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A New Strategy for Managing China's Community Forests -Share Holding Integrated Forestry Tenures (SHIFT) System

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Abstract

The establishment of the Share Holding Integrated Forestry Tenures (or SHIFT) System in Sanming prefecture of Fujian province, People's Republic of China is a social forestry adoption and experiment as well as a strategy for managing community forestry in which villagers adjacent to a forest patch become forestry share holders and key players in management of the forestry resource under different tenureship. The SHIFT system has improved sustainability, productivity, equity, and flexibility in the changes caused by biophysical and human intervention, and encouraged a more democratic rural life, and more power of villagers' independent decision-making. It has also given a greater role to professional foresters and led to more diversified management. This study discusses the initial success of SHIFT and suggests the need to expand SHIFT and to compare it with the community forestry practices in other countries.

Keywords: community forestry management, forestry tenures, China

1. Introduction

China has a long forestry history. Over the thousands of years of Chinese history there has been a cycle of deforestation, mild recovery, and more severe deforestation (Liao 1987). Intensified promotion of afforestation occurred at the beginning of each dynasty; however, rampant cutting and misuse of forest resources were frequently found during conflicts among different political interest groups and dynasties.

Types of forestry management organization have changed many times since 1949. Policies oscillated between periods of sudden social change and intensified afforestation, and periods of more measured forest expansion in a relatively stable social environment. The Land Reform Law of 1950 called for the expropriation of the landlords. It essentially substantiated the system of private ownership by transferring property to the land-poor and landless, while at the same time

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confirming the rights of relatively well off middle class peasants. State ownership was mandated for large forests and other types of land for reasons of both strategic importance and management efficiency.

A central feature of forest management in China at mid-century was the mutual-aid team, which had risen to 51 percent of total villages in China by 1955. Generally, three to five households formed a mutual-aid team of a temporary type, and some ten to thirty households a team of a permanent nature. Farm land and tools continued to be owned by individual households, but labor was pooled and people worked together. After the Chinese countryside experienced a period of relative stability, collectivization proceeded quickly between late 1957 and early 1958 due to the installation of the People's Commune system (1958-1978). Maoist policies were designed to achieve accelerated and balanced development of both agriculture and industry on a foundation of heightened socialist political consciousness. Forest management and afforestation, like other sectors of society, were affected by the policy changes of what was to be known as the Great Leap Forward (1959-1961). The changes were abrupt, as shown by a comparison with the previous directives which were intended to further the consolidation of cooperatives by slowing down social change to enhance production.

Under the People's Commune system, higher villagers' participation in forestry production was observed (Ross 1980) because of the influence of mandatory administration and regulation. However, the efficiency of villagers' participation in forestry production was low (Song 1991). The liquidation of timber holdings, inadequate financing, and lowered morale demonstrated that a higher rate of participation did not necessarily lead to a higher rate of productivity.

The Cultural Revolution (1966-1978) resulted in a national disaster, severe lessening of afforestation throughout China and a weakening of forest management systems. Even the Ministry of Forestry was disrupted during the Cultural Revolution. State forestry farms and community forest regions suffered from overwhelming hardship until the fall of the Gang of Four in 1976. After Deng Xiao Ping took power in late 1978, the new leadership spoke of dramatically accelerated afforestation. The multi-year plans for afforestation released in 1979 called for essentially maintaining the current annual volume. The Forestry Law of 1979 placed strong emphasis on forest protection, which had in the past been in competition with afforestation.

The economic reforms introduced since 1978 have covered almost every sector of the economy. Chinese leaders recognized that there was something fundamentally wrong with the forestry system and institutions, which needed to be changed in order to encourage foresters' work incentives, improve forestry management and increase productivity. An agricultural contract system-- Household Tenure (HT) -- was introduced that gave forestry responsibility to individuals and rural cooperatives by early 1984. Twenty million hectares of barren hills had been offered to 50 million peasant households as allotments to set up small forestry farms and orchards. By late 1984, 4 million specialized rural households were engaged in forestry operations and 175,000 cooperative forestry farms throughout China managed some 17 million hectares (China Forestry Yearbook 1986-1991).

However, releasing community forests to individual households, resulted in mass illegal and premature cutting of over one million hectares of forests in south China, because of the lack of confidence in the policies related to the HT system (Liu & Lin, 1990). The seemingly high economic gain from the illegal cutting was at the sacrifice of sustainability.

During the years of 1983 and 1984, a completely new forestry system, SHIFT, was introduced to several villages in Sanming. In this system, locally elected village SHIFT boards participate in managing all aspects of forestry production. Villagers hold shares in the SHIFT system and, as with corporate dividends, receive a share of the net profits from their forestry activities. Villagers also work in the forests through a tenureship arrangement whereby they contract with the SHIFT board to plant, tend and harvest the trees.

The Chinese government observed the damage cause by HT in many forestry regions in the south, and after comparing it with the Sanming phenomenon, suspended the practice of HT in June, 1987. By this time, 71% of the southern community forests were tenured to individual households (Chinese Government Document No. 20 1987). Over much of southern China, as a consequence, forests are now managed by various systems of village and government collectives.

In late 1982, Mr. Wang Shan Yang, former Director of the Sanming Forestry Committee (SFC), which is the forestry professional bureau under Sanming prefecture government, learned of Shang Luo's forestry share holding test, he promptly suggested to the Committee that they test this new system in Long Ci, Huang Zhuang and two other villages. The Sanming Forestry Committee accepted his suggestion and sent professional foresters to these four villages to initiate the SHIFT in the Sanming area. This is the beginning of SHIFT system in Sanming.

The goal of this study was to explore how variation between certain broad policy approaches relate to observed variations in the social organization, acceptance, and general attitudes of the villagers and variations in forest productivity. Historically, a variety of traditional, feudal, capitalist, and socialist systems have been applied to the forests of south China. However, our interest is in three policies that have been tried in the region since 1958 -- a socialist commune system, a household capitalist system (HT), and the most recent middle ground approach of the SHIFT system. Diagnostic questions included: What led to the adoption of the SHIFT system? How did this system compare to the others in terms of forest productivity, sustainability, and equity? How do the villagers view the three systems? How does the changing role of professional foresters in the various systems affect the success of each system?

2. Materials and methods

2.1. Description of Southern China and Sanming

Southern China is primarily subtropical and temperate with a generally warm and mild climate and abundant rainfall. Fertile soils in many areas, along with the favorable climate, provide good conditions for fast plant growth. The region is dominated by hills, mountains, and plateaus which make up about 70% of the total

land area. Its climate, soil, and varied landscape make this a region of great plant and animal diversity.

