, 2015)	1345 (USD, 2015)	1565(USD, 2015)	1367(USD, 2015)
Forestry				
Dominant natural forest vegetation	Pine (*Pinus armandii, P. yunnanesis*), (*Sabina pingii var. wilsonii)*	Fir (*Taiwania flousiana, Tsuga Dumosa*), Pine (*P. Armandii, P. yunnanesis*), Alder (*Alnus nepalensis)*,	Fir (*T. flousiana, T. dumosa*), Pine (*P. armandii, P. yunnanesis*), Alder (*A. nepalensis*).	Pine (*P. kesiya*)
Plantation	Walnut (*Juglans sigillata*)	Walnut (*J. sigillata*), Fir (*T. flousiana*), Alder (*Alnus spp.*), oil tea (*Camellia reticulata*)	Mixed forests of *A. nepalensis, Betula alnoides, T. flousiana, T. dumosa*	Bamboo (*Dendrocalamus membranaceus)*

Third, at the individual household level, a questionnaire survey was implemented in a face-to-face manner to understand personal perspectives of the underlying factors that have shaped the tenure reform. Using a random sampling strategy[6], a total of 242 farmers were selected in the four villages. The questionnaire focused on individual preferences for the distribution of revenues generated from the collective forest, in line with individualization (as the notion of privatization) and communalization principles of forest management[7], as adapted from Martin et al. (2019)[8]. The respondents were asked to rank their choices from their most preferred to their least preferred to quantify their priorities among five methods of revenue distribution: 1) prioritizing rewards flowing to those who have contributed most to producing them (Contributor), 2) prioritizing those who experienced losses arising from forest management (Compensation), 3) prioritizing investment to generate public goods in the community (Community), 4) prioritizing poverty alleviation (Pro-poor), and 5) prioritizing an equal distribution of revenues among community members (Equality). The first two priorities refer to meritocratic forms of distribution as an individualization principle, while the remaining three methods reflect the principles of collective action and egalitarianism. Following completion of the structured questionnaire, open-ended questions were asked to elaborate on the respondent's reasons for their choice of preference.

3.2 Data analysis

Quantitative and qualitative data analysis was carried out for each of the levels of investigation. At the national and regional levels, the national inventory data was analyzed quantitatively to present descriptive statistics of forest property regime changes across different regions and time periods, while qualitative data generated from the interviews with officials helped to understand the reason for those changes and the stories behind the changes evident in the statistics. At village level, the qualitative data were analyzed to generate insights into the policy implementation process and actual practical outcomes at the local-level, while the quantitative data relating to actual forest holdings and different forest regimes was incorporated to support the qualitative analysis of policy implementation. Finally, at the individual household level, SPSS (Statistic Package for Social Science) software was used to analyze the quantitative data generated from the survey questionnaire. A Chi-square test was performed to examine the significant differences among the different preference choices for forest benefit distribution and use. Qualitative data was presented to help understand the reasons behind those preference choices.

[6] In each village, a name list of adult villagers provided by the village heads was coded by researchers; then the approximately 60 individuals were selected by a simple random sampling strategy for the questionnaire survey. When the selected person was not available, we interviewed the next person on the name list.

[7] The emphasis here is to examine preferences about the allocation of benefit from collective forest, which help to obtain insights on individualistic vs. communalist principles among individual farmers. It is not generalized to preferences concerning communal vs. private forest ownership.

[8] The survey is part of larger project led by the University of East Anglia (UK) entitled "Conservation, Market and Justice: Global and Local Perspectives". The questionnaire used in the survey with English translation can be found in the supplementary materials.

4. Results

4.1 National-level analysis

There were significant changes to China's forest property regimes alongside the country's market liberalization process (Hyde et al., 2003). While private forests firstly emerged in the country in late 1980s through the Responsibility Forest (*zherenshan*) and Private Freehold Mountain (*ziliushan*) systems to provide management incentives for farmers, the most remarkable change occurred with the pilot forest tenure reform in late 2003 before becoming more nationally widespread in 2008. Table 2 shows the changes in forest area for the different property regimes in China from 1999-2014. It is clear that the area of private forests has been an important share of China's total forest area since 1999-2003 when it accounted for 21% of the total forest area. Since then, its portion has continued to increase along with implementation of the CFTR. During the periods 1999-2003 to 2004-2009, private forests increased from 21% to 32% of China's total forested area and then further increased to 44% during the period 2010-2014. Meanwhile, the collective forest area reduced from 38% to 29% between the sixth and seventh inventory periods (1999-2003 to 2004-2009) and continued to decline to 18% during the 2010-2014 period. In contrast, the portion of state forest has remained relatively stable over the last two decades.

