

AN ABSTRACT OF THE THESIS OF

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Abstract approved:

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State-owned forestland in P.R. China has long been an important source of natural resources for communities. The Chinese government has undertaken several conservation initiatives with the intent to restore degraded landscapes and conserve biodiversity, while simultaneously improving the quality of life for rural people. Using Yaze Village, Pingwu County, Sichuan province, China as a study site, this study used qualitative methods to understand relationships between changes in land tenure, conservation policy, and community well-being. The following are key research findings: 1) Conservation policies have not fully recognized *de facto* land tenure patterns or objectives, resulting in frequent conflicts between *de jure* and *de facto* land tenure systems. 2) Diminishing religious belief among villagers has contributed to the deforestation of local holy mountains. 3) National political and social trends have disrupted traditional methods of conservation but have also shifted the objectives of *de jure* tenure from narrow, short-term timber extraction to broader, long-term ecological functions of forests. 4) Although the ban on commercial logging is well enforced, lack of enforcement or selective enforcement of other rules concerning mountain closures hampers conservation. The long-term economic well-being of the local villagers is woven into the *de jure* and *de facto* land tenure systems. Instilling certainty in both

systems and setting up clearly-defined legal boundaries around both systems could help reduce tenure insecurity and short-term resource exploitation.

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Land Tenure Change under Recent Conservation Policies in China
A Case Study in Sichuan Province, P.R. China

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Ke Du, AUTHOR

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**LAND TENURE CHANGE UNDER RECENT CONSERVATION POLICIES
IN CHINA
A CASE STUDY IN SICHUAN PROVINCE, P.R. CHINA**

1 INTRODUCTION

Standing on the west-facing slope of the Ri Wa Da Wa mountain of Yaze village, the ragged land of the Yaze village unfolds: A meandering river cuts through the valley. Tidy clusters of outbuildings with shining satellite dishes perch by the riversides on the broad, gently sloping land. Clearly delineated agricultural lands are located at the bottom with irregular-shaped clearings above. Increasingly dense clumps of vegetation miraculously cover the higher elevations of the mountain ridge. Although the landscape is picturesque in Yaze village, drive upstream to the nearby Wanglang Reserve, and a disparate landscape will be seen. The slopes in Wanglang Reserve are covered by thick deciduous forest at lower elevations and towering coniferous forest at higher altitudes except on imposing rock faces at the highest elevations. A half-century of logging in Yaze village creates the distinct differences between the landscape of Yaze village and Wanglang Reserve.

The mountains surrounding Yaze village were claimed as state-owned forest area in the early 1950s. Presently, a large proportion of the mountainous areas adjacent to villagers' settlements is still owned by the state. The condition of the state-owned forest areas and the impact of policies, in general, have received little attention and publicity (Richardson 1990). Despite extensive literature on national impacts of recent forestry policies (State Forestry Administration 2000; Zhang et al. 2000), the local residents who live in the state-owned forest areas have received little attention. The well-being of local communities involves economic, social, and environmental components (Bliss et al. 1998). For the purpose of our research, we

examined only one component of the well-being of the local community: the ability to access natural resources. This case study in Yaze village, Baima region, Sichuan Province, P.R. China presents a finer resolution with detailed accounts of the historical as well as current socio-economic dynamics that are intricately related to conservation and rural well being in a specific locale in P.R. China. This research examines the complexity of the history of natural resource utilization and the on-going implementation of recent conservation initiatives in Yaze village, Pingwu County, Sichuan province.

1.1 Goal and objectives

The goal of this study is to understand the relationship between changes in land tenure, conservation policy, and community well-being in Yaze village, Pingwu County, Sichuan province, China. The results of this case study can not be simply generalized to other parts of China. However, by providing thick description stakeholders who are dealing with similar issues can decide whether the information from this case study is transferable (Lincoln, 1985). Three objectives underlie this goal:

Objective 1. Describe the historical and current land tenure and natural resource utilization patterns in a selected area of rural Sichuan Province.

Related questions:

- To what extent are villagers dependent upon local forest resources for their livelihood?
- How did local people, especially the poor, women, minority groups and the collective utilize local forest resources historically?
- How do they utilize local forest resources now?
- What conflicts attend designation of limited access areas?

Objective 2. Describe land tenure and conservation policies which influence local access to, and use of, forest and related resources.

Related questions:

- What land tenure and conservation policies are being implemented locally?
- How are the policies implemented and administered?
- How does local government perceive the geographic boundaries of local limited access areas?

Objective 3. Identify local peoples' attitudes and behaviors regarding land tenure changes and conservation policies.

Related questions:

- Has the demand for fuel wood, construction material, fodder, and other forest resources changed among local residents of different socio-economic status?
- Where do local people obtain fuel wood, construction material, fodder, and related resources?
- What are local peoples' attitudes toward land tenure changes and conservation policies?
- What are local peoples' perceptions of the geographic boundaries of limited access areas?

1.2 Rationale

Deforestation in Yaze village, Baima region resulted from a set of complex socio-economic and political factors. The goal of this study is to provide thick description about the relationship between changes in land tenure, conservation policy, and community well-being in Yaze village, Pingwu County, Sichuan province, P. R. China. This study provides information about forests and

communities at the local level to gauge the local implementation and enforcement efforts of three conservation initiatives: the establishment of Wanglang Natural Reserve, the Natural Forest Protection Project and the Green-for-Grain Project.

Very little detailed information exists on factors related to deforestation in natural resource dependent communities in P. R. China. Information related to deforestation is usually scattered and inadequate. In addition, little is known about the socio-economic and political components that contribute to deforestation in natural resource dependent communities in P. R. China. This case study of land tenure change and recent conservation initiatives in the Baima community of Pingwu County helps clarify the major driving forces that extract local forest resources and the missing links between changes in land tenure, conservation policies, and community well being in Sichuan province, P. R. China.

2 LITERATURE REVIEW

This research borrowed many concepts and perspectives from different disciplines, such as political science, anthropology, and sociology. The wealth of literature in these disciplines was used to guide data analysis and to increase the understanding of research phenomenon. The purpose of this literature review is to review relevant theories on land tenure and its institutions, the legitimacy of conservation policies, and the role of religion in conservation. Special attention is paid to literature related to China.

2.1 Land tenure

“Land tenure, derived from the Latin *tenere* (to hold), refers to the possession or holding of the many rights associated with each parcel of land” (Riddell 1985 P2). Tenure forms are usually mixed. Examples of mixed tenure systems have been found in both developed and developing countries (Dove 1985; Geisler 1993). In many developing countries, the state has laid claim to vast proportions of the nation’s forestland, which had previously been held by other owners such as collectives and private families (Thomson 1985; Bruce and Fortmann 1992; Richards 1997; Lele 2002). In many cases, state intervention reduced the previous informal reciprocal obligation to maintain common-pool resources through social sanctions and customary arrangement (Jodha 2000). Examples from Nepal suggest that the nationalization of forests has hastened forest depletion at times of political turmoil, except for forest plots around holy shrines (Panday 1985).

Common-pool resources are difficult to keep from potential users but are easy to be depleted (McKean 2000). Almost all environmental resources fall into the category of common-pool goods. There are two property rights that are most relevant to common-pool resources. They are the right to access physical property

and the right to extract natural resources from that property (Schlager and Ostrom 1992). Degradation of common-pool resources has been observed where effective mechanisms are lacking in controlling the rights to access and extract (Banana and W. 2000; Jodha 2000).

2.2 The effectiveness of conservation policies

Highly centralized conservation attempts have often failed because local conditions and local costs and benefits have not been taken into account (Lele 2002). There are several reasons why people ignore or flout certain policies. They may believe that the law does not direct them or authorize them to take action; they lack incentives or capacity to take the needed actions; they may disagree with the values implicit in the means or ends of the policy; or the situation may involve high levels of uncertainty (Schneider and Ingram 1990). Regulations without proper enforcement often result in widespread non-compliance instead of sustainable resource use (Smith 1988).

Residents in protected areas are often poorly represented in official deliberations, and regulations use vague language that avoids clarifying local demands. Decision-makers often ignore the economic impacts to local people. The resulting conflict can tear apart the social fabric (Lee 1999). If governments do not consider local peoples' use of resources when designing resource management or calculating transactional costs, the whole evaluation can be severely skewed and can lose its ability to mirror what actually occurs on the ground (Hanna and Jentoft 1996). The role of people at the local level is crucial. Because national governments rarely possess enough personnel and resources to enforce their laws adequately, local communities often both filter and ignore the central government's rules. They also add their own rules, generating local institutions—rules-in-use and patterns of

activity that can diverge widely from legislators' and bureaucrats' expectations (Gibson et al. 2000).

Various factors affect the capacity of an organization to exert its control, including the size of the organization, distance from the resource, and the nature and size of the resource (Menzies 1994). The long rotation of forest resources dictates that the efficacy of conservation policies is hinged on the sustainability of policy enforcement (Rozelle et al. 2002). Economic and political conditions at larger scales affect the sustainability and efficacy of conservation policies. For example, economic crisis and political dynamics have profoundly impacted tropical forest in Indonesia and contributed to converting forestland into other uses (Sunderlin 1999).

2.3 The role of religions in conservation

The oneness between nature and humans is emphasized in places where a respectful relationship between people and their environment is essential for survival (Hanna and Jentoft 1996). In Indian, sacred groves near religious sites such as temples and monasteries have been better preserved than forests without religious significance (Sharma et al. 1998).

Peoples' relationship to the environment is subject to change by social rules and institutions (Gelobter 2001). For instance, a shift from local use of resources for subsistence needs to use of resources for exchange can narrow the cultural and social significance of local resources (Gelobter 2001). The anthropocentric point of view reduces nature to an object of consumption (Tu 1993). As the utilization viewpoint towards nature has taken precedence over religious ideals in modern China, environment degradation has resulted (Jenkins 2002).

3 METHODS

This chapter describes the research design and methods used to achieve the following objectives regarding natural resource usage in the Baima area:

- 1) Describe the historical and current land tenure and natural resource utilization patterns in selected areas of rural Sichuan Province.
- 2) Describe land tenure and conservation policies which influence local access to, and use of, forest and related resources.
- 3) Identify local peoples' attitudes and behaviors regarding land tenure changes and conservation policies.

The project used a case study framework. Case study is a strategy when dealing with a phenomenon in contexts that needs to be traced over time, rather than mere frequencies or incidence (Yin 1989).

Conservation initiatives are new to P. R. China, and very little is known about their impact on the ground. As a single case study, it is hoped that this study will significantly contribute to the body of knowledge and theory building, help focus future investigations, and be a prelude to further studies (Yin 1989).

Qualitative methods were used to provide an in-depth understanding of the research questions. The essential features of qualitative research are the choice of appropriate methods and the recognition and analysis of different perspectives. The researchers' reflections on their research are part of the process of knowledge production (Flick 1998).

A grounded theory approach was used during the entire research process. The emerging questions from the initial data analysis directed the process of theoretical sampling (Strauss 1987). The goal of grounded theory is to generate a theory that explains and accounts for a pattern of behavior that is relevant for those involved (Strauss 1987). The variations in patterns of behaviors that were identified initially were open to alternative explanations and expansion to capture new

conflicts and relationships. A review process was carried out during the data collection period and adjustments were made for new situations and conflicts uncovered. A reflective journal was kept to record the chain of evidence that led to the final version of the theory.

3.1 Background exploration

SELECTION OF THE FIELD SITE: Baima Township was identified as the tentative research site for three major reasons:

- 1) Historical dependence on surrounding forest resources.
- 2) Current existence of significant reserve system properties and/or other special land use conservation policies.
- 3) The researcher had worked for Wanglang Natural Reserve adjacent to the Baima Township for one year. Through working closely with members of the Baima communities, the researcher developed a degree of understanding about local land use pattern changes. Given limited research time and resources, the researcher decided to focus on one village in Baima Township. After a five-day visit, the researcher and an experienced community worker, who works as a community work coordinator for both the Integrated Conservation and Development Project (ICDP) and Wanglang Natural Reserve, selected Yaza village as the research site (ICDP is funded by World Wide Fund for Nature China Office, hereafter referred as WWF China. The goal of the ICDP includes both the economic development of the adjacent communities and enhancing management inside of the Wanglang reserve. The project has been implemented in Wanglang reserve and nearby communities since 1996).

PRELIMINARY STUDY: A preliminary study of the chosen site was conducted. This included a background study of the conservation policies that were

implemented on the specific landscape, and a study of the cultural background, language, traditional natural resource utilization, land tenure, and unique ritual and religion of the Baima people. Additionally, historical archive data, government documents and newsletters were examined. Secondary and map data examined include: the contract for the Natural Forest Protection Project in the Baima area and the nearby Wanglang Reserve, documentation related to the current conservation initiatives (provided by the Pingwu County Forestry Bureau), contract and customary rules and regulations related to the Natural Forest Protection Project (from the Baima Township government), and basic socio-economic information about the Baima area and Yaze village (provided by the ICDP office), GIS data with spatial features including roads, rivers, boundary, hamlets, etc. in the Baima area, and information about human disturbances and grazing areas inside Wanglang Reserve (from the ICDP office).

3.2 Interviews

Personal interviews, an important tool of case study, were carried out. I used different types of interviews to obtain the needed information. Three major forms of interviews were conducted in this research:

- 1) Oral history interviews with key informants were used to gather personal recollections of events, their causes, and their effects.
- 2) Semi-structured interviews, guided by pre-determined questions, to give the interviewer more freedom in the exact wording of the questions, and the allocation of time and attention given to each topic (Robson 1993).
- 3) Open-ended interviews, with no pre-specified set or order of questions, aimed at getting interviewees' perceptions and identifying relevant cultural themes (Robson 1993).

SELECTION OF INTERVIEWEES: The field research period was from the beginning of July to the beginning of September 2002. In choosing interviewees, a purposive sampling strategy, usually referred to as “theoretical sampling” (Strauss 1987), was used to get the views and perspectives of different parties. Analysis of the initial phase of interviews revealed the potential theory, which in turn, guided the purposive selection of additional interviewees. Interviews were carried out till the point that information from additional informants repeats itself, which indicates that the information gathering has reached its saturation point (Lincoln and Guba 1985). A total of 25 interviews, each about ninety minutes, were conducted in the field. I tape-recorded the interviews with the consent of interviewees and took detailed notes when interviewees did not want to be recorded. I classified and coded the tapes and interview notes, then transcribed and translated the interviews.

Table 1. Interviewees and their association with Yaze village

Affiliation with Yaze village	Villagers	Non-villagers	Ethnicity	Gender	Age range
Villagers	14		Baima Tibetan	6F/8M	15-72
Pingwu Forestry Corporation rangers		2	Han	2M	
Baima Township ranger		1	Han	1M	
Senior logger		1	Han	1M	
Pingwu Forestry Bureau staff		2	Han	2M	30-40
Yaze village school teacher		1	Han	1M	
Reserve staff		3	Han	3M	25-63
ICDP staff		1	Han	1M	

Table 2. Villager interviewees in Yaze village

Villagers	Gender (F/M)	Economic-status (Self-defined)	Years of Education	Main Occupation	Age range
Zhang	F	Low	12	Farming	30-40
Xu	M	Medium	>12	Grazing	>50
Liu	F	Medium	12	Bee Keeping	30-40
Fang	M	High	6	Village official	30-40
Song	F	Medium	6	Farming, Weaving	>50
Tian	M	Medium	6	Renting horse	10-20
Bao	M	Medium	6	Medicine man	>50
Jiang	M	High	5	Hotel owner	30-40
Pan	M	High	3	Hotel owner	20-30
Wang	M	Medium	12	Village official	30-40
Yang	F	Medium	9	Hotel owner	10-20
Lin	M	Low	3	Grazing	>50
Huang	F	Low	3	Farming, Grazing	20-30

*All the villagers were Baima Tibetans. They were all involved in farming, firewood collecting, and grazing.

INTERVIEW DATA ANALYSIS: Coding is a qualitative data analysis approach creating microscopic examination of the field data to bring out the complexity that is grounded in the data (Strauss 1987). Three tiers of coding were done: open coding (for microscopic analysis), axial coding (to synthesize main themes), and selective coding (to generate key codes). The coding process was aided with Atlas-ti, the software designed for qualitative data analysis.

I translated and synthesized the secondary data, then compiled and coded this data using the same coding method that I used in analyzing the interview transcripts. I translated some relevant secondary data into English, such as historical factors about Baima people. Special attention was paid to maps, especially maps depicting local land use pattern dynamics. Information from interviews and field observations

was incorporated into the map data to provide a visual comparison between the historical and current grazing areas.

Oral histories were used to determine the different factors of deforestation and the utilization patterns of the land prior to implementation of conservation policies. Field observation was conducted and recorded with detailed notes and reflective journals (I wrote reflective journals while collecting the field data. Those reflective journals, stored separately from the interview data, offered a record of the researcher's own bias and the gradual process of hypothesis revision.). Secondary data, from different government bureaucracies, regarding relevant national policies and regulations, were crosschecked for consistency. A rigorous coding procedure, with chains of evidence grounded in the field data itself, was employed.

The same researcher did the interviews, the translations, and the final data analysis. Aware that the particular perspective of the researcher might bias the research process, the following measures were taken to minimize this bias: triangulation of primary and secondary data (which provided a mean of testing one source of information against other sources), crosschecking of information from different sources, and coding. The use of multiple methodologies, multiple layers of data sets, and coding helped compensate for the limitations of individual methodologies and minimize the researcher's bias.

3.3 Mapping method

Knowing which practices are found where and how locations affect these practices are considered as vital as knowing what the practices are and who owns the land (Messerschmidt 1995). To aid in showing the historical and current land use by villagers in Yaze village, field data collected from interviews are incorporated in the map data. To provide a better geographic reference, ArcInfo coverage files of

Chinese provinces and counties from the China Dimensions' website (1997) were used.

Incorporating the interview information into the map output provides a visual representation of the local knowledge. GPS (Global Positioning System) was not used to get the exact position of grazing areas; therefore, the data was not precise. However, the precision is good enough to serve my purpose -- to get a visual comparison between the historical and current land use patterns.

3.4 Researchers' background

Because the quality of a case study largely depends upon the investigators, the following section is included:

Dr. John Bliss is Professor, Starker Chair in Private and Family Forestry, and Associate Department Head in the Department of Forest Resources, College of Forestry, Oregon State University, Corvallis, Oregon, U.S.A. With academic training in cultural anthropology and forest management, Dr. Bliss' research focuses on social and policy dimensions of forest resource management in mixed-ownership landscapes. Dr. Bliss has published extensively on forest-based rural development, private forest policy, and social science applications in forestry.