The social condition of southern China, as shown in Map 1 with study site indicated, is one of rapid industrial development along the east coast region, and slower development in the interior. Although industrial growth has increased the number of people working in the non-agricultural sector, most people still work on the land. The poorest regions in southern China are those located in the mountains where there is little industry, and fertile, flat land is rare. Many of the mountainous areas have been extensively deforested and are now experiencing severe environmental consequences such as soil erosion, changing local climates, and a loss of useful plants and biomass.

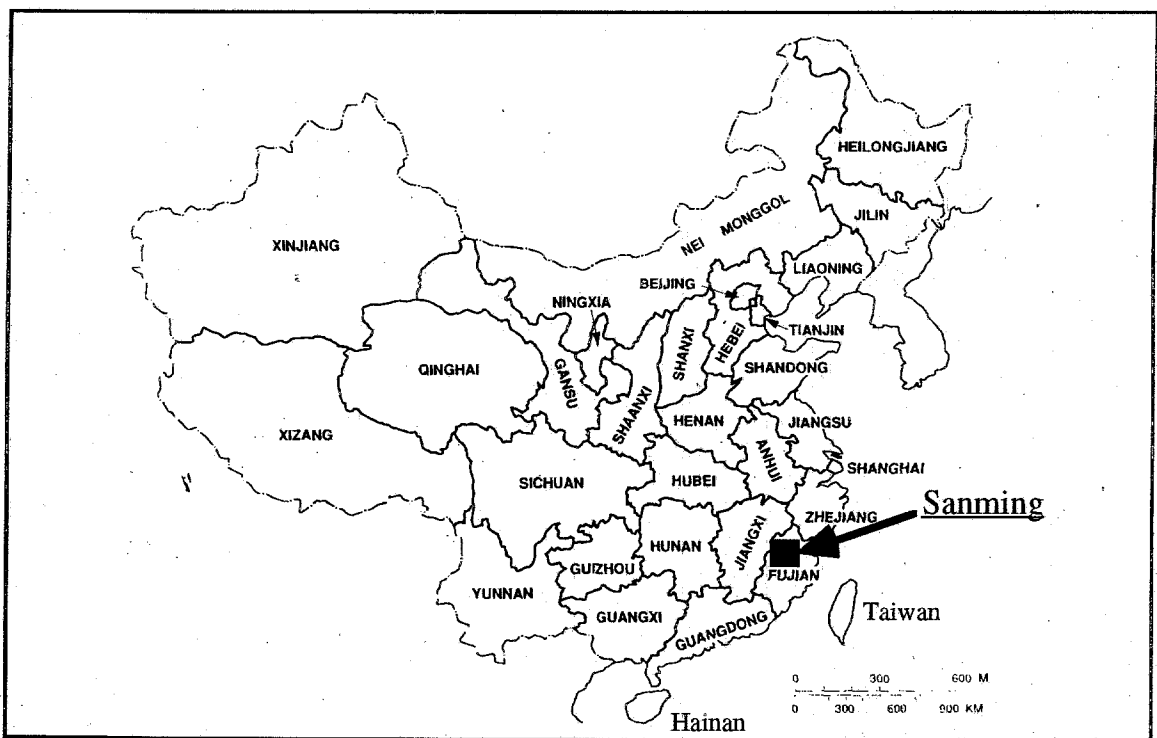


Figure 1. Map of China with Study Area Indicated

Source: The Map of People's Republic of China (1993).

There are over 300 prefectures within twelve provinces in south China. Sanming prefecture is the northwestern mountainous region of Fujian province. It has an area of 2.3 million hectares and a population of about 2.56 million. Nearly four-fifths of the land area is composed of hills and mountains, with 71% of the land covered by forest. The total forest stock in Sanming is 117 million cubic meters, or an average of 45.7 cubic meter per capita. Annual timber production is 2.5 million cubic meters or an average of 1.1 cubic meters per capita. The annual growth of forest is 7 million cubic meters at a growth rate of 9% (Sanming Forestry Statistics 1990). 81% of Sanming's forests belong to village communities. Sanming is representative of community-owned forest regions.

The diversity in population is a salient difference of the Sanming region, compared with other non-SHIFT regions in Fujian, such as Nanping. Over ten nationalities live in Sanming, including Han, Kejia and other minority populations. The diversity of populations and nationalities provided a mixed social and cultural background with a more open environment. This made it easier for the opinion leaders to introduce SHIFT to Sanming.

2.2. Selection of sample villages

The six forest villages studied were selected based on recommendations of local governments and on sampling methods. (McCormick and Francis 1958). The following features have been taken into consideration: Sanming region and non-Sanming region; SHIFT treated and non-SHIFT treated; recommended by the Sanming Forestry Committee and non-recommended; random sample and non-random sample; and pre-noticed study sites and unnoticed study sites.

Among the five villages selected in Sanming and one village in Nanping (out of targeted region), four were "treated," which means they had adopted the SHIFT system. The other two were non-treated, and served as controls in comparison with the first four. Local governments and forestry authorities recommended a dozen villages which had adopted the SHIFT system, but not all were selected. Two of the SHIFT villages, Long Ci and Huang Zhuang, were strongly recommended by the Sanming Forestry Committee. They were selected because intensified efforts to guide SHIFT practice had been made by many government researchers and professional foresters in these two villages. These two villages are well-known in China as key models, having attracted more than 26,000 visiting community social forestry managers in 1993. For a better understanding of SHIFT in Sanming, taking the prefecture government's recommendations into account, one SHIFT village, Chong Hou was randomly selected out of 28 recommended villages.

Another SHIFT village, Qing Yao, was randomly selected by the researchers of this study. To compare forestry villages in Sanming with those belonging to neighboring regions, Shang Yang in Nanping, a forestry region north of Sanming, was selected. Normally, a visit by a "foreigner" is prepared for in advance, a "planned," or "guided visit." However, special attention was given to this study to compare "planned" and "non-planned" visits, Qing Yao village in Sanming and Shang Yang village in Nanping were intentionally selected without previous notice. Figure 1 indicates the sampling source and selection of the case study villages