Table 2. Changes in forest property regimes in China from 1999-2014

Forest area changes	6th Inventory: 1999-2003		7th Inventory: 2004-2009		8th Inventory: 2010-2014		6th to 7th Inventory		7t to 8th Inventory	
	area	%	area	%	area	%	area	%	area	%
State	70.16	42	71.44	39	72.44	38	1.27	0.70	1.01	0.53
Collective	63.89	38	51.77	29	35.00	18	-12.12	-6.68	-16.77	-8.77
Private	34.96	21	58.18	32	83.73	44	23.21	12.80	25.56	13.37
Total[9]	169.02	100	181.38	100	191.18	100	12.36	6.82	97941	0.05

Source: State Forestry Administration, 6th, 7th and 8th National Forest Inventories. Note：Units = million of hectares (area). The National Forest Inventory is conducted every 5 years and was first conducted from 1973 to 1976. But private forests were first recorded in the sixth inventory. Calculation of changes in the percentage of forest area under each type of property rights is informed by He et al. (2014)

Table 2 also shows the percentage of change in forest area over time for the different property regimes. From the 6th to the 7th inventory, the private forest area increased by 12.8% of the total forested area, while the collective forest area decreased by 6.68%.

[9] The share of forest to the total land area in China was 17.61% in the 6th inventory, 18.89% in the 7th inventory and 19.91 % in the 8th inventory. But this number is different from forest coverage, which includes any form of tree cover with a canopy greater than 20%, such as trees on farms and roadside trees.

Similar patterns can be found from the 7th to the 8th inventory. Across the time period from 1999-2014, the collective forest area decreased from around 63 million ha to 35 million ha (a decrease of around 28 million ha), while the private forest area increased from 34 million ha to 83 million ha (an increase of around 49 million ha). However, the decrease in the collective forests only accounted for 44.44 % of the total collective forest area from 1999 to 2014, which is far less than the national goal of 80% privatization. It is also noted that from Table 2, one cannot simply conclude that all the increases in private forest have resulted from the CFTR. Indeed, the increase in the private forest area is a result of nationwide afforestation programs, particularly the Sloping Land Conversion Program (SLCP). This program has converted approximately 8 million ha of cropland to forest, and this forest has been registered as private forest, thereby contributing to the increase in the private forest area at both the national and local levels (SFA, 2016).

In sum, at the national level, forest privatization implemented through the tenure reform was much less than what government expected, as shown in national forest inventory datasets. Thus, a large portion of the collective forest area remains under communal management. Although forest officials realize the blanket approach to forest privatization cannot work well given the diversity of China, they continue to push for forest privatization across the country to meet the national target. As a result, they have begun to allow some types of communal forest to be regarded as privatized forest. This is further discussed below.