Ke Du is a Graduate Research Assistant to Dr. Bliss. From September 2000 to June 2003, Ke Du was employed by the WWF China Office as the interpreter and translator for the Pingwu ICDP and the Wanglang Panda Reserve. Ke Du was involved in the Grain-for-Green Socio-economic Impact Assessment Survey in Sichuan Province. She is from Sichuan Province, received her undergraduate degree at the West China University of Medical Sciences, and is fluent in English and Mandarin. Through her work experience, she gained a basic understanding of the landscape in the Baima area and in other natural resource dependent areas in Sichuan Province. Her involvement in the Grain-for-Green Impact Assessment

Survey also helped her gain an insight into the implementation and impact of conservation initiatives in Sichuan Province, P. R. China at the grass-root level.

The field interview notes and the secondary data were transcribed and translated by Ke Du. Coding and primary data analysis was done by Ke Du with assistance from Dr. John Bliss.

3.5 Limitations of this study

This case study in Yaze Village is limited in geographic scope and sampling population. Other limitations also present in this study. First, the fieldwork portion of the study lasted for only three months; therefore the observation may be limited by the time frame. Second, Baima Tibetan language is the first language of Yaze villagers; therefore, villagers were using their second language during the interviews. This may cause some misunderstanding in communication potentially. Villagers who cannot speak mandarin were reluctant to be interviewed, which may have limited the sampling pool. Third, the study touches sensitive issues, such as corruption; therefore, the access to government documents is very difficult. Fourthly, most of the journals and books in Chinese do not share the same citation method as their English counterparts. It poses a tremendous difficulty for the researcher to trace information back to its original sources. Despite all the limitations, the research findings reveal some deep-rooted cultural values for forest resources as well as a standing conflict between the *de jure* and *de facto* land tenure system, which can likely be observed in almost every rural location in China.

4 RESEARCH SETTING AND BACKGROUND

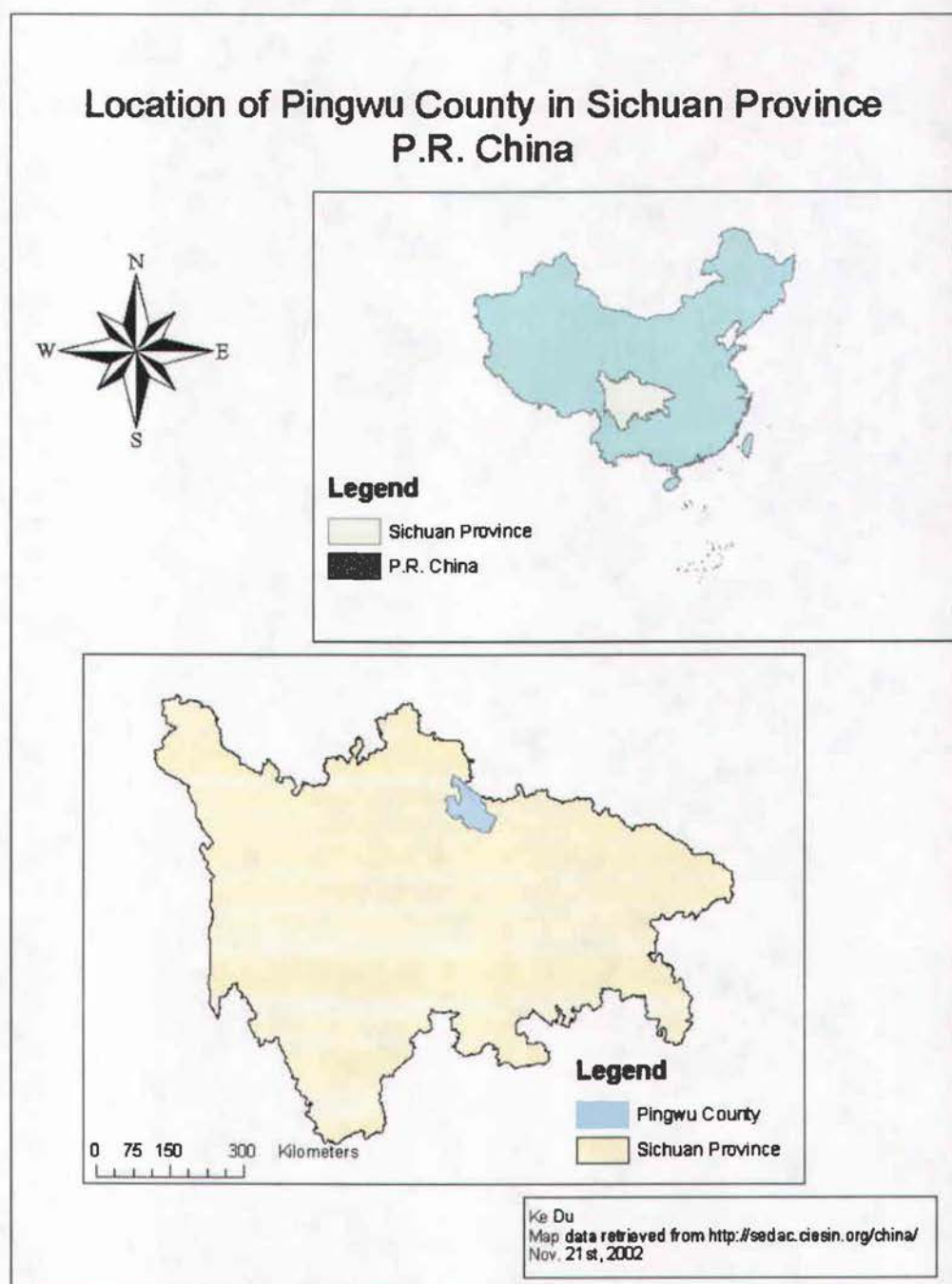
This chapter describes geographic, socio-economic, and historical factors that have affected the landscape of the Baima region, Sichuan Province, P. R. China (Figure 1).

4.1 Geographic setting

The research site is located in the Yaze Village of Baima Township in Pingwu County, Sichuan Province, P. R. China. For convenience, I will refer to the area as the Baima region. The region is located near the divide of the drainages of the Yellow River and the Yangtze River. Water, draining from the high point north of the Wanglang Natural Reserve, flows south to form the Huoqi River in the Baima region. The Huoqi River eventually meets other tributaries and becomes the Fujiang, an important tributary of the Yangtze River.

The mountains in this area are part of the Minshan range. The Minshan mountains are located in the transition zone between eastern edge of the Tibetan Plateau and the low-lying Sichuan Basin. Historically, this region had dense deciduous forests at the lower elevations and coniferous forests, alpine grasslands, and snow-capped mountains at higher elevations. Forest species composition in the Mianshan mountains is stratified according to elevation. Although precipitation also affects species composition, the impact of elevation tends to predominate. A typical stand in this area contains *Pinus* spp. in the drier, lower elevation valleys (mainly *P. tabuliformis* in the north, *P. armandii* in the south), with *Picea* spp. (*P. likiangensis* in the south, *P. brachytyla*, *P. purpurea* or *P. wilsonii* in the north), *Abies delavayi*, and *Larix potaninii* abundant above 3,000 m. Late successional forests at lower elevations consist of mixed stands of *Abies* spp. and *Picea* spp., although the species vary from one place to another. *Juniperus* spp. (*J. chinensis* or *J. saltuaria*) may grow at the highest elevations, especially in rocky places with well-drained soils.

Figure 1.



Tsuga spp. is also an important component of the coniferous forest. Common deciduous broad-leaved trees include *Acer spp.*, *Betula spp.*, *Sorbus spp.*, *Viburnum spp.*, *Daphne spp.*, and *Mussaenda spp.* Thickets of medium to small-statured bamboo also grow here and provide a critical food resource for both giant pandas (*Ailuropoda melanoleuca*) and red pandas (*Ailurus fulgens*). Open areas near the tree line are often covered in a closed shrub layer of *Rhododendron spp.*, together with deciduous shrubs such as *Rosa spp.* and *Berberis spp.* (Carpenter 2001).

The Baima region has been heavily logged in the past fifty years, which has greatly changed the local landscape. Today, old-growth coniferous forests are only found in the Wanglang Natural Reserve and on the most inaccessible mountaintops of the Baima region.

In the Baima Township, there are four main villages located along the upper Huoqi River valley. Villages are the heritage of production brigades popular in the late 1950s in China. Each village consists of several hamlets, clusters of as few as six to more than sixty households, which usually consist of close kinship groups.

The Baima Township encompasses an area of approximately 46,250 hectares--7.7% of the land in Pingwu County. Table 3 shows the land resource data in Baima Township in 1997. However, official records do not have detailed information on forest or grassland condition, such as whether the forest has been logged or not. The numbers in Table 3 should be viewed with caution. The reported forestland area in Baima had stayed the same from 1997 to 1999 despite the fact that logging continued from 1997 to 1998 without proper regeneration. Similar concern about the reliability of official data is mentioned in the literature (Richardson 1990). In addition, the definition of forestland is changing too. According to the Consolidated Forest Law, "forestland" refers to "grasslands and woodlands with 30 percent canopy cover"; however, it had been formerly defined as 40 percent canopy cover (Richardson 1990). In Baima most of the forestland is state-owned; less than

15% of the total forestland is collectively owned. Collective ownership means that the forestland could be owned by the Baima Township, or it could be owned by individual hamlets. The Yaze village is responsible for managing the 2,158 hectares of collective-owned forestland within its boundary--almost half the collective-owned forestland of the Baima Township (Pingwu Forestry Bureau 2002). The remaining forestland within the Yaze village is state-owned.

Table 3. 1997 Land resource data of Baima Township

Land types	Area (hectare)	Percentage (%)
Agricultural land	627	1
Forestland	34,156	74
Grassland	5,109	11
Unmanaged land	5,633	12
Road and others	724	2
Total	46,250	100

* Source: Pingwu Statistic Bureau 1997.

Some less valuable hardwood trees and shrubs, including several species of oaks, maples, cottonwoods, alders, birches, etc. can now only be found in small patches in so-called "sacred places", the places where locals traditionally believed that the spirits reside. Willow and other shrubs are found along the rivers and in places that have been previously logged.

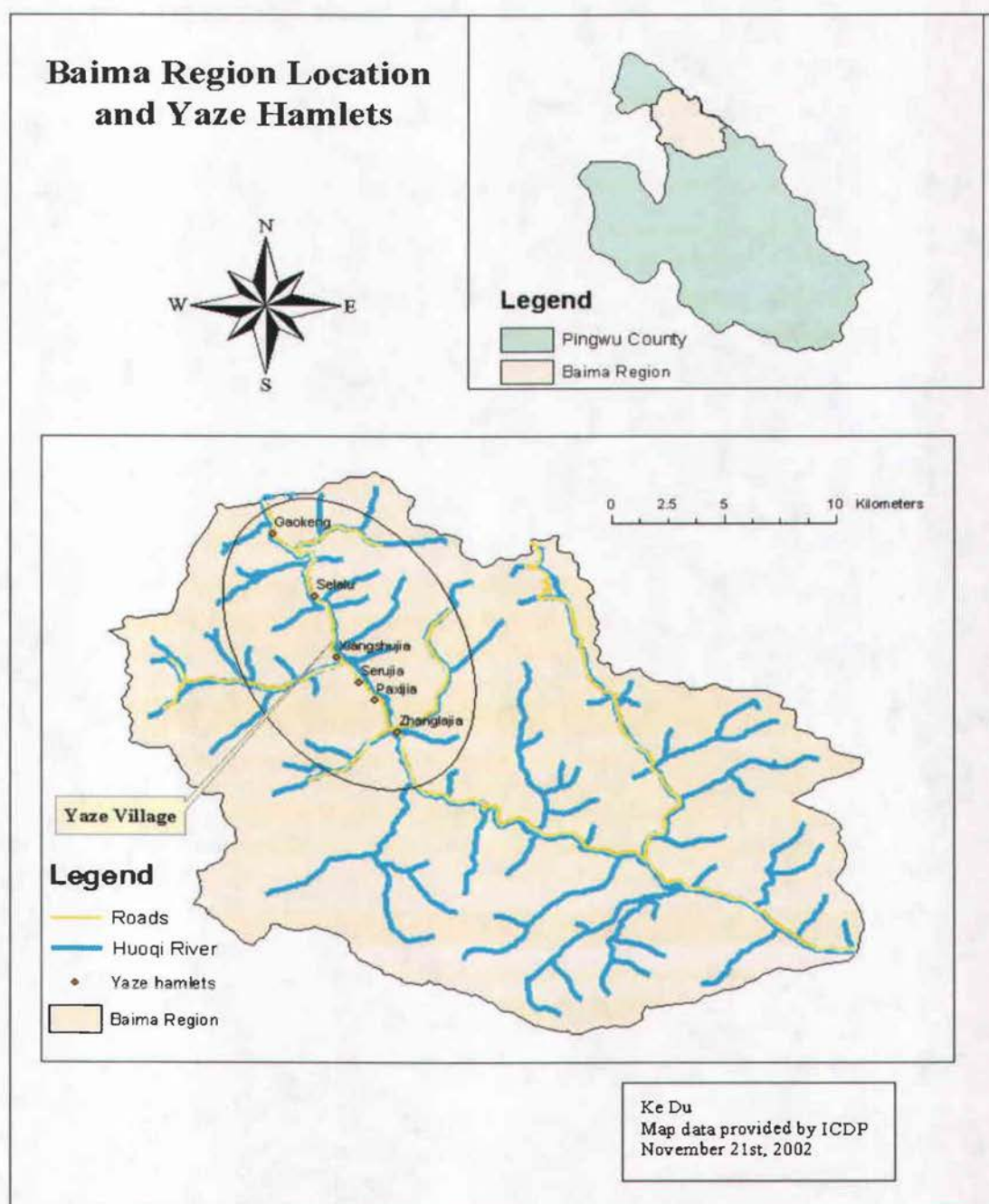
According to my informants several streams and lakes in Yaze village have dried up in the past 5 years. Locals placed the blame on logging carried out by state-owned logging companies. The Yaze village is connected to the outside world by a dirt road. The road was built by different state-owned logging companies, which were involved in logging the local forest at different times. The road is wide enough to allow two medium-sized logging trucks to pass through side-by-side.

4.2 Socio-economic setting

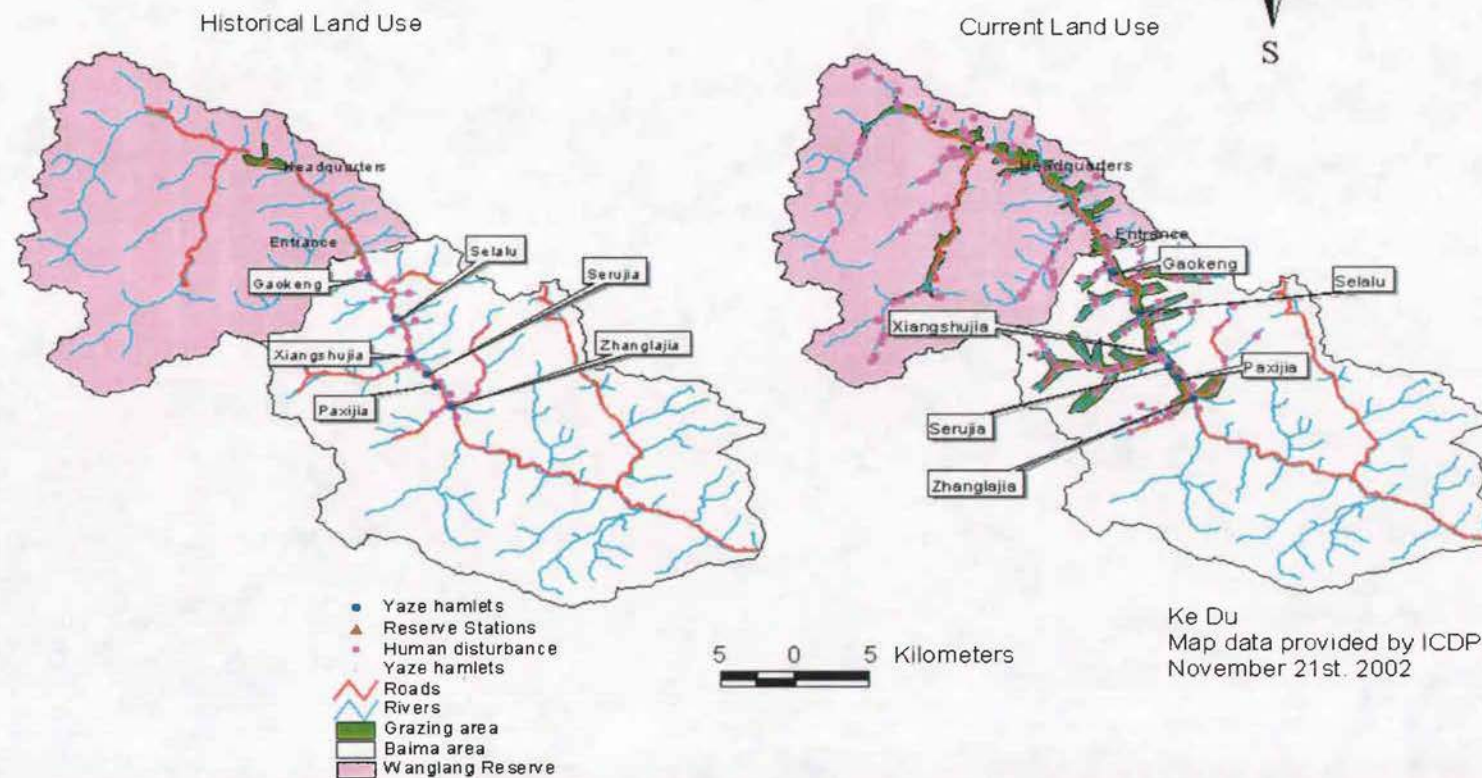
The Yaze village, the village closest to Wanglang Natural Reserve, consists of six different hamlets, with a total of about 450 people (Figure 2). The average age of the villagers is under 30 (ICDP report, 2000). The largest hamlet, Xiangshujia, has approximately forty households, and the smallest, Zhanglajia, has less than five households. About 17% of the villagers, mainly from Xiangshujia, have permanent homes outside of Yaze village in Longan, Pingwu County seat (ICDP report, 2000). Due to the significantly higher cost of living outside of the village, villagers who have permanent homes outside of Yaze, are usually comparatively richer than the other villagers.