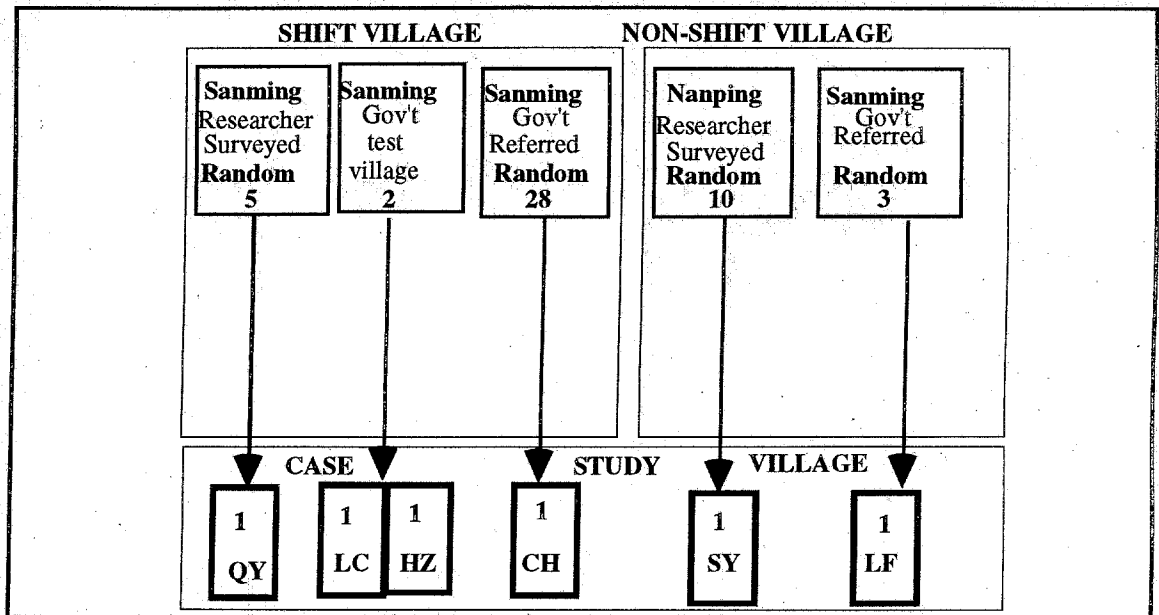


Figure 1. The Illustration of Study Village Selection
 Note: Number refers to amount of villages

2.3. Data collection

This study used the changes in forest land and in villagers' lives related to community forestry as major indicators for evaluating sustainability, productivity and equity. To test whether the assumption of a positive impact of SHIFT is valid or not, variables closely related to the three observational values, or criteria, were defined. The variable SIFA, the Sustained Increment of Forest Area, is established to represent the criterion of sustainability.

There are other variables selected in this study. SIFA is a designed dependent variable to represent the net forest biomass change upon which the factor of sustainability can be observed. Sustainability is also evaluated by AFBL (afforestable forest bare land), RFA (reforested forest area). The volume of stumpage and harvest was used to evaluate productivity. Income changes--both the average level (financial sense) and the gap between the rich and the poor (social sense) and statistical standard deviation of household income--were used to judge equity.

The data for the whole region are from 1980 to 1992, while those for most of the villages are from 1984 to 1992, after the SHIFT system had been established. Most of the data were obtained from village forestry documents and annual reports to the Sanming Forestry Committee. Other reliable documents available included the government's annual evaluation, tax report forms, forestry subsidy records, and records on welfare fund distribution. A variety of data collection techniques were adopted to assess different resources at the Ministry of Forestry, the Fujian Forestry Department and relevant counties of Sanming prefecture.

Reliability and validity of the observations were checked by a variety of data collection techniques. The variety of data and the "ground truthing" of documented

data were such that where there was consistent convergence between reported value and our observation. We felt the validity was reasonably confirmed. The openness of our approach, the checking of similar findings by others in the field, and the relatively easy-to-replicate techniques we used, gave us reasonable confidence as to the reliability of the data. Further, the diagnostic approach required comparison with other similar community forestry adoption approaches in other places and times as an external check.

2.4. Village interview

We interviewed a sample of seventy-four villagers in the six sample villages in the Sanming region. This sample represented about 6% of the client villagers in each community. Selection of the sample was designed to provide a representative sample of the client population.

Some political and social concepts and terms were given new meaning in this research interview to ensure that interviewees understood. A simplified concept of socialist distribution, for example, was adopted to explain what is meant about equity. The Chinese socialist distribution principle that "every laborer should do their best, their pay should be distributed based upon work, more pay for more work" is further interpreted to become one of the criteria of equity: "fairness in distribution, payment upon results of work". A similar approach was used to define sustainability and productivity in our interviews.

The preference of the adoption by those villagers who have experienced the option of various social forestry systems since 1949 became valuable during the seventy-four household interviews, and later the analysis of the information from these interviews. Villagers who had lived through those systems became a significant source of comparing SHIFT and various social forestry systems. Some forestry officials preferred "old" systems and ideas, but the view by the majority of villagers was more crucial. The responses to the innovation--SHIFT adaptation and SHIFT performance and the preference for other social forestry systems (to what degree foresters like or dislike it) were carefully investigated and collected. Based upon five degrees of satisfaction (excellent, very good, good, fair, and poor), this study produced the following results of "Foresters' responses to the adoption and treatment." The credits from each household response were added. Table 1 shows how "credits" were assigned to quantify opinions of those interviewed during this study.

Table 1. The Evaluation of Opinion Response

Degree	Excellent	V. Good	Good	Fair	Bad
Credit	5	4	3	2	1

3. Results

3.1. Structure of new organization

The SHIFT system, at the village level, is no longer a government agency, but an independent legal power. The rights to possess forestry holdings is dealt with at the first multi-management level (Ownership-Share Holding), while the right to manage a forest is mainly dealt with at the second multi-management level (Management-Forest Tenures).

Two types of forestry shares were first set: the basic share, or "old" share, was derived from the pre-existent collective forest, including both natural forest and plantations; "new" shares were issued in return for the investment of labor or other input. The basic share was privately owned, and could be inherited, or transferred, but could not be sold. However, the new share could be sold, transferred, or inherited. Share holding certificates for both old and new shares were issued to all members. Forests were contracted to individual households under different types of tenure arrangement.

The share holding regime establishes of a forest's assessed value and its equivalent forestry stock share. The forest is claimed by its beneficiaries in the form of holding stock shares. The share holding system is based upon the principal of "converting stumpage into forestry stock and share the forest by forestry stock rather than by the stumpage itself" (Zhang 1989). The eight basic elements of share holding are:

1. stumpage and forest land are converted into stock shares;
2. community residents are determined to be share holders;
3. SHIFT charter is approved by the Share Holder Assembly and Forestry Committee;
4. Share Holder Assembly elects SHIFT board of directors;
5. SHIFT board of directors manages daily activities and forest tenures;
6. SHIFT board of directors decides how shares and share dividends will be distributed to individual share holders;
7. SHIFT board of directors calls annual meetings to issue dividends and annual report to share holders;
8. SHIFT performance is periodically evaluated by officials and technicians from competent forestry committees.

Figure 2 is a SHIFT organizational chart. The government forestry bureaucracies in China are: Ministry of Forestry (central), Forestry Department (provincial), Forestry Committee (prefecture and county) and Forestry Station (township). Sanming Forestry Committee's supervision is applied through policies, and jurisdictional administration, providing technical advice and regulation to the community. Harvest schedules and cutting quotas are determined by township forestry stations. SFC manages 13 county forestry committees which have the comprehensive responsibility to manage forests and forestry activities.