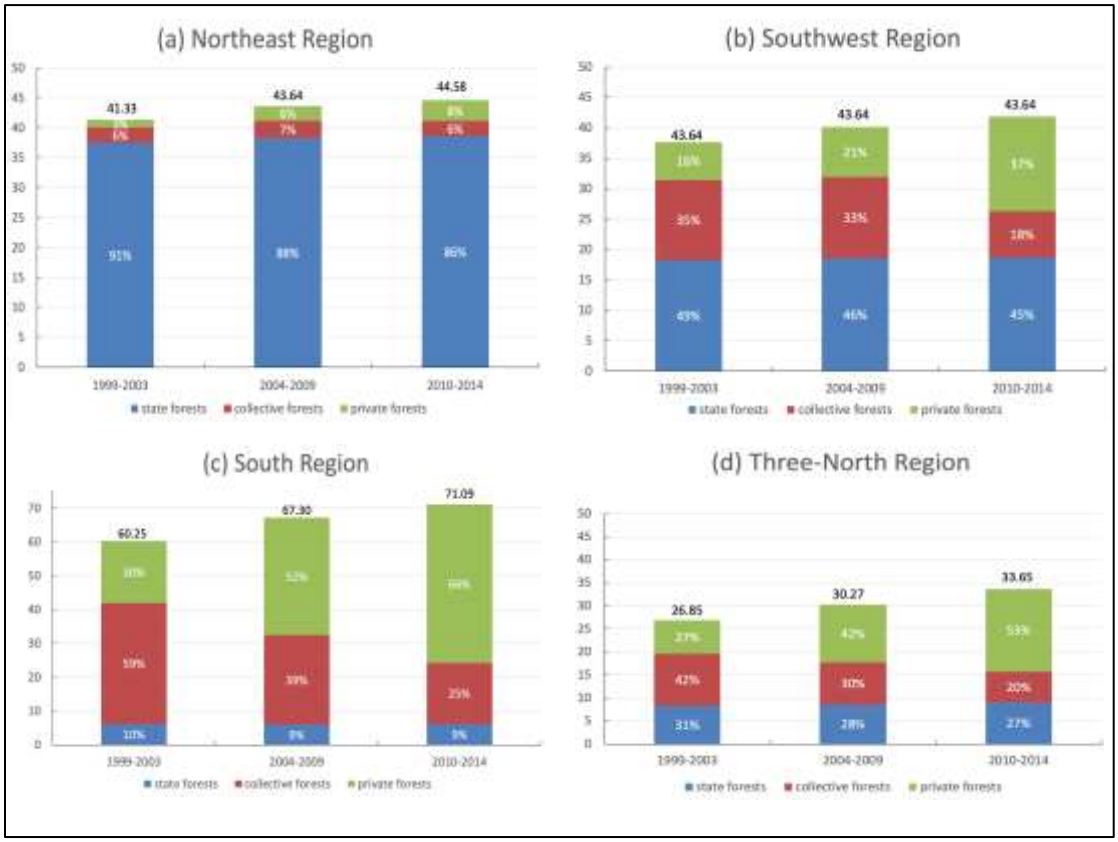
4.2 Regional-level analysis

Figure 2 shows the changes in forest area for the different property regimes from 1999 to 2014 across four regions of China, namely the Northeast, Southwest, South and the Three-North regions. It also shows there has been an increase in the percentage of the private forest area in all regions expect the Northeast Region which has long been dominated by a state forest enterprise that manages the forest to supply national timber needs. In the other regions, we can see a clear decrease in the share of the collective and state forests and an increase in the share of the private forest.

In the Southwest Region, the marked decrease in the collective forest area occurred after the CFTR was officially implemented in 2008. This region's share of collective forest decreased from 33% in 2004-2009 to 18% in 2010-2014, while the private forest area increased from 21% to 37% over the same time period. In the South Region, the increase in the share of the private forest was greater between 1999-2003 and 2004-2009 than between 2004-2009 to 2010-2014. This was because the tenure reform was firstly piloted in this region. In the Three-North Region, the share of the private forest area was increased across the three inventory time periods. Thus, it is evident that the effects of the Collective Forest Tenure Reform have varied across time and

across different regions, in line with the varying times of implementation of the reform across the different regions.

Figure 2. Changes in forest property regimes across four regions of China



Source: State Forestry Administration, 6th National Forest Inventory (1999-2003), 7th National Forestry Inventory (2004-2009), 8th National Forest Inventory (2010-2014).

Note: Unit=million ha. The four forest regions were officially classified to include the following provinces: a) Northeast = Heilongjiang, Jilin and Inner Mongolia; b) Southwest = Sichuan (Chongqing included), Yunnan, and Tibet; c) South = Anhui, Zhejiang, Fujian, Jiangxi, Hunan, Hubei, Guangdong, Guangxi, Hainan, and Guizhou; d) Three-North = Liaoning, Hebei, Beijing, Tianjin, Shandong, Jiangsu, Shanghai, Shanxi, Henan, Shaanxi, Ningxia, Gansu, Qinghai, and Xinjiang.