Yaze has about 122 hectares of arable land, including reclaimed arable land after 1949 (ICDP report, 2000), which had lost its fertility after several years of farming. Therefore, less than 50% of the arable land was actively used by villagers in Yaze in 2000 (ICDP report, 2000). Almost all the villagers in Yaze village were involved in logging since the early 1990s. A total of 84% of households in Yaze village derived more than 50% of their household income from logging in 1997 (Cheng 2001). Locals who were directly involved in logging became rich (Lama 2001). They brought trucks and employed both local and non-local manual laborers to work for them. Logging became the main livelihood of the locals. Agricultural production continued, but it was no longer a priority, for the locals could purchase food from other places. Villagers used nearby valleys to collect herbal medicines and to graze their yaks. Like their predecessors, the locals continued herderless grazing and expanded the size of the yak herd from dozens before 1949 to several hundred today. The grazing area expanded from "Mu Yangchang"(Figure 3), the valley for sheep grazing, now the headquarters of the Wanglang reserve, to all the valleys surrounding Yaze.

Figure 2



Historical and Current Land Use Patterns of the Yaze Village, Sichuan Province, P.R. China



Tourism in Yaze village has boomed in the last five years, and Xiangshujia has become the hamlet most popular for tourists. The villagers in Xiangshujia hamlet alone built 15 new hotels in 2002, which is five times as many as that in 2000. The number of horses owned by the villagers increased more than 10 times from 2000 to 2002 (ICDP Report, 2003).

Table 4. Tourism information in Xiangshujia Hamlet

Years	Xiangshujia Hamlet			
	Number of horses	Hotels	Hosted Tourists	Tourism Income (Yuan)
2000	Less than 5	3	500	35,000
2001	30	12	10,000	600,000
2002	70	15	15,000	830,000

* Source: ICDP office and Pingwu tourism bureau

4.3 Forests in China

Before 1949, most of the rural population in China made its living through tenant farming (Prosterman 2001). From the 16th century to the late 19th century, forestland was owned and managed by various entities including villages, lineage groups, monasteries, temples, or the imperial government. (Menzie's 1994).

Throughout the history of China, the steadily increasing human population and the resulting expansion of human settlements were accompanied by the continuous conversion of forested land into agricultural and urban uses (Menzie's 1994). Warfare frequently marked Chinese history and the post-war reconstruction also contributed to the loss of forestland (Shen 2000).

Deforestation led to many natural disasters, most importantly soil erosion caused by wind and water (Westoby 1989). The Chinese call the Yellow River and Yangtze River "Mother Rivers". Silted by eroded soil, both of the two principal rivers have been repeatedly diked over the centuries. Disastrous floods,

caused by breached dikes, were recorded almost every year throughout the 19th century. When communist China was established in 1949, only 5% of the landmass of China, mainly in the southwest and the northeast, was covered by forest (Westoby 1989).

China is acutely short of forest resources. The majority of the land base in northwest and southwest China is non-arable, including forestland and pastureland. Most of those areas are inhabited by China's ethnic minority groups (Li Ping 2002). Currently 45 percent of forestland is owned by the state, and 55 percent is owned collectively or by private families (Hammett 2001). In southern China, the majority of forested land is collectively owned, and collective forests in the southern provinces comprise 37 percent of China's forested area. Sichuan and Yunnan provinces in the southwest China have almost equal divisions between state and collective owners, and their combined forest area is 17 per cent of the total forestland in China (Li 1996).

Following the devastating flooding of the Yangtze River in 1998, Sichuan governor Song Baorui announced that all logging and timber marketing in natural forest areas of Western Sichuan province would be halted (Xiang and Chao 1998). Under the Natural Forest Protection Project, the Forest Law of People's Republic of China (revised draft) encourages mountain closure for natural regeneration (1998). Each of these initiatives attempts to conserve and restore precious natural resources chiefly through limiting access to those resources.

4.4 History of Baima

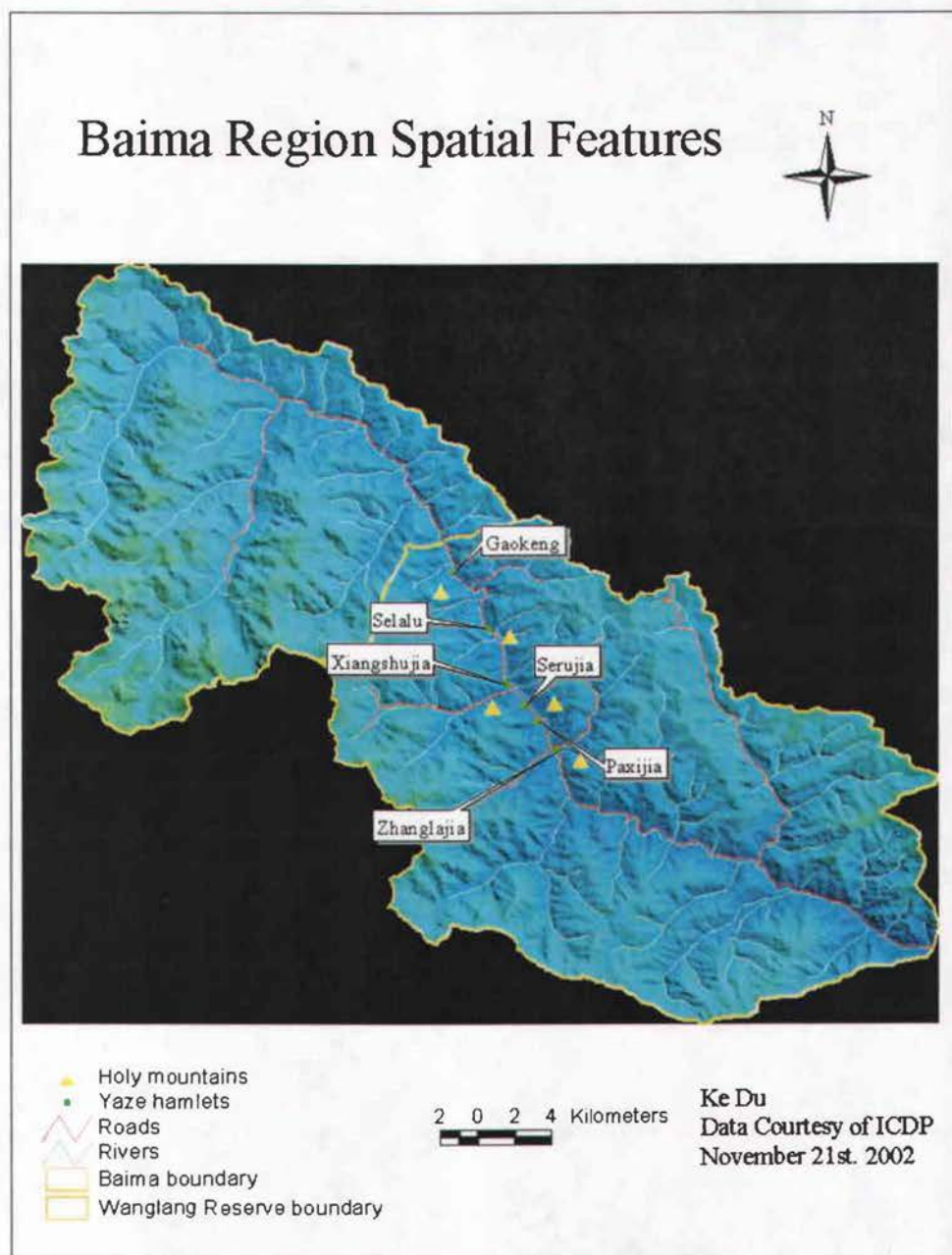
4.4.1 Pre-1949 history

The earliest record of the Baima people in this area is from about 200 BC (Xiao 2001). Politically, the Baima region was at the margin of government control. Before the 1950s, central Chinese governments claimed only nominal tributary authority over the Baima people.

Although the Baima language has some words that are borrowed from Mandarin and Tibetan, it is a unique language. (Sun 1980). Baima was not a written language and most of the Baima people spoke only Baima before the 1950s. Due to its remote mountainous location, Baima's history was not well documented in written records. Therefore, most of the history of the Baima people was passed on orally from generation to generation. Baima history was preserved in legends as well as in songs and dances. Much of the information presented in this paper comes from the oral history of the Baima people.

The local culture was built on a profound respect for nature. The traditional Baima religion is animistic, the belief that spirits are in all natural objects - including the sun, moon, mountains and trees. Almost all my sources over the age of fifty mentioned the existence of holy mountains and holy trees, usually located near the hamlets. According to these sources, people were not allowed to cut down trees on the holy mountains or to harm the holy trees. Each of the six hamlets of the Yaze village has their own holy mountains and holy trees (figure 4). Traditional rituals and special ceremonies offered prayers and sacrifices to the mountain gods to ensure a bountiful coming year. Rules were set up to punish those people who felled trees on the holy mountains, however, grazing and collecting activities were allowed on holy mountains. The Baima people depended on nature to provide them with many of the things they needed for survival - food, cloth, shelter, medicine, and spiritual peace. Although none of my data sources explained the ancient wisdom behind the designation of the holy mountains and trees, in most cases, the holy mountains were located right in front of or behind Baima settlements. By protecting these areas from excessive exploitation, the Baima people could continue to use these areas for their subsistence needs for generations.

Figure 4.



Historically, the Baima area was very remote and without road access and the Baima people led a subsistence lifestyle. The Baima people planted barley and hemp for food and clothing and raised sheep and goats for meat and wool. They wove their own belts and clothes and made their own hats. In addition to agriculture and animal husbandry, hunting, gathering and bee keeping were practiced. The rugged land of the Baima provided abundant habitat for wildlife and herbal medicines. Hunting provided extra protein, and takin (an animal whose nearest relative is the Arctic musk ox) hides kept the Baima warm during the chilly winter nights in the mountains.

Mountains were considered common property, and all the Baima had equal access to the natural resources in the mountains. The farmland in the valleys was individually owned. Wealthy landowners owned a few draft animals and controlled large tracts of agricultural land. Wealthy residents let poorer farmers borrow their draft animals for farming and expected gifts from poorer households each year.

Traditionally, Baima people were not allowed to marry non-Baima. Therefore, most of the Baima people were related to each other, either through marriage or through blood ties. Lineage groups were formed by a group of males all descended from one common ancestor. They all lived in one settlement, and their wives and unmarried daughters were counted as the same lineage group (Baker 1979). Members of the same village from different lineage groups would be called on to guard against invasions from outsiders (Baker 1979). A set of unwritten laws and customs overseen by the chieftains and elders in the village maintained the internal control of the village (Baker 1979). This lineage influence was not compatible with severe exploitation of the poor by the wealthy and may explain the fact that major exploitation on shared resources did not exist (Sun 1980).

Except for occasional trading, contact between the Baima and the outside world was infrequent. The remoteness of the Baima area shielded it from being

disturbed by outside government influence. Before 1949, because of the lack of transportation routes and methods of control, central and local government control was very loose, and local chieftains and wealthy landowners represented the only political power that existed in the area.

Traditionally, the Baima population was not large enough to significantly impact natural resources such as timber, herbs, and wildlife. Various factors contributed to the relative stability of the population in the Baima area. Much of the local folklore depicts wars, epidemics, famines, and natural disasters such as droughts, floods, and earthquakes. The most recent disastrous earthquake was recorded in 1976. These natural and human-induced disasters served to limit the Baima population.

4.4.2 Post-1949 history

4.4.2.1 Land tenure change under communist regime (the early 1950s)

After the establishment of communist China in 1949, the government created a nationwide administrative structure, using communes and the Party apparatus, to control even remote areas. In the first land reform instituted by the Communist government, agricultural land was taken from historical landowners and reallocated to previously landless peasants. In Baima, all the agricultural lands were allocated equally to each individual.

The Communist government claimed state-ownership of nearly all forestland in China soon after the 1949 takeover (Richardson 1990). State-ownership of forestland had little effect in the Baima region; locals still used the forest as their predecessors had before 1949.

In the early 1950s, a logging team of about 1,000 people was sent to the Baima area by a state-owned enterprise, the Northern Sichuan Forestry Bureau. They dynamited the riverbed to prepare for timber transportation and began logging the forest along the river. Because there was no road, timber was transported via the river. Logging design prohibited logging steep slopes and

mountain ridges, and seed trees were left to facilitate regeneration (ICDP Office 1998).

4.4.2.2 Great Leap Forward (1957-1960)

After the Communists took power, an industrial base was established that was heavily dependent on material and intellectual support from the Soviet Union. After Stalin's death, political disputes emerged with Khrushchev, the Soviet Union's new leader. As the Soviet and Chinese alliance cooled, the Soviets left China (Crespigny 1975).

Because China was historically an agricultural society without an industrial base, it lacked the capital and skilled labor to develop its industry without Soviet support. Beginning in 1957, Mao Zedong, the leader of China, mobilized the people of the countryside to engage in industrial development (Crespigny 1975). Heavy industry, especially steel production, was given high priority. To produce pig iron, people built "backyard blast furnaces" and millions of trees were logged to fuel these backyard furnaces. Although the "backyard blast furnaces" were not established in the Baima region, trees were logged to provide fuel to furnaces in other townships.

To restrict the growing role of the central government's bureaucracy, supervision of provincial economic activities shifted from the central government to provincial governments (Crespigny 1975). Locally, the Mianyang city-owned Logging Company replaced the Northern Sichuan Forestry Bureau in 1957 and continued logging in the Baima area. During this period, individual villages were combined into larger production and political units known as communes. Agricultural production tools, including draft animals and seed grains, were pooled, and commune members worked in the field in teams (Becker 1996).

The central government carried out a series of political assaults on traditional customs and practices to create a new society free from the historical trappings of Imperial China. All religions were regarded as illegal or anti-

revolutionary. Enormous political and social pressure disrupted local religious practices. All the local traditions including local respect to holy mountains and holy trees were considered superstitious, and needed to be eradicated. Although some of the locals continued their prayers to the mountain gods surreptitiously, by in large local religious practice was put to an end. The traditional reciprocal relationship between the local people and environment was forced to halt.

4.4.2.3 Cultural Revolution (1966-1976)

For a period of time after the end of the Great Leap Forward, control was re-centralized. A more technology-oriented strategy helped stabilize China. The pursuit of individual benefit attempted to overtake Communist ideology as the primary motivating force behind economic and social activities in China (Hudson 2000). As a countermeasure to this trend, Mao Zedong launched the Cultural Revolution in 1966. The purpose of it was to transform China's institutions, national consciousness, and social values, revitalize communist ideology, and buttress his own political status (Hudson 2000). The Cultural Revolution further depressed local tradition and religious practice. One of the important aftermaths of the Cultural Revolution in Baima area is that people have become disillusioned with both communism and traditional Chinese values (Personal communication, Cha Xiu, Xue Shixiu, Senior villagers, 2002).

However, the political upheavals didn't impact logging. Logging by the state-owned enterprise continued, and a road connecting the capital of Baima Township to the county seat was built. Because of the road, logging was no longer bound to the area along the riverbanks. However, the road did not extend to Yaze village, and Yaze experienced only limited logging.

With improved medical care and living conditions, in line with the rapid population growth nationwide, the population in the Baima area increased dramatically, almost doubling between 1949 and 1982 (Xiao 2001). This

population growth increased the demand for food and more forest was cleared for agricultural production.

4.4.2.4 Rural reform (1978-1982)

After the death of Mao in 1976, the Cultural Revolution ended and, in 1978, Deng Xiao Ping took over the leadership of the country. One of the reforms instituted by the new leadership was to convert collective agriculture to a contract system. The contract system allowed agricultural lands to be leased out to individual households for up to fifteen years. Furthermore, laborers could be hired and draft animals could be owned and inherited (Richardson 1990). Material incentives were reintroduced into agricultural production (Hudson 2000). Many restrictions on private commerce were gradually lifted. Encouraged by the local government and the high market price for yaks and goats, the number of yaks and goats was greatly increased. Grazing was gradually extended to each branch valley. According to the staff working for regenerating the mountain closure, free range Yak grazing, without herders, together with rapid increase of yaks, may have contributed to the poor forest regeneration after logging (Personal communication, Song Heshan, Fu Jiamo Mountain Closure Manager, 2002). Large scale logging by the Mianyang Logging Company continued. Meanwhile, sporadic commercial logging was done in Yaze by some locals.

4.4.2.5 Economic transition (1990-present)

From the establishment of communist China in 1949 to the early 1980s, despite all the political turmoil, the nation's economic system was primarily based on a planned economy, under which the central government set production quotas and controlled the distribution of resources. In the 1990s, the central government initiated a transition from a planned economy to a market economy, under which the market played a central role in allocating and utilizing resources. During the transition period from a planned to a market economy, a "two-track" pricing system was developed to accommodate the gap between market supply and

demand and the production quotas and distribution system of the old planned economic system, which were still in effect in some industries (Hudson 2000). In Sichuan province, the bulk of annual timber production (which in theory must not exceed the annual increment for the purpose of being sustainable) was sold through provincial authorities (forestry departments and local timber corporations) at an "in plan" price; however, surplus wood could be sold at a different, higher price (the "out-of-plan price") which better reflected the relationship between demand and supply (Richardson 1990). The "two-track" system encouraged the Mian Yang City logging company in Baima to exceed the province-set logging quota every year for its own profit. Some Baimas were employed by the Mian Yang City logging company. In 1982, the forests with less extractable valuable timber were designated as collectively owned forests. The Baima Township established Township Logging Enterprise and started logging those collectively owned forests in 1982. Many local households benefited from the Township Logging Enterprise for a short period of time.

4.4.2.6 Whole process contract (1995-1999)

The Pingwu county Logging Corporation replaced the Mian Yang City Logging Company in 1994. The Pingwu County Logging Corporation inherited the logging crew of the Mian Yang City logging enterprise, as well as the hospital and the primary school attached to the logging company. Therefore, the Pingwu County Logging Corporation assumed that it naturally inherited the logging right from the Mian Yang City Logging Company in Baima area. Though the legitimacy of the logging right of the Pingwu County Logging Corporation was questioned by the Pingwu Forestry Bureau, no concrete measures were taken to challenge the logging right of Pingwu County Logging Corporation in Baima area (ICDP report 1998).