The second component of SHIFT is forestry tenure arrangement to implement efficient management of forestry resources under the share holding system. The forests and forest land are assessed as different types of forest by professional foresters from SFC, township government officials, and local villagers. These

different types of forests are tenured to individual foresters who bid for tenure contract, making a best offer. The six different types of tenure arrangement were defined:

1. Output Guaranteed Forest Tenure (OFT)
2. Maintenance Guaranteed Forest Tenure (MFT)
3. Ecological Forest Tenure (EFT).
4. Profit Guaranteed Economic Forest Tenure (PFT).
5. Afforestation and Regeneration Forest Tenure (AFT).
6. Cutting Forestry Tenure (CFT).

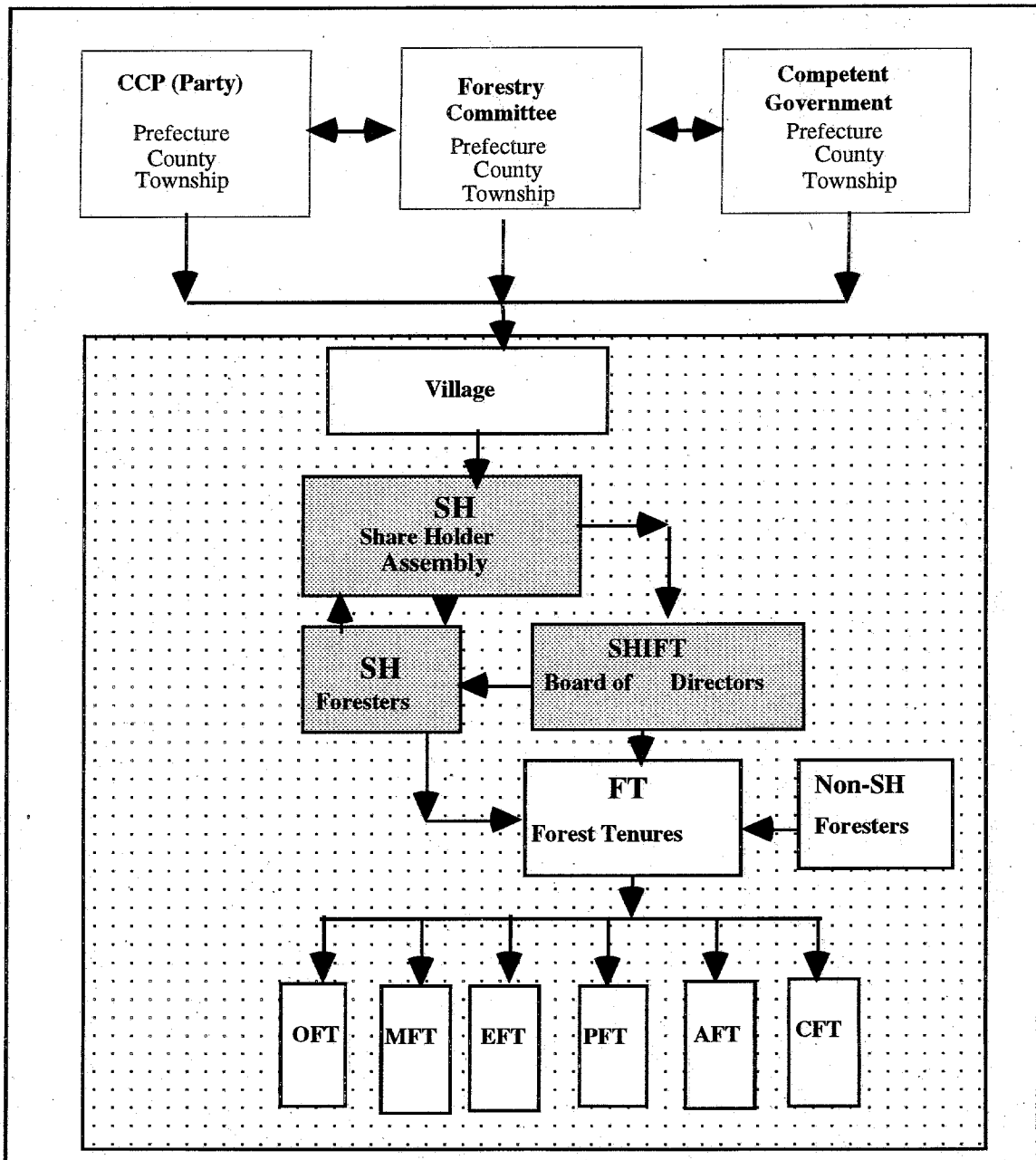


Figure 2 Organization of the SHIFT System

Table 2 provides a brief description of the rights, the duties, and the responsibilities of each tenure arrangement.

Table 2. Six Types of Forestry Tenure in Sanming

Types of Tenure	OFT	MFT	PFT	EFT	AFT	CFT
Concept of Tenure	mature wood volume guarantee at harvest	maintenance guarantee during whole tree growth	mature tree (fruits) products profit guarantee	maintenance guarantee during entire tree growth	quality and quantity of tree planting guarantee	quality and quantity of tree harvesting guarantee
Rights Applied to Tenants	wide range restricted rights over timber forests	limited rights of maintenance and protection	wide range of restricted rights over (economic) trees	limited rights of maintenance and protection	limited rights of afforestation and site preparation	limited rights of harvesting and log removal
Duties and Obligations of Tenants	wide range duties of maintenance and protection	restricted duties of tree maintenance	wide range duties of tree maintenance and protection	restricted duties of tree maintenance & protection	restricted duties on planting quality and quantity	restricted duties on harvesting quality and quantity
Term of Tenure	15-25 years matching the tree rotation age	3-5 years	10-15 years	3-5 years	6 months to 1 year	6 months to 1 year
Total (%) of Tenures	25-32	25-30	10-15	12-15	8-12	7-10
Forests	Premature timber forests	mature timber forests	economic forests (fruit-trees)	ecological forests (watershed forests)	timber, ecological and economic forests planting	timber, ecological and economic forests harvesting

The tenants are either households or individuals. The right of forestry ownership is represented by the Share Holder Assembly and SHIFT board of directors. The right to manage the forests is separated from the right of ownership and is carried out by the tenants. The SHIFT board of directors becomes a financially independent entity, bearing both possible loss and gain. In Sanming, SHIFT is called "two legs walking": one is the socialist, or public ownership leg, and the other is the capitalist or private ownership leg.