Figure 2, however, only tells part of the forest regime change story. Although the national-level analysis notes the increase in the private forest area derived from the SLCP, the actual allocation of collective forest is in question at the regional level, as in many cases, the forest privatization only appears on paper. He and Sikor (2017) report that the local government in Yunnan Province has included unallocated ecological forest[10] as privatized forest to meet the high national requirement (i.e. 80%) for

[10] Forest in China has been classified as two types according to the purpose of use: 1) economic forests that include fruit trees and timber forest that can been cut for commercial purposes, and 2) ecological forest that refers to the forest areas that are protected for ecological functions and public goods (i.e. ecosystem services).

privatization. The local government's argument for doing so is that privatization cannot be implemented in ecological forests, as a private holding can mean the loss of government control, which could lead to a degradation of ecosystem services from these critical areas. This practice had been approved by the central government and applied to the entire Southwest Region which contains the largest area of ecological forest in China. Zinda and Zhang (2018) also found that in Deqin Prefecture in the Southwest Region, forests that are jointly held by several households have been regarded as privatized forest. In a number of these cases, the jointly-held forests cover large areas and involve over 20 households or a whole natural village. In the provinces of Jiangxi, Zhejiang and Fujian, scholars have also found forest have been reported as privatized (as individual holdings) when they are actually jointly-held collective forests (e.g. Shen et al., 2009). Also, de facto local re-collectivization of privatized forest has taken place in Jiangxi Province to ensure collective action after implementation of the reform (Luo et al., 2015; Liu and Ravenscroft, 2016). As many interviewed forest officials stated, the joint-holding is actually a form of communal forest management, but has been reported as privatized forest to ensure regions meet the national privatization goal. These officials also imply that including ecological forest as privatized forest also contributes to the meeting of the national requirement.

In sum, while statistics show privatization of collective forest has increased in many regions, there is a large difference between the area of forest that has actually been privatized and that which is being reported. Current state statistics includes jointly-held forests and collectively-held ecological forest, which has led to overestimates of the forest privatization. In addition, there has been an increase in collective actions and re-collectivization to retain communal forest management (Liu and Ravenscroft, 2016), which also makes the reported private forest much greater than the reality. Therefore, the reported increase in the private forest area is not at the absolute expense of a decrease in the collective forest. The national goal of privatization of the collective forest area has clearly led to large regional-level variations in implementation.

4.3 Illustrative case-studies

The case-studies were conducted in four selected villages in Yunnan Province. The community-level analysis was conducted in these villages to understand how different villages have responded to the forest tenure reform and the outcomes of the reform in term of the changes in forest holdings. At the local-level, the significance of forest tenure lies not only in the allocation of forest management responsibility but also in the allocation of economic benefits secured from that forest. For example, collectively-managed land can involve different forms of benefit sharing including greater and lesser forms of individualization. For this reason, we explored preferences for collective (vs. private forest management) by using non-structured interviews and the preferences concerning different forms of benefit distribution, in addition, by using structured questions. The latter preference was explored through the individual

household-level analysis. This focus on distribution preferences also provides us with further insights into the factors shaped the tenure reform in the case-study villages. Also, we intend to use both the community and individual household levels of analysis from the empirically-grounded case-studies as illustrators to show the local contexts and variations in the CFTR, with a particular focus on local dynamics and local preferences for tenure arrangements and senses of communality and individuality.

4.3.1 Community-level analysis

All four villages implemented the CFTR between 2007 and 2008, when, as per the policy, they were required to allocate collectively-held forests to individual households. However, there is still a large portion of village-level forest that remains collectively-owned forest. As Table 3 shows, over 75% of the village-level forest remains as collective holdings. Each village has responded to the CFTR differently to retain the collective holding, although the provincial government intended to achieve 95% privatization of the collective forest[11].

Table 3. Forest tenure and holders in the four case-study villages

Village	Form of tenure and holder	Area (ha)	%
Xinqi	Collective forest held by the Administrative Village	1650	60
	Shareholding forest held by the Natural Village	339	12
	Individual holdings	784	28
Baojia	Collective forest held by the Administrative Village	1371	83
	Individual holdings	280	17
Shiba	Collective forest held by the Administrative Village	5980.2	100
Manhong	Collective forest held by the Administrative Village	78.4	100

Source: data obtained in 2016 from Forest Departments in Baoshan, Xishuangbanna and Deqin.