In order to reduce overhead and respond to the demands of market competition, in 1995 the Pingwu County Logging Corporation started to contract

out logging rights in the Baima area to individual sub-contractors. Most sub-contractors were not Baimas. The small proportion of Baima sub-contractors were people with both social and economic assets. The sub-contractors logged their assigned areas and transported timber to the township capital. To minimize their own operational costs, these individuals began clearcutting. Other local Baimas, who did not have contracts with the county logging company, also started logging. Illegal logging was rampant. Even the Baima holy mountains, which were covered by valuable coniferous forests, were contracted out to local residents with social assets and logged. It is estimated that there were five million cubic meters of standing timber in Baima area before 1949. According to the official figures, about two million cubic meters of standing timber were logged (ICDP Report, 1998). However, because the official figures were calculated according to the logging index, illegal logging was not taken into account. It is estimated that almost three million cubic meters of standing timber were logged in Baima (ICDP Report, 1998).

4.4.2.7 Wanglang Natural Reserve (1963-present)

In an effort to protect the giant panda, the Sichuan Forestry Department established Wanglang Natural Reserve in 1963, just before the Cultural Revolution started, although effective management and adequate staffing were not in place until the late 1990s. As one of China's four original panda reserves, Wanglang is one of a small minority of reserves in China that is fully staffed and actively managed.

Although the communist government claimed state-ownership of all forestland soon after the 1949 takeover, the area inside of Wanglang Natural Reserve, used as grazing land by Baima people for thousands of years, continued to be used for grazing. Grazing is still a problem for the reserve. Together with the Baima regions outside of the reserve, the areas along the rivers were logged by the Northern Sichuan Forestry Bureau. However, the establishment of the reserve

saved the area inside of the reserve from logging afterwards. The distinctive difference between the landscape of the Baima area and the area inside of the reserve makes it hard to believe that fifty years ago there was homogeneous forest cover throughout Baima Township.

4.4.2.8 Natural Forest Protection project (1998-present)

In 1998, commercial logging in the Baima area was stopped by a nationwide logging ban. The logging ban was part of a larger umbrella conservation initiative, the Natural Forest Protection Project (NFPP), initiated by the central government. The NFPP was induced because of the enormous economic consequences and loss of life caused by the disastrous 1998 flooding of the Yangtze and Nen Rivers. Loss of forested land in the upper and middle reaches of Yangtze River was identified as one of the direct causes of the flood. Of the strategies initiated by the central and local governments to prevent further loss of valuable forested areas, the two most important measures were to ban commercial logging and to close mountains to livestock and people. State-owned logging companies in Sichuan were either shut down permanently or shifted to sustainable forest management, such as becoming involved in afforestation or guarding against illegal logging (WWFChina). Natural Forest Protection Stations were built in each hamlet of Yaze village. In areas where marketable trees still existed, rangers patrolled for illegal commercial logging. Fences and signs stating that the mountains were closed for natural regeneration were installed in the mountains surrounding Yaze, and some seedlings were planted in the closed areas with funds from central and local governments. However, field observation revealed that the signs and the monuments did not prevent the locals from using the resources within the closed mountains. The locals grazed livestock, collected herbal medicine and even mined. Locals could also get construction timber and firewood from the closed mountains as long as the wood was for household-consumption and not for commercial purposes.

4.4.2.9 Burgeoning tourism (1998-present)

After the logging ban, Pingwu County, which had been very dependent on taxes from timber, lost its main source of revenue, and the local government started to look for new ways to develop the local economy. Tourism was one of the most important alternative economic sources identified by the local government. The promotion of tourism by the local government coincided with a new central government holiday policy, which increased three major national holidays from one day to seven days each. Nearby urban dwellers, mostly from Mianyang city (about three-hour-drive from Baima region), attracted by the unique culture of Baima and the natural beauty of the adjacent Wanglang Natural Reserve, rushed in during those holidays and tourism boomed. Although there are no official records of the dramatic increase in tourists in Baima Township, a hotel owner told me that his hotel with a capacity of thirty beds had housed more than 1,000 overnight tourists in 2002. The logging ban stopped commercial logging; however, logging by local residents for firewood and construction has increased due to the need to host the increasing number of tourists. To build an average-sized hotel with an overnight capacity of 30 tourists requires at least 200 cubic meters of timber (Personal communication, the Yaze hotel owners, 2002). From 1998 to the present day, more than twenty hotels were built by locals in Yaze, and many more are under construction.

4.4.2.10 GRAIN-FOR-GREEN project (2001-present)

Following the Natural Forests Logging Ban initiated in 1998, the Chinese government formally instituted the Grain-for-Green project in March of 2000. The Grain-for-Green policy aims to restore hillside agricultural lands into forest by giving grain subsidies to local communities in exchange for planting trees (WWFChina). The Baima area started the Grain-for-Green project in 2001 and it is to run for five years (Du 2001). The amount of grain subsidy offered by the central government to the converted land on the upper and middle reaches of

Yangtze River exceeded the productivity of local agricultural lands. Therefore, the project was warmly welcomed by the locals. Because the grain subsidy is dependent on seedling survival rate, locals have erected fences surrounding their converted lands to prevent yaks from browsing the newly planted seedlings. No detailed information about seedling survival rate is available.

5 RESULTS AND DISCUSSION

The qualitative data analysis identified four themes that are most relevant to the objectives of the research: land tenure, ideology, national social and political trends and conservation initiatives. The following section provides results and discussion for each theme.

5.1 Land tenure

This section describes issues related with land tenure. Land tenure refers to the possession of rights associated with parcels of land. The rights associated with a tract of land are commonly considered as a bundle, which can be broken up, re-allocated, or passed on to others (Riddell 1985). "A property right is the authority to undertake particular actions related to a specific domain. For every right an individual holds, rules exist that authorize or require particular actions in exercising that property right" (Schlager and Ostrom 1992). In other words, particular rights associated with land can be held and exercised by individuals, groups and political entities with authority endowed by the rules. " 'Right' refers to the prescriptions that create authorizations" (Schlager and Ostrom 1992). Rights that are given lawful recognition are classified as *de jure* rights. Rights that are defined and enforced by resource users and not recognized by government authorities are *de facto* rights (Schlager and Ostrom 1992). In general, *de facto* rights are less secure than *de jure* rights (Schlager and Ostrom 1992).

5.1.1 Customary forestland tenure in Baima

Customary property rights are rights to property (land and natural resources), which are recognized by the local community by virtue of local customary usage, which is long-standing usage recognized and accepted by the community (Fortmann 1990). Customary land tenure was practiced in Baima before 1949. Although the State had laid claim to the forestland in the Baima area, the customary land tenure, which endowed equal access for villagers to natural

resources in the mountains, continued to be practiced despite interruptions by political turmoil.

One older resident of Yaze village, Mr. Xu stated:

As the saying goes 'we depend on water to sustain our life for we live by the side of water; we depend on mountains to sustain our life for we live in the mountains.' We can't survive without grazing, farming and collecting herbs from the mountains. The government knew that. If the government had to stop us, it had to find other ways to sustain our life.

Despite the external tenure changes caused by different tenure policies, local villagers have always viewed the forest as the place where they traditionally collected their fuel wood, fodder and other non-timber forest products (Gilmour and King 1989). Compared to the statutory tenure system imposed by the communist party after 1949, the customary land tenure system was much more resilient. The most important reason for the resilience was the direct relationship between customary land tenure and locals' self-interests and subsistence needs. A staff member of the county forestry bureau described the *de facto* land tenure system as one of "legitimacy":

The locals used the area for thousands of years, and the government claimed that almost all the forests are owned by the nation. Locals have to use resources in the national forest to survive. When the government allocated forestland tenure, it didn't take Baimas' [resource use] into consideration. Forestland with an area more than 500 mu [about 33 hectares] was classified as nationally owned forestland. At that time, the Baima region was surrounded by primary forest; therefore, all the forest was classified as nationally owned forest. The allocation of forest tenure happened pretty recently [in the early 1950s], but the locals have used the forest for thousands of years. In the past [before 1949], the locals used the forest for self-subsistence, taking the vast forest area into consideration; local use could never bring any actual damage to the forest.

The practice of *de facto* tenure rights still persists despite the *de jure* rights. Even the reserve could not exclude locals from using its forestland resources. In recognizing the important of animal husbandry to local people's economic well-being, the staff members of the reserve tolerate the grazers.

A reserve staff member said:

About 170-180 yaks are still grazed in the reserve. All the yaks belong to the three households in Gao Keng hamlet [located three kilometers from the reserve]. Grazing in this region has a long history. It is a standing conflict between the reserve and the local people, too. The Baima community is very dependent on the forest and grasslands here. Agriculture and animal husbandry were the main livelihood for the Baima people.

5.1.2 *De jure* land tenure

The *de jure* land system of state-ownership has been imposed on Baima's forestland since the first land reform after the establishment of communist China in the early 1950s.

A staff member of the county forestry bureau commented:

According to the law, forestland greater than 500 mu was categorized as State-owned forest. All forestlands in Baima were owned by the state and later, a small proportion of forestlands were classified as collectively owned.

Tree tenure is intricately related with land tenure (Fortmann 1985). According to Baima locals, traditionally local people did not plant trees. Mrs. Song spoke about the local forest:

The trees in the mountains were grown by themselves. We people didn't plant them, no, not that I am aware of.

The same opinion was echoed by another senior resident, Mr. Bao:

We never needed to grow trees; they just grew by themselves, everywhere.

Almost all forests in the mountains were self-propagated. Because no labor was invested by the locals to create the forest, the claim of state-ownership was easily and readily accepted by the locals. However, the newly established state ownership of forestland was in name only. Local land users still practiced *de facto* rights despite the fact that *de jure* rights had been imposed. The locals clearly separated forest ownership from the right to use forest resources. According to locals, the State is the entitled owner of the forest; however, like their ancestors, they still hold *de facto* rights to the forest. Mr. Bao, the local medicine man stated:

The mountains were designated as owned by the State and the collective. We could still use the mountains but in an orderly way. We were not supposed to denude the mountains, which we didn't. We could collect firewood, herbal medicine, some wood for building houses, and of course graze.

Another male resident, Mr. Lin remarked:

Our ancestors were using all the resources in the mountains all the time. The claim of state-ownership of the forest didn't affect our life a whole lot. We were still doing what our ancestors taught us to do, farming, collecting herbs, grazing livestock and supporting our families.

5.1.3 Evolving objectives of *de jure* land tenure

The *de jure* state-ownership system allocated timber extraction rights to a series of state-owned enterprises. The rights held by those state-owned enterprises were similar to the "withdrawal right" (Schlager and Ostrom 1992)—the right to obtain the "products" of a resource. In seeking the cheapest way to transport timber, the state-owned enterprises did not take into account the local environment nor the villagers' well-being. Villagers and Reserve staff members had much to say about the timber extraction of the state-owned enterprises. Mrs. Song, a local resident, remarked:

In 1952, there came a group of people, they started to dynamite the riverbed [to facilitate timber transportation through the river channel] and built their houses in the valley for sheep grazing. There must have been more than 3,000 people living there. Then they began logging the area.

The local medicine man described:

In early 1950s, staff of the Northern Sichuan Timber Bureau came into our area. They began to survey valleys in our region ... And then they put up a water gate [sluice gate] in the Seven Trees. Lots of dams were built along the big river. After enough water accumulated, the water gate would be opened. The wood was washed down and after the wood arrived at the other dam, another sluice gate was opened as well... Trees were cut along the rivers, the water came out the riverbed and became a flood. That was a man-made flood!

Mr. Lin, another resident remarked angrily:

I don't know what the hell was going on over there. Those logging companies kept on changing their names. It was once named the Northern Sichuan Forestry Bureau, and later on Mianyang City Logging Company, Pingwu County Logging Corporation... They logged all the forests in Baima.

A reserve staff member said:

Actually, the government logged most of the trees in the area to develop the country's infrastructure, and left the locals to suffer the consequences.

Before the logging ban, state-owned logging companies did not exclude the locals from accessing local forests. Many locals contracted out logging rights from state-owned logging companies; others practiced logging without any legal permission. As an elderly Yaze villager, Mr. Xu, noted:

We could obtain firewood and timber for our houses either in state-owned forests or collective-owned forests. Then people started to sell timber. The [illegal] logging happened in the [previously] logged area [by state-owned logging companies]. The local people only got to log the remnants.

The *de facto* land tenure system practiced by the locals coexisted with the *de jure* logging rights carried out by the logging companies. The locals did not challenge the “validity” of the *de jure* logging rights for two major reasons. First, logging companies exerted pressure through command and control regulatory processes. Second, practice of the *de jure* system did not impede the practice of the *de facto* system. Senior resident Mr. Xu said:

The locals don't have the right to ask any one to be responsible for the massive logging, for the whole region belongs to the nation.

However, after a series of environmental crises, Chinese society gradually realized the ecological value of the forest was much more than its timber value alone. Chinese Premier Zhu Rongji (1998) pointed out for today's China “one standing tree is worth three trees cut”. Forest protection rather than timber extraction became the guiding principle of the nation (State Forestry Administration 2000). State-ownership of Baima forestland enabled the government to put the forestland under a blanket logging ban, which removed the “withdrawal rights” of the state-owned logging companies and enacted a rule

stating that “the enterprises which benefited from the forest before should foot the bill” (State Forestry Administration 2000).

An older logger who worked for a series of state-owned logging companies explained the changing objectives of the logging companies:

The Forest Management Institute logged Fu Jia Valley before, and now after the logging ban, no logging was allowed, the mountain was closed. It is responsible for managing and protecting the closed mountains in Fu Jia Valley. And other valleys were all closed mountains, managed by Pingwu Logging Company. Nowadays named Pingwu Forestry Development Corporation. Those valleys were now under the supervision and management of the Pingwu Forestry Development Corporation owing to the principle that one who benefited from logging before should protect the logged areas now. Pingwu Logging Company of course benefited before from logging those valleys and selling timber. Now it is their turn to protect and manage the forest.

The logging ban also prohibited locals from logging for commercial purposes. The change in allowable practices under the *de jure* land tenure system greatly affected local livelihoods, because nearly all Yaze households had been involved in logging before the ban. Mr Pan, the villager who acquired his wealth through logging commented,

The Natural Forest Protection Project didn't protect me, I felt worse off.

Villager Mr. Jiang complained:

After the logging ban, we couldn't sell timber anymore. My family is now completely dependent on the savings we had. We don't have any stable income source now.

However, other locals expressed a different opinion about the logging ban.

The local medicine man told me:

For those people who liked logging, the impact is definite, especially an economic impact. I don't feel a whole lot of difference, for my family didn't log that much. I feel it is better to ban logging than to have those people strip the mountains bare.

A skillful local beekeeper said:

I don't care whether the government banned logging or not. My family didn't really benefit while logging was allowed.

A staff member of the Reserve discussed implementation of the logging ban:

In Baima area, the forest bureau sometimes did organize a forestry police force to control the locals on illegal commercial logging. Though there are still a few people involved in illegal logging, they are afraid of being sent to jail. The government logged the area then turned around and became the guardian of the forest. However, the locals live here all the time. Their natural resources were gone. The areas around their settlements were just like what you saw now in the reserve with lots of big trees. However, after the continuous logging damaged the macro-environment, the growth rate, the recovery of the forest became very slow.

5.1.4 Evolving objectives of *de facto* land tenure

Like the evolving objectives of the statutory land tenure system, the objectives of the *de facto* land tenure system have evolved over time. The main objective of the *de facto* land tenure system used to be local subsistence. However, with the ever-greater emphasis on materialism, the local use of natural resources has expanded exponentially.

Mr. Xu, a long-time resident said:

We had yaks before, but the number was much smaller than today's. Nowadays the government encourages enlarging the number of yaks and goats. People started to purchase yaks and goats.

The expansion manifested itself in several ways. With the development of local animal husbandry, more and more land became used for grazing. A half-century's worth of logging cleared lots of forestland. Herbaceous plants colonized logged areas first, followed by the pioneer species, such as willows. The villagers in Yaze village expanded grazing from the valley for sheep grazing to all the branch valleys surrounding the village now (Figure 3).

One of the Yaze village officials discussed the time frame of the increased grazing:

We used to graze in Muyangchang [the "valley for sheep grazing"] from 1949-1963. From 1963-1981, all the yaks were owned by the production brigade [collective]. And the yaks were sent to Muyangchang. In 1981-1982, yaks were allocated to individual households. At that time there were about 50-60 yaks, 100 goats in the hamlet. Now yaks were sent to any unfarmed areas. The number of yaks increased rapidly in the later 80s for farmers saw both the policy and the price being relatively stable.

Before 1949, the locals only needed a minimal amount of wood to build houses for their own use. However, with the development of tourism and the influence of commercialization, locals' demands on natural resources greatly expanded. Traditional houses with their weathered shabby look are considered by most of the locals as a symbol of poverty.

Mr. Pan, a mid-aged local hotel owner told me:

My parents' house is much smaller. They didn't use a lot of wood. They used adobe a lot. It looks ugly.

A senior villager Mr. Xu told me:

Before, people didn't have the money and labor to build big houses like this. For the old house, only three pillars and a few planks were needed. The walls were built with compacted soil. Now people are richer and can afford to build taller and prettier houses with wood and bricks; the more wood used, the nicer.

With the burgeoning tourism in recent years, locals need large amounts of timber to build hotels; most hotels can host approximately thirty tourists each. The local tourism has also amplified other demands on natural resources, such as the increased consumption of firewood and increased exploitation of herbal medicines.

Mrs. Song revealed:

In our village some households employ more than ten people to help them collect herbal medicines and most herbal medicines in the vicinity have already died out afterwards.

Although the locals' subsistence needs were considered "legitimate" by local government, the expansion of these needs from its original meaning to the current commercial use was not necessarily accepted by the agencies that are implementing conservation policies. However, for a long period of time after 1949, no serious measures were implemented to maintain the exclusiveness of state-ownership. A Baima Township ranger commented:

Collecting firewood is inevitable here in Baima. However, for each village there is a designated place for firewood collecting. There are some management measures to prevent large-scale denudation.

This contrasts with the proposition of the village head, who said:

There isn't any rule on firewood collection. People can get firewood anywhere they want.