3.2. Consequence of organizational change-improved sustainability

The changes observed by this research provide insight into the status of Sanming's forests in the 1980s. Two indicators suggest general improvement of sustainability in Sanming: an increase of forest area and a decrease in bare land

suitable for forestry under SHIFT. Figure 3 shows the changes in area of bare land suitable for forestry in Sanming during the 1980s. State data and field observation all suggest that there has been no afforestable bare land left since 1990 except for those recently harvested areas to be replanted. At the current level, the annual area of silviculture treatments includes nursery stands (140,000 hectares), thinning (66,660 hectares), and mature forests (53,330 hectares). The quality of afforestation and regeneration has improved greatly along with a transition from extensive management to intensive management.

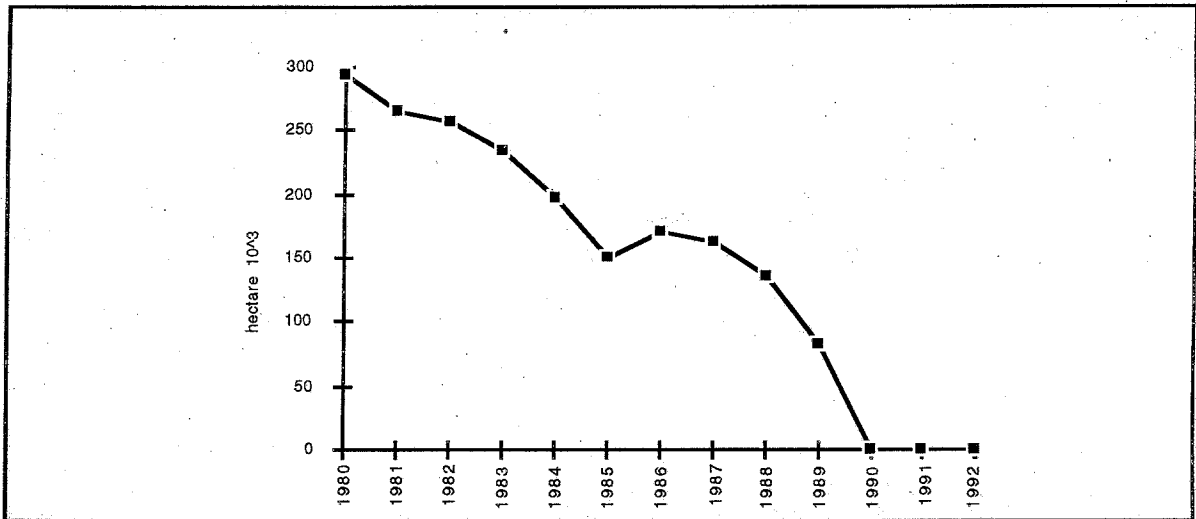


Figure 3. Decline of Afforestable Bare Land in Sanming
Source: Sanming Forestry Statistics (1980-1992)

The change in Sanming forest land based on data from the provincial and prefecture forestry sources and this study, indicate a "Saddle-shaped cumulative curve", on which three significant increments, and two decrements of changes in forest areas were observed from 1980 to 1992 (Figure 4). This "Saddle Curve" shows a drastic decrease of forest area between the years of 1981 -1983. This was coincident with the short period of the household capitalist system in Sanming. It was found that Sanming social foresters resisted this system so that its damage was minimized to only about 5% compared with much more serious disasters in south China as a whole. The loss in 12 southern provinces was confirmed to be 35% of premature forests, which was over one million hectares. This demonstrated that the household capitalist system, although high on gain of income from cutting premature forests--was low on sustainability.

Two periods of forest decrease were observed in our study, while only one significant decrease was observed in the data claimed from official sources. However, both curves show two periods of improvement after the adoption of SHIFT in 1983. The first improvement was observed coincident with establishing SHIFT (1982-1983). While, the second improvement was coincident with abolishing the short-lived free timber market and the SHIFT reassessment and adjustment (1987-1988).

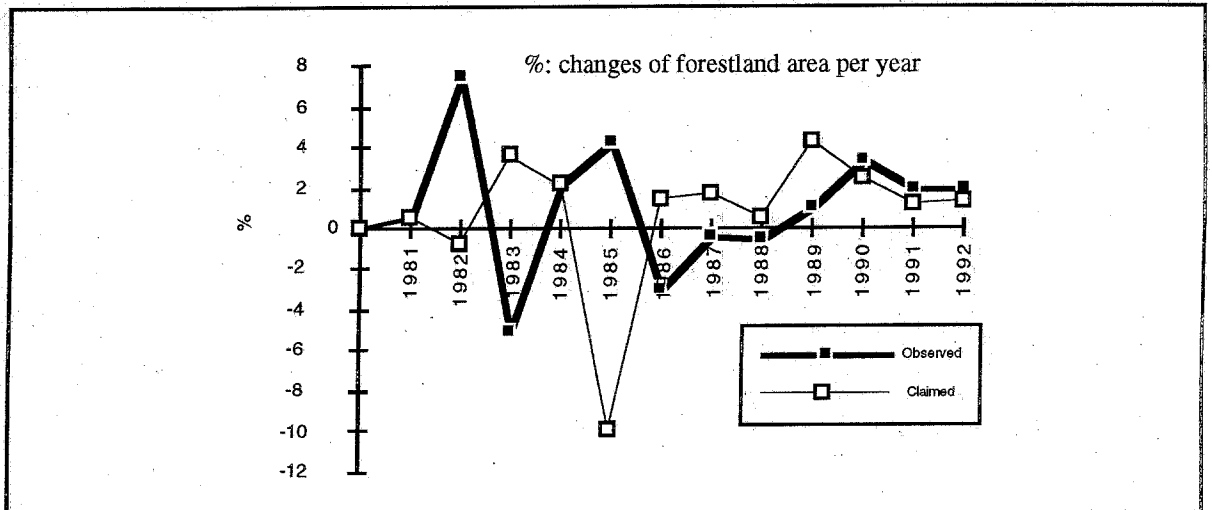


Figure 4. Annual Percentage Changes in Forest Land Area (ha) in Sanming
 Source: Observed data verified through field research and claimed data collected from Sanming forestry Data (SFC)

We looked into the different contributors to forestry regeneration and afforestation—the state tree farm, the SHIFT villages and other forestry communities, and individual forestry households. We found that the SHIFT villages have been the main contributors to afforestation. The SHIFT households actively participated in afforestation soon after SHIFT installation in 1983 and became the leading contributors to afforestation, accounting for 71% of the total afforestation during this period. The afforestation done by Non-SHIFT households is second, at about 17% of the total. Contributions from state tree farms is relatively minor at only about 12% of the total.