In Xinqi, farmers have a long tradition of communal forest management, following their establishment of the first forest farm for collective management in the 1960s. Later, the collectively-managed forest farm was expanded to 15 forest farms, which now include more than 2000 ha of collective forest. The revenue from the collective forest contributes significantly to public infrastructure including for road construction and school buildings. After implementation of the forest tenure reform, Xinqi has retained three types of forest holdings, as shown in Table 3: 1) the collective forest owned by the Administrative Village, which accounts for about 60% of the total forest area, 2) Natural Village collective forest through a shareholding system that accounts for 12% of the total forest area, and 3) the individual forests held by private households that account for 28% of the total forest area. As the provincial government has aimed for a 95% privatization rate, the village head of Xinqi had to go the County Forest Department to

[11] The provincial government aimed for a higher percentage of privatization than the national goal to show their capability to the central government.

negotiate with the vice-director to give them an exception for keeping the large area of collective forest.

> "I used three arguments to persuade the director to approve our case. First, I said: "According to the policy, once two-thirds of the villagers approve the plan we have to follow this collective decision based on the Village Autonomy Law [Village Organic Law]. Second, collective management of the forest has greatly benefited the local economy and the village so that we do not require external money for road construction, school-building and so forth. We should keep this collective forest. Third, we have had bad experiences in the past with allocated forest being rapidly cleared. For its ecological function and economic reasons, we need to keep the collective forest." [Interviewed in Xinqi on 13 April, 2011]

In Baojia, following redistribution of forests during the 1980s, there was large-scale deforestation. Many farmers stated this was because the forest tenure reform in the 1980s did not provide a clear duration for the forest holding contracts. Many people were afraid the government would take back the forest, and this uncertainty caused many villagers to cut the trees for timber. The village head then asked to be able to re-collectivize their forest for communal management to avoid the deforestation and also to carry out collective reforestation efforts. Many years later, the forest is recovering well, and this has been supported by the communal management. In 2000, Baojia's forests were designated as a national park for developing ecotourism, as the forest grows in a volcanic area. Therefore, when the CFTR was carried out in Baojia, there was little redistribution of the forest, as there was a community desire to retain the traditional communal management to strengthen their bargaining power with the tourist company when seeking compensation. Also, the village communal management was seen to help the community better protect the forest. The perception of one farmer about the collective management approach is outlined below:

> "If we allocate the forest to individuals, the tourist company will come to deal with individuals one by one with a lower price. If the forest is collective forest, they have to deal with us as a whole. Any agreement has to get approval by over 2/3 of the villagers. So we have more power to negotiate with the company." [Interviewed in Baojia on 20 April 2014]

In Shiba, although the Lisu people own large areas of the forest, the forest has never been distributed to individual households since the founding of the People's Republic of China. Situated in Deqin County, Shiba used to be part of a major logging area, due to the region's high forest coverage and quality timber. Since 1998, the Natural Forest Protection Program (known as the 'logging ban') has been implemented to protect the

upper watershed of the Yangtze River. Along with implementation of the logging ban, the people's livelihoods have shifted from being timber-oriented to diversified strategies that include ecotourism and non-wood forest products. Now, the people of Shiba are particularly reliant on the commercial collection of Matsutake mushrooms, which often make up to 80% of the household's cash income. The mushroom resource is managed as common property that allows for the inclusive access for all village members. Given the significant proportion of income that the mushrooms provide for households, the villagers were not willing to allocate the forest to individual households, as the mushroom is unequally distributed throughout the forest. This was discussed by one villager:

> "we cannot allocate the forest to individual households. Otherwise, we will have conflict in mushroom collection, as the mushroom is traditionally collected in our communal forest. The allocation of forest to individual household will make somebody's forest had abundance of mushroom production, and others may have none. That will definitely cause conflict. So, the allocation cannot be practically carried out, as the agreement for forest allocation will be never made." [interviewed in Shiba on 1 May, 2015]

Manhong, a village of the Dai ethnic minority in Xishuangbanna Prefecture, is a small village with only 78.3 ha of forest. Despite this small area, the forest is of significant cultural importance to the villagers as it is considered a sacred forest in accordance with their religious customs. The sacred forest is therefore traditionally protected as a cultural landscape where only ritual activities can be carried out. Thus, the forest provides cultural services to the whole community and is collectively managed by the community members. The sacred forest is also located in an upper watershed, which means it provides important environmental services to the downstream Dai people who cultivate rice paddies in the valleys. Thus, the village prefers to keep the forest as a communally-managed resource to protect the cultural and environmental values of the small watershed, as described by one villager:

> "The Long Shan (the sacred forest) cannot be allocated. It is the forest where our ancestors and god live….. it belongs to the whole community, and cannot be distributed to households……..[this] forest is small area, but it is our watershed forest, it provide water supply. We are afraid the forest allocation will lead to forest degradation and water shortage." [Interviewed in Manhong on 20 January, 2016]

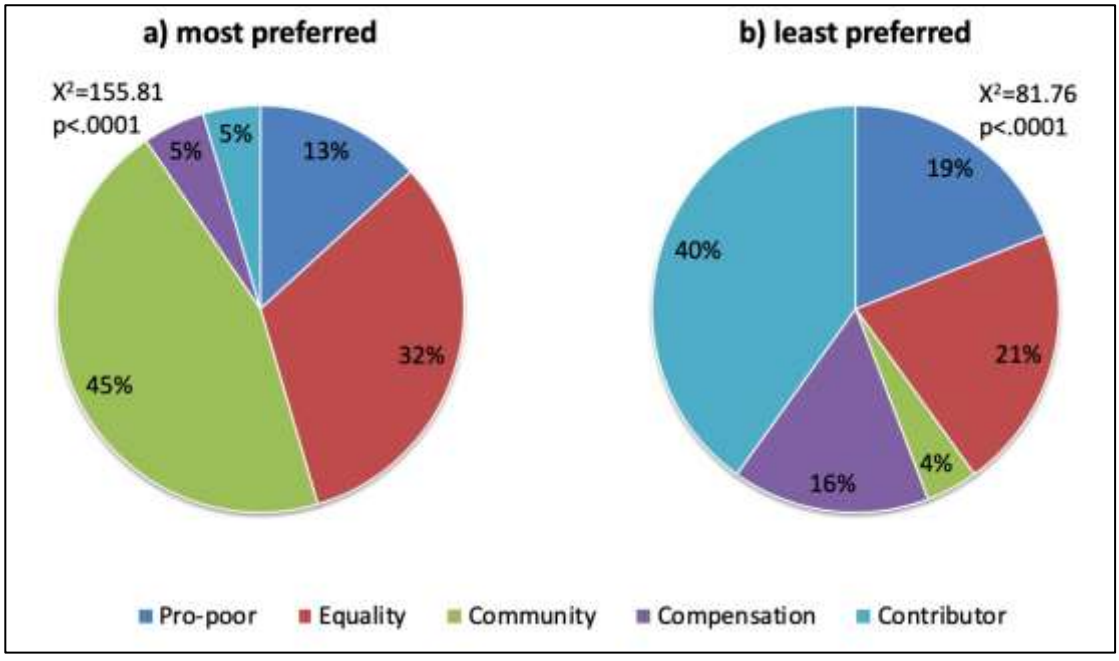
In sum, the different villages have different reasons for retaining significant proportions of the collective forest for communal management. At the community level, the revenues generated from the collective forests can make significant contributions to the village economy and be used for needed public infrastructure or other community-based investments, as evident in Xinqi. In Baojia, the village has retained the collective forest to

enhance their bargaining power when dealing with other stakeholders. In Shiba, the collectively-owned forest provides provisional services for the collection of non-wood forest products (particularly Matsutake mushrooms) that are an important basis of alternative livelihoods. This communal forest management approach also avoids potential community conflict due to the uneven distribution of mushrooms throughout the forest. In Manhong, the collective forest is of high importance for the local people for cultural reasons and to protect their watershed, meaning they believe the forest cannot be privatized. And in Manhong and Shiba in particular, it is ultimately the spatial indivisibility of benefits that makes privatization a poor fit with the community's needs. Thus, these community's ecological, economic and cultural considerations mean that forest privatization might not be an appropriate match with their needs.

4.3.2 Individual household-level of analysis

The national-level and regional-level analyses show a strong national push towards forest privatization that is being unevenly realized across the regions. The village-level cases reveal diverse reasons why some communities are resisting privatization. The resistance is dependent on particular place-based social and economic characteristics such as local histories of collective management, the presence of a valuable but unevenly distributed non-wood resource, or the present need to negotiate with a more powerful land-use stakeholder. In this section, to understand the underlying reasons behind the resistance to privatization at an individual household level, we examine farmer's perceptions within the villages by exploring their preferences for revenue allocation from collective forests. In particular, we are interested in whether respondents favor methods of distribution in line with the principles of individualization versus communalization.