Speaking of the collection of herbal medicines, the Township ranger said:

Strictly speaking, it is forbidden to collect herbal medicines in the closed mountains, and people should obtain a permit to enter the mountain. However, I can't rule out the possibility that some individuals are collecting herbal medicines illegally in the closed mountain areas. The Township government tried to issue permits for the collectors. It didn't work and now even the issued permits have expired.

The conflict between the official and customary land tenure systems was escalated recently, when the logging ban halted commercial logging by both state-owned enterprises and locals. The increased enforcement of *de jure* land tenure rules and the expansion of *de facto* land tenure practices has resulted in conflict over merchantable timber.

The village head said:

Before the logging ban, people with special social resources [e.g. political connections] could contract out the mountains for logging. Nowadays, farmers who logged a few trees could be warned. There is no regulation either to allow or to forbid local people from getting construction wood for their own use. Several years before, to build a house, one had to get a quota from the local forestry bureau. However, usually the quota was far from enough to build a house. It was a common practice to build a house with wood several times exceeding the quota. However, nowadays there is no such thing like a quota.

Having no quota does not mean that no house can be built. My field observations revealed that in Yaze at least five hotels with an average capacity of thirty beds were under construction.

The senior villager Mr. Lin remarked:

When logging was allowed, they [the state-owned logging companies] earned all the big money [from timber], they didn't care if we used a little. Now those people would question us if we want to use a few trees to build our houses, but we will build our houses anyway.

An order is considered as valid only if action is oriented to the set rules (Weber 1947). An order hinged on expedient motivation is less stable with less binding force compared with an order considered "legitimate" (Weber 1947). The

logging ban on commercial logging could be viewed as a system of order hinged on expedient motivation, the fear of being punished. The logging rights had not been limited to the state-owned logging companies from 1949 to 1998 with effective enforcement measures. Therefore, the locals had not adopted the exclusive "withdrawal rights" of the state-owned enterprises as a valid order to direct their actions. The transfer of local villagers' traditional rights to others does not simultaneously transfer the physical opportunity to use these resources. The people who live adjacent to forests still have ample opportunity to use them. But when they lose secure property rights in the resources to others, they also lose any incentives they might have felt in the past to manage these resources to maximize long-term benefit. They might compete with each other and new claimants to extract as much short-term benefit from the resource as possible. The incentives for monitoring and restrained use of natural resources by local villagers will diminish as soon as the customary usage pattern is impaired (McKean 2000).

After the logging ban in 1998, Natural Forest Protection Stations were built in each hamlet and some sincere measures were taken to crack down on illegal commercial logging. The locals started to realize that regarding merchantable timber, they were obliged to conform because disobedience would carry some undesirable consequences.

Villager Mr. Xu said:

Nobody dares to log [for commercial purpose] now. If one did, he would be captured and sentenced to jail.

Mr. Jiang, a resident who had been sentenced to jail for 2 years because of illegal logging in the reserve before logging ban, remarked:

They [the state-owned enterprises] logged the mountains bare. We don't have any to log anymore, and if there were any, we wouldn't log.

The locals' current conformity to the logging ban is guaranteed by external sanctions. However, the establishment of a logging ban that is widely recognized as legitimate among villagers would be a very slow and long-term process.

5.1.5 The coexistence of different tenure systems

The simultaneous existence of both official and customary land tenure is possible because people from different interest groups have radically different interpretations of the same rules and the enforcement of the official system is ineffectual.

A staff member of the county forestry bureau described the closed mountain policy:

The closed mountains are forests with less than 20% of canopy closure, which have both seedlings and seed trees, or alpine grassland, where afforestation is difficult. No cattle are allowed to enter the area, no people should be allowed to collect herbal medicines or firewood in the closed mountain area.

The ranger working for the Natural Forest Protection Station appeared somewhat confused by his own mission and what he could do on the ground:

As far as I know, the closed mountain zones forbid all kinds of logging including firewood collecting and grazing. In other words, in the closed mountain zones, any activity that might impede the natural generation of forest would be forbidden including mining. The monument [a stone monument identifying the closed mountain area, and sometimes displaying regulations] is established to symbolize that all activities that might prevent natural forest generation are forbidden.

According to the 1998 Forest Law of the People's Republic of China, (1998), local governments are responsible for closing the newly cultivated young-growth land and other forestland that should be closed to facilitate afforestation. The law suggests that any factors that would potentially harm afforestation should be eliminated from closed forestland (1998). Annex II in Sichuan Natural Forest Protection Project Implementation Design (trial) mentions fencing and guard stations as appropriate measures (1999). However, the detailed implementation is subject to local interpretation tailored to fit local enforcement capacity.

Mr. Xu, a senior villager, explained to me the meaning of closed mountains:

It means all the trees including pine trees [locals call all the conifers--pine trees] and other trees grown from the earth should not be logged. The only thing you can't do is to log. And the meaning of

"the mountain is closed" means the mountain is closed for logging. Except for logging, one can collect herbs and graze freely.

A more specific explanation of logging was given by the Yaze village head:

Closed mountain means not to log big trees, and you can do whatever else in the closed mountain area.

Mr. Jiang, a local hotel owner told me:

In the closed mountain, the only things we can't do are hunting, logging and burning. It is okay to mine in the closed mountains since the only thing the mining needs is a small hole, which won't do any harm to the trees.

In addition to these various interpretations, some individuals justified their actions using contradictory systems of order. In Baima, people who logged the closed mountains for small amounts of timber and firewood justified their actions according to the legitimacy of customary land tenure practices. Baimas are well aware of the tacit endorsement of the "legitimacy" of their own subsistence needs.

A senior villager, Mr. Bao remarked:

I think it is perfectly justified for us to get firewood and timber in the mountains, that's what we always do.

Although the local government put a ceiling on the maximum amount of timber and firewood that locals could use, there was no system established to supervise locals' own consumption of wood. A county forestry bureau employee read to me from a Pingwu County Forestry Department document the firewood and construction timber quotas of the whole Baima Township:

In the year 2002 for the whole Baima Township the construction timber quota is 1300 cubic meters. For firewood, it is 275 cubic meters.

The owner of a medium-sized hotel told me proudly:

You know what, now my hotel needs at least 20,000 kilos of firewood [roughly 20 cubic meters] per year. There is no quota limit on using firewood.

In year 2002, there were 15 hotels of similar scale in operation in Xiangshujia Hamlet, one of the six hamlets in Yaze village alone. The fire wood consumption of Xiangshujia hamlet would well exceed the firewood quota for the whole Baima Township.

The simultaneous existence of customary and statutory tenure practices can lead to a great deal of acrimony (Bruce and Fortmann 1985). The villagers claim the unlawfulness of the timber extraction done by the state-owned enterprises and justify their own use of timber resources without government permission. A ranger implementing the logging ban expressed the contrast between official policy and its application:

About firewood collecting, for the area is far away from urban areas, it is hard for people to get fuel besides firewood. There are some rules that allow locals to collect some shrubs as firewood, for example, willows. Even this is only a local policy. According to the policy of the central government, nothing should be taken out of the closed mountain zones. About the local construction wood, according to the formal rules, the villagers should obtain a logging index before logging. However, in practice, locals just get into the remaining forest and log the wood they need. What we could do is just to warn them not to use wood in a wasteful manner. I heard some officials from the forestry system say that rangers should not get too serious when the poor locals go into the forest to obtain construction wood that's not worth fighting. The rules of thumb are, as long as the villagers don't log for commercial purposes, we should not take real measures. It's okay to warn them but no real measures are taken against them as long as they are playing by the rule.

When talking about controlling herbal medicine collection, the ranger said:

Collecting herbal medicines should be forbidden, however, that is a mission impossible here in an area inhabited by the minority groups. As rangers, we cannot stop herbal medicine collecting; even the county government couldn't stop people collecting herbal medicines. What we can do is when there are some collectors entering the mountains we tried to convey the information that it is important to prevent fire hazard, no logging is allowed.

The customary forestland tenure system has been practiced by the locals for thousands of years and the corresponding behavior has become habitual. The continuous local use of forest resources was also well recognized by people who work for government agencies implementing and enforcing the official forestland tenure system.

The ranger commented:

As far as I know, now locals graze in all the branch valleys along the Huoxi River. We don't have figures about the number of yaks. Our task is to protect the forest and we don't want to get involved in other issues. It could be written on the paper that cattle are forbidden in closed mountain zones, but we can't make it happen on the ground. For the main income of the locals is animal husbandry.

Although those branch valleys were classified as closed mountains, in the case of grazing, customary land tenure practices took precedence over statutory land tenure regulations. The right to graze and local well-being are inseparable.

However, the local practice of herderless grazing and the objective of the closed mountain, which is to facilitate natural tree regeneration, are highly conflicting.

The recent emergence of numerous herds of goats grazing in the closed mountains will hinder natural tree regeneration.

A logger who now works as a ranger said,

The yaks and goats trample the seedlings, nibble away all the newly flushed leaves. Of course it will bring negative impacts to the regeneration of the forest in the closed mountain areas.

A ranger working for Baima Township's collectively owned forest had an opposing opinion:

People here set their yaks free all the time [herderless grazing]. In collective and state-owned forestland, the trees are big enough and the yaks cannot destroy them.

Numerous fences were observed on the closed mountainside. Mr. Fang told me:

The fences were built by us, to keep the yaks inside of the closed mountain zone, therefore, they won't come down to the flatter lowlands to harm the crops.

Despite the monument declaring that the mountains were closed, the local unspoken rule is that the locals are the rule makers on the ground to decide where to graze and how to fence their yaks.

The reserve staff commented on the rules that are supposed to guard state-ownership:

No rule can control [local people's need]. Local people's traditional building material is wood; one can't divert them into using cement. Local people, especially the poor have enough labor and time to log wood, but they lack cash.

5.1.6 Summary

Nationalization of forestland in Baima area after the establishment of communist China introduced the *de jure* land tenure system. The *de facto* land tenure in Baima was poorly represented in official deliberation. However, the physical opportunity for the locals to access and make use of the forest resources was ample due to the insufficient enforcement of the state-ownership. The *de jure* and *de facto* land tenure coexisted. The local forest resources were on the verge of depletion mainly due to the unsustainable timber extraction of the state-owned timber companies. Traditionally, the local forest resources were the common-pool property shared among the locals for their subsistence. The establishment of the *de jure* land tenure system introduced the state-owned logging companies into the local landscape. The local forest resource turned into the common-pool property shared among the state-owned logging companies and the locals. The environmental crises of the late 1990s led to the enactment of the logging ban. The *de jure* land tenure system enables the government to implement locally a blanket ban on commercial logging. However, the *de facto* land tenure practices except logging for commercial purpose persist and are magnified by burgeoning local tourism.

5.2 Ideology

This section describes ideology dynamics in Yaze village. According to Webster's College Dictionary (1991), ideology is defined as "the body of doctrine or thought that guides an individual, social movement, institution, or group". The Baimas' ideology towards nature is dynamic. Their changing worldviews are reflected in their changing attitude towards their own traditional religious belief, attachment to the local area and their value systems.

5.2.1 Religion

Baimas' traditional religion is animism—"belief in personalized, supernatural beings (or souls) that often inhabit ordinary animals and objects,

governing their existence(1963)". A basic principle of animism is that every element belongs to the whole (Hanna and Jentoft 1996; Pedersen 2001). The villagers' traditional religious ideology about holy mountains and holy trees effectively protected the forest resources from being extracted. Traditionally, behavior of locals was bound by their religious belief, a social dynamic generalized by Max Weber (1947):

The derivation of the legitimacy of an order from a belief in the sanctity of tradition is the most universal and most primitive case. The fear of magical penalties confirms the general psychological inhibitions against any sort of change in customary modes of action. At the same time the multifarious vested interests, which tend to become attached to upholding conformity with an order, once it has become established, have worked in the same direction (Weber 1947 P 131).

None of my informants were clear about why specific mountains and trees were designated as holy mountains or holy trees. The unanimous opinion was that they knew which mountain or tree was the holy mountain or holy tree from older people in their family and village. The ancient wisdom behind the designation of the holy mountains was lost. The holy mountains are usually very close to the settlements, and the holy trees are near or even adjacent to people's houses. My impression was that the deforestation of the holy mountains might bring immediate threats to the nearby human settlements, such as increasing the probability of landslides.

Mrs. Song, a long-term resident as well as a communist party member, recalled the local holy mountains:

Before 1956, nobody was allowed to log the holy mountains and each hamlet had its own holy mountain. People worshiped their own holy mountains. And the pine trees on the holy mountains were so big. Most of them were bigger than a hug. Those pine trees were so tall. Your hat could fall off your head if you tried to look at the top the trees...

The local medicine man remarked:

Before chairman Mao was in charge [before 1949], we had insistently held that no logging was allowed in the holy mountains. If

some one cut the holy tree, he would be fined. According to the custom, the fine would be a goat.

Besides holy mountains and holy trees, the reciprocal relationship between the locals and their natural environment was illustrated in local festivals that were colored with religious significance. A series of religious ceremonies closely related to agricultural production were carried out in those festivals, including the sacrifice of a goat to the mountain god before sowing, or the sacrifice of a yak after harvesting to pray for a bountiful future harvest and to show their gratefulness to the mountain god (Sun 1980).

5.2.2 Great Leap Forward and post Great Leap Forward era

The legitimacy of the belief about holy mountains and holy trees was not challenged until the Great Leap Forward. The series of political upheavals from the late 1950s to the late 1960s made it necessary for the believers to hide their religious beliefs and severed the younger generation from their own religious beliefs. Mrs. Song pointed out:

In 1956, there was a campaign against superstition. Nobody dared to practice those so-called superstitious thoughts openly. Since then most of the young people gradually lost their faith in the belief. And some villagers started sporadic logging of the holy mountains afterwards.

The younger generation not only lost their interest in their own religion; they saw that continuing religious practice was wrong. A young hotel owner accused the local medicine man of provoking most of the superstitious activities in the village:

I don't believe in his [the medicine man] tricks. He is the person who is fervent about the superstition. Although he cured some villagers using some herbs, that doesn't mean anything.

Animistic beliefs served the purpose of explaining natural events (Cziko 2000). However, with more frequent communications between the Baima region and the outside world, people became increasingly exposed to science and technology. More and more Baimas were educated under the

system of science and technology. Mr. Xu, a well-educated local resident commented:

In the late 1950s several Baimas were sent to training sessions to learn how to write [Han Chinese], and we also learned that we could cure our diseases by taking medicines instead of worshipping gods or spirits. In general, Baimas had better education after liberation [1949].

The reciprocal relationship between nature and the local people was gradually replaced by an anthropocentric attitude. The change in locals' attitude toward nature reflects the Chinese government's policies from the 1950s to the 1970s. During that period of time, the dominant political ideology emphasized the notion that humans were the masters of all things and that human effort could change natural laws (Tu 1993). During the time of the Great Leap Forward and the Cultural Revolution, the ideas espoused in the political campaigns led to rejection of all the natural laws (Crespigny 1975). A famous slogan during that period of time was "the land could produce as much as one's courage". The central government encouraged farmers to plant as many plants as possible in a single plot of land to increase agricultural productivity during the Great Leap Forward (Huang 1998). Human exploitation of natural resources was justified, because the value of nature was based on its contribution to the nation's industrialization. The mountains, which used to be the spiritual realm of the locals, were reduced to objects containing extractable resources. After the young Baimas became disillusioned with their religious beliefs, they began to illegally log their holy mountains at a small-scale in the beginning. Later on, in the middle 1990s as the economic system allowed for individual economic development, some privileged locals began to contract out and clearcut their own holy mountains. Mr. Lin noted:

The youngsters were devoid of any respect to our holy mountains for they were taught holy mountains and holy trees were part of superstition. They started taking out trees from the holy mountains as their wish during and after the Cultural Revolution (1966-1976). Later on in the 1990s things got worse. A young villager contracted

out the holy mountain of our hamlet and ruthlessly logged it.

The sacredness of the "holy mountains" gave way to a secularized view of commodities.

Mr. Xu sadly recalled the logging of the holy mountains:

The locals logged some holy mountains. Now, it is outdated to execute a fine on anyone who logs in the holy mountains. The old rules were not working properly after Mao's period.

The medicine man pointed out:

Nothing is left in the holy mountains but some worthless bushes and a few hardwood trees, now. All the pine trees are gone.

Mrs. Song, an older villager, complained:

Most faithful believers of our religion are the old. They gradually passed away or became poorer and poorer. Their words won't count. Nobody will abide by the old rules now.

5.2.3 Commodification

Xiao (1994) argues that the locals in Baima have long had a tradition of collectivism. He notes several examples: First, there was equal access to natural resources in the mountains before 1949. Second, there was voluntary collective grazing of goats after the goats and draft animals were allocated to individual families in the late 1980s. Finally, logging benefits from the collectively owned forest were allocated equally to all the villagers. Xiao (1994) also mentions that traditionally, Baimas displayed contempt for all kinds of commercial activities, and they did not establish any kind of markets or fairs. Equal access to resources was well engrained among locals. The medicine man told me how the locally run logging company used to allocate profits from logging the collectively owned forestland:

Profits were divided among locals here equally, without any differences between the young and the old. For babies who were just born, they would also have their share.

However, the equal allocation of profit among villagers only happens on less than 15% of the forestland in Baima Township, which was the state-owned forestland that was reallocated to the Baima Township in late 1980s. The

inequality in logging opportunities on state-owned forestland during the mid-1990s enlarged the income gap among the locals, which continues to be manifest today. The logger who has been working in Baima area since the 1950s noted:

The holy mountains are part of state-owned forestland. The logging company that was logging in Baima in the 1950s didn't log them for the Baimas didn't allow it to. The company tried to negotiate but Baimas argued that logging in their holy mountains would bring them bad luck. In the 1990s, Pingwu Logging Corporation began to contract out mountains. Some Baimas got the contracts of their own holy mountains. They logged them. Words don't count; it is money that decides the game.

Although the vestige of Baima peoples' religious belief prevented the state-owned logging company from extracting their holy mountains directly, it was unable to ward off the local sub-contractors and the boldest illegal loggers. Those local sub-contractors and illegal loggers who logged their own holy mountains did not abide by the traditional religious belief. Most of them became today's hotel owners after the logging ban. However, people who did not get a large profit from logging before continued being losers in tourism, for only the hotel owners reap the greatest profit from tourism. The village cadre commented:

It is every villager's dream to have their own hotel to earn big money from tourists. Now only the rich who logged most trees before the ban can afford to build hotels. The other law-abiding residents stay poor and only earn a little from tourism.