3.3. Consequence of organizational change for improved Productivity

Since they were freed in 1983 from the centralized forest system based on state and commune ownership, villagers have been working on the forests in which they hold tenure rights for long-term investments. Labor productivity has markedly increased. In Long Ci village, for example, labor productivity was higher in 1991 than 1971, when this village was under the commune system, according to household investigations performed during this research. From 1969 to 1974, there were 22 villagers from 15 families assigned to maintain 1,243 hectares of watershed forests in Long Ci, an average of 56 hectares per villager. In 1991 the same amount of watershed forests, now called environmental forests, were tenured to 6 villagers from 4 families under the EFT contracts. Long Ci villagers told the researchers that the amount of work for planting trees and harvesting, which required 4 or 5 workers during the commune era, now can be easily assigned to one SHIFT villager. Increased productivity in many aspects of forestry work such as planting, cutting, road maintenance and stumpage site maintenance was reported by the villagers interviewed from other study villages. The increased efficiency has caused a problem in the community: the labor force needed in Sanming forestry has dropped

from over 70% of the total labor force in the villages (1983) to less than 50% (1991). In some villages, such as Long Ci and Huang Zhuang, the rate has dropped to less than 40%.

Increased productivity has resulted in increased profitability. In 1989, the gross income of 1,347 SHIFT boards in Sanming was 196 million RMB Yuan, of which 69.36 million RMB Yuan* was net income. This was a 76% increase compared with that of 1987 and it is quadruple that of 1984. There are 770 SHIFT boards with an annual gross income above 100,000 RMB Yuan and twenty-six SHIFT boards with income above 1 million RMB Yuan. The total dividends distributed from the SHIFT system increased by an average of 46% from 1984 to 1990. These figures suggest that SHIFT has brought about substantial changes in forestry productivity in Sanming since the early 1980s.

3.4. Consequence of organizational change for improved equity

The basic, or "old" shares of stock were held by eligible villagers with equal shares and equal profits. Although the timber price changes have had an impact, the SHIFT dividend per share holder has increased. Figure 5 shows such changes in two SHIFT villages: Huang Zhuang and Long Ci.

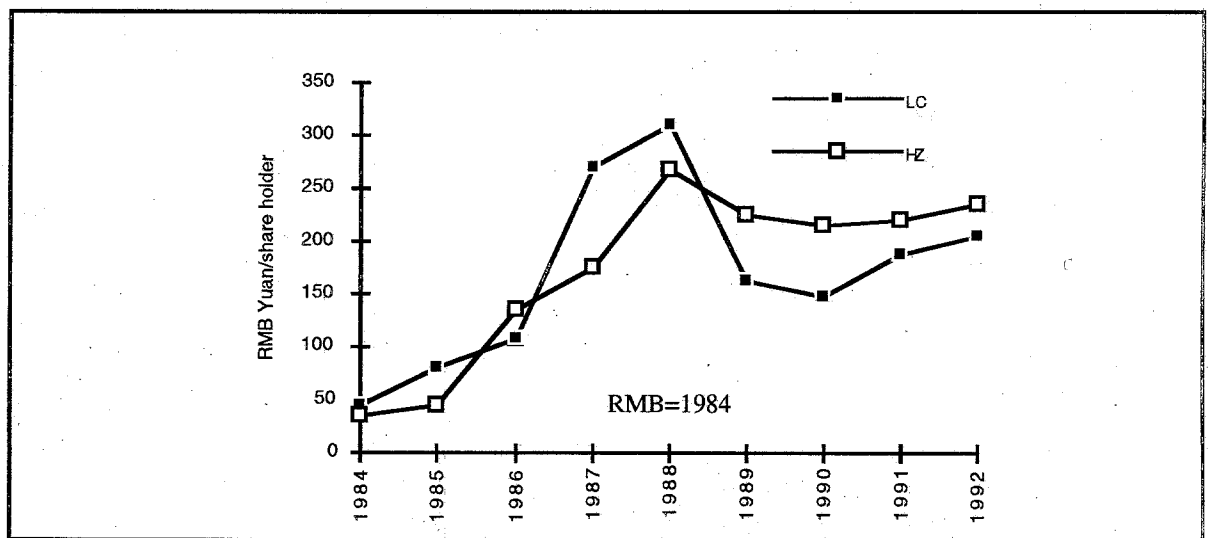


Figure 5. SH Dividend in Long Ci (LC) & Huang Zhuang (HZ) Villages
Source: SHIFT Data in Long Ci and Huang Zhuang villages

The basic, or "old" shares were equally distributed to eligible individuals. Forestry incomes of 12 household studied at Long Ci village show that from 1984 to 1993:

*RMB is the only Chinese money which has a average exchange rate of 1:8 with US dollars.

1. the forestry-oriented income has generally increased (1984-1992) under SHIFT organizational change;
2. the "gap" of forestry-oriented income (1984-1992) between the rich and the poor has narrowed, which is statistically indicated by the reduced difference between the maximum and minimum household income and also decreased standard deviation.

3.5. Villagers' satisfaction

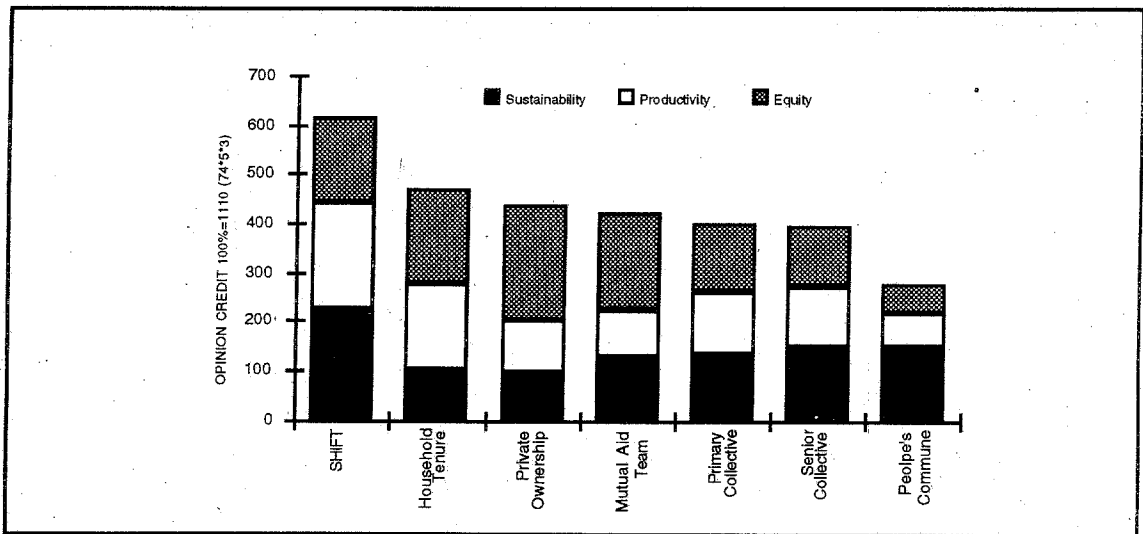


Figure 6. Villagers Preference to SHIFT and Other Systems in Sanming
Source: Results of Interview Schedules (1991).