Figure 3. Farmers' preferences for the allocation of forest benefits.



Source: village survey 2015-2016; note: n=242.

As Figure 3 (a) shows, the most popular preference for benefit distribution is to use the forest-based revenue for community purposes or public goods. This preference was noted by 45% of the 242 interviewees. The 'Equality' option was preferred by 32%, the 'Pro-poor' by 13%, and the 'Contributor' and 'Compensation' options were both preferred by 5% of the interviewees. The Chi-square testing among the group of most preferred benefit distribution options shows its significant level at $p<0.0001$ (Chi-square=155.81, df=4). Both the 'Contributor' and 'Compensation' options represent forms of individualization of benefits based on individual deservedness – the former based on reward for effort, the latter based on opportunity cost. Together, these preferences for individualization of benefit distribution amount to only 10% of preferences. On the other hand, Figure 3 (b) shows that most (40%) of the interviewees chose 'Contributor' as their least preferred option, while 16% chose 'Compensation'. The selection of 'Community' and 'Pro-poor' account for 4% and 19% respectively. The chi-square testing among the group of least preference shows its statistically significant level at $p<0.001$(Chi-square=81.76, df =4).

The results presented in Figure 3 show a strong desire by individual farmers for the communal principle rather than the individualization principle as the basis for forest-based revenue allocation. Farmers consider that communal forest management can contribute to the effectiveness and efficiency of forest management for improving forest quality as well as for community-based public goods. This was evident in a number of farmers' statements, like the ones presented below:

> "It is not a good idea to allocate many forest to individual. That will become a fragmentation of forest holding. Individual smallholders cannot manage the forest effectively and efficiently. So they cannot achieve economics of scale of management. Then, it would be high cost for us and our forest quality will get bad." [Interviewed in Xinqi on 10 Feb. 2012]

> "….we can only protect the forest collectively that we can have good environment [habitat] for mushroom grows, that will benefit all the communities." [interviewed in Shiba on 5 May, 2015]

Villagers also discussed the social justice dimension for communal forest management, which they consider privatization cannot meet:

> "We use those money [revenues from collective forest] as matching fund from national fund for infrastructure development, like road and water pipes in our village. I think this is more fair to get everybody

> have equal benefit from these money [from the collective forest]. We had very bad experiences when we have to collect money from each household for building the village road. Some villagers may contribute money, some villagers may not. That is really unfair, as the road is built for publics." [Interviewed in Baojia on 26 April, 2015]

> "we use those revenues (from the collective forest) as public fund for public goods. We build temples, clinic, school and roads by using revenues from the timber harvest [in the collective forest]. We also buy the health insurance to everybody by using those revenues. We think this is more fair, as everybody need walk on those road, send kids to school, go to clinic." [Interviewed in Xinqi on 2nd March, 2016]

In sum, farmers preference to retain collectively-owned forest for communal management for reasons of forest management effectiveness and efficiency and ensuring all the village members benefit from management of the forests. The communal management of forests was also chosen by the local people from a justice perspective, with the belief that privatization of forest management will not deliver this important outcome. The basis of the farmers' resistance to forest privatization and their preferences for local collective action includes the history of the community, the need to retain their barging power with other stakeholders, concerns about the potential for uneven distribution of resources and benefits, and community-based cultural beliefs and needs. As such, the principle of forest privatization has been rejected by individual farmers interviewed in this study.

5. Discussion and Conclusions

The Chinese government has made a substantial investment in improving its forest tenure system via a privatization approach to increase the allocation of individual holdings from the collectively-owned forest resource. While the government believes this reform can improve the local incentive for forest management through an equal distribution of the collective forest resource, the on-ground results appear very different to the government's intention. Differing from existing literature, this research provides thoughtful insights into China's CFTR by using a multi-level analysis of the reform. As the study has indicated, far less privatization of forest than what the government expected has actually occurred. The theoretical and empirical implications drawn from this research lie in four aspects.