Commercialism has become part of Baima life. Locals compete with each other in advertising their hotels, souvenirs, herbal medicines, and any merchantable products that one could imagine. A hotel owner, who wanted to sell me dried and live salamanders, tried in vain to persuade me of the effectiveness of salamanders in curing stomachaches. He even swallowed a live salamander in front of me. I also observed many boys of Yaze village skillfully renting their horses to tourists to get some pocket money. Little Tian, one of the horse boys, said:

I'm tired of school. I dropped out from middle school last year. My uncle bought me my horse two years ago. I can get enough money by renting my horse to tourists to get liquor and cigarettes.

The concept of the holy mountains and the holy trees and related rituals were also commercialized. The medicine man commented:

The young people learned about holy mountains and holy trees just enough to coax tourists. They don't care about the holy mountains and holy trees themselves, and they don't believe in them either.

5.2.4 Out-migration

Historically, the belief in holy trees and holy mountains was related to local dependence on scarce natural resources. The traditional practice of agriculture was not enough to provide subsistence. Forests provided locals with all the other resources they needed to sustain themselves; therefore, the locals perceived forests in the Baima area as their final refuge. As a minority ethnic group, the Baimas had been expelled from their traditional homeland by both the majority Han Chinese, and the Tibetans, a stronger indigenous group. One Baima song depicts their migration history:

The Hans took our fertile farmland and the Tibetans occupied our lush pasture. We were forced to stay here among the mountains with nowhere else to go.

The local's perception of his or her own dependency on natural resources was critical in this case. Traditionally, locals were isolated from the outside world; therefore, depletion of local resources would be disastrous. The words "nowhere else to go" clearly reveal the Baima peoples' opinion about the "scarcity" of their habitat. The co-existence of both dependence on and scarcity of local natural resources provided impetus for locals to engage in developing institutions to manage their natural resources (Gibson 2001).

In recent decades, minority ethnic policies, which endow preferential treatment of minority groups under certain circumstances, allow Baimas more opportunities to receive better education. Some took office in government institutes and some grew rich from logging. With increased communication between the dominant Han and the Baima minority group, traditional marriage rules have loosened up and intermarriage has gradually become accepted by most

young Baimas now. Local elites started to migrate out to the nearby town, Longan, the Pingwu county seat (population 12, 000, Census data, 2001), which is about 120 km from Yaze village. A small proportion of Baimas migrated to Longan after they married. The increased rate of out-migration due to the more convenient life in urban areas gradually changed the predominant views of their dependency on local forest resources. Some locals perceived that they could use up local forest resources and move on. This point of view is apparently common among local youth. Little Tian, the horse boy, expressed his opinion on out-migration:

I don't care to live here or find a job in Longan. Of course it is more fun to live in Longan or Mian Yang City. To be frank, I don't like it here when there are no tourists. It is too quiet. I will move to the urban area as soon as I get enough money.

A reserve staff member commented on the villagers' out-migration:

There is no obvious increase in the population of the Yaze village, because when people got rich they move out to Longan.

However, out migration is only part of the story. Mr. Li's family emigrated to Longan as soon as the logging ban was carried out. He tried to invest in a different business outside Baima, but failed. He realizes that he is in a disadvantageous position when trying to do business with people in Longan or other big cities such as Guang Zhou. He suggested that his lack of education was a business impediment. Soon after tourism flourished in Yaze village in the late 1990s, like many of his peer emigrants, he built a hotel in Yaze village. His two children go to school and live in the apartment he bought in Longan. He and his wife take turns coming back to Yaze village to manage their hotel. As most of their peer emigrants, most of Mr. Li's family members are in Longan, but Yaze village is still the place where most of their family income comes from. Mr. Xu commented on people who emigrated after they grew rich from logging then returned and built hotels after tourism flourished:

They moved out because the village is isolated, and it is hard to get around. The streams here dried out, people have to run a long way

to get clean water to drink. But we still live here. Now they've built hotels in other hamlets where tourists like to hang out.

Although the emigrants derive most of their income from local natural resources, they are less attached to the surrounding environment compared to villagers who still live in the village. The emigrants are still reaping the profit of local natural resources but they do not need to face the dismal consequences of local environment degradation on a daily basis.

5.2.5 "Father - Mother - Official" (Fu Mu Guan)

On the one hand, "Heaven is high and the emperor far away" is a centuries-old Chinese maxim that expresses the peoples' aloofness towards their governments (Hsu, 1981). This attitude is a natural mechanism developed by Chinese people overtime to guard against volatile government sweeping mandates. On the other hand, the magistrate, the chief official of the lowest level of government and the official closest to the people, is known as Fu Mu Guan, the father mother official (Columbia University, 2000). The state usually plays a major role in determining famine control and relief, and insuring social stability. People expect paternalism from their governments in times of crises. The paradoxical attitude towards government has been explicitly expressed by lots of Yaze villagers.

When talking about the difficulty in seeking alternative income sources after logging ban, Ms Song noted:

It is the government's job to help us.

When hypothesized that if the reserve would take strong measure to forbid villagers grazing in the reserve Mr. Pan responded:

Farmers can't survive without cattle. The land is flat; the weather is pleasant in the reserve. If the reserve doesn't allow people to graze, it doesn't do any good to the nearby communities. The government needs to come up with some solutions for us.

With this kind of attitude the villagers are able to shirk their responsibility for unsustainable natural resource use and regard conservation of forest resources adjacent to their settlements as government's job that has nothing to do with them.

5.2.6 Summary

Traditional religious belief protected holy mountains and holy trees. Ideological campaigns dismantled the traditional religious belief and created a gap between the older and younger generations. The influence of commodification degrades the natural resources to pure commodities. The divinity of holy mountains is used for commercial purpose. Out-migration did not relieve the pressure on local natural resource. On the contrary, it opened up the avenue for irresponsible users.

5.3 National political and social trends

Not only did changing social and political trends on national scale influence land tenure and local ideology, but they also led to alteration of the local landscape. Humans live in two realities: the physical system of nature and the equally real systems of social institutions (Hanna and Jentoft 1996). Human behavior reflects the dual influence of both individual and social objectives. From the 1950s to the present, the changing social and political conditions of Chinese society have placed differing demands on local natural resources, and they shape the way that people understand and utilize their environment.

5.3.1 Changes in logging and regeneration practices

From the early 1950s to the mid-1990s, Chinese society underwent industrialization. In the early 1950s, the construction of the nation's infrastructure was a major priority for Chinese society. Timber was extracted from Baima's virgin forests to fulfill that goal.

Meanwhile, the society also began to realize the scarcity of its forest resources. The State Council promulgated the "Directive on Mass Afforestation, Cultivation of Forests and Protection of Forest" in 1953 (Richardson 1990). Locally, a parallel institute was established to supervise the logging design and regeneration procedures of the state-owned logging company-Northern Sichuan Forestry Bureau.

An older logger who had worked for the sequence of state-owned logging companies noted:

The Forest Management Institute was established in 1953. Its main responsibility was to design logging layout and oversee regeneration areas for the Northern Sichuan Forestry Bureau.

Wanglang Reserve chief recalled that in Baima, the Northern Sichuan Forestry Bureau logged the area along the river and created desirable conditions for natural and artificial regeneration (Personal communication, Chen Youping, 2002). Shelter wood and seed trees were left in some logged areas to help with natural regeneration by ameliorating the microenvironment at an average elevation about 2,500 meters above sea level. Site preparation and artificial regeneration were carried out in some logged areas, strictly according to the regeneration design. The prolific regeneration in the Wanglang reserve proved the success of the regeneration strategy of the early 1950s. However, local resident Mr. Xu had the following to say:

I know that there were big trees along the rivers. Some trees were so big that two people couldn't get their arms around. Those trees looked like the dikes of the river. There were no tangled bushes like nowadays. No matter how big was the flood; it was contained within the dikes made by the trees... Some trees were cut along the rivers [by Northern Sichuan Forestry Bureau]; the water came out of the riverbed and flooded.

No road was built while the Northern Sichuan Forestry Bureau was logging in Baima region. Therefore, most of logging was done along the river.

Consequently, disturbed riparian areas resulted.

From the late 1950s to the late 1960s, frequent mass political movements led to the abandonment of existing orders. Logging was done without any overall plan; regeneration after logging was ignored (ICDP report, 1998). From the mid-1970s to the 1980s, road access and logging techniques (e.g. cable logging) were improved, and both the logging area and the logging volume were greatly expanded. Under the planned economy, wood prices were kept artificially low. The costs of growing timber were long ignored under the belief that trees were

gifts of nature. The timber price barely covered the direct harvesting and processing costs. The meager silvicultural fees offered as a substitute for stumpage prices tended to be diverted to other purposes (Repetto 1988). In Baima region, only nominal effort was made to regenerate logged areas. Instead of planting logged areas, the state-owned logging company planted seedlings in local grasslands to reduce the costs associated with site preparation (ICDP report 1998). The administration of the state-owned logging companies severely cut the already inadequate funding available for regeneration by diverting it to other purposes (ICDP report, 1998).

In the mid-1990s, the forestry enterprises put forward various contracting measures to revitalize state-owned enterprises (State Forestry Administration 2000). Meanwhile, the timber trade gradually shifted from a planned state purchasing monopoly to a more market-oriented system (State Forestry Administration 2000). The parallel supervisory institute, which was supposed to oversee the logging design and regeneration of the logged site, was not functional. The older logger recalled:

Forest Management Institute had stopped performing its former responsibilities since Pingwu Logging Company began sub-contracting mountains...Instead the Forest Management Institute was allocated one valley, Fu Jia Valley. The Forest Management Institute has been engaged in running and managing Fu Jia Valley since then.

The radical changes in economic and political conditions introduced great uncertainties into the macro-level Chinese society and micro-level local communities. The liquidation of merchantable timber was caused by the dual influence of national and local individual objectives. The former rules and conventions which governed the logging and regenerating practices of state-owned enterprises in the early 1950s were eroded by the mass political movements, which also disrupted the locals' customary rules. The change in economic conditions drove both the state-owned enterprises and the locals to act in a way that maximized profit. The state-owned logging enterprises were

endowed by the State with “withdrawal rights” as well as the duty to regenerate forest resources. However, the actual regeneration had nothing to do with the profit margin of the logging companies or the availability of the “withdrawal rights” of the state-owned logging enterprises, the right for timber extraction. Consequently, according to most villagers, the mountains are today “Green mountains without any discernible valuable standing timber, just bushes” (Personal communication, Xue Shixiu, Nisu, et al, villagers, 2002).

5.3.2 Corruption

To encourage those in authority to refrain from using their positions for personal benefit, the principal slogans during the late 1960s and the 1970s included “Serve The People” and “Fight Self-Interest” (Hudson 2000). During that period of time logging profits from Baima region were less likely to be channeled directly to those in authority. In the early 1990s, corruption became the biggest fissure in the new market-oriented economy (Hudson 2000). In Baima, the Pingwu Logging Company started contracting out mountains to individual subcontractors. The contract process was flawed with corruption. Subcontractors were from in and outside of Baima region. Some locals got the contract to log their own holy mountains from the state-owned logging company through illegal means.

Mrs. Song, a party member, commented:

The people who managed the logging company in Chairman Mao's time kept their hands clean. The subsequent managers tried to collect as many bribes as they could while they were in office...In our hamlet, the holy mountain used to be covered with big pine trees. The person who used to be our village cadre got the contract through his relationship with the logging company heads. His family hired several tens of people and began clearcutting the mountain. Most trees on the mountain were gone by 1999.

Mr. Lin and one of his relatives remarked:

As soon as one got the contract, it was like he bought the mountain. Some of the Baimas, who are well-connected and well-to-do became sub-contractors. They had to bribe certain persons who were in

charge of contracting out forestland. If you could only give 10,000 Yuan [about \$3,000], the person in charge would not be satisfied. He might tell you 'Ha, the money is good for buying candy for children'. You had to give him at least 20,000 to 30,000 Yuan [about \$6,500-10,000]. That's just an example, the actual number must be even more than that.

The shift from a planned economy to a market-oriented economy in the early 1990s resulted in the dysfunction of almost all the measures employed by the central government to prevent illegal extraction of timber resources. According to the Forest Law (1984), state-owned forestry enterprises were supposed to have cutting licenses issued by the county-level forestry department; timber cannot be transported from the forest unless with a transport certificate issued by the county level forestry department.

Mr. Lin commented sarcastically:

People who logged without any felling certificate could sell timbers the same way as the others. At that time there were so many buyers trying to get "black timber" [timber without felling certificate]. It is amazing that buyers could always get the 'black timber' out...Those buyers had the cutting licenses issued by the forestry bureau. If they didn't, they couldn't get through the timber checking stations. The sham started from the forestry bureau ultimately.

The expropriation of local forest resources in the early 1950s usurped local Baimas' governance and management rights towards local natural resources. The state-owned logging companies together with the outside and the inside sub-contractors extracted local timber resources. The logging practices of the state-owned logging companies were generally bound by certain rules, but the practices of the sub-contractors were not.

A staff member of one of the state-owned logging companies said:

The logging done before the 1990s was restricted by state quota and various rules. After mountains were contracted out the sub-contractors logged legally for the state-owned logging companies as well as illegally for themselves. There was no way to control them.

A staff member working for another state-owned logging company voiced a slightly different opinion:

The state-owned logging company could always get around the pre-set quota limit by filing a report begging for a higher logging quota from its superior agency. The sub-contractors did not bother to file any reports. They were out there logging as much as they could by cheap and dirty means.

Changing political and social conditions introduced more free riders (such as sub-contractors, and illegal loggers) into the local resource management system. The changing political and economic regime in China exposed the timber resource in Baima to the national timber market. If no logging ban were instituted, the forest resources in Yaze village would be drained and local's living conditions would deteriorate.

5.3.3 Degradation of non-timber forest resources

The timber extraction done by the state-owned enterprises from the late 1950s to the 1990s was not consistent with the objective of sustainable resource use. Besides the disorganized logging practice that directly reduced forest resources, there were other side effects.

A staff member of the reserve commented on the side effects brought by the logging team:

The logging brought loggers in, which in its turn provided a market for wildlife meat. Therefore, hunting and other human activities greatly increased in the reserve. And the wildlife faced more threats than ever before.

When talking about wildlife resources in Baima, one long-time resident said:

Before, there were wolves, leopards, jackals and even bear. They were threats to goats. Of course, both local people and people from outside hunted them fiercely for a period of time, plus all the nearby forests are gone; they don't have a place to hide. As far as I know there is no bear around anymore.

For some Baimas their values towards local forests narrowed from a place harboring resources such as wildlife and herbs to timber for the purpose of financial exchange. Without the forest habitat, other resources were on the verge of depletion. For example, increasing demand coupled with an extensive market

network pushed herbal medicine extraction to the extreme. According to the locals, both the quality and quantity of herbal medicines in Baima were reduced.

A Yaze village official said:

We only have very scanty herbal medicine of very low quality in the vicinity of the village now. We used to have abundant supplies, now they are gone.

A staff member of the reserve pointed out:

Collecting herbal medicines, mushrooms and salamanders has been rampant in recent years both in the area around Yaze and even the reserve. I think that's because there is a market for them. Everything needs an economic stimulus in recent years.

Villagers also felt the increasing number of herbal medicine collectors. No explicit rules existed on herbal medicine collection. Both villagers and outsiders are involved in irresponsible extraction.

Mr. Xu noted:

There are too many people collecting herbal medicines. The villagers started to hire outsiders to collect herbal medicines for them, and some outsiders came on their own to collect herbal medicine here too.

The non-existence of rules makes the herbal medicines an "ownerless" resource. The degradation of the forest habitat accelerates its diminishing. This is similar to examples of unsustainable forest resource use found in another protected area in Sichuan Province (Liu 2001). The locals' subsistence and spiritual needs for the resources provided by the local forests were eliminated from the allocation equation. The state lacked enforcement capacity, which in turn created *de facto* open-access and led to resource degradation.

5.3.4 Uncertainty introduced short-sighted actions

The volatile political and economic condition of the past fifty years, together with the complex social institutional setting (i.e. different state-owned logging companies), increased the uncertainty surrounding local use of resources. Therefore, Baimas could not properly gauge the potential threats facing local natural resources over the long term. In fact, the Baimas were very pessimistic

about the future of local natural resources. Mrs. Song, a long-term local resident commented:

I couldn't figure out how many people were logging here, but I knew they would some day deplete all the trees on the mountains...I don't know when that day will come and what will happen afterwards. Maybe the government will have to support us. I have no idea.

The state-owned logging companies extracted most of the timber resource in Baima region. The medicine man complained:

All the forest here was destroyed by the Northern Sichuan Forestry Bureau and the later timber companies. The land by the sides of the river was destroyed by them, too...

Some locals started logging illegally, for the traditional controls on the forest were removed and the state forest was deemed as an "ownerless" resource open to extraction. Mr. Lin recalled the rampant illegal logging and the ineffective attempts made by the state-owned logging companies to control it:

Those people who could not get a contract started logging, too. Some of them even hired 10-20 outside laborers to log for them. People who could not afford hiring outside labor, but had extra hands at home started logging, too. When lots of people started to do the same thing [illegal logging], what the timber company did was to pacify all of them. It was like plastering, nothing more than that was done.

Mrs. Song recalled the disorganized timber extraction:

The timber company couldn't possibly control the illegal logging. There were some devils that would fight without giving any consideration to their heads. We had some cusses here.

The commercial logging done by locals both illegally and legally would not be implemented without adequate economic incentives. Personal material gain was deemed the heart of capitalism, and was strongly condemned by a series of political campaigns during Mao's period. In the 1990s, economic reforms carried out by Mao's successor, Deng Xiaoping, reintroduced personal material gain as a major driving force of the market-oriented economic system (Hudson 2000). Without any bounds from traditional customs or adequate legal measures, together with outside subcontractors, Baimas aggressively pursued commercial logging to

achieve economic ends.

Mr. Pan, who gained his fortune from logging, argued:

When the Pingwu Logging Company began contracting out mountains. Lots of outsiders became sub-contractors. I could have chosen to wait for them to log the mountains bare then starve to death, or to log myself and earn some money.

5.3.5 Summary

The uncertainty in predicting the threats facing local resources induced locals to engage in rapid timber extraction either by legal or illegal means. The uncertainty introduced by the larger social and political regime changed the locals from self-organized users to free riders, who usually behave in a narrowly self-interested way and do not cooperate to resolve natural resources dilemmas (Gelobter 2001). The villagers do not see their own natural resource use as unsustainable. The national political regime did not offer any avenue for villagers to collectively manage local natural resource use themselves. The change in local landscape instigated by the national social and political conditions continues.