The results of the villagers' opinion survey also indicate that they had higher rates of preference for the reforms launched since 1978, symbolized by household tenures and later SHIFT. The results also indicate that the villagers rejected the process of tightening control over rural forestry since the founding of the People's Republic. This process started with the relatively open, but short-lived private ownership program (1949-1952) and ended with the failed People's Commune (1958-1978). It reflected consecutive adoptions of new rural systems which were more and more rigidly controlled by increased political pressure under Mao's socialist rural policy.

4. Discussion

4.1. What changes occurred after SHIFT was adopted in Sanming?

A complex of factors had an impact on forestry in Sanming and caused the fluctuations. These factors include institutional (adopting HT or SHIFT), legal

(opening a free timber market), public administration (abolishing regulations and rural systems), economic (changing timber price) factors, and even biophysical changes. The most substantial contribution is organizational. Through all these fluctuations, SHIFT demonstrated its flexibility and ability to meet the challenges and make proper adjustments to minimize the losses in Sanming, compared with other forestry regions in south China.

The primary finding of the adoption of SHIFT is that it is a process of adopting an innovation. In south China, the forestry authorities were reluctant to allocate forest land to villagers for over three decades before the installation of SHIFT in early 1983 (Zhang 1984). SHIFT has since been efficient in utilizing natural and human resources. The SHIFT system was adopted in 1,347 of 1,768 villages (76%) in Sanming by the end of 1992. From 1983 to 1992, SHIFT increased the per capita forestry income by 129% and afforested a total of 475,000 hectares of forests or bare land suitable for forests. The forestry survival rate increased from 45% (1983) to 95% (1992).

The majority of villagers' dependence on forests is a primary condition for the adoption of SHIFT. Forestland consists of 81% of Sanming's total land area; 1.9 million out of its total population of 2.56 million and over 50% of the state revenue depends upon forestry resources. At the village level, among those SHIFT villages surveyed, villager households are likely to continue to rely heavily on forests in meeting their needs for firewood, fodder and nonfood biomass. Given the high concentration of the population that depends on forestry, the role of community forests as the main source is increasing. A booming economy, a growing population and migrants pose an increasing threat to the efficiency and quality of forestland unless some drastic reforms are taken immediately.

The SHIFT development can be undertaken on three fronts. First, forestry and community development efforts will have to be effective in order to raise the sustainability, efficiency and productivity so that the trend of expanding demand upon forests can be adapted to by combining the physical and biological constraints of the forestry resources with the varying objectives that villagers have as they pursue forestry activities, such as nonfood biomass production, watershed protection, and horticultural activities such as fruit trees. Second, a situation-specific package and strategy are needed for the different patterns of ownership and utilization of land and forest resources. Special attention should be paid to understanding the SHIFT background of villages: their history, social structure, economy and political conditions which will help understanding of the conditions and constraints affecting the adoption of SHIFT. Third, those villages where "minor" forestry product activities are more important will require a modified package of SHIFT or other types of social forestry management, such as a village cooperative farm. SHIFT should be adopted only after local social activities are acknowledged. SHIFT cannot and should not provide a "universal" pattern of organization for all situations. A specific case by case study is recommended.

4.2. *Has SHIFT improved equity?*

The analysis suggests there have been improvements in sustainability and productivity; however, it is not as clear that SHIFT has meant greater equity. Local villagers' evaluation of these criteria under SHIFT became an important part of the test of this research.

Of the three values, equity is the most controversial because of the difference between "equitable", or "fairness" as defined in this research and the concept involved during four decades' socialist practice of "socialist egalitarianism", or as the local villagers said, "equal" distribution of benefits. The primary concern of the SHIFT equity in this research is internal equity, to make sure that SHIFT and its regulations lead to each villager having equal chances and rewards for the same level of effort no matter who they are. Or, those who carry the burden of production share, at a commensurate rate, its benefits.

Another concern is how equal opportunities and rewards are shared among the various institutions related to SHIFT: village CCP divisions, village municipalities, and government agencies at the township level and above. This research also demarcates SHIFT equity into financial equity (rewards to share holders and tenants), social equity (how the poor became richer and how the income gap between the poor and the rich was reasonably narrowed), and political equity (rights to participate in management and share holder activities).

Any rural innovation will not be successful without sufficient support from the villagers who are directly affected by it. A fair distribution of forestry profits and opportunities to the villagers (equity) demands both the endurable utilization of forestry resources in a continuous period of time (sustainability) and the efficient employment of available natural and human resources at maximum levels (productivity). Any single one of the three defined criteria cannot solve the broad problem that SHIFT faces. The relatively moderate response to the equity system under SHIFT reminds us that both potential benefits, and challenges exist in developing SHIFT theory and practice. In summary, SHIFT, an innovation of social forestry organization, has presented a unique process, by which new ideas and events are adopted and developed. Other possible side-effects of the SHIFT innovations seem to be increases in:

1. rural democracy and villager participation
2. professionalization and effective training of foresters
3. diversified management and opinion leadership of village resources
4. market orientation and forestry investment activities.

The "extreme egalitarianism," a prevailingly dominant theory in China since the founding of the People's Republic of China, appealed strongly to poor people. It was hard for villagers to distinguish between "egalitarianism" and "equity". Equity does not mean equal distribution of profits; rather, equity is concerned with how production is distributed in a fair pattern so that those who bear the burden of production have a representative share of its benefits. Some of the complaints related to equity were motivated by the influence of "extreme egalitarianism". In an interview, Yang, a former commune leader in Long Ci village, recalled the days when Mao was in power:

In his day, even though living standards were very low, everyone was equal in rights. Today the country is more developed and the living standard higher, but there is also a big difference between those who have money and those who do not. (personal interview with Yang)

Yang was only one of those who complained during the interview about a large range of issues from the decreased share of benefits for regeneration to the increase of dividends.

Practically, equity has improved under the SHIFT system. SHIFT, as a social forestry system, provides sufficient institutional, and regulatory guarantees such that both share holders and tenants have a fair chance to be rewarded by the same level of effort and contribution to "ensure that people's basic needs are met" (Miller et al. 1994). Driven by China's reform policy of "allowing part of the peasants to become rich first to motivate the others," some previously poor foresters who had more family labor and were hard-working became "rich foresters." Some previously rich foresters such as the commune village officials, for various reasons, fell to average. Overall, forestry income has been steadily increasing among all those interviewed.