First, this research reveals the gap between government intentions and local practices occurred when pre-existing local contexts were ignored in devolution reform of forest tenure systems. While there can be a willingness from state authorities to provide more rights to local people and communities, local contexts can shape the reform and lead to unexpected results that widely differ from the state's intentions. In

the case of China, the central government has considered privatization of forests to be the best approach for improving the country's forest tenure system and resource security. However, as this research shows (based on analyses of national-level and regional-level datasets), when the state pushed for large-scale privatization, only about 44% of their proposed allocation of collective forest to individuals was implemented[12]. Also, while there is much forest privatization recorded on paper, communal management remains common in practice (He and Sikor, 2017; Zinda and Zhang, 2018). Studies from elsewhere also show that when states push for tenure reforms, there can be a range of unexpected outcomes including communalization, conflict and forest degradation, particularly when states ignore pre-existing local contexts and apply a top-down implementation of policies (e.g. Lane, 2003; Guneau and Tozzi, 2008, Sikor et al., 2017; Robinson et al., 2014; Gebara, 2018). In China, where state policies are usually top-down implemented, there is a need for the government to better understand and respond to local needs and contexts.

Second, this research suggests that local preferences for tenure arrangements are very complicated and can greatly differ from simple privatization. In many cases, the local communities might want to retain their traditional communal (and complex) tenure system, instead of seeking private property rights (e.g. Haenn, 2006; Perramond, 2008; Cellarius, 2011). As shown in this research, local customary arrangements for commons interests, cultural needs, and emerging values of non-wood forest product collection and ecotourism development can form different and complicated tenure arrangements for communal use of forest resources. Individual considerations of communality are embedded within community needs and individual preferences. Thus, the state's understanding of egalitarian forest distribution via privatization may not match local preferences. In Xinqi, people believe communal forest use rather than privatization could better contribute to public goods through a fair distribution of forest benefits, while in Shiba, there is a desire to retain the communal forest holding system to enable the equal access to valuable mushrooms. These examples reflect complex local perspectives of equality in forest tenure reforms. In Baojia, the community wish to retain the communal forest to strengthen their bargaining power when they confront external powerful actors like tourism companies, while cultural services are a more important reason for Manhong village's desire to retain the traditional communal forest management system. Thus, as suggested in existing literature, improving the tenure arrangement cannot rely on titling programs alone. Of greater importance is incorporating local preferences by empowering local communities to play a role in the tenure reform decision-making (Robinson et al., 2018).

Third, this research has suggested that communal management of forest resources supports less conflict when there is emerging diversification of forest property rights,

[12] But there are also cases where the rate of privatization was larger than the case shown in this research, being in Fujian and Zhejiang provinces, where there is strong local preference for privatization, as noted by Qin et la. (2013), Liu et al. (2017) and Li et al. (2016).

because communal systems are more embedded in the local contexts and social-ecological systems. Globally, there is currently emerging diversification of forest property rights that goes beyond the rights to forestland and timber (Sikor et al., 2017). For example, the increasing value of non-wood forest products, monetary benefits being derived from environmental services, and cultural ecosystem services requiring the forest to be managed in a form of communal management (e.g. Yang et al., 2009; He et al. 2014; Mujawamariya and Burger, 2016). Forest titling programs for privatization may not fit those complexities. Communal forest management therefore would allow an inclusive and equal access to the forest and forest benefits, while privatization might lead to potential conflict in forest-dependent communities. In most forest tenure reforms, there is a separation of forestland and timber from other provisional, environmental and cultural services, which could be problematic. Instead, there is a need for a holistic understanding of the local social-ecological system in tenure arrangements to meet local complexities and adaptabilities in tenure reforms.

Finally, the specificities in the case of China drawn from this research call for discussion about the effectiveness, efficiency and justice from local conceptions of forest management. While dominant thinking from economists is that privatization of forests will lead to forest management cost-effectiveness and efficiencies, the individual-level analysis presented in this research suggests local perceptions can be different. Rather, the local perception of effectiveness and efficiency is locally- and culturally-embedded into variations of social-ecological conditions, which might include the consideration of forest fragmentation, uneven resource distribution, public goods and cultural needs. These perceptions formed the basis of a unique consideration of justice, which differs from the market economy perception of privatization. Research and policy are thus required to incorporate local perceptions and recognize the local differences in preferences for community-based forest management (Martin et al., 2017).

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