5.4 Conservation initiatives

This section describes the most significant conservation initiatives that affect Yaze villagers' use of natural resources. The establishment of the Wanglang Natural Reserve represents the earliest conservation initiative passed by the Chinese government. Subsequent conservation initiatives include the Natural Forest Protection project and the Grain-for-Green project.

5.4.1 Wanglang Natural Reserve

In the early 1960s, scientists appealed to the Third National Peoples' Congress on designating specific areas in all provinces in the interest of conserving vegetation and wildlife for research purposes (Harkness 1998). Sichuan Forestry Department established Wanglang Natural Reserve in 1963 to protect the giant panda. Establishment of the Wanglang reserve also protected forest resources within its boundary from being extracted. However, a systematic effort to

catalogue and preserve biodiversity in the Wanglang reserve was not carried out until the 1990s. Consequently, the local Baimas have their own opinions about the date the reserve was established. Mr. Pan commented:

I don't think there was such a thing as a natural reserve in our area until the 1980s. I heard it from others. Later I found some staff were there.

Every interviewee that I talked to was aware of the existence of the reserve and the illegality of logging and hunting in the reserve. The associate chief of the reserve explained:

There was an illegal logging case in 1995, before the implementation of the ban on commercial logging. Two people from Gaokeng hamlet came to log on the boundary between the reserve and the hamlet, and they logged the area inside of the reserve. They had logged about several dozen cubic meters of wood. And then they got caught. One of them was sentenced to jail for 3 years and another 1 year. The event greatly affected the nearby communities and made the point clear that one is not suppose to remove even a tree or a blade of grass from the reserve.

The reserve faces increasing threats posed by the nearby communities. The shift from the State-planned economic system to an increasingly sophisticated market-oriented economy increased as well as diversified natural resource exploitation and consumption (Harkness 1998). The local Baimas had never been denied access to the reserve. The Baimas from Gaokeng hamlet, the hamlet closest to the reserve, insist on their traditional grazing rights in the reserve. A middle-aged villager from the Gaokeng hamlet commented:

The elevation of our hamlet is too high; therefore, our agricultural production is the lowest among other hamlets in Yaze village. Some villagers in our hamlet built hotels, but not many tourists chose to stay in our hamlet, because our hamlet is too close to the reserve, the tourists would rather choose to stay in the reserve than the hotels in our hamlet. Unlike other hamlets in Yaze village with a relatively stable electricity supply from the township hydroelectricity plant, we get our electricity from the reserve. The electricity voltage supplied by the reserve is too low to run a TV with one light on--no electricity, no tourist. We have to depend on grazing and bee keeping. All the yaks in the reserve were from our hamlet because we have no other places to send them.

Miss Huang from Gaokeng hamlet said:

Several years ago, the reserve asked us not to send our yaks to the reserve, but they don't have enough staff to keep our yaks out. We still send our yaks to the reserve.

Although the villagers underrated their own use of natural resources, a reserve staff member remarked on the diversification and increasing of natural resource exploitation in the reserve driven by the local villagers:

The Baima people living in nearby communities could enter the reserve freely and grazing in the reserve had never been interrupted since the establishment of the reserve. Local people started collecting herbal medicines, mushrooms and salamanders in the reserve in recent years. Before the early 1980s, wild vegetables and mushrooms were not popular at all; therefore, the locals didn't collect them at that time. Now eating wild vegetables and mushrooms has become a fashion. As soon as the locals realized the economic opportunities for wild vegetables and mushrooms, they started to collect.

The Wanglang Reserve faced more pressure from not only nearby communities, but also increasing numbers of tourists who placed various demands on the natural resources. Another reserve staff mentioned a recent encounter with some tourists on the issue of wildlife:

Yesterday, some tourists complained that there is no wildlife on our menu [for the reserve-run restaurant]. The associate reserve chief joked if we sold wildlife here, there won't be any staff in the reserve, because every one of us would be sent to the prison.

The reserve management and monitoring capacity has been greatly improved due to a collaborative effort by relevant government agencies and international conservation organizations, such as WWF (World Wide Fund for Nature) in the past five years.

The reserve head discussed the improvement in wildlife monitoring in recent years:

We used to carry out very simple monitoring work, such as some random patrolling along the road. We knew very little about monitoring work, and we were poorly equipped, too. The monitoring records were filled based on staff's vague descriptions about 'where and what did I see and hear' while they were

patrolling. There was no way to retrieve the specific geographic location. With the support from WWF and other sources, we now have night vision equipment, GPS units, etc. we have established a more scientific-based monitoring system. In addition, the staff is more motivated than ever before.

Although staff in the reserve engage in more frequent patrolling, the number of potential offenders is increasing due to economic motivation. Through trial and error, potential offenders simply find loopholes and resort to new ways of evading the rules and regulations.

The associate reserve chief commented:

In recent years, the price of herbal medicines in general has been soaring. The number of collectors follows the market condition. For example, this year the number of collectors is slightly reduced from last year, because the herbal medicine market price is not as desirable as that of last year.

Education and community projects were carried out by the Wanglang reserve to forge a reciprocal relationship between the Yaze village and the reserve. The recent flourish of tourism brought local surplus labor into various service trades. Although the number of illegal herbal medicine collectors increased in the reserve, fewer Yaze villagers were involved in collecting herbal medicines in the reserve.

The associate reserve chief remarked:

Last year we caught more than forty herbal medicine collectors. Not many people in Yaze village were involved in herbal medicine collection at all... There are lots of hotels in Yaze village now. On weekends those hotels need lots of people to help with cooking and organizing dancing and singing for the bonfire party held in the evenings. Those activities keep some surplus labor occupied.

In spite of the fact that local tourism brings direct revenue and employment opportunities to the local surplus laborers who might otherwise pose a threat to the natural resources in the reserve, tourism development also brings some negative impacts to the reserve. Villagers from Yaze brought horses and started renting them to tourists in 2001. The number of horses quickly exceeded demand, and fierce competition for the trade led to physical conflicts among

villagers from different hamlets. The final resolution among the different hamlets was to send the extra horses to the reserve. My field observation revealed that lots of horse boys were teenagers with bad manners, according to Chinese standards. They spoke only to coerce you into riding their horses. A senior staff of the Wanglang Reserve revealed that local newspaper articles reported that horse boys in Wanglang Reserve had fleeced tourists of extra change. The article laid the blame on the reserve management (Personal communication, Gao Yuanxin, Wanglang Reserve staff, 2002). The reserve received increasing numbers of complaints from tourists about losing possessions in the reserve-run hotel after the presence of horse boys in the reserve (Personal communication, Wang Xiaorong, Wanglang Reserve staff, 2002).

A senior reserve staff noted:

The horse boys came in fairly large groups. They forced their way into the reserve. About six to seven horses were in the reserve during weekdays. The number of horses would be more than ten on weekends. Those horse boys squat at the panda rehabilitation center and stay there overnight. They make fires to cook in the evening and warm themselves by the fire during the night. They sometimes are intoxicated by alcohol. They definitely increase the fire hazard inside the reserve.

Several days before I left the reserve, a huge quarrel broke out between the reserve staff and the horse boys and their helpers. The reserve posted an announcement that no horses were allowed in the reserve for several days and the staff orally informed the horse boys, too. When the deadline came, the horse boys brought many of their adult male helpers into the reserve. A big quarrel went on for more than one hour between the reserve staff and the horse boys and their helpers. Finally, the horse boys left.

The chief of the reserve argued that China's economic development plays a big part in the threats to natural resources in the reserve:

The threats posed to the reserve and our management work inside of the reserve are closely related with the larger environmental and economic development trend of the society. For example, collection of herbal medicines in the reserve is closely related with the

fluctuations of the herbal medicine market, especially after the development of the market economy in China.

The conflict between the different needs of the local community and the conservation objectives of the Wanglang reserve continues.

According to the reserve chief measures have been taken to enforce the rules in the reserve:

Last year, we took some strong enforcement measures to control the number of herbal medicine collectors. We used a police car to send those herbal medicine collectors we caught to the county forestry bureau (in Pingwu county seat). But only the forestry policemen have a final say about the punishment for those collectors.

Strong enforcement was also placed on anti-poaching efforts inside the reserve.

Several reserve staff were forest policemen, who were equipped with guns and authorized to track down dangerous poachers inside the reserve. After one widely known incident, in which there was a face-to-face shooting, the poachers were captured and afterwards sentenced to jail. An ICDP staff member suggested that people from lower and middle-income families were more likely to be involved in illegal extractive activities. He remarked:

To be frank, the middle and lower income families rather than the higher income families pose a bigger threat to the reserve. Since comparatively speaking, hunting and herbal medicine collecting tend to be very strenuous and time-consuming, the rich are unlikely to take on those activities for they have easier ways to earn money.

He also mentioned some WWF funded activities that are carried out to provide alternative income sources for those lower and middle-income families:

We organize a greenhouse vegetable group, a bee-keeping group, a women's group and a cash-tree group, those groups were designed to involve people from middle and lower-income families. We also require the group members to promise that they and their family members won't collect herbal medicines or poach in the reserve. I think maybe those measures contributed to lowering the number of Baima poachers and collectors.

My field observation reveals that greenhouse vegetable and women's group activities are in their infancy and other group activities such as bee-keeping group are starting to provide some poor villagers with alternative

income sources. However, because the group activities are targeting the poor in the community and the Yaze village is a heterogeneous community, the households with higher income feel they are left out and are hostile to those group activities and the villagers who are involved in those activities. In addition, WWF donors cannot see immediate conservation effect in doing those community projects; therefore, the funding for those projects is insecure. The community projects are still struggling with the external and internal conflicts.

5.4.2 Natural Forest Protection project

The natural forest protection project was implemented in Sichuan province right after the devastating flood of 1998. The project included two important measures: first, a commercial logging ban, second, closing of the mountains for tree regeneration. When logging in Pingwu County was banned, the immediate threat to Panda habitat was reduced, but other problems arose. Illegal collection of wild plants increased and farmers became more reliant on livestock grazing – both of which affect the conservation of the Panda and its habitat (Lama 2001). Most Yaze villagers were lucky enough to find alternative income sources soon after the logging ban from opportunities offered by the burgeoning local tourism. Although some villagers who grew rich from logging complained about the arduousness of their newly adopted role as hotel owners, other villagers are quite willing to accept the fact that nobody can log for commercial purpose.

Mr. Pan, one of the hotel owners complained:

We used to earn big money by logging. Now we have to work from the early morning to the late evening and doing all kinds of dirty chores to just earn some pocket money. We were better off before the logging ban.

A villager, Miss Huang said:

Only a small proportion of villagers got rich from logging. It was very unfair. The logging ban is good because nobody is allowed to log for money.

The logging ban had a negative impact on vulnerable groups in Yaze

village—the logging dependent poor. Ms. Zhang complained:

My family is very poor. Before the logging ban my husband could bring home some money by serving as a temporary laborer for logging entrepreneurs. Now even that income is impossible. I started cooking for a hotel and my younger son dropped out of middle school for we cannot afford his tuition fee. We borrowed some money and bought a horse. My younger son is helping out family spending by renting out our horse to tourists.

However, not all of the six hamlets in Yaze village benefit from tourism.

Villagers in some hamlets had to find other income sources since tourism income was too little to cover family costs. When I visited Mr. Jiang, he was busy building a wooden sink (probably built to pan gold) with some of his friends who run a gold-mining business. He told me he was building a wooden fish-tank to raise some fish. He complained that he spent two years building a hotel but no tourists came because the tourists chose to stay either inside the reserve or in other hamlets, where there is an aggregation of hotels. In my conversation with other members in the village, I was told that Mr Jiang was involved in a gold-mining business. Villagers have stopped drinking water from the main river for they know that harsh chemicals used by local gold miners are dumped directly to the main river.

When discussing the advantages of the logging ban, Mr. Xu revealed:

We have to get drinking water from little streams for the water in the major river is not drinkable anymore. The logging ban will increase the volume of the water; therefore, the water in the streams won't dry out for most of the year.

The mountains surrounding Yaze village are either owned by the state or the Baima Township and were all closed according to the Natural Forest Protection Project. Commercial logging has been banned in those mountains since 1998. A staff of Ping Forestry Bureau noted:

In 1998, Pingwu Forestry Bureau started a logging ban by dynamiting all the roads in the forests crucial for commercial timber transportation.

After that, Natural Forest Protection Stations were built in each hamlet of Yaze village to enforce the logging ban. According to one of the rangers both illegal

poaching and logging were effectively cracked down on, after the establishment of the Nature Forest Protection Station:

Recently, one forest station reported that there was a poacher in their forest area. The forestry police station (located in Pingwu County seat) sent out some policemen and captured the poacher. Three months ago, rangers found several locals in a nearby valley logging for commercial purposes. We organized seven or eight rangers from different protection stations. We forced the loggers into a car, which was rented by me, and sent them to the forestry bureau where the forest police took them in custody.

The rangers' job responsibilities are posted on the door of the Natural Forest Protection Station. A gap exists between what is written in the description of the rangers' responsibilities and what can be done on the ground. One of the responsibilities is to stop any grazing, herbal medicine collection, and firewood collection in newly regenerated areas. Because the local offenders greatly outnumbered the rangers, the rangers turn a blind eye to grazing, firewood and herb collection and concentrate on cracking down on illegal commercial logging.

A young ranger remarked:

We couldn't possibly control grazing in the closed mountains. Actually we had a hard time getting rid of yak droppings in front of our protection station. I know there are lots of herbal medicine collectors, but we can only encounter a few. We can only warn them on cautious use of fire. Nothing else can be done.

Another ranger commented on the lack of enforcement authority in his job:

We are responsible for conveying information. We cannot really enforce any thing. We don't have any right to capture or hold any one in custody. Only the forestry policemen have the right to do so. We can only convey the information.

A middle-aged ranger complained about the ineffectiveness of reporting information to the higher agencies and insinuated the possibility of corruption, which made those agencies turn a deaf ear to the information:

If we wrote up a report, the report would go to the Natural Forest Protection Office in the County Forestry Bureau, then to the county government, city government, provincial government and finally central government. But generally speaking, the information wouldn't reach that high. It would vanish into the air somewhere.

Presumably, another responsibility of the rangers is to stop, when possible, any activities which would harm the forest; otherwise they should report it to the superior agencies. Therefore, it is the rangers' responsibility to query and warn locals when the rangers feel the villagers are harming the resources in the forest. One of the rangers recalled an incident:

We found in our area, there was someone mining rock gold. They dug a hole and tried to put some harsh chemical there for panning the gold. I felt very upset and I queried them. They were pissed off and started to argue that there were some other people doing the same thing downstream, why not question them first? I told them that they were mining in an area under my jurisdiction, therefore; I had the right to query them. I asked them whether they knew that here is the closed mountain zone, and no mining is allowed. They said they knew that. I warned them and told them not to bring further damage to the vegetation nearby.

The direct confrontation between the locals and the rangers of the Natural Forest Protection Station not only resulted in resistance and hostility from locals, but also physical conflicts. The same ranger remarked:

That's the only thing we could do at that time. We only had two people, but there were several of them. It is unwise to try to stop their mining operation with two people. If we really got them pissed off, we would get beaten up. There has been some fierce fighting between local villagers and rangers in this area.

According to the rangers they were not given enough staff members and rights to fulfill the mission written on their job descriptions. The rangers definitely have affected local use of natural resources. A staff member of the Reserve gave his viewpoint:

The rangers working in the stations might warn local people not to cut too much firewood or not to cut firewood in a wasteful manner. I think from this perspective it might affect the locals.

A local resident who used to be a subcontractor for the state-owned logging company commented:

No one is there to guard the closed mountain area. The forestry bureau intentionally destroyed the logging roads in the mountains. Hunting and firewood cutting are not allowed in the closed mountains because sometimes they are guarded by rangers.

Owing to lack of enforcement before the logging ban, the timber resources in the mountains around Yaze village were common property with open access to both legal and illegal loggers despite the fact that they were held under *de jure* state-ownership. The logging ban initiated by the central government ended the commercial logging of the state-owned logging companies and is attempting to keep remaining timber from being extracted by potential local users for commercial purposes. The fighting is not over, however, because locals still have the same physical access to the forest and the area needing protection is huge compared with the number of rangers available. In addition, the cost for controlling poaching and commercial logging is high because the locus of the control is far from the forest (more than two hours' drive). Enforcement of the ban on commercial logging is made possible through the costly measures. However, preventing excessive extraction of timber for household consumption purposes, herbal medicines, and so forth is not affordable. Those unprotected resources are common property with open access to both the locals and outside freeriders. The ambiguity between the uses of timber for commercial or household consumption purposes increases the difficulty involved in the implementation of the logging ban.

State-owned logging companies considered forests as factory farms for manufacturing logs for pulp and lumbers (State Forestry Administration 2000). Owing to various managerial as well as tree and land tenure issues, over-harvesting of forest resources led to serious degradation and loss of forestland (Ross 1988). The Natural Forest Protection Project is an effort to renew forest resources and coordinate development among economy, resources, environment and population in the mountain and forested regions of China (Zhang 1999). Because Yaze village is heavily dependent on local natural resources, the community would not be diverted from commercial logging without being provided with alternative income sources. Local use of natural resources would be expanded if access to alternative income sources were denied. The larger social

and economic regime, in which local users are embedded, affects the way the local users act. By providing unambiguous information about natural resources and avenue that local users could be engaged in, the large social and political regime could allow local users to resolve conflicts on their own. However, if the regime entirely ignores local resource users' need, the costs of monitoring and sanctioning those who do not conform to the rules devised by the remote authority would be very high (Ostrom 2001).

5.4.3 Grain-for-Green project

Yaze households have more arable land than most other rural households in Sichuan Province. On average, each household has almost nine mu (about 0.6 hectares) farmland in active use and eleven mu (about 0.7 hectares) not actively used farmland, which is called wasteland by the locals (Data provided by ICDP, 2001). According to the village official, rice cannot be produced in Baima Township, because the elevation is too high (Personal communication, Yin Zhu, Yaze Village Party Secretary, 2002). Only a limited variety of crops such as oats and barley can be produced in Baima. In general, the productivity of Baima farmland is lower than the grain subsidy--100 kg rice and 50 kg wheat per mu converted farmland, offered through the grain-for-green project. Among all the villagers that I interviewed there was no resistance to the policy. The village head remarked:

Before the implementation of the grain-for-green project, I had to purchase 70% of my family's staple food, and even had to purchase corn to feed my pigs. Now I have enough rice for my family. But still I need to get some rice for the tourists.