Of the three criteria evaluated, equity was also the least easy to measure. SHIFT equity encompasses the share holders and the tenants, the financial sense, the liberal social sense, and even the political sense. As far as the expanded scope of equity is concerned, internal equity deals with concerns within SHIFT, while external equity is concerned with all facts and organizations concerned, such as village community and social organizations, government agencies, and the Communist Party branches. The benefits from timber sales were not commensurate with the burden shared by the SHIFT board. Many other benefits were shouldered by SHIFT but benefited the society. For example, the watershed forests managed by SHIFT but provided the non-cash value to the society for the benefit of flood control, clear water and clear air supply. Some improvements in equity were made under SHIFT; while many issues concerned with equity are still unsolved.

4.3. Why SHIFT was first adopted in Sanming'?

The obvious reasons that the SHIFT was adopted in Sanming is that geography and forestry supply and traditional tenure characteristics were all match each other for the SHIFT adoption. Besides, there are several other reasons. Local leadership was one factor. SHIFT was invented in Shannxi province in central China in the late 1970s, although it was not developed in that region. News of the SHIFT invention was brought to Sanming by the mass media. It immediately caught the attention of opinion leaders. They were aware that the potential of this innovation dovetailed with their own motives to change the Sanming forests. Among these opinion leaders, the Sanming Forestry Committee, the regional forestry professional bureaucracy under Sanming government, and professional foresters played progressive and creative roles in SHIFT adoption. This environment made it easier

for SHIFT to be understood, accepted, and tried initially with only a few forestry villages before its full installation.

Economic history is another factor. Sanming is a poorer, more mountainous region than the other five prefectures in Fujian province. Sanming residents have had to work harder to survive and make a living. However, many residents have migrated from this region to other countries in the past century. People in Sanming were historically filled with a desire to survive and succeed. They were used to seizing opportunity--from rafting across the ocean in search of a better life to joining Mao's Red Army guerrilla force to overthrow "the rich and the capitalists". They were driven to become rich, and the influence of entrepreneurial dedication by overseas Sanmingers who had left before, and the opportunities provided by Deng's reform, and an open policy, may all have contributed to SHIFT adoption.

Finally, favorable political attention has been given to Sanming since the founding of the People's Republic. Sanming was one of the birthplaces of the Chinese Communist Red Army. Mao Zedong had fought and survived in this region. He created the First Chinese Red Army in Ninghua County of Sanming, which contains two villages that were part of this study. This Army later became a leading branch of China's military force. Many Red Army veterans still remember Sanming with deep emotion (Zhang 1988).

There are some other reasons, such as well-established grass-roots professional forestry training before and after the Communists took power; the successful social forestry experiments in the early People's Republic; the private ownership practice after 1949; and the mutual aid team and other types of collectives developed by local professional foresters. The relatively favorable biological conditions and rich forestry resources also contributed to the adoption. Beijing approved adopting SHIFT in Sanming and designated this region as China's first community forestry reform zone in April, 1988.

The general condition of Sanming's SHIFT adoption are: 1) High concentration of village and villager dependence on forestry; 2) Traditional small-scale, low energy, low capital, and minimal technology of community forestry; 3) Needs of reform--higher efficiency and quality of forest production--caused by economic boom and population migration pressure.

This study also detected the unique condition of Sanming's SHIFT adoption: 1) Villagers' cultural, social, and political factors such as historically formed entrepreneurial spirits and political favor; 2) Mao's Red Army birthplace; 3) Diversity of population, leadership, and management; and especially the soundly grounded professional training; 4) Qualified, energetic opinion leaders of innovation such as the respected SHIFT initiator Zhang Shou Biao and his colleagues in the Sanming Forestry Committee.

All these together provided the necessary factors and conditions for SHIFT adoption in Sanming. In addition, a strong incentive--such as an increase of share dividends and awards for high efficiency and quality of forestry work--combined with necessary mandatory regulations--such as cutting norm and stipulations, forestry criminal law and enforced forestry police force--applied in adoption, resulted in a smoother and more effective process of adoption compared with other previously installed socialist and capitalist systems.

Two non-SHIFT villages were selected in this research. In Li Fang village, for example, forestry is a minor profession. Most of Li Fang's village income (about 75%) comes from mining products and the majority of village residents (over 50%) are employed by heavy spar mining industry. Shang Yang village, another non-SHIFT village comparatively selected from another region, has its major income from agriculture and tourism. There was little need and motivation among the villages to adopt SHIFT. Therefore, dependence upon forest products and a tradition of such dependence seems to be a necessary condition in the readiness to adopt a SHIFT system. Some questions still remained unsolved, such as the adaptability of SHIFT to other forestry regions and professions in South China and the constraints of adopting the SHIFT system in each individual case.

The results of the adoption of SHIFT indicate the balance between human ecology and community forestry. SHIFT increases flexibility due to a constant review by the SHIFT assembly and board of directors, which minimizes and adjusts to the fluctuations caused by social and political changes, that could respond to factors such as the mandatory installation of household tenure (1980-1982) and, even after the SHIFT installation, the opening of rural free markets for timber (1985-1987) as well as the drastic changes in timber prices (1987-1989) ordered by government authorities.

4.4 What questions remain to follow SHIFT development?

A greater understanding of the conditions and constraints of the application of SHIFT should be addressed in future research to identify any local problems. In addition, a comparative study on the features of SHIFT villages and forested villages that did not adopt SHIFT, or non-SHIFT villages, should be made. An on-going monitoring to track the adoption of SHIFT, especially when encountering political and economic contradictions is necessary. General questions recommended for future research include:

1. What are the other biophysical and socio-economic conditions that affect the adoption of SHIFT?
2. What are the initial variables affecting the adoption of SHIFT for northern China's state tree farms?
3. What are the initial variables affecting the adoption of SHIFT in other countries with different political and/or economic systems?
4. How transferable are the SHIFT methods to other natural resource activities, e.g. agriculture?

In addition to these questions, studies are needed to compare SHIFT and the community forestry cases in other countries, such as Taungya (Thailand), the Village Forestry Association (South Korea), the Cooperative Tree Farm (Mongolia and North Korea), BRAC (Bangladesh), and Perum Perhutani (Indonesia). This cross-cultural comparative study will develop current SHIFT studies as well as experiments in community forestry around the world.

5. Conclusion

Share Holding Integrated Forestry Tenures, or SHIFT, is an innovation of organizational strategy for managing community forests in Sanming prefecture of Fujian province, People's Republic of China. SHIFT is based on a system of benefit sharing and tenureship that provides both management responsibility and economic incentive to local villagers. SHIFT improved sustainability, productivity, equity, and flexibility to changes caused by biophysical and human intervention, and encouraged a more democratic rural life, more power of independent decision-making, and given a greater role to professional foresters and a more diversified and open rural management.

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