When describing the impact of the grain-for-green project on the Yaze village, the chief of Wanglang Reserve commented:

It's definitely a good thing for the village. After implementing the grain-for-green project, the country gives each household 100 kilogram rice for each mu it converts into forest or grassland. After converting, the villagers still have some farmland where they could plant hemp and other stuff, which could do better here. But my

concern is that more villagers might come to the reserve to collect herbs and salamanders for they were free from most of their farm work.

The locals provided varying explanations, regarding the purpose of the policy.

Miss. Huang speculated:

We don't know why the government asked us to convert farmland into forestland. But I suspect that the government did this for tourism purposes. As soon as trees grew up, the area would look prettier. Then more tourists would be attracted.

Mr. Jiang, the gold miner ventured his guess:

I think the government paying us to convert our land had something to do with the dam under construction downstream [a reservoir of a hydroelectric power station was under construction in Baima]. As far as I know, the trees will have some effect on water.

All households in Yaze village were engaged in the project in 2001.

Villagers planted the seedlings in the spring of 2002 when it was easier to plow the soil (Personal communication, Yang Jin, Villager, 2002). Plots were usually located along the main road. I visited several converted family plots in the village. Some families built fences around the converted plots to prevent yak and goat browsing. Two kinds of seedlings (*Larix spp.* and *Picea asperara*) were planted (Personal communication, Cha Menzao, villager, 2002). The local forestry bureau provided the seedlings. Villagers voluntarily built fences because the seedling survival rate was directly related to compensation. Although locals told me that they had cut back bushes and grasses several times, the grasses quickly came back. Most of the seedlings in those plots were crowded and overtopped by tall herbaceous plants. At the time I visited Yaze village (August 2002), most seedlings were not more than fifty centimeters in height. Villagers told me that the main cause for seedling fatality was desiccation. No herbicide or fertilizer treatments were implemented on newly planted plots (Personal communication, Cha Menzao, villager, 2002). At high elevations, seedlings in the open are often damaged by intense heat during the day, heavy frost over night, and direct evaporation from the uppermost soil strata (Smith, Larson et al. 1997). The scorching sun in the mid-summer day poses a threat to seedling survival. The freezing temperatures and heavy snow in winter in

Yaze village can potentially wipe out all the seedlings if their succulent bark has not hardened before the first frost in late fall. Villagers complained that the government did not offer enough technical support. Ms. Huang said:

We planted the seedlings by ourselves. Nobody told us how to do it. They [foresters of the township government] just told us to cut back the grass and don't let the seedlings get browsed by goats. Nobody came to teach us how to prevent the seedlings from drying out. I guess I have to get some seedlings from the market and replant them after they all died, just as my neighbors did.

Seedlings need a long time to reach the point of merchantable timber. The impact of the grain-for-green project in Yaze is still too early to assess. Ms. Zhang, a middle-aged local resident, did not jump to a quick conclusion. She remarked:

We just started implementing it [the grain-for-green project] this year, I can't tell the effect yet.

The grain compensation for the converted forestland will be offered for five years. Mr. Pan, a local hotel owner said:

The compensation period should be definitely longer than five years. After five years, if the seedlings were lucky enough to survive, they probably would be as tall as me. At that time we cannot plant any crop under the trees and the trees will not be ready to bring any cash. The government needs to find a solution for us.

His opinion was echoed among other villagers. Ms. Song commented:

Lots of villagers are trying to find other income sources now. The grain subsidy guaranteed that they would have at least enough food for themselves during the time they were seeking other income sources. However, not many people will be able to make it after five years. Then it is the government's job to help us.

The sustainability of the Grain-for-Green Project will be seriously challenged after the compensation period ends. The sustainability of the Grain-for-Green project is dependent on the availability of the subsidy instead of the unforeseeable merchantability of the future timber harvest. When discussing the Grain-for-Green project, villagers seldom considered seedlings with less than one meter in height to have any economic value. Therefore, currently villagers did not pay enough attention to the tree tenure. Mr. Jiang remarked scornfully:

I cannot see that I will make any money out of those seedlings. They

are not good even for firewood. We got the seedlings from county forestry bureau, I guess the government owns the seedlings.

Ms. Zhang commented:

I know that trees will belong to their growers. Now they [the seedlings] are tiny. I cannot imagine how long it will take for them to grow into big trees. I cannot possibly depend on them for any income.

With the growth of seedlings, their value will increase. Any ambiguity regarding tree tenure today will impede the sustainability of the Grain-for-Green policy in the long run.

6 CONCLUSION

The implementation of conservation policies brings to the fore the complexity that lays in land tenure, ideology, and national social and political trends. Opportunities and challenges are embedded in these interrelated issues. The theoretical sampling process of the grounded theory approach gave the researcher the needed flexibility to gather information and different perspectives. The review process of the grounded theory approach provided opportunities for triangulation, consequently, enhanced the credibility of the research. The main findings of our research include: 1) *de jure* and *de facto* land tenure systems coexist, 2) the loss of religion has contributed to deforestation, 3) national social and political trends affect local land tenure systems, and 4) lack of enforcement or selective enforcement of rules hampers conservation.

6.1 Coexistence of *de jure* and *de facto* land tenure

Our findings show that in designing conservation projects, the local political leadership did not fully recognize the *de facto* land tenure objectives of the Yaze villagers. Consequently, agencies involved in implementation were embroiled in frequent conflicts with local inhabitants. After the establishment of communist China, in Baima, the *de jure* land tenure system that nationalized forestland was imposed over the traditional *de facto* land tenure system. The *de jure* land tenure system justified timber extraction by a series of state-owned logging companies in Baima. Because state ownership was not adequately enforced, the two land tenure systems coexisted. By the late 1990s, the objective of the *de jure* land tenure system shifted from timber extraction to ecological restoration and conservation. The *de facto* land tenure system survived wherever the national government could not afford effective monitoring and control. In addition, the *de facto* land tenure system is evolving along with growing and shifting market demands. Our findings echo the work done by Schlager and Ostrom (1992), which suggests the possibility of overlap between *de facto* and *de*

jure property rights. The disparate interpretations of the same rules by villagers and local government officials explain the resource use behavior of the villagers. Wherever conservation rules are not enforced, it is the villagers who decide how to use the resources.

The *de jure* land tenure system did not give enough clarification of the locals' utilization rights. This finding supports the work done by Lee (1999), which suggests decision-makers often ignore the economic impacts to local inhabitants. Local utilization rights for both non-timber forest products and home use timber need further clarification. Securing and legitimizing locals' utilization rights for certain forest products could offer an avenue to change the locals from illegal free-riders in the *de jure* land tenure system to good stewards in a well-defined and secured *de facto* land tenure system.

Most importantly, giving locals some recognized utilization rights to natural resources could encourage local organizations to regulate themselves. The primary precondition for conservation is secured land tenure. Only secured land tenure can give the villagers the incentive to conserve resources. The coexistence of *de jure* and *de facto* land tenure systems suggests that government agencies and locals need to converge on sustainable use of local natural resources. It is important to create desirable conditions for locals to engage in sustainable use of natural resources. Threats from government agencies and nearby communities and dynamic socio-political conditions may overpower locally based rules (Gibson 2001). Managing forest resources at the local level requires a willingness by locals to take on the responsibility of contending with competing stakeholders. The locals need to establish an institutional solution. The existing legal and policy provisions concerning state-owned forest area need to recognize the legality of the local users' groups and provide additional protection for sustained local resource use. Despite widespread improvement in communication in China, the local peoples' lives have not changed much; most villagers do not have much contact or interaction with the outside world. When reacting to the implementation of new conservation policies

and initiatives, villagers tend to relate them to their previous experience of government policies. First, villagers doubt the stability of the policy. Second, members of poor families are tempted by economic profits to see how far they can go before the policy is enforced and they get punished. Third, when locals feel that their rights are being eroded by governmental agencies, they fail to seek justice. To solve these existing problems, governmental agencies should stabilize enforcement mechanisms and expand technical support for the existing conservation policies. In addition, poverty alleviation efforts need to be integrated into the whole process to protect the poor. Instead of giving the locals direct economic support, government as well as non-government organizations need to put emphasis on building the capacity of the poor. In building local capacity, university extension programs could serve as a vehicle. University extension programs could be one of the most economical and effective ways to enlarge villagers' scope, develop their skills that could help them find alternative income sources, and empower them in seeking justice when their rights are infringed.

Further research could collect additional data on the *de facto* land tenure system, including how the locals organize their *de facto* land tenure practices and deal with internal conflicts concerning *de facto* land tenure practices. The impact of local tourism development is another research topic that is worth delving into. Cost and benefit analysis could be done on local tourism development to evaluate whether tourism is economically as well ecologically viable for villagers.

6.2 Loss of religion contributed to deforestation

Our research results suggest the diminishing religious belief in Yaze village contributed to the villagers' participation in deforesting local holy mountains. Traditionally, religious sanctions imparted to trees on holy mountains a status superior to that of objects of consumption. The ideology campaigns carried out by the Chinese government in the late 1950s severed the continuation of the religious ideology between older and younger generations. Within Yaze village, there are

now those who are still faithful to traditional religious beliefs, and take it as their code of conduct, and those who are disillusioned with religion. The first group is usually comprised of older people who have fewer social and economic assets. The second group consists younger people (in their 30s), who have benefited from timber extraction. The ideology gap between younger and older generations is enlarged by the difference in their social and economic status within their communities. The secularized "commodity" view of natural resources dominates among the younger generation. Many young people have immigrated to urban centers, but continue to use resources in the Baima region. Presently, the emigrants are usually absentee resource users, who profit from exploitation of local natural resources. The synergic effects of loss of faith in religion, commodification of natural resources and increasing demand even as youth migrate out of the village accelerated deforestation.

Villagers suffer from the degraded environmental condition and realize the grim effect of deforestation due to the logging done by the state-owned logging companies. The sweeping political campaigns changed the villagers' relationship to the environment. Villagers are changed from guardians of the holy mountains to accomplices who abetted deforesting holy mountains. This finding is in accordance that of Jodha (2000) and Jenkins (2002), which suggests the loss of traditional social sanctions results in deforestation. The belief of oneness of nature and people embodied in traditional religion was disrupted among younger generations, but the condition of local forests is still closely linked to locals' living conditions as well as economic well-being. Our research finding suggests the disillusion of holy mountains is irreversible among the younger generation. Nevertheless, given the increased exposure to science and technology and the outside world, the younger generation will find science more acceptable than their traditional religious tenet. More educational opportunities are needed to help the locals make the connections between their natural environment and their own behavior, their long-term economic well-being and the sustainable use of natural resources.

Further study designed to explore the attitudes of the younger generation on local use of natural resources would provide insights on the potential leverage points that would facilitate conserving remaining forest resources.

6.3 National social and political trends

National political and social trends influence the objectives of both the *de jure* and *de facto* land tenure systems. Political turmoil and ideological campaigns during the late 1950s to the middle-1970s fundamentally changed the relationship between the locals and their environment. The economic reforms of recent decades reintroduced economic incentives to stimulate growth. The *de jure* land tenure system contained various management loopholes, which resulted in unsustainable extraction of timber by state-owned logging companies. The uncertainty surrounding local use of resources led to shortsighted unsustainable local use of timber as well as non-timber forest products.

The social and political dynamics disrupted the traditional methods of conservation that were embedded in the *de facto* land tenure system, and increased the local demand for natural resources. The changing priorities of Chinese society shifted the objectives of the *de jure* land tenure from narrow, short-term timber extraction to broader, long-term ecological functions of forests. The radical social and political changes of the Chinese society led to inconsistency in the *de jure* land tenure system. This finding echoes the work of Jodha (2000), which suggests that state intervention has, in many cases, reduced the previous *de facto* tenure systems that used to conserve the forest. Peoples' confidence in stable national social and political conditions takes time to grow. Volatile macro-social and political conditions discourage long-term commitment to sustainable forest management (Deacon 1994). Therefore, stable social and political conditions are crucial for conserving forest resources. Unlike the *de jure* land tenure system, the *de facto* land tenure system with its distinct site-specific characteristic is less likely to change by factors, such as political rotation. Therefore, the *de facto* land tenure system has more potential to be consistent.

Consistency in conservation and relevant land tenure policies could forge peoples' confidence in the future value of their natural resources; and consequently contribute to sustainable use of the natural resources. The consistency and site-specific characteristics of the *de facto* land tenure system can serve the purpose of conservation only if its legitimacy is recognized in designing conservation and relevant land tenure policies. Our findings suggest strengthening local control is a way to overcome top-down sweeping mandates and fit conservation into the context of communities.

Further study could monitor the sustainability of the current conservation initiatives both locally and nationally, and evaluate the consequences. Lack of enforcement/selective enforcement of rules

6.4 Lack of enforcement/selective enforcement of rules

The ban on commercial logging is well enforced; however, lack of enforcement or selective enforcement of other rules concerning mountain closures hampers conservation. The unenforceable rules introduce uncertainties among users and unsustainable use ensues, such as unsustainable herbal medicine harvesting.

Our research suggests that although the reserve increased its enforcement of rules, natural resources inside the reserve face increasing encroachment from nearby communities. With the evolution of the objectives of the *de facto* land tenure system and the growing external market for wildlife meat, herbal medicine, and timber, villagers have attempted to expand their *de facto* land tenure practices inside the reserve. The reserve responded by increasing its monitoring frequency and intensity and diverting local resource demands to resources outside the reserve through community projects.

The ban on commercial logging stopped large-scale logging by the state-owned enterprises, removed the immediate threat to the local forests and conserved the fragmented panda habitat. Furthermore, illegal commercial logging incidents and wildlife-poaching incidents have been addressed by a cooperative

effort among different law enforcement agencies. Local governments enacted some other conservation measures, such as decommissioning roads and bridges.

Establishing mountain closures for tree regeneration is another part of the Natural Forest Protection Project. Our findings suggest the establishment of mountain closures in Yaze village has not achieved its ecological goal, because it cannot accommodate the two highly competing goals: tree regeneration and livestock grazing. Local governmental agencies act as buffers between the central government that initiates the policies and the local people. Local governmental agencies tailor the mountain closure policy so that it is enforceable given their capacity and funding. For instance, in the region surrounding Yaze village, agencies implementing the Natural Forest Protection Project enforced the ban on commercial logging, but relinquished attempts to prevent grazing and gathering activities in the closed mountains. The selective enforcement creates the *de facto* open access for gathering activities in the closed mountains. The unspoken agreement for both the rangers and locals is that the *de facto* land tenure practices of grazing and herbal medicine collection overrule the *de jure* regulations that prohibit both. In contrast, commercial logging and mining are not as acceptable as grazing. Therefore, villagers seem to have leeway for grazing and gathering activities in the closed mountains but not for commercial logging and mining. However, some locals with social and economic assets can still get around most rules and mine gold.

From the locals' perspective, the logging ban has removed their primary livelihood. The booming tourism trade has offered some alternatives, but this in turn has increased household consumption of natural resources. If access to the mountains were restricted without any compensation, local well-being would be greatly impeded. Local governmental agencies attempt to soften the rigidity of the central government's policies so that they can respond to local needs. However, the establishment of the monuments claiming that mountains are closed and the presence of the rangers have increased local uncertainty about the future of their

natural resource utilization rights. Villagers have experienced frequent changes in land tenure after the establishment of communist China. They have developed a "use-it-or-lose-it" attitude towards natural resources. The ambiguously worded close mountain policy creates uncertainties among local users and contributes to unsustainable use of natural resources.

Currently, local incentives for planting tree seedlings in low-productivity farmland is driven by the temporary grain subsidy. Villagers fenced the plots where they planted tree seedlings; some even replanted seedlings at their own expense because the subsidy is related to seedling survival rate. Locals are better off by participating in the project, because the grain subsidy is worth more than the productivity of the farmland. However, locals do not give much thought to the period after the five-year subsidy runs out. The future of the seedlings is not promising after this time period. Our finding is in accordance with the work done by China's Forests and Grassland Taskforce (2001) which cautions that the most crucial challenge of the Grain-for-Green project is its sustainability after the subsidy has ended (Rozelle, Huang et al. 2002). The research findings suggest that the capacity of government control is limited by the size of the forest and the distance from the forest, which proves Menzies' (1994) theory that the degree of control is dependent on the nature and size of the resource.

Although the ban on commercial logging has brought temporary difficulties to local communities, the remaining forest will serve as a tourist attraction. The ban on commercial logging and mining in the closed mountains should become a continuously enforced long-term strategy. Under the overarching Natural Forest Protection Project, more detailed locally-based regulations should be drafted. Instead of using ambiguous regulatory language to circumvent local demands, the legality of household consumption and of natural resources should be guaranteed. More locally-based enforcement measures need to be crafted, such as endowing local users' groups the legal right to harvest Non-Timber Forest Products (NTFPs)

to actively motivate villagers to guard the resource from excessive use and outside competing users.

Studies that compare local tree regeneration rates with the quantitative estimation on the amount of firewood and timber consumed by the villagers could provide some scientific ground for the government agency design of local timber and firewood quotas. Evaluation of grazed and un-grazed plots would help evaluate whether the establishment of mountain closure is achieving its ecological goal. It would be extremely relevant to have a follow-up study on local community well-being and the outcome of the grain-for-green project after the five year subsidy period runs out.

6.5 Summary

Instead of considering that *de facto* and *de jure* land tenures are competing systems, a clearly delineated and well-recognized *de facto* land tenure system might complement the *de jure* land tenure system. The forest in Baima region can be kept out of bounds by the ban on commercial logging or irresponsible sub-contractors can wipe it out in a rush, but the economic well-being of most villagers will remain bleak. The long-term economic well-being of the local villagers are woven into the *de jure* and *de facto* land tenure systems. Instilling certainty in both systems and setting up clearly-defined legal boundaries around both systems, could help reduce tenure insecurity and short-term resource exploitation. The idea of "father mother official" impedes the villagers from solving the crisis on their own by giving them an excuse to shift the responsibility of environmental conservation to the government. Stable and secure land tenure is key to villagers becoming involved in sustainable use of natural resources. The idea of home is the countermeasure to engage villagers in conservation.

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